

Chapter I

Introduction



1.1 Thesis Background

This thesis proposal proposes an alternative material management system that uses various methodologies to manage the large amount of information involved in the material requirement estimation process. In order to fulfill the goal, this thesis proposal elaborately identifies the problem, cause of the problem, purpose and objectives, scope and assumptions, methodology, related researches, and the expected benefits. This also requires the concentration on how company improves their competitiveness, but the most important winning capability under high global competition. How to develop an advanced model of material supply to improve competitively is becoming a very important topic to all company. Company moves forward to worldwide operation following new challenges from globalization. In the future, the competition will not only exist in price, quality, efficiency, and customer service, but the ability of stock control. Successful supply chain management and strategy enable company to meet customer demand with lower cost and more channels. Beside operational service to handle global business, internal processes such as production management, material management and physical distribution are complicated and correspondent. (Yeh, 2004)

1.2 Statement of Problems

On-time delivery service is of critical importance in today's Hard Disk Drive (HDD) business. Therefore, HDD manufacturer who desires to be competitive among competitors is required to concentrate on the agility of delivery. Agility of delivery means the company delivers the exact quantity of products to customer within the due date. However, on time delivery performance and service level of the company are considered to be one of the major problems. To solve this on time delivery and service level performance means company is required to focus on expedient Supply Chain Management (SCM). In order to solve the problem effectively, we need to elaborately define the cause of the problem. The strategic importance of on time delivery, short

delivery times, service levels and production flexibility is increasing with the high fluctuation demand, complicated supply chain management, complexity of process flow, and short product life cycles of end products.

Material requirement planning method currently exercised in the company is on SAP whereas manufacturing process is considerably complex and requires long manufacturing lead-time. The current material requirement planning process used in company heavily relies on experienced system performance, while SAP is difficult to customized system. Dramatically demand change directly causes the impact on lumpy demand of part supply. Inventory level, inventory turnover, and service levels (part supply shortage) are affiliated to the company's revenue and production performance. Dynamic demand change cannot be undertaken by using current SAP system owing to the system runtime, MPS modification, configuration maintenance, parameters adjustment, and sophisticated logic that can address the most complicated interdependencies. Existing material requirement planning tool is considered a complicated and sophisticated system.

Additionally, case studied company has planned to expand the business by establishing Head Stack Assembly (HSA) production plant. To premeditate the effective supply chain process, MRP has to be planned and established in advance. The accuracy and integrity of MRP parameters are also important to originate the operative MRP. One issue of MRP in case studied company is that SAP can only assign single method for all part numbers, consequently, some MRP outputs are inappropriate with the real situation. Therefore, the appropriate MRP method for different type of part supply should be considered in order to solve the existing issue. The disadvantages of having single method for all part supply leads to production inflexibility, poor execution and excessive work in process inventory. Also, production resource utilization of case studied company is another issue. MRP sequence is considerably high, since demand is changed frequently. With existing MRP system, planner is required to make several adjustments to the MRP output in order to correspond with manufacturing situation and supplier's agreement.

The MRP system was designed as an inventory control system for manufacturing industries. Its principal goal is to reduce stock levels with consequent savings in capital, resources, and space (Frenk and Kleijn, 1998). This improvement is reflected in the production process creating more reliable and faster delivery times, improving the use of facility space as materials are always available, and reducing the time to estimate and place material orders (Waters, 1992). The MRP systems determine all items that need to be purchased and completed to support the master production schedule. The most common MRP systems are designed to use backward scheduling as the primary tool. The master schedule date becomes the end point and then all elements are offset backward in time (Ptak, 1997). The result of the MRP application is a schedule of order strategies. It answers the question “when” the order needs to be placed and how much is needed. By using MRP, the companies can obtain dramatic decrease in inventory, improve on-time delivery performance, improve service levels and improve profitability (Ptak, 1997). Although MRP shows many advantages for manufacturing companies, it also presents some disadvantages. It is a very complex system that needs to manage great amounts of information; therefore this system requires the help of computer software (Martin, 1995). Material management system is also a tool to develop and support the MRP. To obtain the effectiveness and operative material management system, it requires a systematic approach to investigate the advantages and disadvantages. Based on the analysis and evaluation, it proposes an improved inventory control and material management policy to reduce inventory level and increase on-time delivery performance and service levels. The proposed policy integrates several systems including procurement management, material management, production control, inventory control, quality control, finance management, and project management. This research also suggests data transparency and consistency to facilitate a more effective and efficient planning and integration of materials among different functional departments. A better data base management system is designed accordingly. (Chun-Hsien Li, 2002) To design an efficient and effective material supply chain management system for industry, it is necessary to accelerate the flow of information and products across the supply chain. To achieve this goal, the system needs three ingredients: generators of quick information flow, generators of quick material flow, and facilitators of both quick information flow and material flow. The research proposes a material requirement planning (MRP) system

that uses a database approach to manage the large amount of information involved in the material requirement estimation process. The Database has been created using information provided by a manufactured housing facility to demonstrate the benefits that the application of these systems can bring to the MH industry. The MRP database will be supported by a visual basic interface to demonstrate its functionality. (Edgar, 2003)

1.3 Rationale of Study

Presently, the demand of hard disk drive has fluctuated and agile response from the case studied company is substantially required to cope with this dynamic change. The case studied company apparently cannot perform the accurate demand forecasting in compliance with customer requirements. As a result, the case studied company tends to have a problem in various ways for instance:

1. Part supply shortage: With the current market situation and demand fluctuation, case studied company failed to respond to change of demand/order since some part supply inventory is insufficient comparing with the arising of the demand. One of the causes of the problem is the method of MRP since the case studied company is using the same MRP method with all the items.
2. High level of inventory: Current MRP of company handles all items with the same methodology. Even though, the nature of each component is different but the case studied company is using the same method for MRP. The result of single method MRP directly effect on the material inventory.
3. Competitive situation: The case studied company has decided to separate HSA manufacturing from HDD manufacturing. The objective of the splitting is to create the competitive advantage by having HSA manufacturing plant as a supplier of HDD manufacturing. In order to achieve the objective, not only the HDD manufacturing company is required to have effective planning and scheduling system but also HSA manufacturing company. One of the most essential systems to have is HSA Material Requirement Planning.

4. Customer Satisfaction: Current issue of case studied company is the customer satisfaction. To meet customer requirement and satisfaction, part supply and capacity have to be prepared and arranged in advance.
5. Plant efficiency: From the statistic of current case studied company, it shows that the result of plant efficiency is still not so effective. In order to achieve the plant efficiency target, case studied company is required to agilely react to the fluctuation of demand. To react with the fluctuation of the demand, machine, manpower and especially part supply have to be available.
6. Inventory control including inventory turnover: inventory is one factor to be considered since inventory level directly effect to company financial report. To effectively control the inventory, company is required to have an effective MRP.

1.4 Purpose and Objectives of Study

The purpose of the study is to develop a material management system for a hard disk drive manufacturer with the following objectives:

1. To improve service level
2. To improve production resource utilization
3. To improve on time delivery

1.5 Scope and Assumption of Study

1. The system to be developed focus on material planning and inventory control in the production of HSA laptop.
2. The material management systems consist of work procedure and information system that specify how to carry out material planning and inventory control. Work procedure will identify the detail of each process in material management systems.
3. The existing information and data from case studied company's existed systems will be used for this thesis. The existed systems and data are BOM,

Inventory status, price, demand, supplier information, transportation, supplier and production lead-time, yield, and scrap quantity, etc.

1.6 Methodology

The methodology of the thesis is to establish material management system for supply chain improvement of case studied company. The methodology process involves 7 steps:

1. Study existing material requirement planning procedure, material management system, and process flow for HSA production in order to determine the proficient system.
2. Collect required data and parameters of each item.
3. Analyze and define the appropriate material management method and technique for each item.
4. Establish material management system included work procedure and program.
5. Test the proposed material management system
6. Fine tune the proposed system

1.7 Expected Benefits

From the study, the suitable material management system for each type of materials will be established for the new HSA manufacturing plant. The expected benefits of customized order review methodology are as follow:

1. Improvement of material management system especially on order review methodology and material requirement planning work procedure.
2. Improvement of service level, less material shortage in production line.
3. Improvement of production resource utilization.
4. Improvement of System Performance Management, the system run time of material requirement planning is expected.
5. Improvement of on time delivery, 100% of on time delivery is expected.

6. Establish a material management system focusing on production planning and inventory control for new HSA manufacturing.