

# Information System Implementation in Supply Chain Management Initiative Case Study in XY Company

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## **Abstract**

*Supply Chain Management (SCM) has been recognized as foremost business strategy that can improve business process, save costs, enhance company's revenue. This strategy application spans all range of businesses from manufacturing to service company. In order to be successful, SCM requires full commitment from corporate executive, supported by thorough strategic and tactical planning. In this report, we audit current supply chain status of PT XY and aim to identify some processes where ineffective operations are being carried in its supply chain activities. The company currently struggles to hold their position in overseas market from vicious competitors from China and Vietnam. Therefore, XY wants to make better and more rapid supply chain decisions in response to volatile customers demand and increasing supply costs. Based on the findings of XY business situation, we recommend process improvements in supplier relationship, product development, transport management, procurement activity and customer relationship management, which will increase XY customer service level. We also propose supply chain information system (SCIS) implementation in production planning, inventory control and distribution which will improve XY supply chain processes, support critical strategy decision and give significant advantages over its competitors.*

**Keywords:** *Supply Chain Management, Information System*

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## **1. Introduction**

Supply Chain Management (SCM) in general terms can be defined as the network of facilities and distribution options available to perform functions such as material procurement its transformation into finished product and finally distribution of finished product to customers. Supply chain exists in both services and manufacturing organizations, though its complexity varies from industry to industry.

Traditionally, components of the supply chain were operating independently with no real communication or flow of information across them. But currently with the advancement in communication technology supply chain has become more efficient, accurate and streamlined. Greater customers demand and mounting competition can be named as the other factors pushing the industry towards higher level of efficiency. The traditional concept of individual company's improvement is revolutionized and now companies are working together to enhance the performance of whole supply chain. SCM is now about managing the flow of information, materials, services and money across chain with the aim to maximize its effectiveness.

The aim of this study is to learn about and analyse supply chain management (SCM) practice in XY Before we can provide solutions that would answer XY's problem, we need to be fully aware of XY's supply chain process. Therefore, we will audit XY's supply chain to find out the gaps and define a systematic project plan that addresses the issues.

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### Company's Background:

PT. XY is a medium sized woodworking/furniture manufacturer from Indonesia. XY has five production lines for wood preparation, component production, finishing, assembling and packaging. This company manufactures bedroom and baby crib set furniture and makes its products based on the customers order. The average production volume is 50 containers per month. XY products are mostly for export market and its primary buyers are big names in furniture and home appliances from United States and European countries.

Currently, XY is experiencing problem in responding to their customers demand and meeting the required delivery time. XY also have problems in their inventory management and in acquiring the necessary materials to meet their production schedules. Therefore, this company needs solutions that would assist it to increase the sales by quickly responding to customer demands, efficiently purchasing the required materials, reducing the delivery times and gaining a competitive advantage in final product price.

## 2. Methodology

One of the tools that provide analysis for describing supply chain system is Double-Bell Model. All the chain members required to create products from raw materials to the end customer will be recorded using this model (Sadler, 2006). We will try to capture the current flow of information and materials on each business unit and determine which activity will perform specific functions or add values to the end products.

We also interviewed the directors and the operation managers of XY to capture essential information about the current status of the company and their strategic plan in the future. First, we interviewed the person in charge of the inbound logistics activity, such as purchasing, production planning and inventory controlling. Then, we focused on the marketing and shipping department to have more insights to the outbound part of the supply chain.

To capture the customer opinion in regards of XY's products and services, we worked together with marketing department to determine customer's qualifying and order-winning criteria that will help XY gain more competitive advantages over their competitors. After we have all of the information about current XY's supply chain status and the order-winners, we will prepare some recommendations to resolve XY's problem based on literature review of SCM books, articles and journals.

### Scope of the Study

XY have broad ranges of furniture products, however in this study we will focus only on Baby Crib line as it contributes largest portions of XY's profit over the years. Table 1 below shows each production lines contribution to XY's revenue for the last 3 years. The Double Bell Model of XY's Supply Chain in Appendix 1, will further illustrate scope of this study.

**Table 1.** XY Product's Contribution to Revenue

XY's Products	Contribution to Total Revenue		
	2006	2007	2008
Bedroom Set	35 %	36 %	33 %
Baby Crib set	63 %	62 %	65 %
Shelves Door	2 %	2 %	2 %

### **3. Current Status Analysis of XY**

#### **3.1 Manufacturing plant**

Three of XY's Crib production lines, wood preparation, components-production, finishing, has machine-automated controlled and operated by the assigned operators. While, assembling and packaging processes are done manually.

#### **3.2 Market share**

Most of XY's Crib products are shipped to United States, while, exports to European market is not high because XY face strong competition from local and Chinese manufacturers.

#### **3.3 Information Technology (IT)**

XY has established basic IT services and applications for each department. Most of the instances are not centralized and sometimes manual checking and re-entry is still needed to transfer information between departments. XY has not implemented Enterprise Resource Planning (ERP) software and still uses spreadsheet applications to support their business activities. All of their accounting-finance related applications are built in-house or outsourced and used for administrative purpose only. XY already established a website, but they use it only for informative purpose. Middle management employees are given access to E-mail and web access but most of them have basic knowledge in computers. Below are the installed applications at XY:

- a. Finance and Accounting system using outsourced application.
- b. Payroll system using in-house application.
- c. Logistics system: Basic inventory monitoring using in-house application.
- d. Customer database & marketing database stored in MS Excel.
- e. Bill of Material database stored in MS Excel and MS Access.

#### **3.4 Production Planning**

Production Planning is determined by sales orders. Production planning and control (PPC) department will check the available capacity of each production line based on inputs from production supervisor or production manager as XY has not yet implemented ERP system. Then, PPC will release and print production orders and schedules that will be distributed to shop floor after PPC obtain the approval from the production manager.

#### **3.5 Material Requirement Planning (MRP) and Purchase Order**

Based on sales orders information, MRP calculation will be done using spreadsheet application. PPC department will compare the warehouse records and the calculation report, before submitting the purchase requirement to purchasing department which will then create the purchase order.

#### **3.6 Inbound Logistics**

XY purchasing processes are still done through fax transmission or phone call and XY is yet to implement an EDI system even though some of major timber and multiplex suppliers have enabled EDI to process their purchase orders. Supplier relationship management is also not evident, as XY still have not established any prior agreement with supplier that guarantee regular purchase nor quality delivery supplies. The existed purchasing contracts only specify the pricing of the ordered material; therefore XY can only record and maintain stability of the associated costs.

XY still practices a multi-sourcing strategy for its materials, even for their critical materials, such as timber and multiplex products, which are supplied by 5 to 10 possible

suppliers. XY purchase their materials in bulk orders to achieve economies of scale and get lowest price, especially for wood and timber materials in reference with ordered to fulfil the forecasted production requirements for the next 3 months. Depending on materials purchased and which suppliers were contacted, in average, XY will have their materials delivered within 1 week to 3 months. Currently, XY inventory levels are quite therefore incurring lot of inventory costs.

### 3.7 Outbound Logistic

XY sales activities are still based on orders received via fax and phone call. Sales department is starting to receive customers order through marketing's e-mail account, yet order confirmations are still done by telephone call. Every season, XY will release products catalogue to current customers and prospective customers. Using this catalogue, customers will choose from many varieties of XY's Baby Crib products and create their orders. However, customers often put different quantity for each Baby crib type under one customer order and require having it on one container and one time delivery.

XY sells directly to domestic furniture stores and ships their products to some exclusive distributors. XY also accept direct sales orders from large supermarket and discount superstore chain in United States. On average, retailers will have their orders fulfilled from distributors within 3 weeks time. While, depending on delivery location and available warehouse stock, XY's delivery time to their distributors is between 2 to 4 weeks. XY only handle order over \$5000, while purchase orders which is less than \$5000 will be forwarded to the distributors. Each distributor usually has 3 to 4 warehouses to stock supplies for 3 months. However, XY do not have accurate sale forecast because the distributors do not have the accurate information about retailer's sales moreover there are trust issues so retailers are reluctant to share the sales information. Consequently, XY have difficulties in predicting their customers demand.

### 3.8 Transportation System

Depending on the delivery destination, XY uses different third party logistic companies to ship and deliver their products. It has also hired the services of a particular company to process the shipping documents and examine the conformity of the delivery container. XY is aware of the fact that overseas customers consider the delivery process as XY's responsibility, even though companies involved in the process are actually independent from one another. Therefore, XY needs to improve the communication and understanding of the business requirements of each company to ensure quality and reliability of delivery.

XY have its own logistic to serve domestic market. Currently, XY have 4 smaller trucks which are also used to pick materials from domestic suppliers. However, XY have not implemented internal logistic scheduling system.

### 3.9 Order Winners

**Table 2.** Order Winners of Baby Crib Product Line – XY's Supply Chain

Competitive Factors	Baby Cribs
Delivery Lead time & Reliability	40
Production Flexibility	20
Cost	15
Information Availability	15
Quality	10
Total	100

The order-winners are derived from marketing department analysis of customer's perspective on XY's performance so far. From the customer's definition on Table 2 above, we interview one of XY's marketing representatives for further explanation.

**Reliability of delivery:** This is considered as the most important factor that can win more orders. It is customer's requirements to receive their orders in time. However data from marketing department shows that XY have severe records of late delivery. Almost 90 % customer complaints that received by marketing department are related with delivery date problems. Therefore, XY should prioritize this factor to win their customers back.

**Production flexibility:** Customers expect XY to release their newest design every season. Therefore, XY should improve their production flexibility to meet various customer demands.

**Cost:** Customers still perceive this as important factor in deciding which company they want to order from. XY realized that comparatively their product's price is higher than China.

**Information Availability:** Recently, XY receive requests from their customers to regularly inform the status of an order, delivery progress or difficulties in production schedule. Improvement in this factor could help the customers to schedule their activities and plan their next orders.

**Quality:** Customers perceive this as important factor to maintain their loyalty to continually buy XY's product. Currently, XY has implemented various quality management initiatives to achieve ISO qualification.

### 3.10 Analysis and Recommendation for XY

It is critical to understand the value adding activities in XY, before we can determine what, why and how to improve XY supply chain process. We illustrate XY's supply chain system on appendix 1. Based on the findings, we will eliminate redundant process, integrate process to increase the business responsiveness and utilize technology to automate some tedious processes.

As showed on appendix 1 XY have large supply chain. Therefore, we propose 3 year plan to integrate and improve the whole process. We decided that we put inbound logistics improvement in very first year rather than the outbound side because XY needs to insure the production and logistics capability to satisfy demands from the downstream supply chain. We also propose the implementation of Supply Chain Information System (SCIS) which include automated transactional system, such as inventory, purchasing request and order management, and the management tool for reporting. In final year, we plan to integrate the whole system to support the management in their decision analysis or strategic planning.

### 3.11 First Year Plan

#### 3.11.1 Supplier selection and agreement

Having stable and reliable suppliers base ensures the delivery of materials in proper quantities and timely manner, thus it will reduce the risk of disruptions in production schedules (Dobler and Burt, 1996). XY should start to sort their suppliers and choose only reliable suppliers which give guarantee delivery in time, with prearranged quality and quantity. XY can analyse their historical supply data that will allow XY to compare different offers, examine purchasing contracts, and evaluate the vendor performance. Using these data, XY will be able to arrange dedicated contracts with the selected suppliers to optimize their supply base.

Even though, reliable and dedicated supplier usually charges higher than market price, XY can justify the increasing cost as XY will experience higher inventory turnover and they may reduce their warehouse rent cost which usually use to stock bulky supplies of materials ordered from the old procurement procedure. Furthermore, once majority of inbound logistics is

handled by dedicated suppliers, XY will no longer require utilizing their trucks to pick material supplies and can fully operate the trucks to deliver their products to domestic customers.

### **3.11.2 Electronic procurement/purchasing system**

As stated by Poirier (2001), company needs to develop an integrated procurement system to enhance the communication with suppliers. Furthermore, this system will reduce the time of purchase order processing by giving an opportunity to the suppliers to involve in material sourcing project (Eng, 2004). Therefore, XY need to consider Electronic Data Interchange (EDI) system implementation as most big suppliers have installed EDI for business transactions. As the Internet connection is becoming cheaper than a dedicated EDI line, XY should choose to install the system over internet with VAN (Value Added Network). By using VAN, XY can transmit their transactions with less cost and can convert their proprietary business data to other format which will be understood by the supplier.

However, it should be noted that XY should not expect every suppliers to adopt EDI instantly. XY may utilize the company's website to share their inventory data and receive offers from different suppliers that already registered and allowed to access these information. For less sophisticated suppliers, XY can also implement fax processor and receiver that equipped with OCR (optical character reader). It is suggested that the suppliers will send their transaction data using predefined format for ease scanning. With these methods, XY, which usually transmits requisition, and communicates with the suppliers via traditional way, gets the opportunity to be more focus on doing suppliers selection and analytical activities.

### **3.11.3 Integrated inventory control system.**

XY have installed warehousing software to record and control their inventory status. However, manual data entry and record checking is still needed to produce logistics report, instead of processing the data in real-time as order information or supply receipt is entered into the system. In order to enhance XY's capability in Production and Inventory Management, we suggest an integrated Warehousing module to be installed alongside with Bar-coding system, both in finished product and raw material warehouses. Even though, the installation of new system will require quite an effort, in the long term XY will experience higher level of service to the internal and external customers as this integrated warehouse system will reduce mean order shipping time through improvement in accuracy to inventory stocking, receiving, picking and dispatching (Hill, 1996).

### **3.11.4 Product reengineering to support customer requirements**

Manufacturers should develop modular products as these will bring benefits such as easier product customization, economical component production, and production lead-time reduction (Bryant et al, 2004). XY should maximize their Research and Development (R&D) Department to reengineer their current and future products that able to support flexible production to anticipate many customer requirements that put various products into a single sales order. R&D can start to design the baby Crib lines based on these criteria:

- Standardize box or packaging dimension that can be easily stack or precisely fit into the container.
- Experiment on different materials to find standard components that can be procured easily and used for several different product types to reduced the inventory level.
- Design or Redesign more modular Baby crib products to support ease of customization and last minute assembly process.

### **3.12 Second Year Plan**

#### **3.12.1 Implementation of Master Scheduling module**

XY should utilize the Bill of Material database by implementing the Master Scheduling module which will help PPC department to control the manufacturing schedules. PPC department will take information from sales orders, marketing forecasting, or inventory status to generate production schedules and purchase requisition automatically to avoid material shortage, inefficient materials usage, expensive freight due date charges and last minute scheduling. PPC also can use the module to test the production schedule for different capacity availability based on the input from production department (Vollman et al, 2004). It should be noted that full control over production flows can not be fully be exploited until end-to-end time-ticket and work-in-progress information system has been implemented.

#### **3.12.2 Logistics company selection for cargo transport and warehousing**

To facilitate better products shipment, XY should begin to consider using reliable logistic company to transport products to the overseas customers. A long-term contract with few selected global logistic company will achieve economies of scales and offers cost advantages than hiring different shipping companies to deliver products to different countries (Dapiran, 2004 cited in Sadler, 2006). This initiative also will ease up the delivery scheduling burden of XY's distributors and can help them to focus on customers demand analytical roles. At this point, XY must integrate their end-products warehousing module to the logistic company information system, to increase the shipping process efficiency and achieve higher end-products inventory turnover rate.

#### **3.12.3 Integrated Electronic Ordering system with customers**

At the outbound side of supply chain, we suggest implementation of electronic ordering system based on EDI over Internet. Tan (2001) stated that information exchange with retailers facilitates improvement in logistics efficiency, reduces cycle time and increases customer service levels. XY will use this system to communicate with their distributors and manage the sales and distribution of large quantity delivery to the dealers and the retailers since the early stages. With the proper ordering system, XY can approach large chain of supermarkets, department stores or discount stores to gain access to their inventory system and exchange information. XY should offer better service level to those big retailers in order to obtain their trusts and have those submitting their sales records regularly. XY also should develop web-based ordering system in their homepage to facilitate any customer (including distributors) which has not implemented EDI system yet. Later on, XY can use this web-based interface to develop online shop that directly serves pre-registered end user/consumers. Again, for more minimalist approach XY can develop a backup order processing mechanism by using automated fax scanning (OCR) to exchange data with their customers.

Lastly, to support this initiative, Sales and Distribution module that linked to the third party logistic company should be implemented. Once XY have linked their Sales module with the Global Logistic Information system, XY and the customers can utilise the system to easily track their shipping status.

### **3.13 Third Year Plan**

At this final year, XY should have finished their in-house Supply chain Information system installation and shift their focus on the managerial decision analysis system application. We also suggest the development of business software application interfaces to capture all the information into a single instance that can be distributed across the required departments as XY

use different software packages to process the accounting, production and logistics activities. Appendix 2 shows the proposed computer network diagram for XY.

### **3.13.1 Automatic replenishment on customer's shelves**

Once the customer requirements from outbound side have been captured by the system, XY can propose an automatic replenishment of its product line on customer's warehouses. Since furniture appliances are not considered as fast-moving commodity products, XY can devise a weekly or forth-nightly stock update and offer direct replenishment once the pre-determined stock threshold level has been reached. Using this integrated system and based on consolidated data of small retailer's sales information from their distributor or individually drills down the aggregated sales record of large retailers, XY can produce and deliver the necessary requirements in time.

### **3.13.2 Production Control Implementation**

At this stage, PPC department should already familiarise with the master scheduling module. However, in order to achieve maximum benefits of this module, XY should implement Production or Shop Floor Control module that can quickly generate and dispatch production orders based on Master Production Schedule. PPC department will utilise this module to control the job of each work centre and monitor the completion status of each orders more easily. Additionally, based on the work centre capacity load information, PPC can schedule the production orders more accurately and ensure the production capacity availability for upcoming customer orders (Vollman et al, 2004). Nevertheless, PPC and Production department should aware that this implementation will need additional effort from each work centre operator to do some administrative job. Therefore, some preliminary human resources training and recruitments may be needed before XY can fully reap the benefits of this initiative.

### **3.13.3 E-commerce site deployment**

As the extension of Electronic ordering system, XY may improve their website to provide direct selling to the end user by developing Online Shop. This web-based ordering system will allow distributors, retailers or end users to place their orders directly to XY system by passing several sales channel structures. The website should also allow the customers to customize their orders according to their taste using a user-friendly interface. At this stage, XY will be prepared to accept more "colourful" customer orders as the impact of the earlier product re-engineering can be realized here.

## **4. Conclusion**

In the today's business world, business executives are striving hard to achieve a flawless supply chain. XY is a well established furniture manufacture and is looking forward to consolidate its business processes and moreover to achieve information flow among its business partners to better forecast and achieve customer demands. To achieve these goals it is essential for its management firstly to incorporate technology especially communication technology (EDI, Web access) into their business function. The next step is the re-engineering of business processes to attain a beneficial relationship with its business partners (suppliers, distributors and customers). Information flow among supply chain will help them to reduce inventory and improve product flow which ultimately helps to meet customers demand.



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Appendix 2  
Proposed Computer Network Diagram

