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## ERP AND ITS APPLICATION IN MAINLAND CHINA

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### ABSTRACT

Enterprise Resource Planning (ERP) is a good technology for planning and controlling of a manufacturing company. Because of the "Manufacturing Fundamental Equation", ERP is applicable widely. But, the data foundations of the companies must be accurate and complete for using ERP, and different methods of thinking in management must be needed. For years, the application status of ERP is not as good as we expected in Mainland China. But we believe that the situation will be improved if leaders and staffs of manufacturing companies have the common opinion of holding on to the implementation and application of ERP. ERP is continuously developing. Now, integrating ERP with other management theories and methods is the trend.

### INTRODUCTION TO ERP

In the past century, manufacturing industry made rapid progress in technical aspects owing to the development of mechanics, electrics and automation. But the progress of management has been much slower than that of technologies. Among all the management methods and technologies, ERP covers almost all of the function areas in a manufacturing company and has the best operability. Therefore, the implementation and application of ERP have become a popular topic that caught lots of attentions in Mainland China.

In about 1960, there occurred in the US a new method to plan and control inventory – computer aided Material Requirements Planning (MRP). The basic function of MRP is using Master Production Schedules (A: What are we going to make?), Bill of Materials (B: What does it take to make it?), Inventory Records (C: What do we have?) to get Material Requirement plan (D: What do we have to get?). What MRP simulates is "Manufacturing Fundamental Equation"[2][5], which can be expressed in a conceptual formula as:

$$A * B - C = D \quad (1)$$

MRP, in its early stage, is a computer aided management tool with inventory control in its core. MRP has extended itself to Manufacturing Resource Planning (MRPII). The theory of MRPII is the embodiment of the natural rules and requirements in the operation of manufacturing companies. Its functions include sales forecast, production plan, capacity requirement, inventory control, shopfloor control, product sales and all the financial transactions involved in the whole production and business process. So

it provides an effective plan and control tool and an intact knowledge system for manufacturing industry.

The concept of ERP was brought up by Gartner Group Corporation in US in 1990s. ERP developed the concept of MRPII in both connotation and extension, with MRPII still being its core.

### THE DATA FOUNDATIONS IN A MANUFACTURING COMPANY

ERP is a cornerstone of a manufacturing company. Planning, scheduling, and business control are important business requirements. ERP simplifies products and processes. Data foundations shrink to only the information required to support a more simplified manufacturing operation [1].

Regardless of the manufacturing environment, ERP system and the concept of continuous improvement require that a company's information be identified and maintained in support of the company's planning, scheduling, and reporting. In almost all companies today, that requires computer software and related data base files. This means that material need to be identified, product structure must be defined, the manufacturing operation must be described, and the resulting products and semifinished materials need to be depicted in drawings and specifications. The data files must be designed and organized to reflect the chosen manufacturing process. Data foundations are also influenced by the product being produced and by the way a company stage or positions products for its customers.

For a company data file to be effective, the resulting information base must satisfy all users. Because everyone uses the data foundations, those foundations must serve everyone's need.

The data foundations must be accurate and complete. Accuracy means that the data being maintained are correct. Completeness means that all required data are maintained. The garbage out of the company system is often the result of the garbage that is in the company data files. Getting the data right is one requirement, keeping the data right is another, and they are not always easy tasks.

A solid manufacturing data foundation must represent the manufacturing process, represent our strategies and plans for satisfying our customers and the products we sell, be understood by and satisfy all users, be complete and accurate, and be supported by good changing control practice.

## **TWO DIFFERENT METHODS OF THINKING IN MANUFACTURING MANAGEMENT**

The application of MRP started a new era for manufacturing management. It has changed the traditional method to think in a manufacturing company. So some new methods of thinking in manufacturing companies are needed.

Traditionally, manufacturing orders were placed and expedited in the manufacturing process; people just pay attention to the problems on the surface. Nevertheless, the new method of thinking emphasize on planning process, data accuracy, employees' education and training, and performance measurement.

Traditionally, in the sales and customer services process people promise the customer orders on the basis of intuitive feeling, then expedite the orders simply, and often have to make apologize to customers due to late delivery. All of these lead to complaint between the sales and manufacturing people. But, after using MRP, customer order commitment is reliable, sales and manufacturing people can understand each other deeply, customer demands for product and service become important driver, and forecast accuracy was concerned.

Traditionally, the focus in purchasing is to avoid material shortage. So, it is not uncommon for companies to keep too much inventory and to expedite the purchase orders. Another weakness is that companies are unwilling to establish long-term relationship with vendors, but to focus on under-the-counter deal. Now, companies consider purchasing right materials with right quantities in the right time. Accordingly, they attach importance to the long-term relationship and win-win cooperation with vendors.

In the past, the engineering and technique department does not consider the importance of providing and maintaining the accurate technique data for business operation, and communicating with other departments, such as, manufacturing, purchasing, especially, sales department. But, now the engineering and technique department focus on customer demand, and think highly of manufacturing process and communication with other departments.

The traditional accounting methods mainly emphasize on financial measurement of events results. Based on the new way of thinking, people pay more attention to the process. Companies make budget plan in advance, control the process in the course of the events, and analyze the results after the events. The accounting method used is management accounting.

## **THE APPLICATION STATUS OF ERP IN MAINLAND CHINA AND THE CONCLUSION CAN BE DRAWN FROM THE SITUATION**

Since we began to use MRPII in Mainland China in 1980s, thousands of manufacturing companies have used ERP systems. But most of enterprises still don't have enough understanding of the importance and urgency of ERP as a tool to face competitions. As a result, if the enterprises were in good status, it would not think of ERP as a planning and controlling tool; if the enterprises were in bad status, it would not have time to think of it.

The application status of ERP is not as good as we expected. If we examine them according to Oliver Wight

ABCD Checklist [3], very few of them can be classified as A, not many are Class B, the majority would be Class C and even a few Ds. So we see that ERP has not yet been widely known and used and for those that do use the status is far from what people expected. This is a severe fact.

A more serious problem is what kind of conclusions can we make in the face of the austere situation.

As regards this, there are two facts we need to pay attention to: One is that the Manufacturing Fundamental Equation is a ubiquity (just like the gravity); the other is that it is a necessity to use computer technology to improve enterprise management level. So what is the combination of Manufacturing Fundamental Equation and computer technology? It is MRP! Whether it is called so.

Then what prevents the companies from getting full benefit from ERP or even leads to a failure? We found that all of the causes can be summarized as one: human factor. The cause behind that is lack of deep knowledge and understanding of the theory, process logic, and implementation and operating of ERP. A "Proven path" has already formed based on the experience of implementing MRP, MRPII, and ERP systems in thousands of enterprises both inside and outside China during last 40 years. Actually, methods to avoid problems in all the above causes can be found in the discussion of "Proven path"[4]. Therefore we got a conclusion: The management level of enterprise will be improved if the leaders and staffs have the common opinion of holding on to the implementation and application of ERP.

## **INTEGRATION OF MANAGEMENT THEORIES**

The fact that ERP is widely applicable does not mean that there are no problems with ERP. In fact, ERP is continuously changing and developing. We believe that integrating other management theory and methods can solve the problems with ERP system. In fact, it is now the trend to combine all kind of management theories.

In different enterprises, we have been asked same question again and again: There are too many acronym we have heard: MRP, MRPII, ERP, TQM, JIT, BPR, ISO9000, CIMS, SCM ... Then, which is the best on earth? Which shall we do? Our answer is: all are good and should be done. But we have to do them based on reality and step by step. This problem is actually a problem of the merge of all kinds of management theories and their integration in actual application. The above-mentioned theories and many other theories that we have not mentioned arose from different aspects of reality. Although they might come from different fields and emphasize on different points, they are not contradictory to each other and can be used together.

There is no limit for the improvement of enterprise management. Even for a world-class enterprise, there are also points to improve in its management. The combination of all management theories is helpful for enterprises to consistently improve their management level. China will be member of WTO soon. After that, the competition will be even more drastic. Nowadays, supply chains and e-commerce have become new popular topics in enterprise operation and management. But this does not mean that ERP is no longer important. On the contrary, it indicates the urgency of implementing ERP. In fact, how

can an enterprise do supply chain management without ERP? And how can it do e-commerce with other enterprises with ERP? Under this new situation of competition, the state owned enterprises should perform ERP implementation better and take part in competition under new situation.

**SOME CASES OF ERP IMPLEMENTATION AND APPLICATION IN MAINLAND CHINA (omitted)**

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