CHAPTER III

SYSTEM DESIGN

3.1 General Information

XYZ Electric Limited Partnership is the selected organisation. It was located in Suphanburi Province far from Bangkok approximately 135 kilometres and established since 1980. Moreover, there is interesting information of XYZ as follows.

6. An official dealer of Sony, Panasonic, National, LG, Sharp, Philips, Whirlpool, Hitachi, Mitsubishi, Pioneer, Distar and Soken

7. Turnover around 120 million bath per year

8. There are fourteen workers including the owner.

9. Location: centre point area in the city

10. Three inventory warehouses, each of them is located in independent area and has different size; 2,500, 1,500, 400 square metre respectively.

The author started working at XYZ since 1999 as the General Manager. The first mission was how XYZ to increase the sales revenue and made customers return to buy the products more one time. Advertising and promoting activities were applied to XYZ, these made sales revenue increase since 2000 to 2001. However, when the owner considered the financial report of XYZ, the profit was not raised with the trend of sales revenue. In the financial report, it shows the figure of remaining inventory in the high level in 2000. Because obsolete products and over-demanded inventory were the cost of business, they can reduce the net profit of XYZ. According to Table 3.1, it shows an amount of stocks in 2000.

Table 3.1: *Sales Performance in Year 2000*

Month	Purchasing volume (Baht x 1,000)	Sold Volume (Baht x 1000)	Remaining Stock (Baht x 1000)
January	6,851.67	6,546.53	(305.14)
February	8,844.00	6,702.27	(2,141.73)
March	6,017.78	7,861.17	1,843.39
April	7,857.45	6,349.46	(1,507.99)
May	6,444.96	6,408.29	(36.67)
June	5,251.83	5,546.15	294.32
July	7,703.05	6,350.07	(1,352.98)
August	6,122.27	5,196.17	(926.1)
September	5,961.61	5,783.88	(177.73)
October	7,675.47	6,231.25	(1,444.22)
November	5,482.30	5,700.34	(218.04)
December	5,691.23	6,050.65	359.42
Total	**79,903.62**	**74,726.23**	**(5,613.47)**
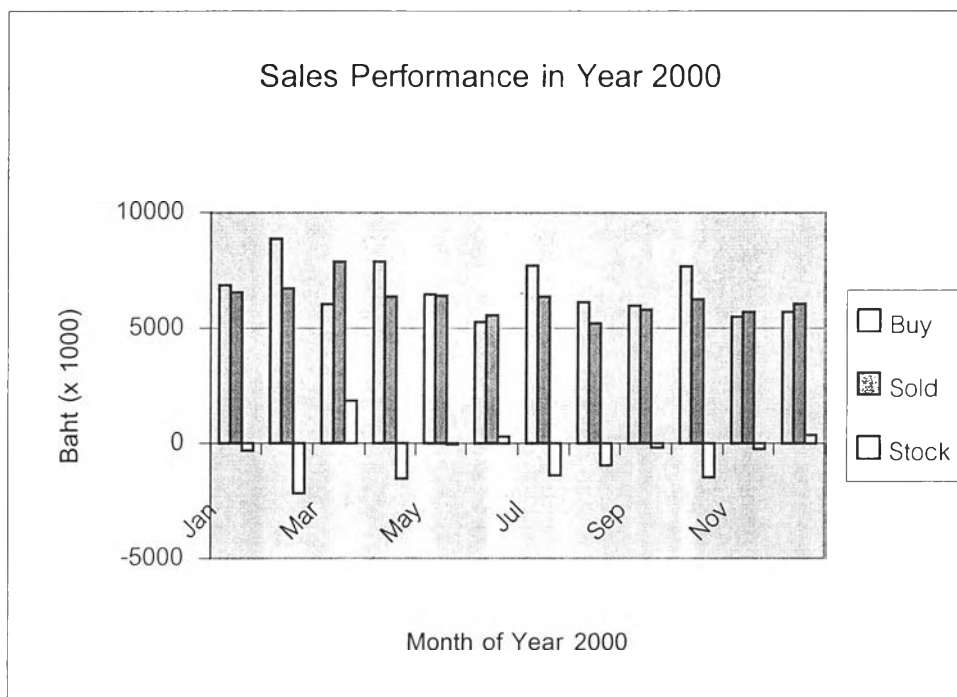
Figure 3.1: *Sales performance in Year 2000*

3.1.1 Statement of Problems

According to Table 3.1, in the Year 2000, there was the value of remaining stock an amount of 5.6 million baht or approximately 7 percent of total purchasing volume. If XYZ can reduce the stock level as much as possible, the net profit will be increased.

3.2 Strategic Analysis Approaches

3.2.1 SWOT Analysis is the form of competitive analysis. The competitive situation for a company is assessed by examining its strengths (S), weakness (W), environmental opportunities (O) and threats (T).

Table 3.2 : *SWOT Analysis*

Internal to Organisation		External to Organisation	
Strength	**Weakness**	**Opportunities**	**Threats**
Greatest market share	Poor administration	Growth market	Increasing competition
Negotiable price	Low profit margin	New government legislation	Recession in economy
Directly contact to the owner	High total cost	Expand into new markets	New legislation
Good service after sale	Limited budget	AFTA : zero tax tariff	Skills shortage
Highly skilled owner	High staff turnover	Advantages of new technology capitalised on	New product development create obsolescence of current products

3.2.2 Porter's Competitive Force

A commonly referred to framework for analysing the competition within an industry is Porter's competitive forces model. Although the model was not initially

intended for use in IT strategy formulation, it can prove useful for IT strategic planning. Porter's model emphasizes five competitive forces:
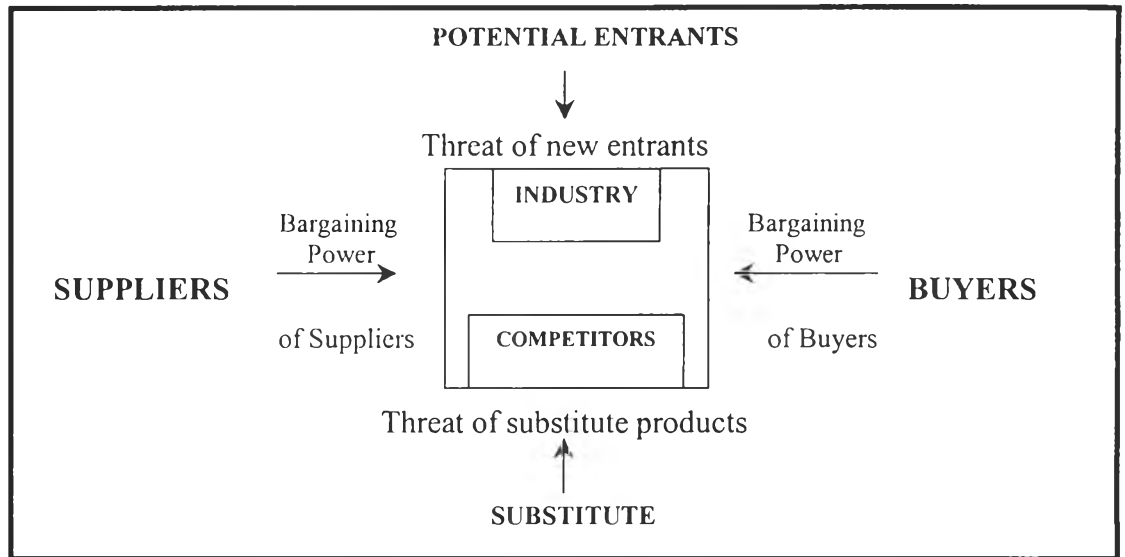

Figure 3.2 : *Porter's competitive forces model*

- *New Entrants* : to compete a new entrant, XYZ may have to lower its prices, change the product or service in some way such as loyalty member card or free interest installment, or improve distribution channels.

- *Increased bargaining power of buyers* : When buyers have increased bargaining power, XYZ should investigate, for example, how to develop loyal customers or provide better service.

- *Increased bargaining power of suppliers* : Suppliers may increase prices or reduce the quality of their products and services.

- *Threat of other industries offering substitute* : When XYZ finds other companies offering product substitutes, profits are difficult to maintain.

- *Rivalry between competing sellers* : Competing companies often lower price, engage in advertising battles, or offer special incentives to customers.

Table 3.3: *Transaction volume of each supplier in the Year 2001*

	Supplier 1	Supplier 2	Supplier 3	Supplier 4	Supplier 5	Supplier 6
Transaction Volume (Baht x 1,000)	10,804.47	7,850.28	7,528.64	6,335.3	7,218.92	6,654.21
Percentage (%)	23.29	16.92	16.23	13.66	15.56	14.34
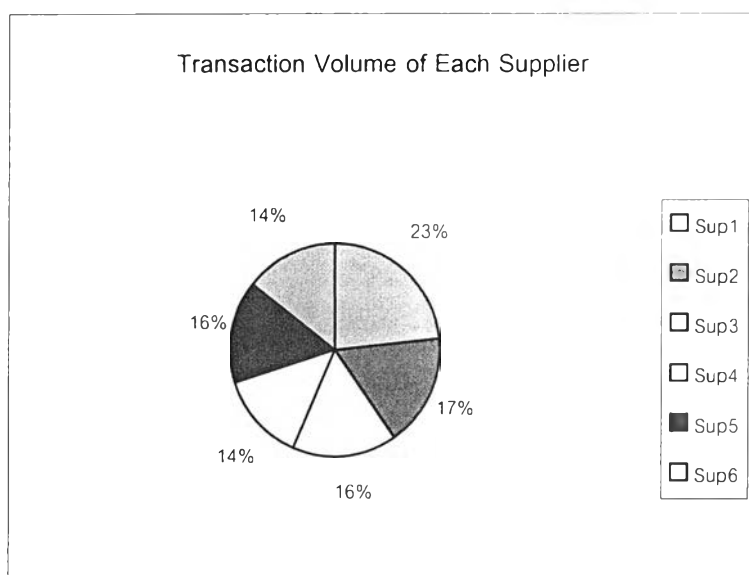
Figure 3.3: *Transaction Volume of each supplier in the Year 2001 (January to October)*

From the Table 3.3, Supplier 1 has the highest transaction volume during January to October 2001. Therefore, Supplier 1 is selected to collaborate with XYZ. Supplier 1 is the audio and visual manufacturer (AV product); for example, Flat Screen Television, Hi-Fi Component, Digital Camera, Video HandyCam, DVD Player, and so on.

Secondly, the meeting is set for contacting with the representatives of Supplier 1 in order to inform what the problem is and the way to solve this problem including the benefit, which Supplier 1 and XYZ will obtain in the near future if this project is developed completely.

The next step is to study the nature of value chain from Supplier 1 to XYZ. The following diagram is shown the regular transaction module between Supplier 1 and XYZ.

3.3 Current System

Figure 3.4 : *Current connection process between XYZ dealer-Supplier1-Logistics*

Procedure:

1. The dealer makes a call to the sales staff in order to purchase required products.

2. This sales staff takes a note of orders and connects to an administration officer.

3. The administration officer makes an invoice and connects to a warehouse staff.

4. When the warehouse staff receives an invoice and then arranges required products following on item by item.

5. Transportation products to the dealer warehouse.

Problems

1. The required product is normally purchased when it is out of stock or nearly to be shortage. This makes a dealer may throw an opportunity to sell it away if a customer walks in to buy this product. (Shortage)

2. The dealer does not generally apply statistical method to collect and analyze data of sales revenue or obsolete products. This makes a dealer lack of well inventory management, which is the cost reducing net profit of XYZ. (Overstock)

3. The step of a sales staff connecting to an administrative officer has a chance to confront the mistake with non-corrective order.(Errors in process)

In addition, the process of purchasing, selling, and controlling a product in XYZ shop is illustrated as diagram below.
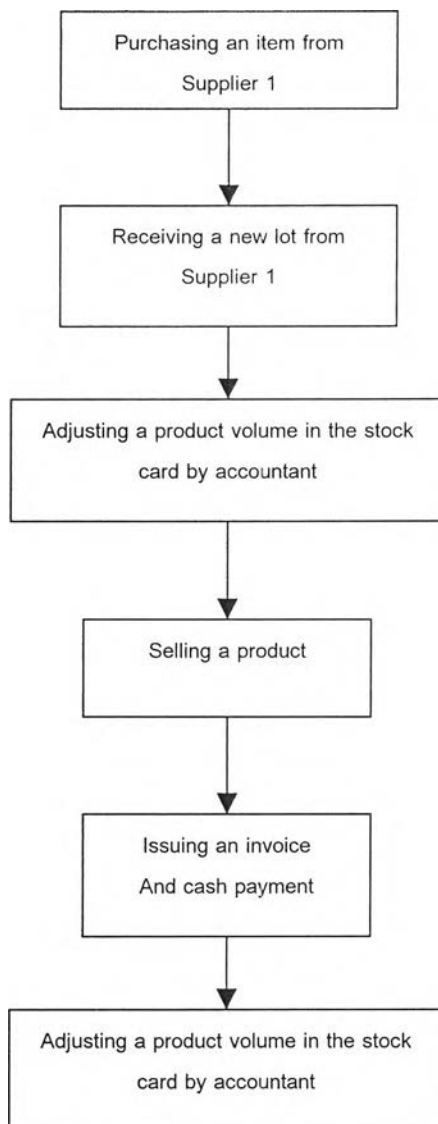
```
┌─────────────────────────┐
│  Purchasing an item from │
│       Supplier 1         │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│  Receiving a new lot from│
│       Supplier 1         │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│ Adjusting a product      │
│ volume in the stock      │
│ card by accountant       │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│    Selling a product     │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│    Issuing an invoice    │
│    And cash payment      │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│ Adjusting a product      │
│ volume in the stock      │
│ card by accountant       │
└─────────────────────────┘
```

Figure 3.5: *Steps of the product movement in XYZ shop*

From the diagram above, it can show that the adjusting a product in XYZ depending on the accounting department, therefore it is not the real time data because an accountant will adjust a product in the stock card by checking from Supplier invoices (product input data) and XYZ invoices (product output data) at 5 p.m. of each day. However, the working time of XYZ is 8 a.m. to 8 p.m. so there are Supplier invoices and XYZ invoices after 5 p.m.. Furthermore, if an accountant does not come to work, the pile of documents will be increased. With this typical pattern, it is not easy for the owner to know exact data of product volume especially for a product, which has many

STOCK CARD

Supplier name.....................................

Product name.....................................

Receiving Date	Invoice No.	Volume	An amount of	Selling Date	Invoice No.	An amount of	Volume	Net volume

Figure3.6 : *Stock Card*

colours. Because manufacturers will not produce products with different colours at the same time as a result of the fluctuation of demand and the quality of pigment colour being not stable every lot. In many times, XYZ lost opportunities of sales because of product shortage or faced with financial problem because of over-demanded stocks.

One thing that is almost always true when a business fails is that there still remains a great deal of unsold inventory. For most small businesses, next to pay roll cost, inventory is the major expense as well as an essential component of the firm's assets. For these simple reasons, once the owner has established proper purchasing procedures and has selected the best vendors or suppliers, the focus shifts to establishing techniques for monitoring and controlling the inventory.

Managing inventory involves a variety of interrelated activities:

    3.1.1   Develop an accurate sales forecast. The proper inventory levels for each item are directly related to the demand for that item. You normally can't sell what you do not have, and conversely, you do not want what will not sell.

    3.1.2   Develop a plan to make inventory available when and where customers want it. Inventory is not likely to sell if the customer has a difficult time finding it.

    3.1.3   Build relationships with your most critical suppliers to ensure that you can get the merchandise you need when you need it. Keep suppliers and vendors aware of how their merchandise is selling, and communicate your needs in specific terms. Your vendors can be your greatest ally in the management of inventory.

    3.1.4   Set realistic inventory turnover objectives. Knowledge of the market and the merchandise allows the owner to better estimate the most likely buying patterns for different types of merchandise.

    3.1.5   Compute the actual carrying cost for your inventory. These carrying costs would include such items as interest on borrowed money, insurance expenses associated with the inventory, and all other related operating costs. Without an accurate cost of carrying inventory, it is not possible to accurately compute an optimum inventory level.

3.1.6 Use the most timely and accurate information system your business can afford to provide the facts and figure necessary when making critical inventory decisions.

3.1.7 Train employees how all the systems work so that they can contribute to the management of the firm's inventory. All too often the employees on the floor have no idea of how the various information systems and inventory control techniques interface and operate. Consequently, the people closet to the inventory and the sale of merchandise contribute little to the firm's management of its inventory.

The owner's goal is to find the perfect balance between the cost of holding inventory and the requirement to have the needed merchandise when the customer demands it.

3.4 Designed System

3.4.1 The Driving Force

Information and Information management is important to the retailer because of the increasing pace of environmental change to which the retailer must adapt. Changes in the age profile of the population, more single parent households, increasing disposable income amongst a myriad of changes all have implications for retailers. Additionally, new technology in retailing, new products and new types of store go to produce an extremely complex environment which retailer must monitor and react to.

However, the key to making a change is to translate what the owner knows about the company into the criteria a computer system must meet, following the steps described next.

Step 1. Develop a list of current activities (as described above)

Step 2. Decide how much and which areas of the business to computerize.

Step 3. Develop a computer budget

Step 4. Define the information needs of the function to be computerized First.

Step 5. Creating or Selecting Software Packages that will perform the required functions.

Step 6. Choose the Hardware.

Step 7. Integrate the System into Business

The following diagram is illustrated the new system to connect between XYZ-Supplier I and Supplier I Logistics and Transport.
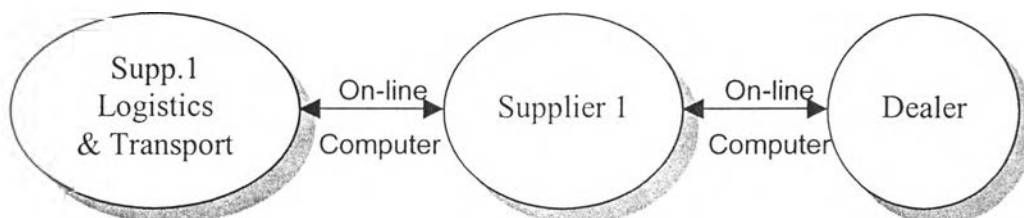

Figure 3.7 : *Designed connection process between XYZ-Supplier 1- Logistics*

3.4.2 System Requirements

The system must be composed of as follows:

1. A computer is a medium linkage between each unit.

2. The bar-code reader is an equipment to read the bar code, which could inform the model, price, quantity, and so fourth on the package of product.

3. There is standard software to control and manage the inventory level and selling-purchasing.

4. When the dealer sell a product, the staff has to correct the number of stock volume, and the supplier 1 will know this sold product simultaneously.

5. If the number of products decreases to the minimum level, there will be an automatic purchasing order.

The new system is seemed to be EDI Module (Electronic Data Interchange) but it is more simplified because of traditional working style and limitation of budget.

The inventory management system represents the basis on which the inventory of the AV products may be able to satisfy the demand and to reduce the total inventory cost. In order to obtain the optimum design, which will increase the perception of system users, it is necessary to determine the real system requirements.

A new computer-based inventory management system should take place only after a thorough study and analysis of an existing inventory management system. The specific purposes of the proposed system are to meet a good inventory management of AV products, to find efficient product ordering policies, to minimize the total inventory cost, to up-to-date with the latest information, and to provide some useful periodic reports to the owner. In this case under consideration, the system requirements can be defined as follows:

- To provide an easy updated and retrieved inventory information
- To provide an efficient product ordering system for replenishment
- To provide more accurate information for the control of management on the AV products
- To provide accountable information

3.4.3 Input and Output Design

The purpose of the input and output design is to design computer-based programmes for the inventory management. The main considerations are the actual working requirements and the computer operation. The general diagram of the input and output design is shown in figure 3.8.
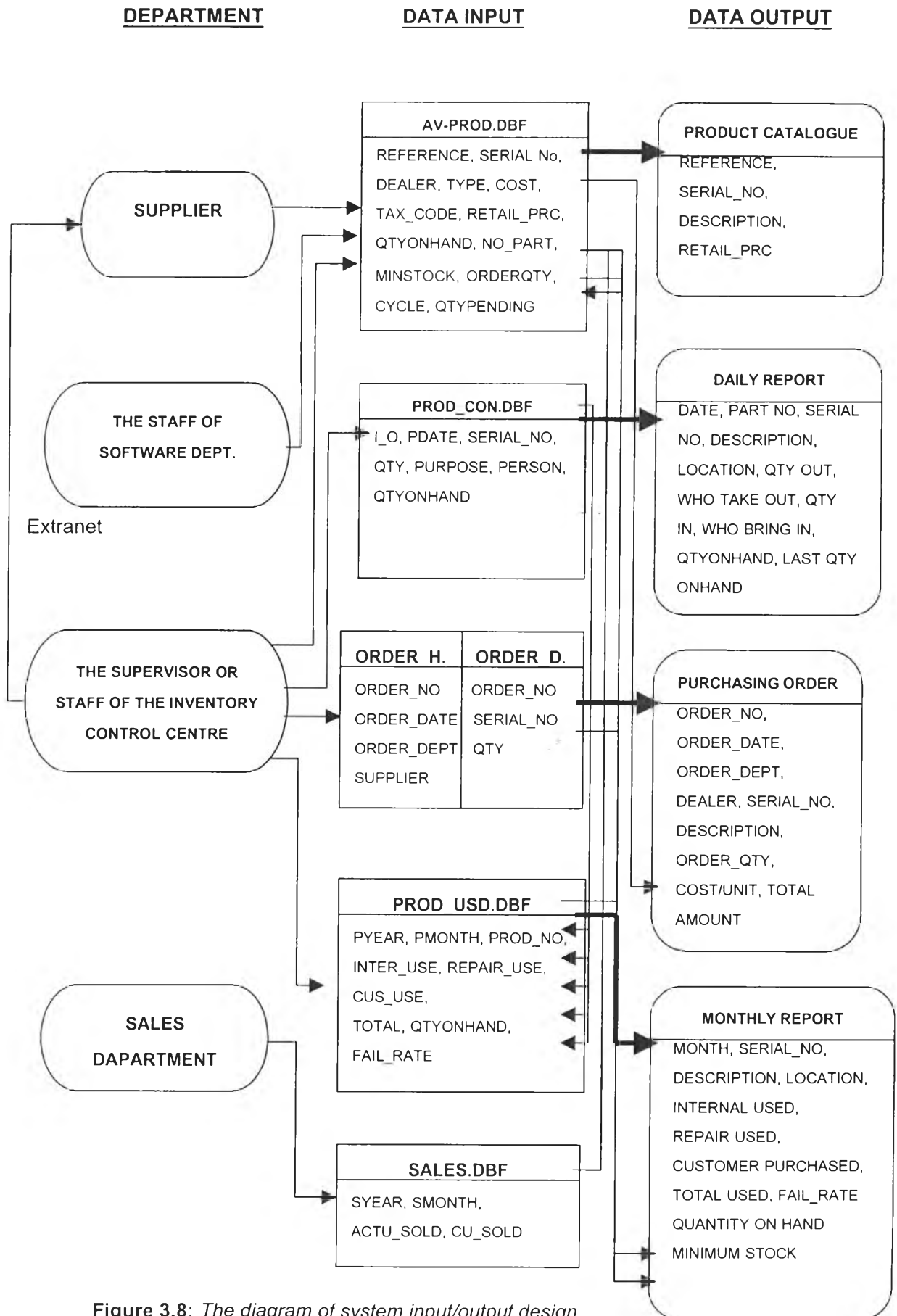
DEPARTMENT　　　DATA INPUT　　　DATA OUTPUT

AV-PROD.DBF

REFERENCE, SERIAL No,
DEALER, TYPE, COST,
TAX_CODE, RETAIL_PRC,
QTYONHAND, NO_PART,
MINSTOCK, ORDERQTY,
CYCLE, QTYPENDING

SUPPLIER

PRODUCT CATALOGUE

REFERENCE,
SERIAL_NO,
DESCRIPTION,
RETAIL_PRC

**THE STAFF OF
SOFTWARE DEPT.**

Extranet

PROD_CON.DBF

I_O, PDATE, SERIAL_NO,
QTY, PURPOSE, PERSON,
QTYONHAND

DAILY REPORT

DATE, PART NO, SERIAL
NO, DESCRIPTION,
LOCATION, QTY OUT,
WHO TAKE OUT, QTY
IN, WHO BRING IN,
QTYONHAND, LAST QTY
ONHAND

**THE SUPERVISOR OR
STAFF OF THE INVENTORY
CONTROL CENTRE**

ORDER_H.	ORDER_D.
ORDER_NO	ORDER_NO
ORDER_DATE	SERIAL_NO
ORDER_DEPT	QTY
SUPPLIER	

PURCHASING ORDER

ORDER_NO,
ORDER_DATE,
ORDER_DEPT,
DEALER, SERIAL_NO,
DESCRIPTION,
ORDER_QTY,
COST/UNIT, TOTAL
AMOUNT

PROD_USD.DBF

PYEAR, PMONTH, PROD_NO,
INTER_USE, REPAIR_USE,
CUS_USE,
TOTAL, QTYONHAND,
FAIL_RATE

**SALES
DAPARTMENT**

MONTHLY REPORT

MONTH, SERIAL_NO,
DESCRIPTION, LOCATION,
INTERNAL USED,
REPAIR USED,
CUSTOMER PURCHASED,
TOTAL USED, FAIL_RATE
QUANTITY ON HAND
MINIMUM STOCK

SALES.DBF

SYEAR, SMONTH,
ACTU_SOLD, CU_SOLD

Figure 3.8: *The diagram of system input/output design*

The meaning of each database for data input is designed and these files' organization is shown as follows:

3.4.3.1 Database of AV products (AV_PROD.DBF)

Description: This file contains the information of each product. The REFERENCE, SERIAL NUMBER (SERIAL_NO), DESCRIPTION (DESC), and COST are input by supplier. And then, the staff of Software Department will input the EXCHANGE CODE (EXCHG_CODE), RETAIL PRICE (RETAIL_PRC) in this file. Finally, the supervisor of inventory control centre adds DEALER, tax code (TAX CODE), number of parts for each unit (NO_PART), LOCATION and quantity on hand (QTYONHAND). The minimum stock (MINSTOCK), order quantity (ORDERQTY) and order cycle (CYCLE) will be calculated from the computer programme and updated automatically. The QTYPENDING is the value of order quantity, which can be obtained from the database of the order. This file is a basic and important source of the inventory management system.

3.4.3.2 Database of AV products control (PROD_CON.DBF)

Description: This file contains the information of daily work of the Inventory management. It concludes the indication of product items sold out or come in (I_O), date (PDATE), serial number (SERIAL_NO), the quantity of items sold out or come in (QTY), the purpose of items sold out or come in (PURPOSE), the person who sold out or bring the items (PERSON), and quantity on hand (QTYONHAND). This file is input by the supervisor or the staff of the inventory control centre.

3.4.3.3 Database of the order (ORDER_H.DBF and ORDER_D.DBF)

Description: In order to get better and faster inquiry, the database of order are divided into two files, the database of basic information of the order (ORDER_H.DBF) and the database of ordering products (ORDER_D.DBF).

- The ORDER_H.DBF contains order number (ORDER_NO), the date of order issuing (ORDER_DATE), the department of order issuing (ORDER_DEPT), and the supplier of product items (SUPPLIER)

- The ORDER_D.DBF contains ORDER_NO (in order to link the database of ORDER_NO in ORDER_H.DBF), the ordering product number (SERIAL_NO) via the EXTRANET, the quantity of order (QTY), and the cost of the spare part (COST). These files are input by the supervisor of the inventory control centre.

3.4.3.4 Database of AV products used (PROD_USD.DBF)

Description: This file is transferred from the database of the product Items control (PROD_CON.DBF) and when the records of PROD_CON.DBF are transferred to this file, the records will be deleted automatically. The supervisor of the inventory control centre makes this file every month (the first day of the month). This file includes the number of year (PYEAR), the number of month (PMONTH), the product number (PROD_NO), the quantity of internal used (INTER_USE), the quantity of repair used (REPAIR_USE), the quantity of customer purchases (CUS_USE), total used (TOTAL), quantity on hand (QTYONHAND), and the failure rate of the product (FAIL_RATE). The FAIL_RATE is made from the ACTU_SOLD of database of the sales (SALES.DBF), NO_PART of the database of the AV products (AV_PROD.DBF), and the REPAIR_USE of this file.

3.4.3.5 Database of the sales (SALES.DBF)

Description: This file is made from the Sales Department and contains year (SYEAR), month (SMONTH), the units sold each month (ACTU_SOLD) and the cumulative units sold (CU_SOLD).

3.4.4 The Development of Supply Chain Team

After selecting the major supplier, the next step was to convince the executive of supplier 1 what he will get benefits from this project. This step was very difficult because the status of supplier 1 in the market being the market leader of audio and visual products. Therefore, it was not interesting matter for supplier 1 to change internal working process dramatically. However, incredibly, that executive had an idea of supply chain management to develop the transaction and communication between dealers and supplier 1. When the concept of XYZ and supplier 1 was the same way, the supply chain team was set to develop this project. The XYZ representative brainstormed with

the team in order to share information what dealers had in their shops, how they worked, and what they want to be in the future. The team recorded all data to find the meet of this project mutually.

The meeting of EXTRANET Project was summarized as followings:

1. TARGET:

- Service commencement with some 50 dealers in Bangkok Area (Phase I).
- Then, expand the service to 250 dealers nationwide including those in upcountry (Phase II).

2. MAIN FUNCTIONS:

2.1) Dealer Sales/ Inventory Information (Dealers' Supplier I):

(1) Objective:

To collect dealer stock/sales information

(2) Procedure:

a) Once products are delivered to dealers, products barcode will be scanned (by scanners at dealers), and such information will be stored into the scanner then to dealers' PC.

b) Once products are sold from dealers, products barcode will be scanned again (& stored in the scanner then to PC).

c) By doing above, dealer stock information as well as dealer sales information will be stored in dealers' PC.

d) By connecting dealers' PC to the extranet, dealer stock/sales information will automatically be given to the extranet, then to Supplier I.

(3) Issues:

a) In addition to the extranet & PC at dealers, barcode scanners should be arranged for the dealers. The scanners should be able to be used on stand-alone basis, store certain amount of information in it (i.e. the scanners should be able to be used without being connected to PC). The information stored in the scanners will be sent to PC once they get being connected, and such information will be sent to the extranet from PC (once the PC is connected with the extranet).

b)   It hasn't been decided how the collected data would be stored in Supplier I (AS/400 or any other server) though, the stock/sales information collected should be easy to be handled/processed by Supplier I staffs' PC (MS excel etc.).

(4) The proposal of Designed System

The main activity of a normal inventory management is to keep track of the AV products coming in, taking out, and ordering. By studying various inventory management systems and the existing system, a new system is designed. The structure of this designed system is shown in figure 3.9 and the daily routing of the inventory management is shown in figure 3.10. The most important of the new system is to develop an efficient ordering policy, thus the following topics will describe the relative ordering policies which are developed for this new system.

Figure 3.9 : *The Structure of the Proposed System*
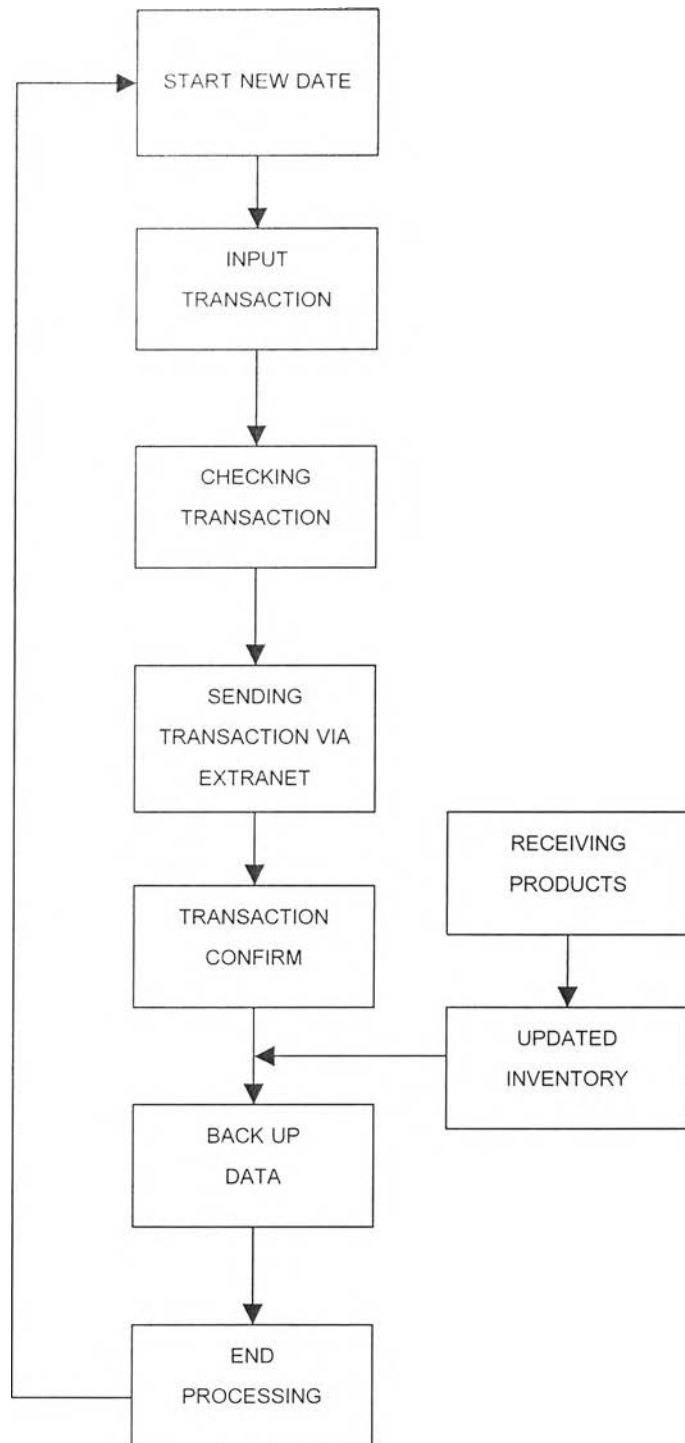
Figure 3.10: *The daily routing of the inventory management*

2.2) Dealer Book Keeping (by/within Dealers):

(1) Objective:

Dealers to handle their book keeping easier (this information shouldn't be given to the extranet).

(2) Procedure:

a) By going through above scanning process, products purchase/stock/sales information of Supplier I will be automatically been stored into dealers' PC, which should be able to be utilized by the dealers for their book keeping purpose.

b) Sales/stock/purchase information will be automatically been given to any "accounting/book keeping software", and dealers will be able to do their book keeping by just adding a few more information.

(3) Issues:

a) Any good book-keeping software available for this purpose ?

2.3) Order Processing:

(1) Objective:

Make it easier for Dealers as well as Supplier I to handle the orders from Dealers.

(2) Procedure:

a) Dealers log into the extranet, click on the product they want, put quantity they want etc. and submit the order (or the Dealers to directly put inquiring model number/quantity – both functions should be available). Two more functions should be available also, that, (a) dealers can work on the order placement input on off-line basis, and such order will be given to extranet once the PC gets connected with the extranet (b) dealers can place orders by scanning products barcode (Suppler I to provide dealers with a sheet showing barcode of each products – barcode of order quantity as well), the order will be given to extranet once PC gets connected with the extranet.

b) Extranet will be immediately communicated with AS/400-JBA, check products availability as well as credit line availability, and reply order acceptance/decline to the Dealer.

c)   Should the order be accepted, AS/400-JBA will automatically process the order.

d)   Should the order being declined/rejected, reason will be given to the Dealer. As well, the information will be notified to Supplier I sales administration immediately. Sales administration of Supplier I will contact the Dealer to discuss any counter-measure.

(3) Issues:

a)   Should be able to provide dealers with "easy operation".

b)   Connection between the extranet & AS/400-JBA – connect-ability, security issue, traffic issue, is there any possibility that the connection disturbs any other AS/400 JBA users etc..

c)   Should there be any technical difficulty in the JBA-extranet connection, we may go ahead without the connection. If this is the case, orders from dealers will be given to the extranet, the order incoming then is notified to sales administration of Supplier I via e-mail (from extranet), he or she will work on the order processing on manual basis (with AS/400, JBA), then order acceptance etc. will be notified to the dealers via phone/e-mail/fax etc. This "manual" function should be available in any case, to be prepared for any trouble at the AS/400-extranet connection.

(4) Order Quantity Design: adjustable EOQ

The EOQ model is adopted for this proposed system to calculate the optimal order quantity and to minimize the total inventory cost especially for product in Class A. Although it is widely used, the analysis for finding an economic order quantity has several weaknesses. The obvious one is the number of unrealistic assumptions for example, in reality; demand and cost are not known exactly, or marketing promotion and season are able to change the demand of customers. Hence:

Total cost per cycle = Unit cost + Reorder cost + Holding cost

$$TC = UC \times D + \frac{RC \times D}{Q} + \frac{HC \times Q}{2}$$

Theoretically, the demand and all costs are fixed, so the only variable on the right-hand side of the above equation is Q. The total cost per unit

time varies with Q, the reorder quantity. If there is the uncertainty in Demand and Costs, the value of total cost per cycle must be changed. Supposed, for example, the demand is forecast and contains a proportional error, E, so that an actual demand of D is forecast to be D x (1+E). Then the EOQ should be:

$$Q = \sqrt{\frac{2xRCxDx\,(1+E)}{HC}}$$

The resulting error in the variable cost should be:

$$\frac{VC}{VC_0} = \frac{1}{2} \times \left(\frac{1}{\sqrt{1+E}} + \frac{\sqrt{1+E}}{1} \right)$$

Similar analyses can be done for variations in costs. If, for example, an, actual reorder cost of RC is approximated by RC x (1+E) while an actual holding cost of HC is approximated HC x $(1+E_2)$ then an order quantity should be:

$$Q = \sqrt{\frac{2xRCx\,(1+E_1)xD}{HCx(1+E_2)}}$$

And the resulting error in the variable cost should be:

$$\frac{VC}{VC_0} = \frac{1}{2} \times \left(\frac{\sqrt{1+E_2}}{\sqrt{1+E_1}} + \frac{\sqrt{1+E_1}}{\sqrt{1+E_2}} \right)$$

For lead-time, the transportation cost and time are fixed. The dealers in Bangkok can receive products in twelve hours and the up-country dealers can receive products in one day after order releasing. This factor can be neglected from the calculation of the reorder level. The transportation company has been able to move products from the warehouse of Supplier 1 on time since 2001. It is one hundred percent on delivery reliability.

2.4) Products / Promotion / Event Information:

(1) Objective:

Dealers to be able to get any updated products / promotion / event information of Supplier I.

(2) Procedure:

By being connected with the extranet, dealers can see products / promotion / event information of Supplier I.

(3) Issues:

We may do it in PHASE 2 (other functions are more important compared with this. Also, we may not be able to prepared for the information supply in time).

3. Offers should include:

- PC supply to dealers (50 in 1st phase, + 200 in 2nd-3rd phase)
- Barcode Scanner supply to dealers
- Field / Call Center Service
- Web Page Construction / Maintenance (according to input/instruction by Supplier I) – web page don't have to be a sort of beautiful one.
- Server
- Server hosting (& maintenance) service
- ISP cost (for dealers as well as for Supplier I)
- Supplier 1 took responsibility to create the software, which was covert and licensed by supplier 1 so the software was not able to sell and demonstrate in public.

Next, the team created the software to be utilized in XYZ shop in February 2003 and then the on-line system was implemented at least 6 months. The data of inventory and business transaction will analyzed to compare with the same period of previous year.

Approaches of Ordering and Receiving ONLINE, Stock Management, and Information ONLINE

The function of online icon is to connect between XYZ company and Supplier I via the internet. However, before coming to this stage, the user must firstly select required items through OFFLINE icon.

How to order a product and adjust the number of product item?

The user can order any of the product models listed. To do this:

1. Click OFFLINE icon and then click OK.
2. Click the arrow icon of PRODUCT GROUP menu such as ACCESSORIES, HiFi, IT, and so on

3. Click the arrow icon of PRODUCT CATEGORY menu. For example, if the user need to purchase the HiFI product, he or she will see the sub-category product lists such as MINI COMPO, MEZZO, RACK SYSTEM.

4. When the user select required sub-category product list, the page will show the product list, transaction, stock level, minimum stock level, recommended order and quantity.

5. There are blanks for the user to fill the number of each model.

6. To do from 2 to 5 for selecting other product groups.

7. When the user finished with selecting required items, click the PURCHASE icon.

8. Click Dial-Up Networking to connect the Internet.

9. Click ONLINE icon.

10. If the user can access the on-line system, there will be show the page as follow.
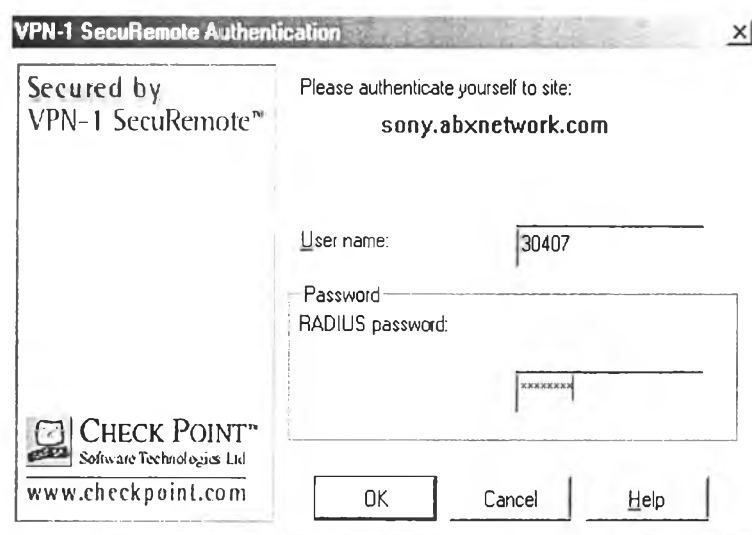
Figure 3.11 : *Security check*

11. The user has to fill in the blanks with correct **username** and **password**.

12. If the user can access this stage. there will be show the page as follow.

Figure 3.12 : *Process to confirm a purchased order*

13. The user clicks the PURCHASE icon and then the page of selected items list to buy will be displayed.

14. The user clicks the confirm button.

15. The user can know whether the selected items are able to delivered to the shop or not by clicking on the TRANSACTION LIST.

Figure 3.13 : *Transaction Lists and Purchasing Status*

16. If the number of each item shown zero, that means that model item is out of stock.

17. Next step is to receive the product. When selected item are delivered to shop completely, the user must click on GOODS RECEIVED icon shown on as follow. After finishing process, the stock level will be adjusted automatically with quantity and serial number of each product item.

Figure 3.14 : *Product Received*

18. This software offers the user more than just an online inventory management but, in fact, it also provides the user facility rather similar to the "internet-banking" allowing user to monitor their account online. However, further details on the advantages would be beyond the scope of the thesis therefore shall be left out.