

Chapter 4

System Analysis of the case study

4.1 Overview

This chapter discusses about system analysis of the case study. Firstly, the chapter will show the business process of the case study to give an overview of how the company is doing business and what are involved in this sort of business.

Secondly, the chapter will illustrate the sales order processing system and the analysis of the system. The analysis of the sales order processing in the case study shows how the process flows and what is the involvement of each function in the flow. This also leads to more understanding of what types of information are involved in order to support the activities in each function of the sales order processing.

The analysis of the sales order processing system in the case study is done by gathering all the data and information from each department which involve in this system from the resources available in the company. Then rearrange the activities in order to get the overview picture of the sale order processing flow and examine what is the involvement.

4.2 Business Process in the case study

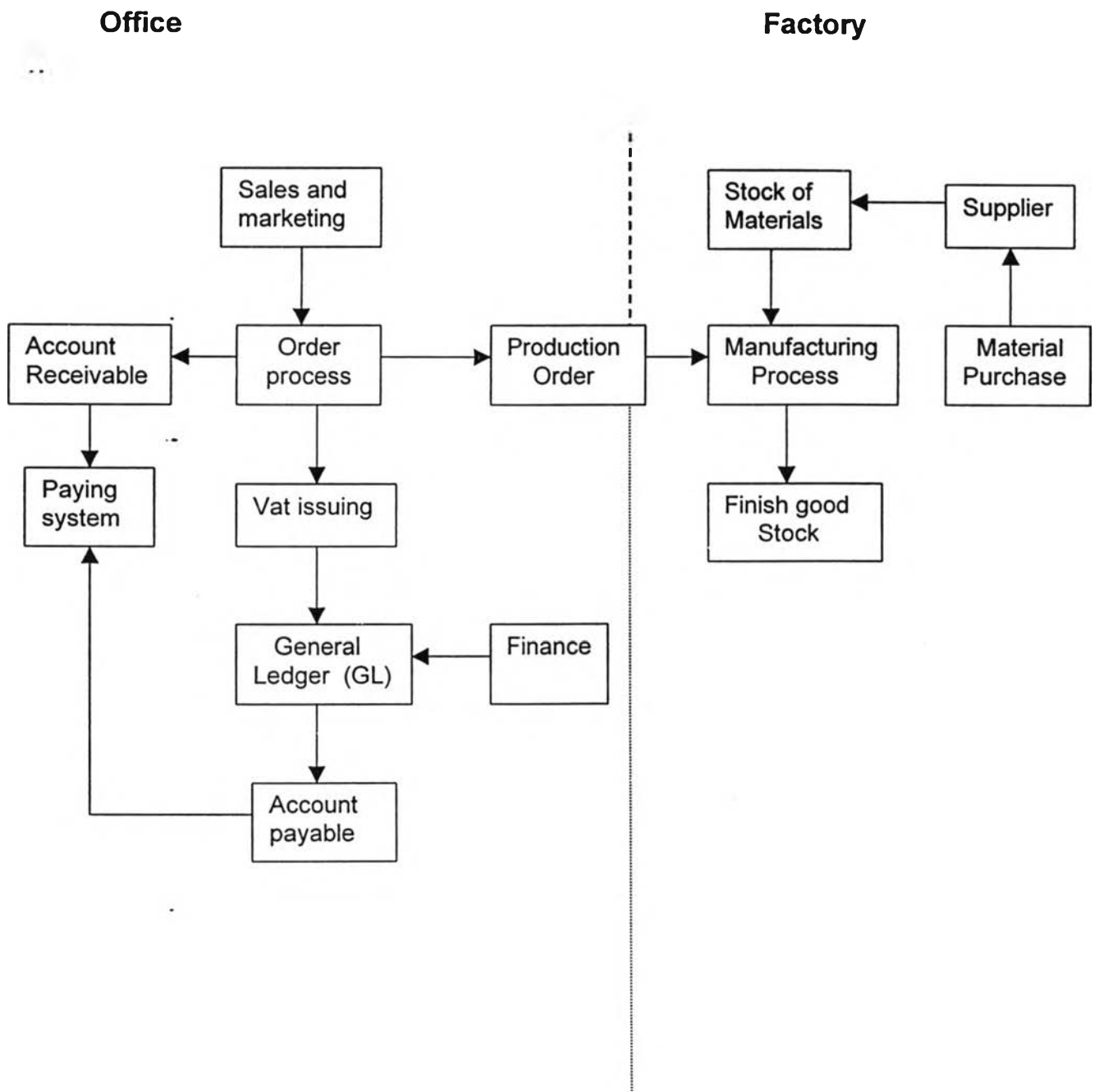


Figure4.1: Business Process in the case study

Sales Order Processing in the case study

Figure 4.1 illustrates the whole business process in the case study. For figure 4.2, it will illustrate the clearer view of the sales order processing in the case study.

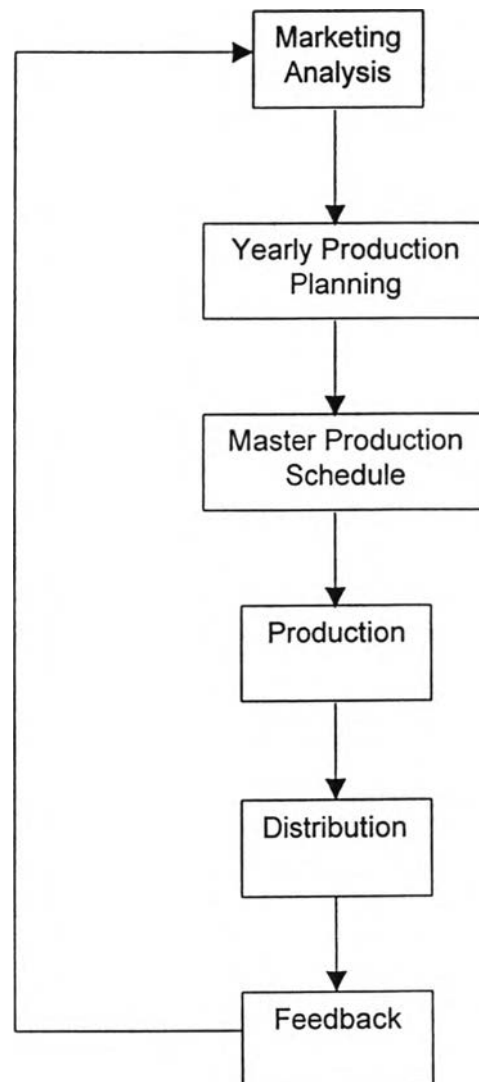


Figure 4.2: Ordering Process in the case study

4.3 Ordering Process at the case study

From figure 2, the ordering process at the case study consists of 6 steps as following:

1. Marketing Analysis
2. Production Planning (all year)
3. Master Production Scheduling
4. Production
5. Distribution
6. Feedback

4.3.1 Marketing Analysis

Marketing analysis is the analysis about the market situation in terms of market trends, customers' behavior, competitor analysis, Porter's 5 forces, PEST analysis, SWOT analysis, our market share, etc. by using inputs such as the best selling products of the company, the financial situation of the company, the economics situations, organization strengths and weakness, etc. The more and the faster information we can gather, the more accurate analysis we can get which would help the company to set up the most appropriate production plan which is the next step of the ordering process.

The activities of analyzing the market situations are done by the sales and marketing department. The analyzing that is presently done in the department includes:

1. Analysis of product by size
2. Analysis of product by trend
3. Analysis of product by distribution channels

4.3.1.1 Analysis of product by size

The analysis of product by size is done by ranking the best selling size of each product. These sizes are kept historically and from each group of product, there are different best selling sizes. This analysis will help the company to set up the production plan rightly in order to manufacture according to the sizes that are commonly bought by local people. The methodology that is used to support this activity is the average value which can be calculate by using the historically records as following:

Example1: sizes of the bra sold (by percentage) during previous year

January	size 30 sold out 25%	February	size 30 sold out 28%
	size 32 sold out 40%		size 32 sold out 41%
	size 34 sold out 20%		size 34 sold out 21%
	size 36 sold out 10%		size 36 sold out 7%
	over 36 sold out 5%		over 36 sold out 3%
March	size 30 sold out 21%	April	size 30 sold out 23%
	size 32 sold out 44%		size 32 sold out 42%
	size 34 sold out 26%		size 34 sold out 22%
	size 36 sold out 7%		size 36 sold out 10%
	over 36 sold out 2%		over 36 sold out 3%
May	size 30 sold out 30%	June	size 30 sold out 25%
	size 32 sold out 37%		size 32 sold out 40%
	size 34 sold out 23%		size 34 sold out 22%
	size 36 sold out 8%		size 36 sold out 11%
	over 36 sold out 2%		over 36 sold out 2%

July	size 30 sold out 22%	August	size 30 sold out 18%
	size 32 sold out 40%		size 32 sold out 45%
	size 34 sold out 23%		size 34 sold out 22%
	size 36 sold out 9%		size 36 sold out 10%
	over 36 sold out 6%		over 36 sold out 5%
September	size 30 sold out 25%	October	size 30 sold out 28%
	size 32 sold out 38%		size 32 sold out 42%
	size 34 sold out 25%		size 34 sold out 22%
	size 36 sold out 8%		size 36 sold out 6%
	over 36 sold out 4%		over 36 sold out 2%
November	size 30 sold out 21%	December	size 30 sold out 24%
	size 32 sold out 45%		size 32 sold out 41%
	size 34 sold out 18%		size 34 sold out 19%
	size 36 sold out 10%		size 36 sold out 12%
	over 36 sold out 6%		over 36 sold out 4%

The average percentage of each size

size 30 sold out	24.17%
size 32 sold out	41.25%
size 34 sold out	21.92%
size 36 sold out	9%
over 36 sold out	3.66%
total	100%

From the previous year information about the sales report, the company could actually calculate the average amount sold yearly and plan their production for the next year. The culture of the production at SABINA is LOT production which mean that the company sets a yearly production

plan and produce once all the items then distribute them through out the year.

According to this calculation, it would mean that from the total amount of bra, the factory should manufacture the sizes as following:

- ◆ For size 30, the company should manufacture around 24% of total amount
- ◆ For size 32, the company should manufacture around 41% of total amount
- ◆ For size 34, the company should manufacture around 22% of total amount
- ◆ For size 36, the company should manufacture around 9% of total amount
- ◆ For size over 36, the company should manufacture around 4% of total amount

4.3.1.2 Analysis of product by trend

The analysis of product by trend is done by ranking the best selling trend of each product. The trend of the product is the style of the product such as for a bra, each bra have different design and pattern. Besides that, the difference of the bra would be in the style of the cup, which are full cup, half cup, or $\frac{3}{4}$ cup. From the sales report, the company could rank the best selling product and from the rank, the company could also find out which style of bra from each design is the most popular one. Since the design will always change and up to date through out the years but the size or the style of the cup will be fixed to a certain extend. That is why the company consider to analyze this factor in order to know which of the styles are more attractive to customers and tend to design and manufacture them according to that analyzed information.

The method that is used for analyzing this data is similar to the analysis of product by size, which is the average value. For each production plan, the designs will vary according to the fashion trends but the design team

will certainly combine the most of the fashion designs with the style of the best selling cup.

4.3.1.3 Analysis of product by stores

The analysis of product by stores differs from the first two analyses, which have been mentioned before. This analysis is concern about the sales in each stores since there are many classes of stores to where the company distributes its products. The stores are categorized into 3 classed as following:

- 1) **Department Stores:** These stores are first or second class department stores where most customers are willing to pay reasonable to high prices for the products.
- 2) **Discount Stores:** These stores are places where customers expect to pay reasonable to low prices for the products, and they also tend to buy more than 1-2 pieces of that products.
- 3) **Retail stores and Mini-mart:** These kinds of stores and shops are mostly around the city where people can find them easily since they tend to sell convenience. These stores will sell the product according to the price in the market or slightly higher.

From the sales report from each stores, the company will be able to analyze that which kind of stores tend to sell best. The sales of the product in each stores will vary according to these following factors:

- 1) The product itself

The quality and design of our products will directly influence the sales.



2) **The relationship between our company and the stores**

The relationships between our company and the stores will results in the

mutual cooperation, the facilities provide for the company from the stores, the promotion and advertisement, etc.

3) **Our personnel sales representative in each stores.**

The sales representative could easily influence the decision making of the customers whether they will buy our product or not. If the personnel have good manner and willing to help or advise the customers, the products will be sold much easily and much more.

4) **Display and location or the shops**

This factor also influences the company sales. If the location or SABINA shops in the stores are easy to find, located where many people walk pass, then the possibility of selling is much more. Also the display is important in order to attract the customers or catch their attention immediately when they pass our shops.

All of these factors have a major influence on the product sales. In each month, the company will analyze the sales report from these stores whether the sales volumes are higher or lower and what are the factors that affect the sales volumes. From this analysis, the company will modify the distribution channel planning and also try to improve the factors that affect the sales volumes.

4.3.1.4 Information support Marketing Analysis

From the marketing analysis that have been discussed before, the information that support these activities are as following:

1. Daily sales report from each distribution channel (stores)

At present, the daily sales reports are sent from each stores every 2-3 days to the head office. The personnel at each stores will collect the sales information manually by copying the code of each lingerie that has been sold on papers and then send them to the head office after a few days. This way of collecting information cause many difficulties and it is not efficient enough to support the business that is continuously growing. The problems that occurs are as following:

- 1) It is not accuracy. There is a high possibility that the personnel in each stores copy the wrong code number and that would effect the marketing analysis. Especially, the personnel that are not well educated tend to be careless.
- 2) The delay of sales reports. As the sales report are send by mail after the sales data has been collected for a few days, until the head office received the report, it would be delayed from the actual selling days about 5-7 days. Since the marketing analysis depends on these data, the analysis would not be up to dated enough in order to set the production plan accurately.
- 3) The delay of the sales report does not support the running production. Since the sales report tend to be delayed, it does not provide the opportunity for the company to consider running production instead of totally LOT production. In order to start a running production, the analysis must be up to date and accurate enough to support this type of production.
- 4) It is not effective and it wastes human resources and time. As the data collection of sales report is done manually, besides that it is not accurate, it is also a waste of human resources and time. The personnel

need to spend an amount of time to copy all the codes of goods sold and the company would have to provide more personnel to support this activity besides selling the products to the customers.

2. Customer database which include customers' address, classification, credit etc.

At present, the company has a customer database in the form of table (Microsoft Access) that has the information about:

- 1) Customers' name, addresses
- 2) Customers' credit, classification, which identify how much we would sell in advance for that customer and the time period of paying back.
- 3) Customers' previous buying record

4.3.2 Production Planning

The production plan is a statement of the planned rate of production expressed in aggregate terms. The plan is the focal point for integrating the manufacturing operations of a company with its business and marketing plans. Production planning is a basic function of manufacturing management applicable in all manufacturing companies.

The principal purposes of the production planning are:

- 1) Provide authorization for the decomposition of the production plan into specific end items in the master production schedule. It is an initial step in authorizing all manufacturing activity.
- 2) Provide the primary input to resource planning so that a resource plan will be developed adequate to support the production plan.

- 3) Stabilize production and employment where demand is subject to seasonal patterns or other variations.

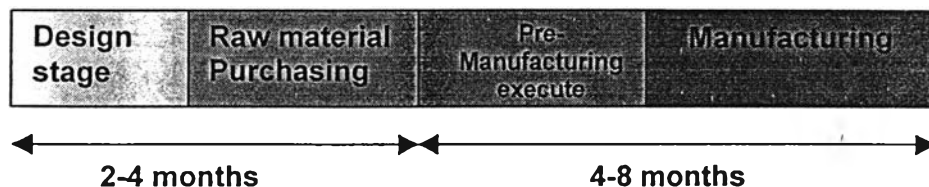
The culture of the production planning at SABINA is that they set up a yearly production plan and manufacture all the products in one time then distribute the finish goods through out the year. This is called LOT production.

Lot production is one of the two productive system types. The productive system are divided into two types as following:

Lot (Batch) Production: This system is a process focus system. It should be flexible since it has to adjust to the customers' specifications or product specification. Each product may be manufactured in different volume according to the orders or forecast demand.

Continuous Production: This is a product focus system which can produce highly standardize products and large quantity. This mass production type is suitable for products that have high demand and large volume. The advantage of this production type is it has low cost.

Usually the production period takes at least 6 months to 12 months depend on many factors. The production period consists of:



After the sales and marketing department has gather all the information and did their analysis then the production planning can be started. The production planning will develop a yearly plan on manufacturing all items to the

full capacity of their factories. According to their full capacity, each item will be produced in different numbers, which depends on marketing analysis. For the products that are better sold, the ratio of the sales figure by the total amount will be higher which results in the higher amount of production. So the production plan will certainly depend directly on the marketing analysis information.

In the design stage, it would take the design team around 1-2 months to develop new collection for the next launching. The designs of the products depend directly from the marketing information such as the trend of the bra, which is full cup, half cup or $\frac{3}{4}$ cup. Besides that, the information about the trend of cloths and colors which is in fashion are also very important for the design team to create the products using those kinds of cloths and colors. For example, in the next year, which is millenium year, the trend of colors is mostly metallic colors such as silver, grayish to represent the time of technology.

For raw materials, they are mostly imported from abroad especially embroideries since the quality and the neatness standard is much higher than local ones. This stage will certainly take longer time than design stage and must be in careful control in order to be able to start the manufacturing stage on time. Mostly, the raw material purchasing period will take 1-3 months which vary according to what types of raw materials will be used, whether they are imported or not. Besides that, some of the raw materials the company bought, need to be modified such as changing the colors, which would take longer, time than expected and may delay the manufacturing period at times.

In the pre-manufacturing execute and manufacturing stage, it usually takes about 4-8 months, which depends on how complicated and detailed are the products and also the company's relationship with the suppliers due to the raw materials on time delivery. Besides that, there are lots of little details and components that need to be carefully handled and that forces most of the

production stages to be human labor. This often causes delay since human are quite unreliable.

4.3.2.1 Information support production planning

The information that supports the production planning activities are all the information that support the design activities, raw material purchasing activities and manufacturing activities. The information needed is as following:

1. Capacity and capabilities of the factory

In order to set up a yearly production plan, the company needs to know the information concerning the capacity and capabilities of the factories throughout the next year. This will help the production planning to be within the limitation of the factories in order to manufacture products on time.

2. Marketing analysis

The results from the marketing analysis will affect directly the production planning. As the factories will work to their full capacity, the number produced of each product will certainly vary according to the percentage that has been analyzed by the marketing department. This will control the amount of pieces of products that are produced.

3. Channel distribution

This information is vital for production planning. The company needs to know whether the channel distributions have increased or decreased in order to satisfy and cover all the needs. Besides that, this would also affect the stocks directly. If the company over manufacture and there are no distribution channels that could hand the products over, the products will be kept in stocks instead of turning into cash.

4. Market research and public information

This information will support directly the design stage of the production planning. As the design team is developing new styles, they will certainly need information about the trend and what will be in fashion. This information is available from many sources such as fashion trend in Paris, magazines, web sites and also customers' opinions.

4.3.3 Master Production Scheduling

The master production scheduling (MPS) is a statement of what end items a company plans to produce by quantity and time period. It is a disaggregation and implementation of the production plan. The MPS is stated in specific configurations with item numbers which are contained in the item master and BOM files. The MPS is the vehicle for focusing the company's engineering, manufacturing, purchasing, and distribution resources in order to meet the company distribution plans or shipping plans. It is a supposing plan that the entire manufacturing organization must strive to achieve if the company is to succeed.

There are four important functions in MPS as following:

1. It schedules production and purchases order for MPS items.
It will state the items and the quantities that need to be ordered and the due dates.
2. It is a principal input to the MRP system.
3. It is the basis for determining resource requirements.
The resource requirements are such as manpower, machine hours, or energy through the rough-cut capacity requirements planning module.

4. It provides the basis for making delivery promises to customers.
It keeps track of units by allocating units of product in the schedule to customer orders and therefore available to promise.

4.3.3.1 Information support Master Production Scheduling

In order to set a master production schedule, there are information needed to support the activities as follow:

1. The production plan.

The production plan provides a set of constraints on the MPS. The MPS must be reconciled with the production plan if the plan is to be achieved. The MPS will sum the production, inventory and resource levels in the production plan.

2. Demand data

The MPS will take into account all types of demand for the items being scheduled including:

- 1) Sales forecast
- 2) Customer orders
- 3) Field warehouse requirement
- 4) Interplant requirements
- 5) Services demand forecasts
- 6) Safety stocks

For SABINA, the demand data is provided from the marketing analysis and the consideration of the capacity. The production will tend to utilize the factories to their full capacities and then forecast each type of product demand according to the average ratio that has been calculated as

mentioned in the marketing analysis. There hasn't been such a forecast demand system according to the real demand of the market.

3. Inventory Status

The amount of products that are already available must be considered in order to determine how much will need to be ordered or produced.

To determine this, the following information is required:

- 1) On hand inventory
- 2) Allocated stock
- 3) Released production and purchase orders
- 4) Firm planned orders

4. Ordering policy

Information stored in the item master file that affects lot sizing decision and release dates includes:

- 1) Unit cost
- 2) Ordering cost
- 3) Inventory carrying rate
- 4) Safety stock
- 5) Lead time
- 6) Maximum order quantity
- 7) Minimum order quantity
- 8) Fixed order quantity

4.3.4 Production

For the production stage, there are many tasks included and each task takes time and need to be closely monitored in order to complete the finish goods in time. In order to complete the production, the tasks must be done cohesively among departments. The tasks of the lingerie production consists of:

Sales and Marketing department:

- 1) Order Purchase
- 2) After Sales, check prices, confirm order
- 3) Send color samples to the lab
- 4) Send the color sample to the customer for approval
- 5) Order pattern & first fit
- 6) Approve size set
- 7) Send order for production
- 8) Send packing detail to the factory

Product department:

- 1) Make the counter & cost of the factory
- 2) Size set & customer approval
- 3) Pattern for manufacturing & spec

Purchasing department

- 1) Purchase order for main material suppliers
- 2) Purchase order for extra items after receiving the lab color test result
- 3) Quality control for raw material and set the jobs

Manufacturing department (factory)

- 1) Cutting
- 2) Packing details purchasing
- 3) Tracking
- 4) Packing

From the tasks in the production stage shown above, it is obvious that there are many tasks and departments involved which would consume lots of data and time. If the time in each step of sales order processing could be shortened, it would also help the production stage to start much faster and be able to complete the manufacturing of the finish goods in time.

4.3.5 Distribution

Physical distribution is concerned with the flow of products from the supplier to the consumer, possibly through several stages of transportation and stocking. It could be defined broadly as including transportation, warehousing, packaging, order processing, inventory control and as far as additional processing or manufacturing.

The key aspects that must be considered in the design of a physical distribution system are:

- 1) The number, location and size of warehouses
- 2) The items to be stocked in each warehouse
- 3) Which plants or vendors are to which items to each warehouse
- 4) The customers to be served by each warehouse
- 5) The mode of transportation – rail, truck, air freight, shipping
- 6) The degree to which the company will carry out its own distribution activities as opposed to relying on services provided by others – such as company owned warehouse or public warehouse, company owned truck fleet or common or contract carrier
- 7) The routing of vehicles
- 8) The selection of an inventory control systems for distribution warehouses

In SABINA, the distribution of the products depends on many factors. After the production plan has been released and the production has started, the

distribution will be planned. The information from the marketing analysis and production planning is needed to support the distribution planning activities. The distribution system at present in SABINA is as following:

1. The products are distributed according to the marketing analysis from the sales report of each stores. In different stores, the best selling products are also different which depend on the types of the stores, the characteristics of the customers or target group, the location of the stores, etc.
2. The stores will receive the products according to the distribution planning the company had made. When the lots of products are distributed to each store, and the products are sold then the sales report are sent to the head office, the company will decide to distribute another lot of products according to that sales report.
3. Besides that, the distribution planning depends on the distance and time used to distribute the products to each store. Usually the distribution from the warehouse in Bangkok to each stores throughout Bangkok and other provinces will take not more than 2 days.

4.3.5.1 Information support distribution

The information that is used for distribution planning activities consists of:

1) Marketing analysis

The information from the marketing analysis is collected from the sales report and other sources that support the marketing analysis activities. The information will help in planning the distribution throughout Bangkok and other provinces, as each store will receive different amount of products according to the sales.

2) Yearly production plan

The yearly production plan will give the approximate figures of each type of products that will be manufactured each year (as a LOT). From the figures and the analysis of sales reports, the distribution plan will be set up.

4.3.6 Feed back

Feed back is the stage where all the information about sales reports from each store in Bangkok and other provinces are sent back to the head office in Bangkok. The personnel in each stores are trained to collect information daily by using the format form of the company that are provided at every store. On the forms, the personnel will attach the product labels.

The labels of the products that are sold will be torn out from the products and the personnel will stick it on the form. The label will illustrate the product code number, which identify what is that product. The identification will distinguish the product from each other such as styles, colors, sizes, type of cups, etc. Then these labels will be sent to the head office weekly.

From the product labels, much information could be retrieved. The sales and marketing department will gather the information, which will be needed for the next stage that consists of:

- 1) Sales report by sizes
- 2) Sales report by trend
- 3) Sales report by stores
- 4) Inventory status in each store
- 5) Customers information, suggestions and complaints

All this information will also lead to the stage of analyzing what kinds of materials will be used in the next production lot, what kinds of embroideries needed to be imported, the raw materials that will be ordered, etc.

From the feed back at present, there are many problems that occur due to inefficient and not effective system. The problems are obvious but not really recognize by the staffs. From the system analysis, the problems are:

1. The unreliable data

Since the data and reports are collected by the personnel in each stores and then are sent to the head office, there are lots of human errors. Some of the labels are missed out although the company has tried to implement as simple method as possible. Besides that, the personnel are not well trained, educated and do not realize the importance of performing their jobs correctly.

2. The delay of data and reports

As mention the data and reports will be collected together by the personnel in each store, then they are sent to head office after a few days. Until the data and reports arrived at the head office, it would take a few days and besides that the data and reports are lost on the way sometimes. This would results in, the difficulties in marketing analysis and planning of the production rightly.

3. Not competitive enough

As the company in this case study is still using this system, many of other lingerie companies has developed a better system in feeding back their data to the headquarter. One of the strongest lingerie firm use the bar code and link the headquarter database with personal computer in big stores. In this case, after the customers bought the products, the bar code will be read and transfer on line to the headquarter immediately. It is

obvious that there is a gap between using the technology to support the information system in each firm.