EFFECTIVE MERCHANDISING SYSTEM OF LINGERIE COMPANY LIMITED

by

Ms. Duangdao Mahanavanont

A Final Report of the Three - Credit Course
CS 6998 System Development Project

Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science
in Computer Information Systems
Assumption University

November, 2000

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Project Title	Effective Merchandising System of Lingerie Company Limited
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Academic Year	November 2000

The Graduate School of Assumption University has approved this final report of the three-credit course, CS6998 System Development Project, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer Information Systems.

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ABSTRACT

This Effective Merchandising System is developed in order to increase production effectiveness and efficiency for all processes to be ready for increasing order in the near future. We have studied the current system and found that most of the flow is quite good but most of the processes are done by the manual system that creates a lot of problems. By using the new proposed system, it will help us to omit data and process redundancy and the most important things is reduced workload. Each officer will have more time to concentrate more on orders comparing to when using the old system. In this way, it will increase work efficiency and reduce work errors.

In the age of globalization, we cannot wait for the orders before starting our planning. We have to plan everything to be ready when the order comes. When we compare the time consumption between both systems, the new proposed system will create more free time by reducing some redundant jobs.

For the new proposed system, we did not create all the new things for users. On the other hand, we use same flows of works but we use the computerized system to support and make every process easier and faster. We have created database like a library when we need any information about a customer, product or supplier. We can access database directly. By using database technique, it will help the sales department a lot in order to be able to quote price and receive order on spot. We also make user manual for users to explain how to operate each function. We are sure that this system will increase more benefits and give us competitive advantage over other countries in global business situation.

ACKNOWLEDGEMENTS

For the success of this project, the writer would like to extend her appreciation to many people. Firstly, she would like to thank all instructors that gave all the valuable knowledge and gave her all the guidance to all the problems. She would like to give a special thanks to Assumption University that gives an opportunity for her to share her experiences in CIS.

Special thanks to "Lingerie Co., Ltd." that gives her all the chances to study each department in order to gather all the necessary information to complete this project.

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I. INTRODUCTION

1.1 Overview of the Project

In the present day, the most important things for competing with other countries in order to be the winner in the customer's mind is not the 4Ps concept (product, price, place, promotion) anymore. The most important things that we should have in order to compete with the others are the 4Cs concept (customer's need, communication, cost and commodity) so this "Effective Merchandising System" is created in order to support all the processes and increase efficiency for all the processes also. We will cut all the redundancy process and create the user-friendly interface in order to speed up the time for the production process and at the same time to avoid mistake that may occur in any processes.

1.2 Objectives of the Project

The objectives of "Effective Merchandising System" are listed as follows:

(1) To accelerate the production process.

(2) To make a clear - cut of production status in order to be able to solve the problems instantly when occurred.

(3) To analyze the existing manual system and change all the possible advantages into the computerized system.

(4) To design the graphic users interface in order to make it as easy as possible to perform with computer.

(5) To minimize the company costs due to the use of overlapped paperwork and mistake from the manual process.

(6) To minimize the human errors from paper works by using the computer to calculate all the necessary processes through the use of the new proposed computerized system.

(7) To provide up-to-date information and reports for production planning and sales forecast in order to set the pricing policy and strategy for quarterly meeting.

1.3 Scopes of the Project

This project will cover only the International Sales Department. We will emphasize on the merchandising system and treat this system as a Centralized unit. We will cover all the information and activities flowing in and out of this system. The effective Merchandising System will deal with 4 main factors as follows:

(1) Customer

(2) Production department

(3) Purchasing department

(4) Packing & Logistic department

We will show the existing system and the proposed system that will clearly show how "Effective Merchandising System" is operated.

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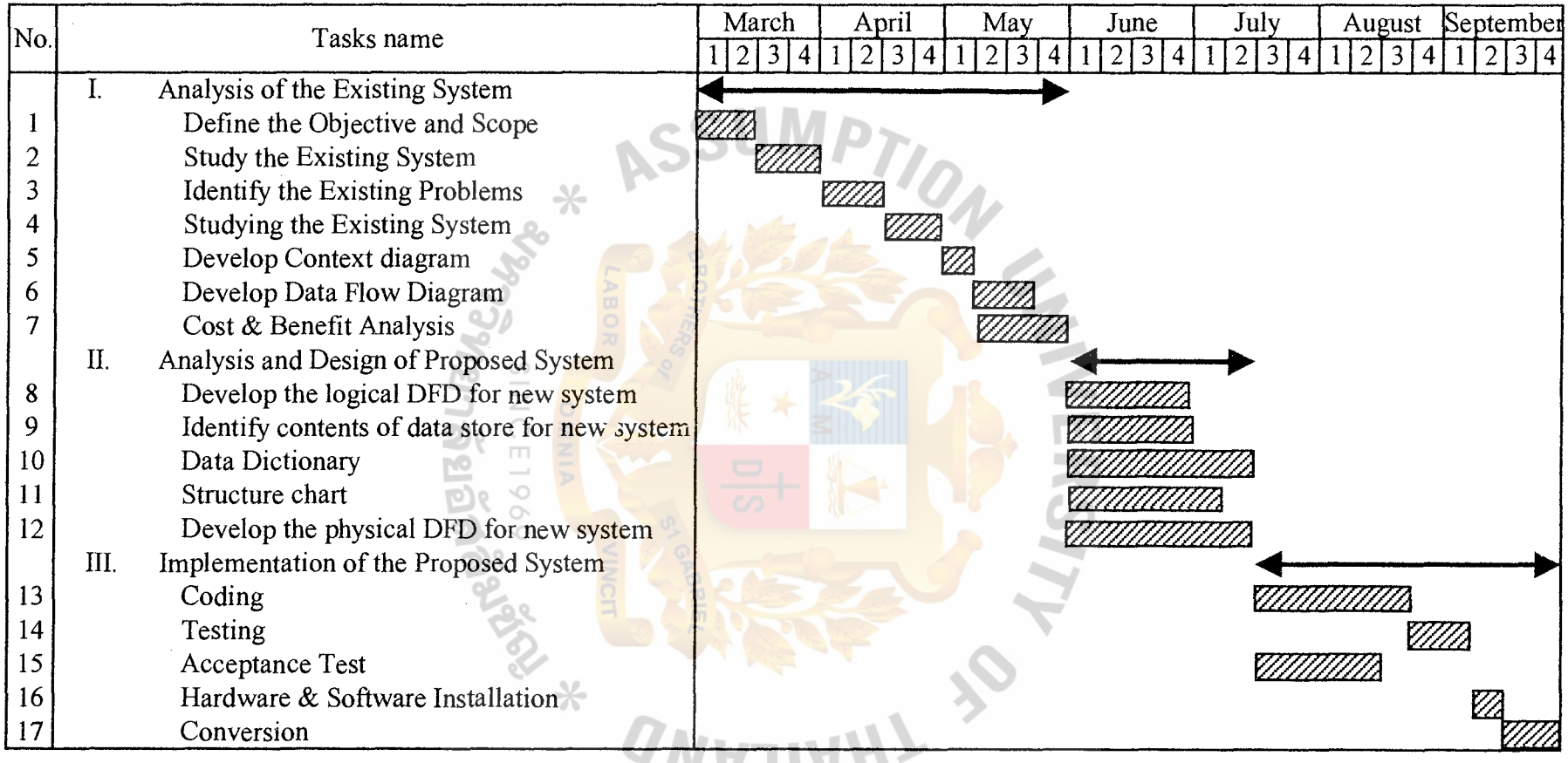

Figure 1.1. Project Plan of Effective Merchandising System.

II. THE EXISTING SYSTEM

2.1 Background of Lingerie Co., Ltd.

Due to the economic recession in Thailand, the exporting market plays the important role in order to solve the problem of unfavorable balance of trade. We have to bear in mind that there are a lot of competitors in the market. In the past, pricing strategy is the key point for competing. In fact, we have already stood at the edge for the pricing so we have to create the new selling point in order to attract the foreign customers. The lingerie market is not a standardized product markets. Most of the products are made to order. The main competitors for Lingerie markets are China (for cotton fabric), Turkey (for fancy fabric), Vietnam, Malaysia and Indonesia.

Our company "Lingerie Co., Ltd." is the affiliated company of "Jintana Apparel Co., Ltd." which is the largest exporter for Lingerie products in Thailand. Lingerie Co., Ltd. has 2 main markets – the local market under the brand of "Sabrina" and the export market. We have just started the exporting market since 1994. At the beginning, we emphasized more on the local market and we will produce for exporting in order to fulfill our production capacity (80% for the local market and 20% for the export market). For the past 3 years, the economy in Thailand is at a slow-down, so we decided to emphasize more for exporting (50% for export and 50% for the local market). The management system within the company is developed from the family business, but we try to make them to be systematic by using the computerized system to perform the routine works and minimize the use of human resources. We will use the human to perform the service job. The organization chart is shown in Figure 2.1.

The pricing strategy does not play the key role for export market at the moment, because usually various factories have used almost the same sources of raw material

which will not make too much a difference for costing. The key selling point for the export market is punctuality. We have to control all the processes from the beginning through the end process in order to make sure that they will be finished within their lead-time. So we try to change our manual system to be a centralized data system (report system) together with delegation of works to each department.

The reason that we have to centralize data is because usually the work will begin from Merchandisers and Merchandisers has to delegate works to each department according to the customers' requirement. Sometimes Merchandisers cannot control the works because they did not know the status of each process.

Usually Merchandisers will know the status of works when those works are completely finished or when those works are delayed. If we have the "Effective Merchandising System", all the departments have to report the up-to-date status of each process to the computerized system and we can retrieve the status of the product or necessary information about each customer from this system.

The new system will accelerate the processing time and we can notify the problem or the delay before those problems occur. We can recheck with this system whether each department performs according to the customers' requirement and within lead-time or not. Merchandisers can follow all the working process and be able to inform each customer if any problems occur.

This "Effective Merchandising System" will cover all the data concerning the customers' orders. Each department will have the terminals in order to follow their job status. This system will have the advantage of pushing and pulling reaction. Pushing reaction means each department will try their best to finish the job within lead-time, if they cannot finish the job it will have the overdue warning from the system. So if this job is delayed, the report will show that it has a problem from that department. All the

processes will be performed in cycle. That means we have to receive the job from another department in order to perform our own job. This will create "Pulling reaction". Each department will pull the job from the preceding department because if the job comes late, it will have not enough time for finishing the job.

This system will help us to make the production capacity planning. The export sales can check the status of the product that they have sold whether the samples will be made on time or not, if not they also will be able to check that the sample is in which process (you can see the relationship for each department from the context diagram).

This "Effective Merchandising System" will facilitate the processes for the entire department, remind about the lead – time for each department, and solve various problems occurring from the existing system and provide the real-time interface for Intranet communication within the organization.

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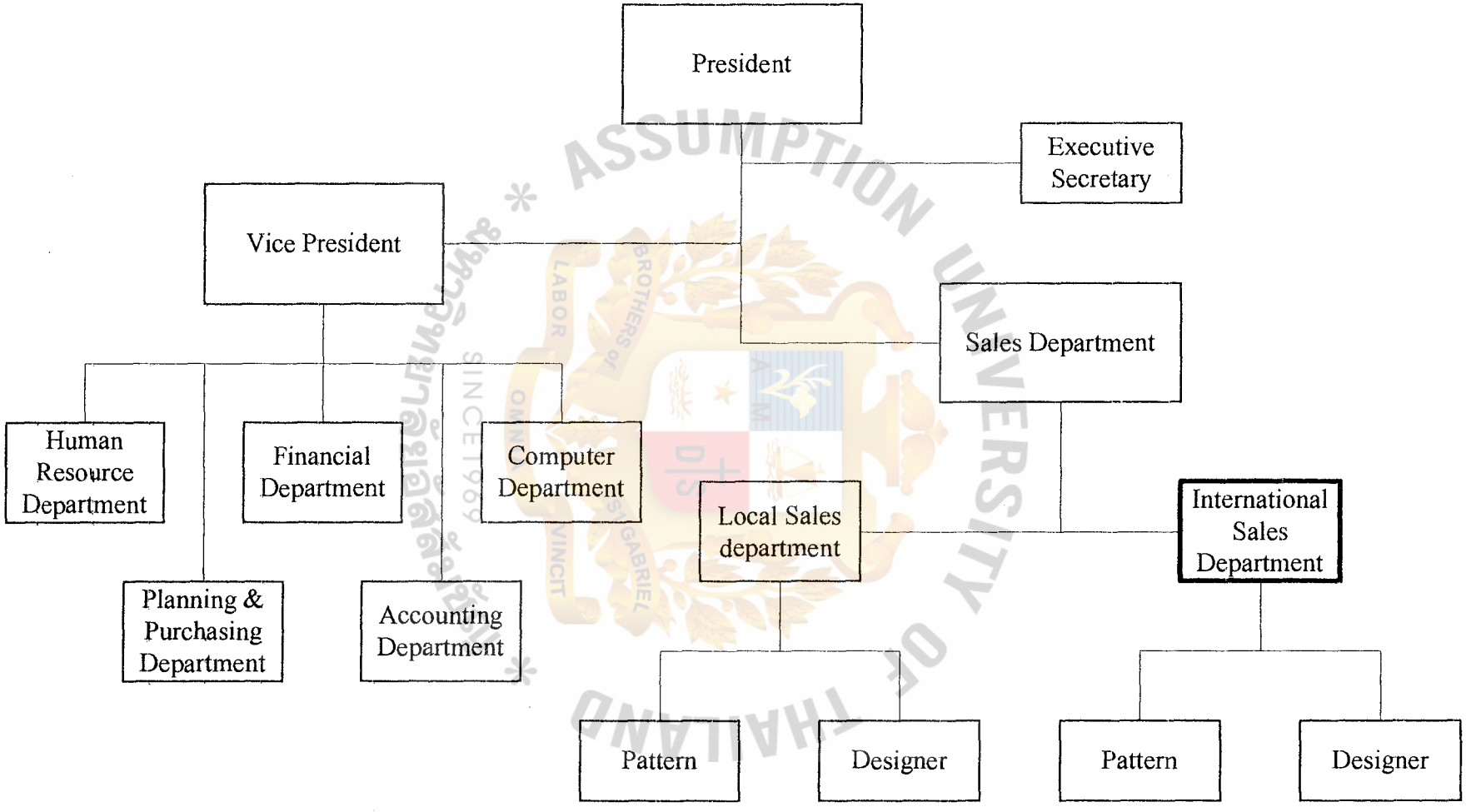

Figure 2.1. Organization Chart of Lingerie Co., Ltd.

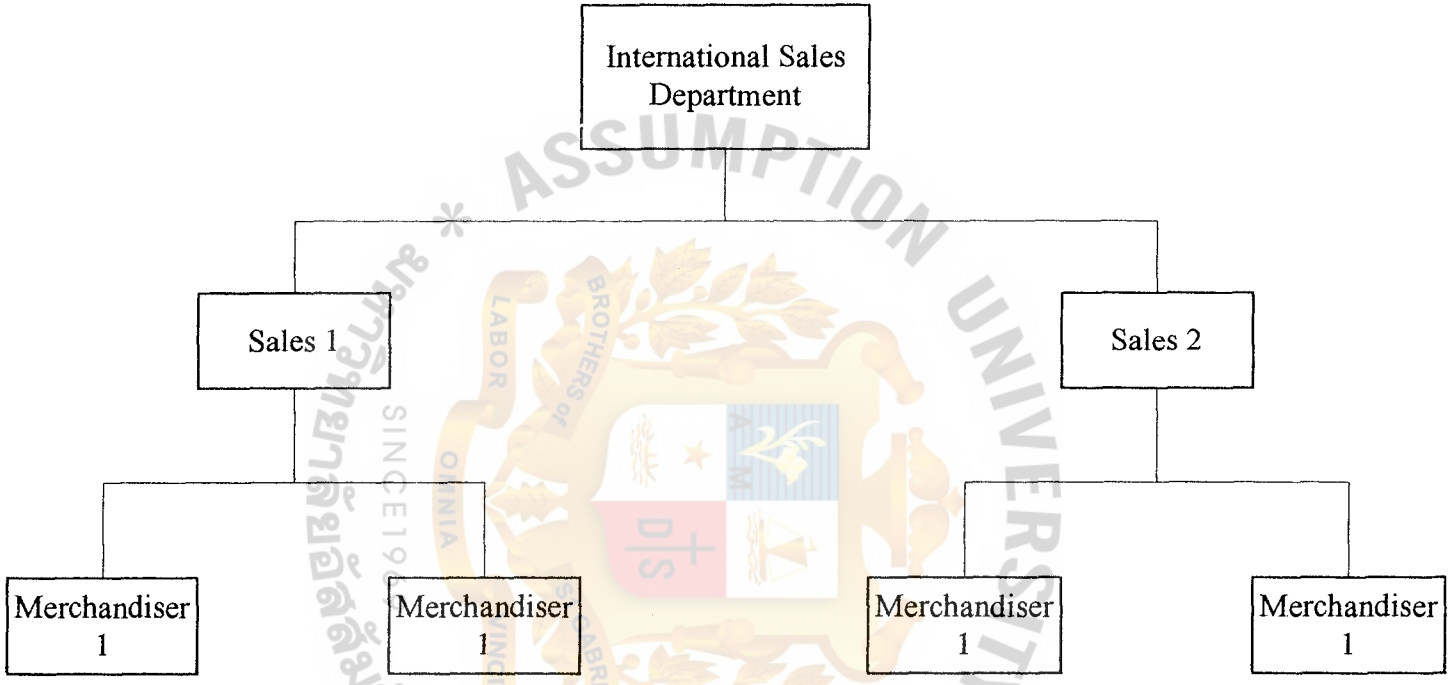

Figure 2.2. Organization for International Sales Department of "Lingerie Co., Ltd."

2.2 Existing Business Functions

The existing business functions that concern with Merchandise system can be classified into 4 main steps as follows:

(1) Preparing raw material formula

Raw material formula is the most important process to be followed. Every department will use the same formula to proceed with their work. For example for product department, they have to use the details of all raw materials from raw material formula in order to make samples for buyer's approval.

For purchasing department, they have to use this raw material formula to open the purchasing order for all suppliers. The Accounting department also has to use this raw material formula to calculate sales report and profit & loss report, and other similar reports.

(2) Preparing samples

Preparing samples process will cover the process after the customers decided to place the order until the samples are finished being made from the sample room. This process will deal with Purchasing department, Product department and supplier.

(a) After selling

This process will concern about preparing the sample. After receiving the requirements from the customers, we will use all the requirements to update the raw material formula in order to calculate the cost of the product. When we finished updating the raw material formula, we will send this raw material formula to the purchasing

department in order to prepare BOM (Breakdown Of Material requirement).

(b) Assign color code

After receiving the purchase contract from the customer, we have to assign the color code. We will create new color code for all the colors except the repeated color with the same fabric from the same supplier only in order to avoid the color-matching problem. After assigning the color code, we have to send the masterpiece of the color to the supplier to make lab-dip for the customer approval. We have to record the color_code into the production order in order to specify the color of all the raw materials and accessories.

(c) Prepare sample

After the Purchasing department has received the raw material formula (the updated one) from Merchandiser, the Purchasing department will use this raw material formula to calculate the raw material requirement. At the same time, the Purchasing department has to acquire the actual quality of raw material but may be in available color for making the fitting sample, if that fabric is not available in the factory we will ask the sample yards from the supplier for making samples.

(3) Production Process

The production process starts from the cutting of the fabric until the product is finished being sewn. This process is very important because we have to control the quantity of cutting fabric pieces. Usually the customers did not accept the finished goods to be more than +/- 5% different.

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(a) Marking Process

After the size set sample is approved, the product department has to prepare the production paper pattern for the cutting process. In case of repeating order, we will be able to retrieve the marking pattern from the marking file, which will save a lot of time for this process. After finishing the pattern marking on the computer we will use a plotter machine to print out the marking sketch into the paper pattern and send it to the cutting process.

(b) Cutting Process

The marking pattern will be sent to the cutting process in order to cut the fabric according to the paper pattern. The Purchasing department will provide the raw material for specific order to the cutting room. After cutting the fabric into pieces, we have to record the cutting amount into daily cutting report order to make the production plan. We used a barcode attached to the bundle of fabric cutting for ease of counting the fabric cutting and calculating labor cost for the sewing process.

(c) Sewing Process

All the fabric cutting will be sent to the sewing factory. We used the barcode from the cutting process for calculating the sewing capability per day per worker. This barcode will be used for calculating the wages also. After finishing the sewing process, all the finished goods will be passed to the packing & logistic department.

(4) Packing & Logistic Process

This process has 2 main functions, which are purchasing the packing accessories and packing the finished goods according to the packing details.

(a) Purchasing accessories for packing

After receiving the packing details file, this process will prepare the packing requirement and send packing details to the purchasing department in order to issue P/O for packing accessories.

(b) Packing Process

After receiving all the packing accessories, the packing and logistic department will start the packing process. After finishing the packing process, they will send all the packed finished goods to the customers.

At the moment all the processes are done by the manual system that takes a lot of time and has a lot of human errors. The reason that there are a lot of human errors is because we have to remake the paper work from 1 department to another department and that creates a lot of jobs to complete for 1 process and if the paper work is lost, there are no signals to warn the users.

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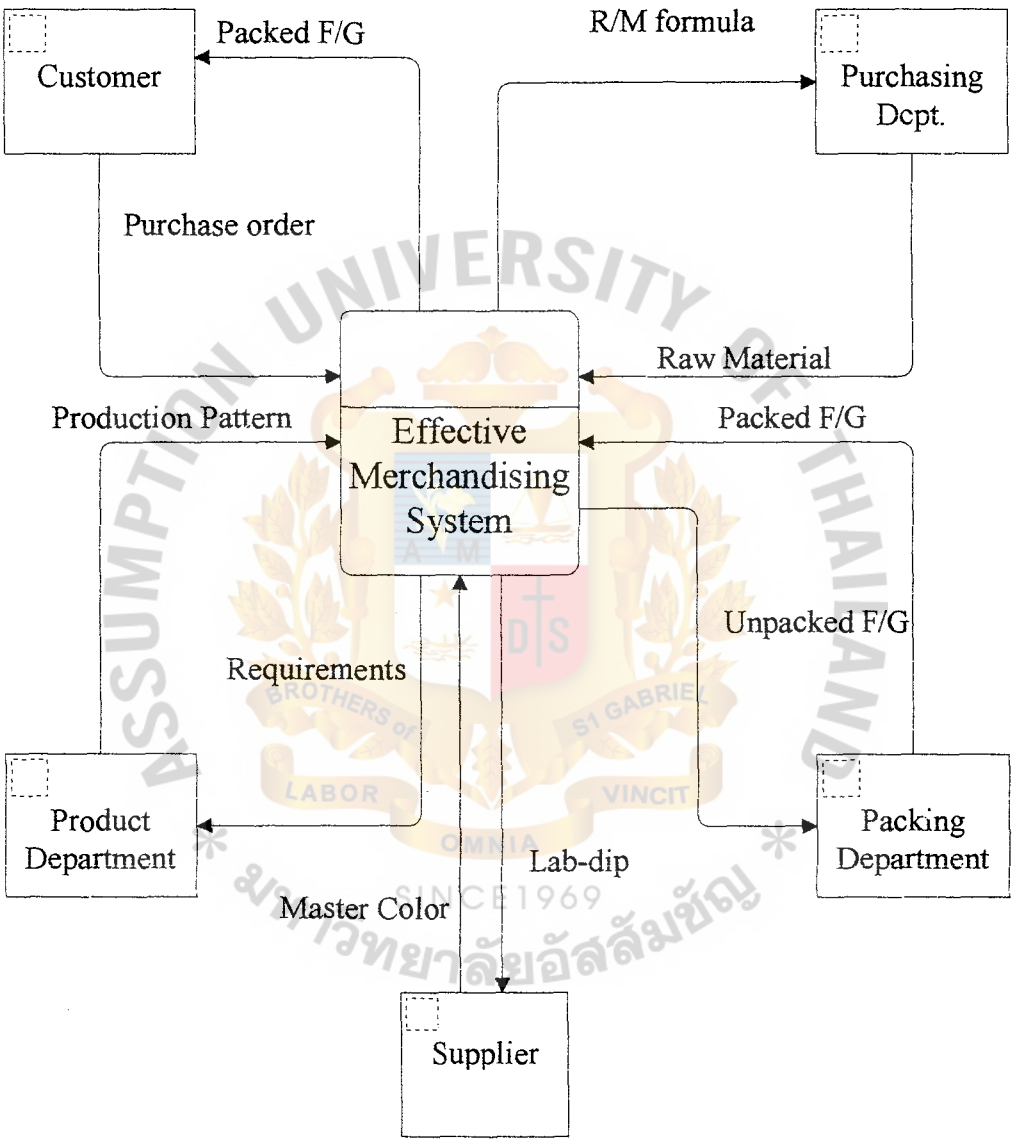

Figure 2.3. Context Diagram of the Existing System.

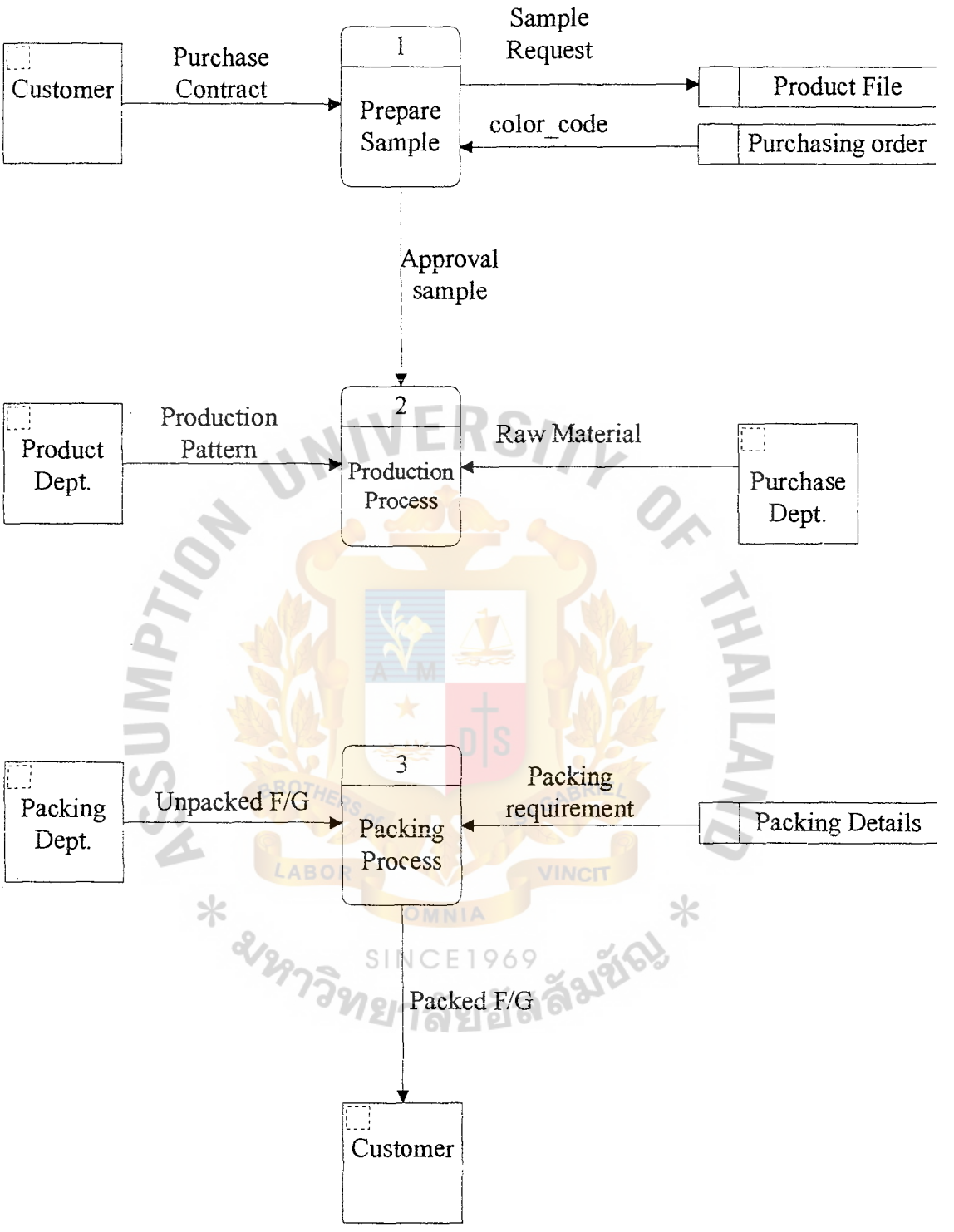

Figure 2.4. Data Flow Diagram Level 0 of the Existing System.

2.3 Current Problems

After analyzing all the users from all the processes, we found that there are many problems occurred from the current procedure. We will list out all the current problems that affect the performance efficiency as follows:

(1) The problem of Accuracy. When we pass the production sheet to the purchasing department, they have to retype all the raw material formula in order to make BOM. This process can create the incorrect typing that creates a lot of problems. For example if we order slides & ring size of 15 mm., in order to use with elastic shoulder strap of a width of a 15 mm., but the purchaser has mistyped it to 13 mm., it means that we have to waste money for all slides & ring size 13 mm. Thus, we have to re-order slide & ring size 15 mm. Again. It will create a big problem in case that we cannot re-order the new one in time so we have to pay air-freight for the whole lot of finished goods due to the wait only for slide & ring to finish the garment. Another most important factor that causes data not to be accurate is because all the data is stored by paperwork that can be stolen, torn, burnt, etc. If the data is destroyed, it will affect the decision-making process a great deal.

(2) Problem of Timeliness. Every department has their own system and documentation. After receiving the paper work from the previous process they have to convert all the details into their own system. Our company and factory are located separately and when we would like to recheck some details we have to waste a lot of time waiting for the factory to find the details and report back to the head office. This problem can be solved if we use the same system and use the computer system to make LAN so we can retrieve any information that we want at anytime.

(3) Problem of capacity. This problem occurred because we have to make all paper work manually and there is a lot of paperwork for each process. The purchasers have to make BOM and use this BOM to open all the purchasing orders. They have to type all the details by themselves. There is no problem when we have only a few orders per month. But when the number of orders are increasing a lot, the purchasers have to a take long time to complete all the documents for all the orders. As all the processes have their own lead-time, even if only 1 process is delayed it may affect shipment date. In the worst case, we may be forced to pay airfreight cost because of this delay.

2.4 Benefits from the New Proposed System

The benefits from the new proposed system can be described as follows:

(1) We can minimize human errors from each process.

(2) We can accelerate the production process in order to compete with other competitors.

(3) We can reduce paper work from all processes and make all the paperwork into the standard forms that will be used for all departments.

(4) All the processes can be monitored and controlled from all departments so when the problems occur we can solve them instantly.

(5) We can shorten production lead-time if all the processes are done within their time schedule. This will gain more profit for company.

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III. THE PROPOSED SYSTEM

3.1 System Specification

Before we go deep into details for System Design, we have to analyze all the problems that occurred from the old system and find the way to resolve all the problems as much as we can by using the new proposed system. There are many ways to gather information but the most important concerns the users. We conduct group interview from all the departments related to "Merchandising System" in order to collect all the problems occurred from current system and gather all the users' needs and expectations from the proposed system. We also gather all the form documents used by the current system in order to analyze whether there are some redundant information or not. After we have collected all the information we will design all the input and output interface for the whole merchandising system. You can see the new context diagram for the proposed system and the data flow diagram as follows:

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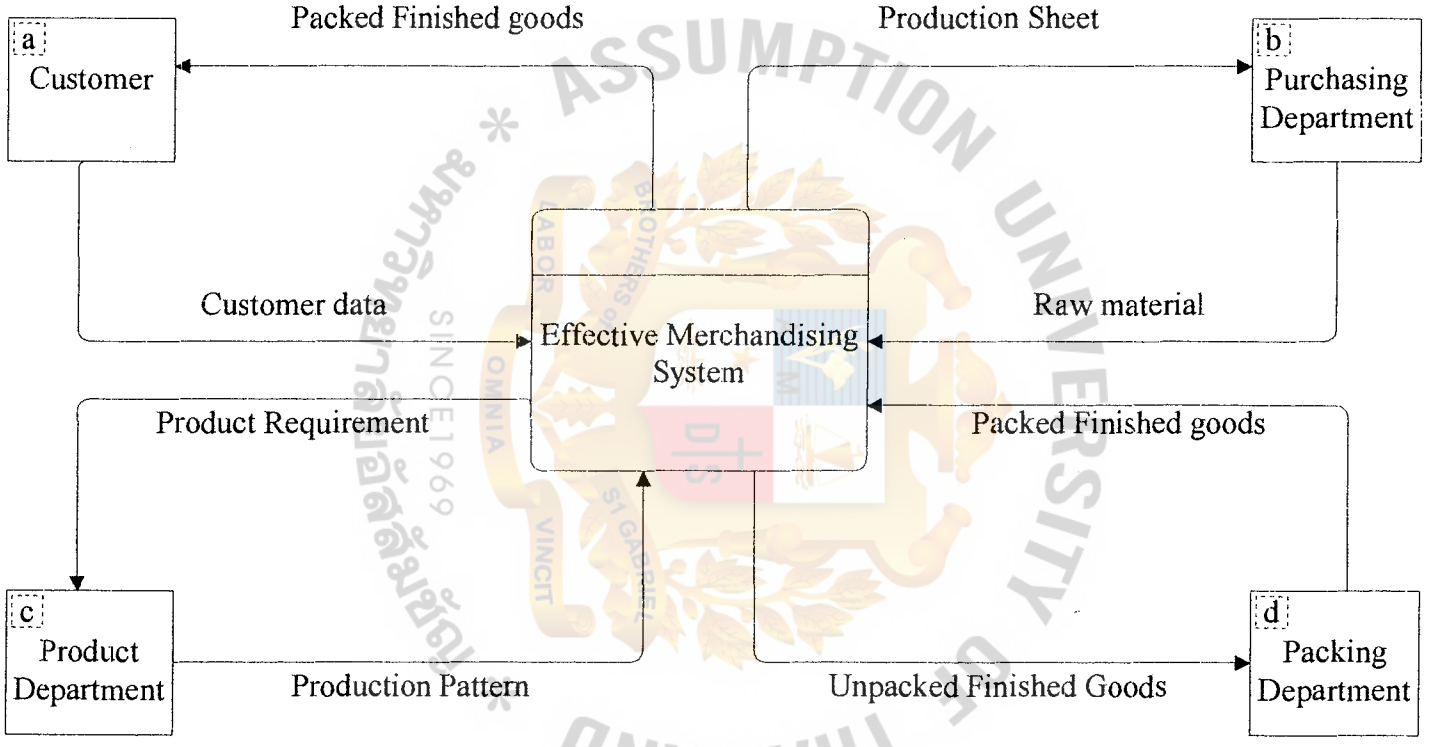

Figure 3.1. Context Diagram of the Proposed System.

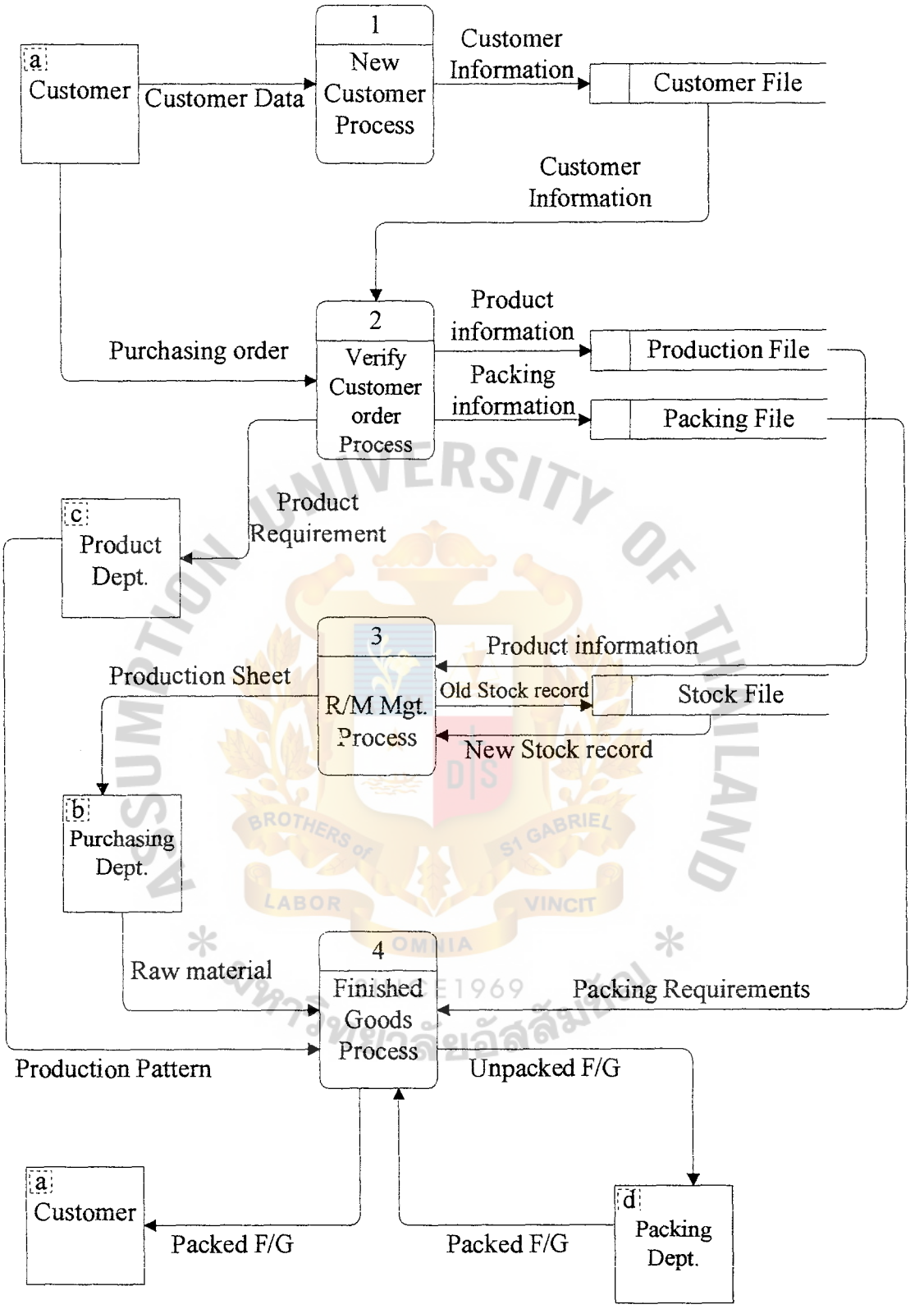

Figure 3.2. Data Flow Diagram Level 0 of the Proposed System.

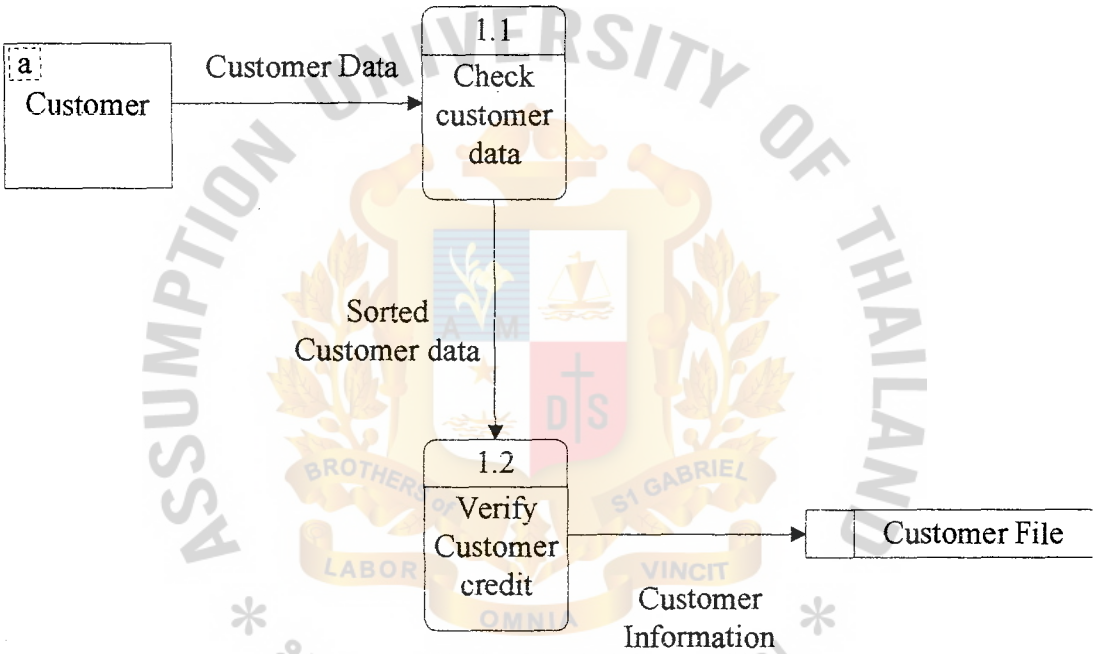

Figure 3.3. Data Flow Diagram Level 1 of the Proposed System.

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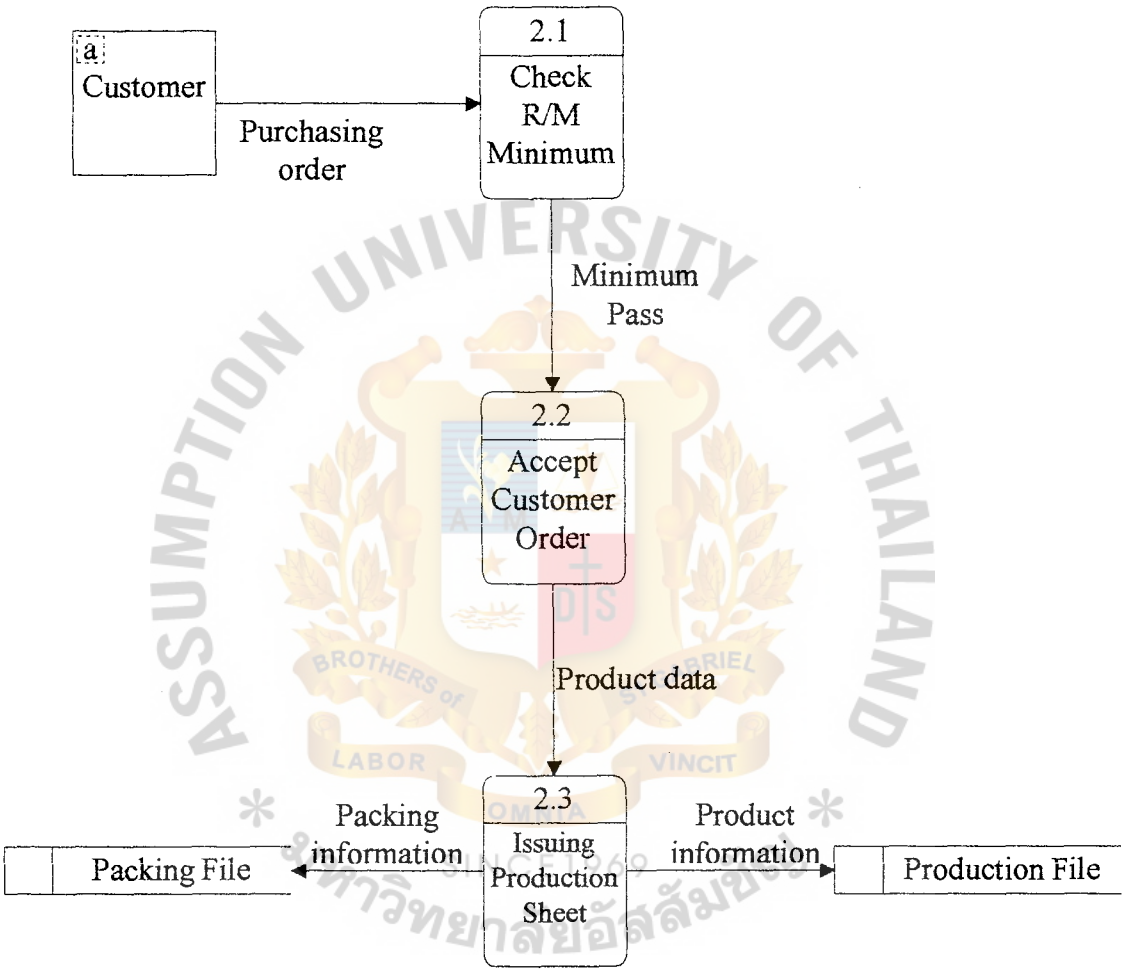

Figure 3.4. Data Flow Diagram Level 2 of the Proposed System.

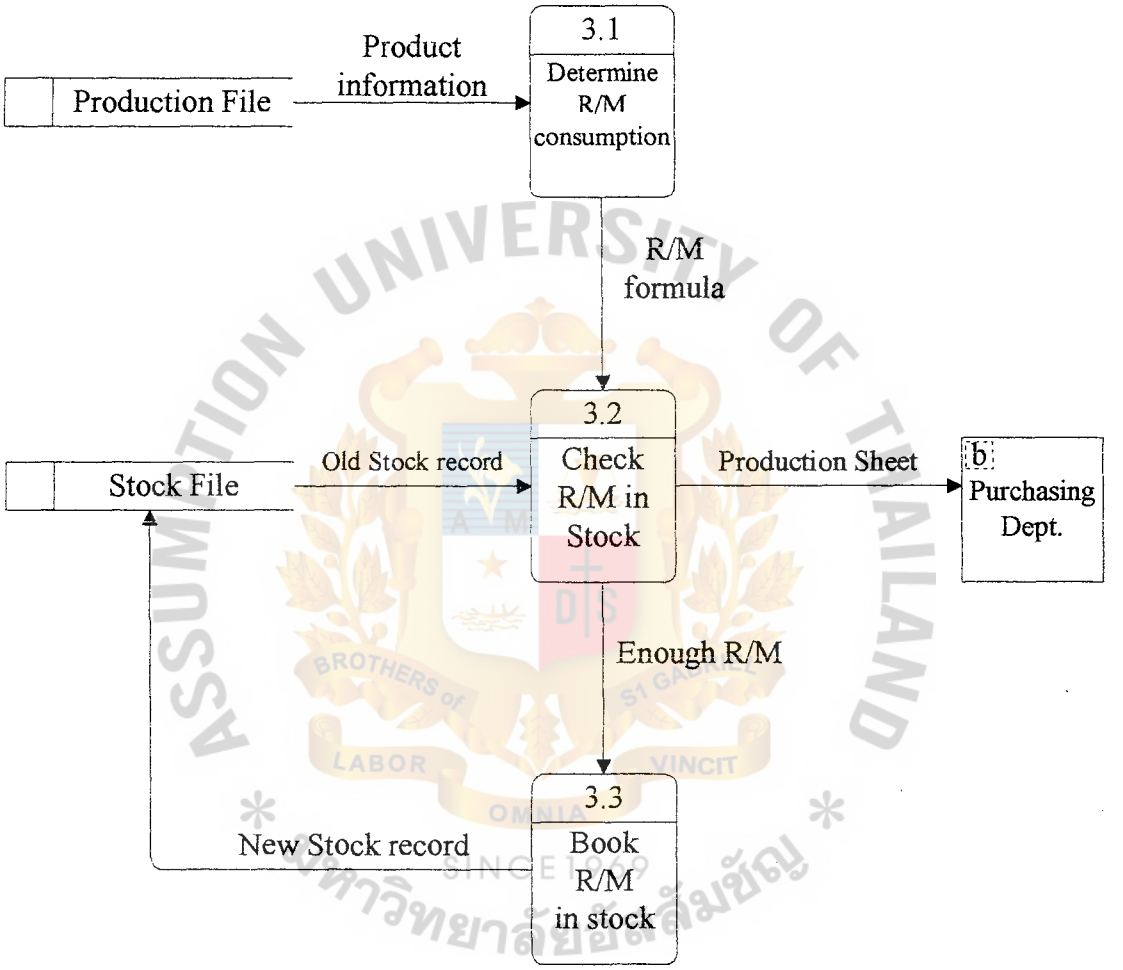

Figure 3.5. Data Flow Diagram Level 3 of the Proposed System.

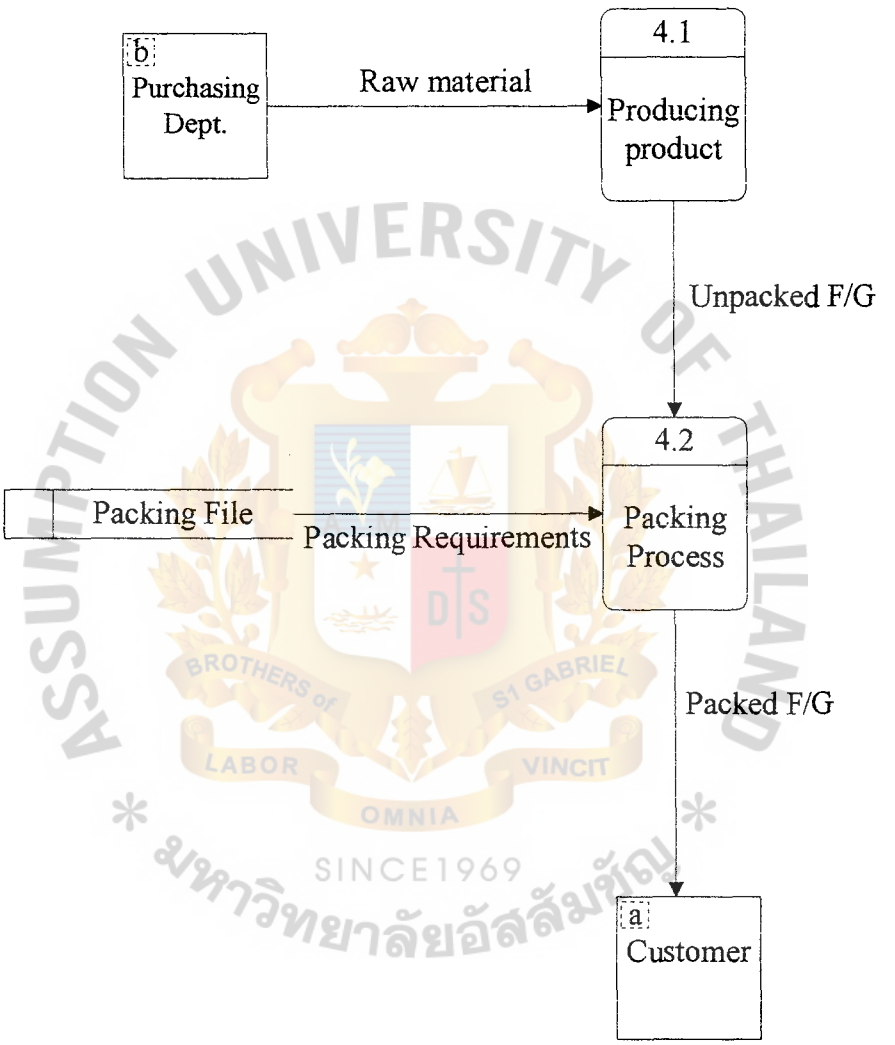

Figure 3.6. Data Flow Diagram Level 4 of the Proposed System.

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3.2 System Design

For system design we will emphasized on input and output interface only. The input screen will cover all the input for database also. The reasons that we have emphasized on input and output interface are as follows:

Input process is very important because if we input wrong data all the processes will be wrong. Most of the input processes will be done via screen interface. So we will design as easy input interface as possible. Input requirements are listed as follows:

(1) easy to understand

(2) have complete necessary information

(3) have enough security for each function

(4) can detect the error from human error

(5) can link with database

(6) faster than the current program

Output process is very important for reporting system in order to check and rate performance, so most of output processes will be in the form of reporting. Reports are very important for management concerning decision making and future prediction. We will create report for each function in order to make it easier to find out system error for future correction plan. Output requirements are the same as input interface but this output screen will refer to database system that can be classified into output screen and report screen as shown below:

(1) Customer File report

(2) Supplier File report

(3) Production sheet report

(4) Purchasing order report

(5) Lead-time control sheet

3.3 Hardware and Software Requirement

From the current system, we have done each process separately so we used quite a limited quantity of hardware and software package. But when we create the new proposed system the aim is to centralize all the processes to the main database in order to have up-to-date information for all processes. We have to invest more for hardware and software requirements.

3.3.1 Hardware Requirements

(1) Server (for database)

CPU Intel Pentium III 500

SD RAM 128 MB Bus 133 MHz

Cache memory 512 MB

Hard Disk 20 GB

Large Tower Case

CD ROM 50x

Disk Drive 1.44 MB

Monitor 16" Super VGA Color-digital screen

Keyboard 104 keys English/Thai support Window 98 and NT

Mouse

(2) Client Computer 4 sets

CPU Intel Pentium II MMX 300

RAM 64 MB

Hard disk 4.2 GM

Mini Tower Case

Disk Drive 1.44 MB

LAN card

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Monitor 14" SVGA

Keyboard 104 keys English/Thai support Windows 98

Mouse

(3) Printer 4 sets

3 sets dot matrix EPSON 2170

1 set Laser Jet HP2100

(4) UPS (Uninterruptible Power Supply) 1 KVA 1 set

3.3.2 Software Requirements

(1) Microsoft Window 98 (Thai Edition)

(2) Microsoft Visual Studio 98

(3) Microsoft Office 2000 Professional Edition

(a) Microsoft Word

(b) Microsoft Excel

(c) Microsoft Access

(4) SQL Database Software

(5) Adobe Acrobat Software

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Table 3.1. The Hardware Specification for Server Machine.

Hardware	Specification
CPU	Intel Pentium III 500
Cache	512 MB
Memory	128 MB
Hard Disk	20 GB
CD-Rom Drive	50X
Floppy Drive	1.44 MB
Display	16" Super VGA
Printer	Dot Matrix (EPSON LQ2170)
UPS	1 KVA

Table 3.2. The Software Specification for Each Server Machine.

Software	Specification
Operating System	Microsoft Windows 98 (Thai Edition)
Application Software	1) Microsoft Visual Studio 98 2) Microsoft Office 2000 Professional Edition 3) SQL Database System

Table 3.3. The Hardware Specification for Each Client Machine.

Hardware	Specification
CPU	Intel Pentium II MMX300
Cache	64 KB
Memory	64 MB
Hard Disk	4.2 GB
Floppy Drive	1.44 MB
Display	14" Super VGA
Printer	Dot Matrix (EPSON LQ2170), Laserjet HP2100

Table 3.4. The Software Specification for Each Client Machine.

Software	Specification
Operating System	Microsoft Windows 98 (Thai Edition)
Application Software	1) Microsoft Visual Studio 98 2) Microsoft Office 2000 Professional Edition 3) Adobe Acrobat

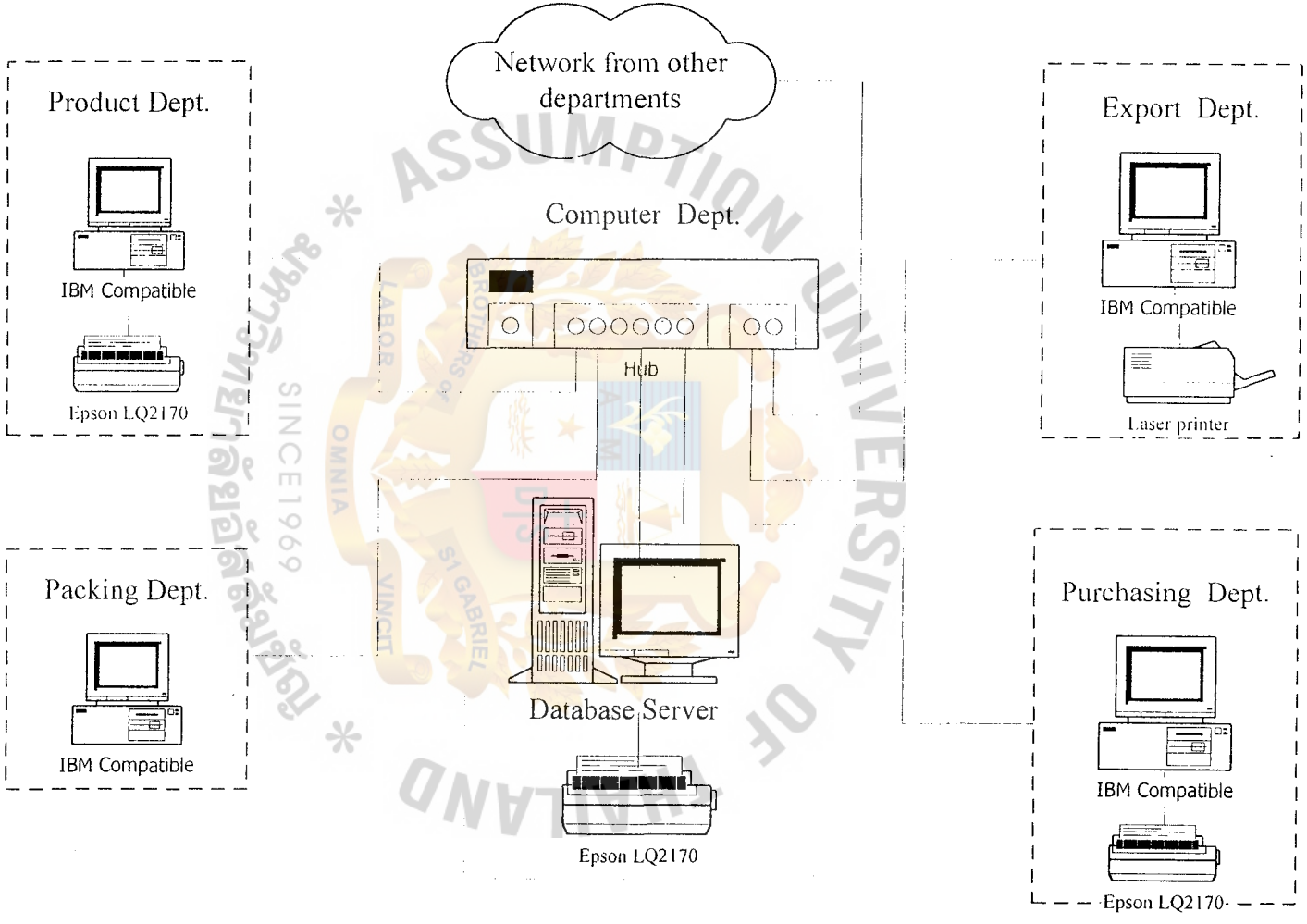

Figure 3.7. The Hardware Configuration of Lingerie Co., Ltd.

3.4 Security and Control

We have used different kinds of controls for each process in order to prevent any errors that may occur during the process. We have discussed each control as follows:

3.4.1 Input Control

We have controlled errors that may occur during input process by creating form control. Using form for input process will prevent error from key-in procedure as:

(1) We have created form name for each job and each form will have running form no. that is created by the computer system. So in this way it will help us to make sure that all the data in is complete.

(2) Within each data form, the computer system will create modified date and completed date. When the users have completed filling in all the data, they will click the send button that will create completed date in that data. This method will help us to make sure that all the information is completed.

(3) We also create security for each form. That means specific users can access each form. Users have to enter their passwords before accessing to each form. The reason that we have to create a password for each user is because we would like to make sure that only authorized persons will be able to modify the data only. This will help us to reduce incorrect data. The most important factor for this login password is database login. Because all the information within the database will be concerned about cost and sales price that we have to keep secret. And all the database has to be backed up every month.

3.4.2 Input-Transmission Control

Even if we can prevent some errors from the data input process, we still face human error problems in that we cannot control everyone to make everything correct. So we have to have some errors control during input-transmission as follows:

(1) We use Flashback (echo) checks to reduce the number of typing that key-in users have to type. When a user types customer id, all the details about customer's name, address, terms of payment, etc. will be shown. By this technique, the user can recheck whether he/she have keyed in the correct data or not.

(2) We will set a computer system to warn back to the sender if the receiver cannot open or receive any files. This technique is called "Journaling". It will help the user to make sure that all the data sent to the factory has been received. Users can retrieve all the files that they have sent to anybody by using their password logins.

(3) We used UPS (Uninterruptible Power Supply) to prevent data lost in case of electricity shortages. This will help us to save all the necessary data during data transmission.

3.4.3 Output Controls

(1) We used login password controls for this output control in order to prevent unauthorized persons from accessing output screen and report.

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3.5 Cost-Benefit Analysis

After reviewing the entire current program and analyzing all the costs compared with those of the proposed system, we can breakdown all costs and benefits generated from both systems for investment decision making.

All the costs occurred can be seen in Table 3.5 which also shows all the costs and benefits generated from the new proposed system. After comparing, we can conclude that this proposed system have more benefits than costs that will support decision making for investment. We have to pay more for first two years by using the new proposed system because of investment cost.

We have broken down all costs from the existing system (see Table 3.6) and all costs from the proposed system (see Table 3.9) and we have matched both systems together to see which system is more efficient (see Table 3.10). We use fewer officers for the proposed system (the current system uses about 12 staffs but the new proposed system uses only 5 staffs). After calculating all the figures, we have created 5 years accumulation for both systems to see the long-tem costs (see Table 3.7 and 3.8). You can see that the current system has increasing more cost every year. But for the proposed system, the percentage of increasing cost will be reduced from year 3 onward.

The main reason for making cost-benefit analysis is to see how many years we can return all the investment cost back. This is a critical point from management's point of view. And all the breakeven points and payback periods are shown in Figure 3.7 and Figure 3.8. The payback period for the new proposed system is 3 years and 3 months that comes from

(1) We get year of payback period by referring to Table 3.11, you can see the within forth year the benefits derived from operation of new system is more

than cumulative time-adjusted costs over lifetime. That means we get back all cost during third year.

(2) Find total cost increase during third year

Benefit during third year = 190,844.73 – (-58,337.84)

= 249,182.57

Benefit per month = 249,182.57/12 months

= 20,765.2145

Cumulative time-adjusted cost 4th year = (-1,202,665.94)

Cumulative time-adjusted cost 3rd year = (-1,141,098.83)

So cumulative time-adjusted cost during 3rd year

= (-1,202,665.94) - (-1,141,098.83)

= (-61,567.1055)

(3) Calculate the month of pay back period by

Bring cost during third year / benefit per month

= (-61,567.1055)/ 20,765.2145

= -2.96 approximate 3 months

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Table 3.5. Cost / Benefit analysis of Proposed System, Baht.

Cost Items	Price
Investment Costs:	
Hardware Cost	660,000.00
Software Cost	300,000.00
Development Cost	60,000.00
Implementation Cost	81,550.63
Total Investment Cost	1,101,550.63
Annual Operation costs:	
Maintenance Cost	96,150.00
Supply and Utility Cost	243,127.78
Total Operation Cost	339,277.78
Total Cost	1,440,828.40
Benefit Expected:	
Tangible Benefits:	
Reduce Manual Operation Cost	1,922,919.68
Reduce Office Utility and Supply Cost	403,371.08
Total Benefit	2,326,290.76

Table 3.6. Existing System Cost Analysis, Baht.

Cost Items	Years				
	1	2	3	4	5
Fixed Cost					
Type writer 4 units @ 5,000	20,000.00	1,000.00	1,000.00	1,000.00	1,000.00
Calculator 8 units @ 800	6,400.00	320.00	320.00	320.00	320.00
Total Fixed Cost	26,400.00	1,320.00	1,320.00	1,320.00	1,320.00
Operating Cost					
Salary Cost:					
Manager 2 persons @	50,000.00	52,500.00	55,125.00	57,881.25	60,775.31
Input officer 4 persons @	30,000.00	31,500.00	33,075.00	34,728.75	36,465.19
Checker 4 persons @ 7,500	30,000.00	31,500.00	33,075.00	34,728.75	36,465.19
Total monthly salary cost	110,000.00	115,500.00	121,275.00	127,338.75	133,705.69
Total annually salary cost	1,320,000.00	1,386,000.00	1,455,300.00	1,528,065.00	1,604,468.25
Office Supplies & Utility Cost:					
Stationary Per Annual	12,000.00	12,600.00	13,230.00	13,891.50	14,586.08
Paper Per Annual	50,000.00	52,500.00	55,125.00	57,881.25	60,775.31
Data Transportion Per Annual	20,000.00	21,000.00	22,050.00	23,152.50	24,310.13
Miscellaneous Per Annual	15,000.00	15,750.00	16,537.50	17,364.38	18,232.59
Utility Cost	20,000.00	21,000.00	22,050.00	23,152.50	24,310.13
Total Annual Office Supply & Utility	117,000.00	122,850.00	128,992.50	135,442.13	142,214.23
Total Annual Operating Cost	1,437,000.00	1,508,850.00	1,584,292.50	1,663,507.13	1,746,682.48
Total Existing System Cost	1,463,400.00	1,510,170.00	1,585,612.50	1,664,827.13	1,748,002.48

Table 3.7. Five Years Accumulated Existing System Cost, Baht.

Year	Total Manual Cost	Accumulated Cost
1	1,463,400.00	1,463,400.00
2	1,510,170.00	2,973,570.00
3	1,585,612.50	4,559,182.50
4	1,664,827.13	6,224,009.63
5	1,748,002.48	7,972,012.11
Total	7,972,012.11	-

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Table 3.8. Computerized System Cost Analysis, Baht.

Cost items	Years				
	1	2	3	4	5
Fixed Cost					
Hard ware Cost:					
Computer Server Cost	100,000.00	5,000.00	5,000.00	5,000.00	5,000.00
Client Computer Cost	200,000.00	10,000.00	10,000.00	10,000.00	10,000.00
Other Hard ware Cost	250,000.00	12,500.00	12,500.00	12,500.00	12,500.00
Total Hardware Cost	550,000.00	27,500.00	27,500.00	27,500.00	27,500.00
Maintainance Cost:					
Maintainance Cost	-	-	30,000.00	31,500.00	34,650.00
Total Maintainance Cost	-	-	30,000.00	31,500.00	34,650.00
Software Cost:					
Software Cost	250,000.00	12,500.00	12,500.00	12,500.00	12,500.00
Total Software Cost	250,000.00	12,500.00	12,500.00	12,500.00	12,500.00
Development Cost:					
Development Cost	60,000.00	-	-	-	-
Total Development Cost	60,000.00	-	-	-	-
Implementation Cost:					
Basic Training Cost	30,000.00	3,000.00	3,150.00	3,307.50	3,472.88
Set up Cost	30,000.00	2,000.00	2,100.00	2,205.00	2,315.25
Total Implementation Cost	60,000.00	5,000.00	5,250.00	5,512.50	5,788.13
Office Equipment Cost:					
Calculator 2 units @ 800	1,600.00	80.00	80.00	80.00	80.00
Total Office Equipment Cost	1,600.00	80.00	80.00	80.00	80.00
Total Fixed Cost	921,600.00	45,080.00	75,330.00	77,092.50	80,518.13

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Table 3.8. Computerized System Cost Analysis (Continued).

Cost Items	Years				
	1	2	3	4	5
Operating Cost					
Salary Cost:					
Computer Manager 1 person @ 45,000	45,000.00	47,250.00	49,612.50	52,093.13	54,697.78
Input officer 4 person @ 9,000	36,000.00	37,800.00	39,690.00	41,674.50	43,758.23
Total monthly salary cost (Baht)	81,000.00	85,050.00	89,302.50	93,767.63	98,456.01
Total annually salary cost (Baht)	972,000.00	1,020,600.00	1,071,630.00	1,125,211.50	1,181,472.08
Office Supplies & Miscellaneous Cost:					
Stationary Per Annual	6,000.00	6,300.00	6,615.00	6,945.75	7,293.04
Paper Per Annual	20,000.00	21,000.00	22,050.00	23,152.50	24,310.13
Miscellaneous Per Annual	8,000.00	8,400.00	8,820.00	9,261.00	9,724.05
Total Annual Office Utility Cost	10,000.00	10,500.00	11,025.00	11,576.25	12,155.06
Total Annual Office Utility and Supply Cost	44,000.00	46,200.00	48,510.00	50,935.50	53,482.28
Total Annual Operating Cost (Baht)	1,016,000.00	1,066,800.00	1,120,140.00	1,176,147.00	1,234,954.35
Total Computerized System Cost (Baht)	1,937,600.00	1,111,880.00	1,195,470.00	1,253,239.50	1,315,472.48

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Table 3.9. Five Years Accumulated Computerized Cost, Baht.

Year	Total Computerized Cost	Accumulated Cost
1	1,937,600.00	1,937,600.00
2	1,111,880.00	3,049,480.00
3	1,195,470.00	4,244,950.00
4	1,253,239.50	5,498,189.50
5	1,315,472.48	6,813,661.98
Total	6,813,661.98	-

Table 3.10. Payback Analysis, in Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development cost:	-921,600.00					
Operation & maintainnance cost(5% increase annually):	0.00	-89,080.00	-91,530.00	-94,102.50	-96,803.63	-101,643.81
Discount factors for 12%:	1.00	0.89	0.80	0.71	0.64	0.57
Time-adjusted costs (adjusted to present value):	-921,600.00	-79,548.44	-72,949.41	-67,000.98	-61,567.11	-57,632.04
Cumulative time-adjusted costs over lifetime:	-921,600.00	-1,001,148.44	-1,074,097.85	-1,141,098.83	-1,202,665.94	-1,260,297.97
	-					
Benefits derived from operation of new system:	-	445,800.00	443,290.00	465,392.50	488,600.13	512,968.13
Discount factors for 12%:	-	0.89	0.80	0.71	0.64	0.57
Time-adjusted benefits (adjusted to present value):	-	398,099.40	353,302.13	331,359.46	310,749.68	290,852.93
Cumulative time-adjusted benefits over lifetime:	-	398,099.40	751,401.53	1,082,760.99	1,393,510.67	1,684,363.60
Cumulative lifetime time-adjusted costs + benefits:	-921,600.00	-603,049.04	-322,696.32	-58,337.84	190,844.73	424,065.63
Return on Investment						424,065.63

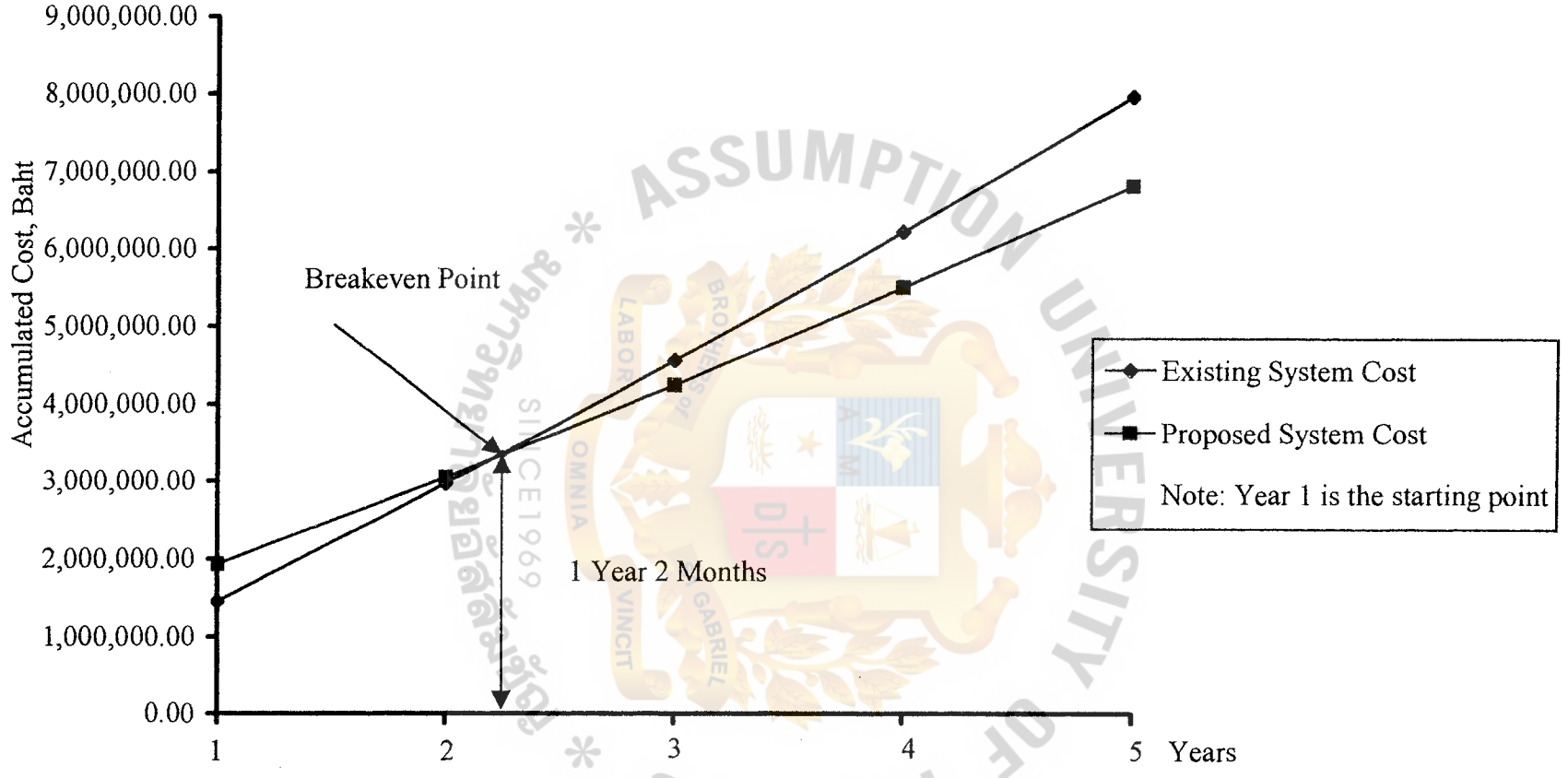

Figure 3.8. Cost Comparison between Existing System and Proposed System.

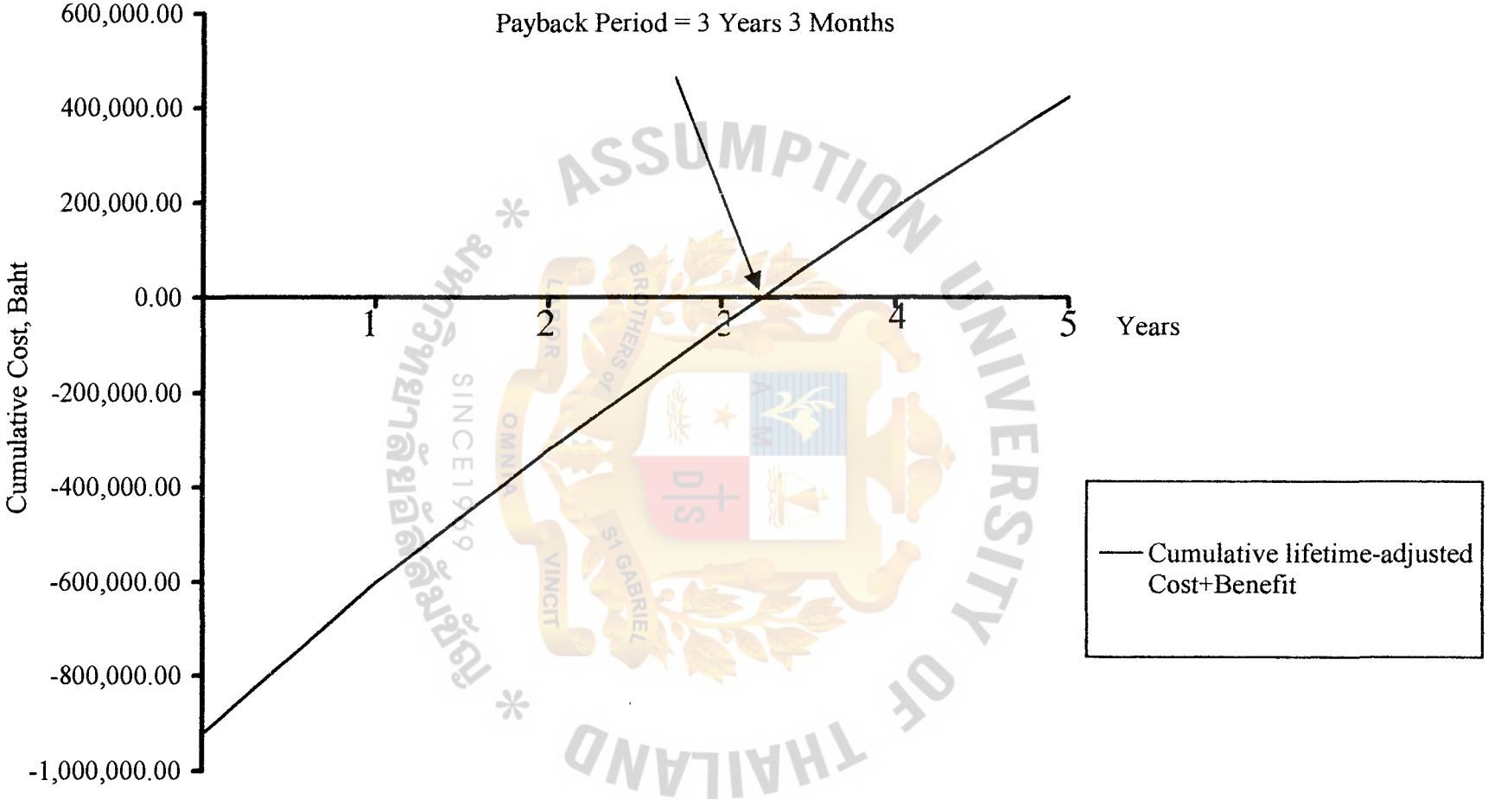

Figure 3.9. Payback Period of Proposed System.

IV. PROJECT IMPLEMENTATION

4.1 Implementation Plan

Before we changed from the existing system to the proposed system, we have analyzed all the strengths and weaknesses of the existing system for about 3 months in order to clarify all the problems and solve all of them by using the proposed system. We have conducted group interview and analyzed the existing document for each department in order to gather all the necessary information for input screen design.

After gathering all the information from the system analysis we continued with the second process of the system design. We have designed the draft system for all the input screens and set test groups to try all the input processes in order to check the input problem and transmission problem. After receiving all responses from the test groups, we generated the new input screen to fit with users' needs. For the output process, we also gathered all the information that users usually use and put them into the output form in terms of reporting and database system.

4.2 Source Code

We have used Microsoft access 97 to make all the input and output screen. We have connected both Server and Client by LAN card. All database has been linked with Microsoft Access screen and retrieve by using SQL operation.

4.3 Test Plan

We have created a test plan for every step of developing the new system in order to make everything correct at the beginning. Before we make the actual form for all the input and output processes we have made draft forms and set test groups to test all the forms in order to find out all the errors and difficulty of use from users. We also set

small complete processes from the input to output reports in order to see how accurate the proposed system are.

4.4 Conversion

We will create training section before the actual use of the proposed system in order to make all users familiar with the proposed system. We also create user manual for each department, so when any users have problems, they can go through the user manual before asking the computer department. For user manual, we will use a form like a tutorial format in order to make it easier for users to find the solution for each screen.

When we operate system changeover, we will use parallel method in order to make sure that all the works flow will not stop because of the proposed system. Because at the beginning of the system, the user is not familiar with the system so it may cause delay in operating. We will use parallel method for about 3 months and reduce the old system step-by-step. This method is done in order to ensure that all the problems in the proposed system have been solved before the old system is discarded. During the 3 months of parallel method, it will create double workload and double time consumption. So the proposed system team has to explain all the benefits that all users will obtain from the proposed system in order to make the users accept the proposed system and be willing to use the new system.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Our global business is becoming more competitive. Everybody tries to lower the price as much as they can. At the same time, they to keep their standard in order to make the customers count on them. Price strategy is not sufficient for the present global business anymore because all the producers try to seek cheaper price at a reasonable quality. After we analyze the business strategy we try to increase work efficiency and reduce cost from the internal company in order to gain more opportunity to compete with other countries. We found that we have weakness about up-to-date data and speed in processing. The main reason that makes our company process more slowly than those of other countries is because we still use the manual system that takes a lot of time and did not have accuracy comparing to the computerized system.

From the reason above, we started our system analysis to find out what the problems are that make our processes slow and how to solve all the problems. We found many problems from the current existing system as follows:

(1) there are many redundant documents that waste a lot of time to create all of them. It creates workload problem and it also needs many workers to key-in all these redundant documents.

(2) All the processes have to be redone by each department this may cause inaccuracy of information.

(3) We cannot control every process because the existing system does not have prompt reporting system to recheck the process all the time. The report will be created manually and it takes a long time to complete all the reports.

(4) Users did not understand all the documents that they do. They create all the files according to previous record and they also do not know whether all the data have been done with correct information or not.

After system analysis, we also started the feasibility analysis in order to find out whether we should proceed with the proposed system or not and in which way. We started to gather all the users' needs in order to make system design. We combined users' needs and all the existing documents and pull out all the good points from the existing documents at the same time including users' needs that still had not been put into the existing document into the draft design. After finishing the draft design, we created a test group to try all screens and reports in order to finalize all the strengths and weaknesses of the proposed system. Finally we obtained the actual system that is ready to work. We did not changeover completely from the existing system to the proposed system but we used parallel method to make all the users familiar with the proposed system for about 3 months before changing to the new proposed system. We used LAN system to connect all departments together in order to have a centralized information center. By using LAN, we can have up-to-date information daily and less inaccurate data.

We also make user manual to support all users in case they have problems. They can study from the manual before asking the computer department. The 2 main reasons that we create the user manual are:

(1) Each department is not located in the same place, it will not waste time to wait for the computer department to solve all the problems.

(2) In case we have new workers joining our company, it is not necessary to create a training session for all workers. They can study from the user's manual and ask the technician only the points that they do not understand.

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5.2 Recommendations

After reviewing all the system analysis and system design for the existing system and the proposed system, we found that the new proposed system is the best solution. There are many reasons to change our system to the proposed system as follows:

(1) For global business, a computerized system is extremely important and acceptable by all buyers. Everybody should be trained to have basic computer skills in order to compete with other competitors.

(2) The number of buyers is increasing a lot, so if we did not change to the proposed system we have to hire more workers that also create more chances to have inaccurate data. It may create bottom neck problems because when all the purchasing orders pass to one department, all related operations have to wait for one process to key-in all the data before passing on to make other processes. It will waste a lot of time and can cause delayed shipment.

(3) For input and output processes, we have to find out useless input or output interface and replace with the useful interface from the new proposed system. The reason that we have to recheck all the input and output interface is because we would like to let the users use only the useful interface and report and have free time to serve other buyers in stead of making redundant documents.

(4) All the security and controls have been created for the new proposed system that will help create data accuracy and protect the critical data – price, customer's details from unauthorized users.

The degree of achievement between the existing system and the proposed system is shown in Table 5.1.

Table 5.1. The Degree of Achievement between the Existing and the Proposed System.

Process	Existing System	Proposed System
1. Issuing production sheet	1 day	15 minutes
2. Retrieving supplier data	2 hours	15 minutes
3. Revising all supplier price	3 days	1 day
4. Modifying raw material	2 days	4 hours
Total	6 days 2 hours	1 day 4 ½ hours

(1) Issuing production sheet

For the existing system, we have to issue production sheets from the head office and all the production sheets will be sent to the factory for operation on the next day. But for the proposed system we still issue production sheets at the head office and then we send this on-line by LAN system to the factory. That will take not more than 15 minutes.

(2) Retrieving supplier data

For the existing system, we have to inform the factory about the supplier data that we would like to obtain and then the officer in the factory will recheck with their supplier file (keep manually) and then report back to the head office. This process will take about 2 hours in order to receive the data but for the new proposed system all the suppliers will be kept in the supplier database. We can retrieve them directly from the supplier database via LAN. It will take not more than 15 minutes to find the desired data.

(3) Revised all supplier prices

When supplier has changed fabric price, we have to recheck all the raw material formula and adjust them one by one. Usually we have about 30 new products every month. That means we have 30 items more each month update fabric prices. We have to use at least 3 days to update all fabric prices for all the raw material formula. But for the proposed system we only directly change the fabric prices from the supplier database, then all the prices within each raw material formula will be updated. This will take not more than one day to update all the revised prices daily.

(4) Modification of raw material

For the existing system, if we would like to modify the raw material of any product that has already been issued a production sheet, we have to revise the raw material formula at the head office and send it to the factory one day after modification because we will have a van go to the factory every morning. But for the new proposed system, we only update the raw material formula and send it to the factory via LAN and that takes not more than 4 hours to complete all the modification process.

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APPENDIX A

USER INTERFACE

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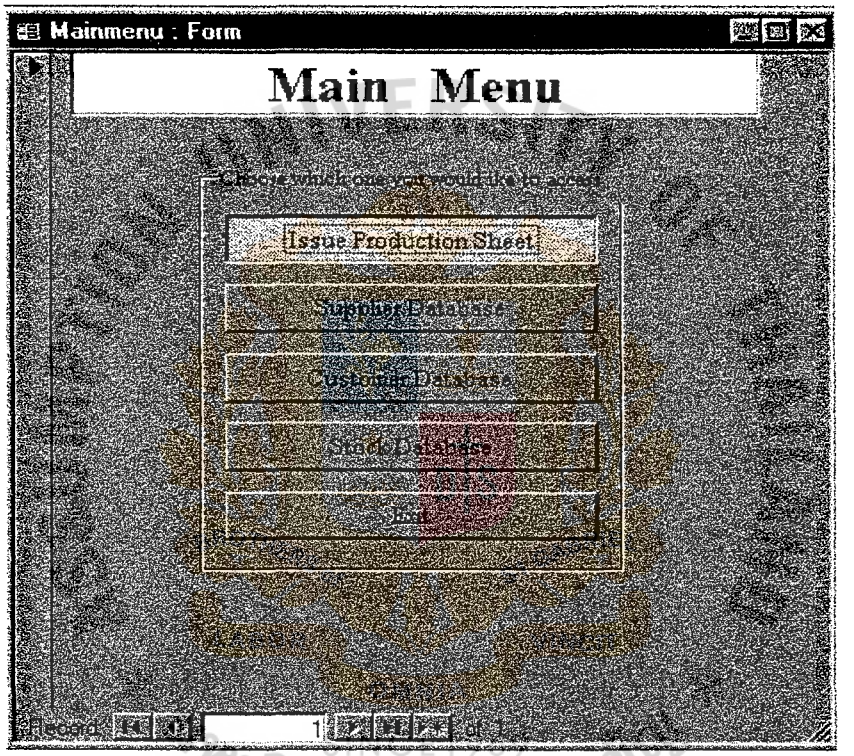

Figure A.1. Main Menu.

Figure A.2. Customer Main Menu.

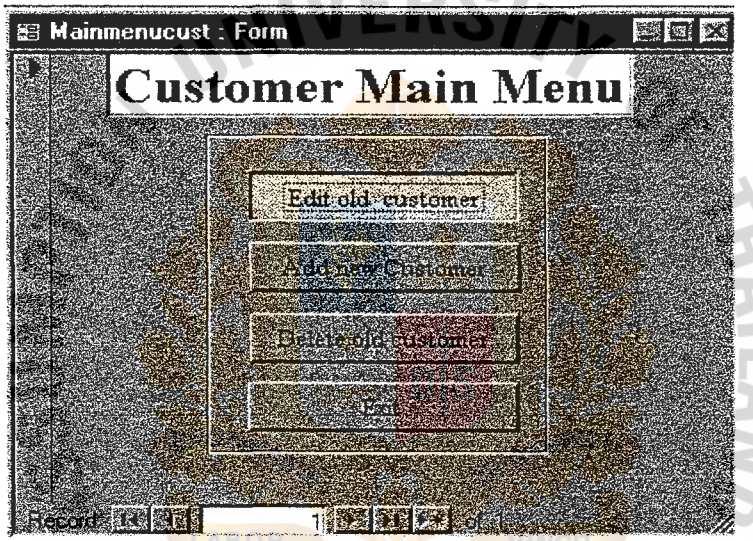

Figure A.3. Customer Main Menu.

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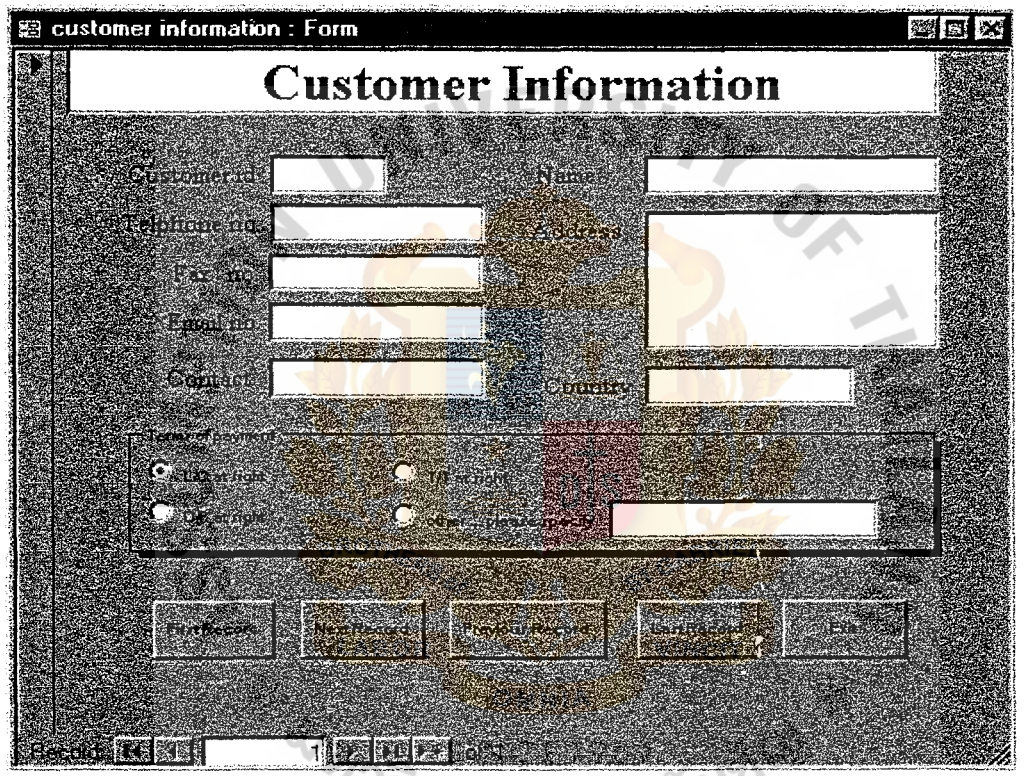

Figure A.4. Customer Information.

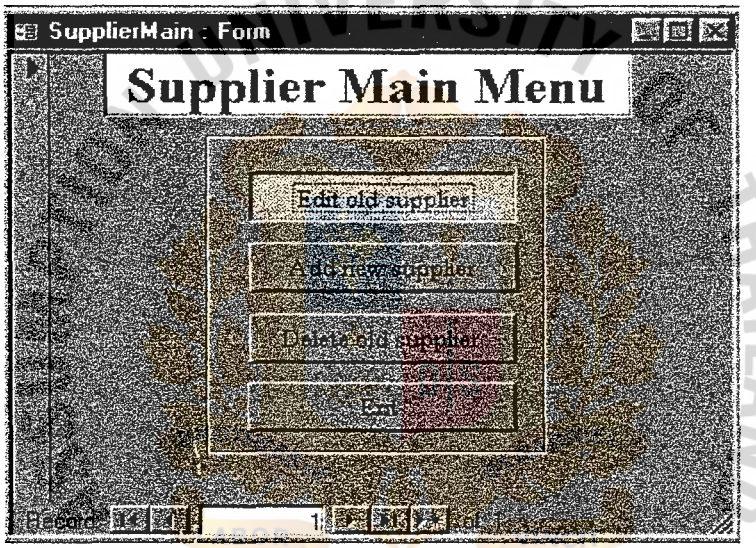

Figure A.5. Supplier Main Menu.

Figure A.6. Supplier Information.

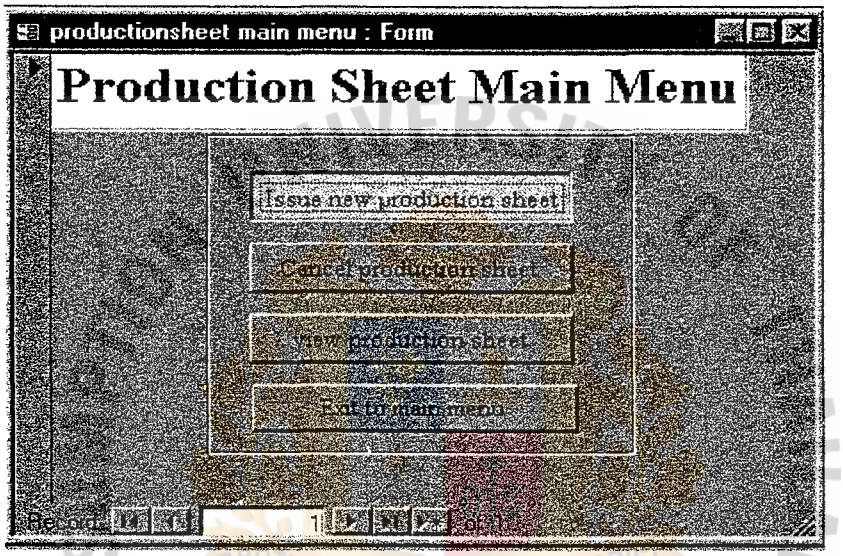

Figure A.7. Production Sheet Main Menu.

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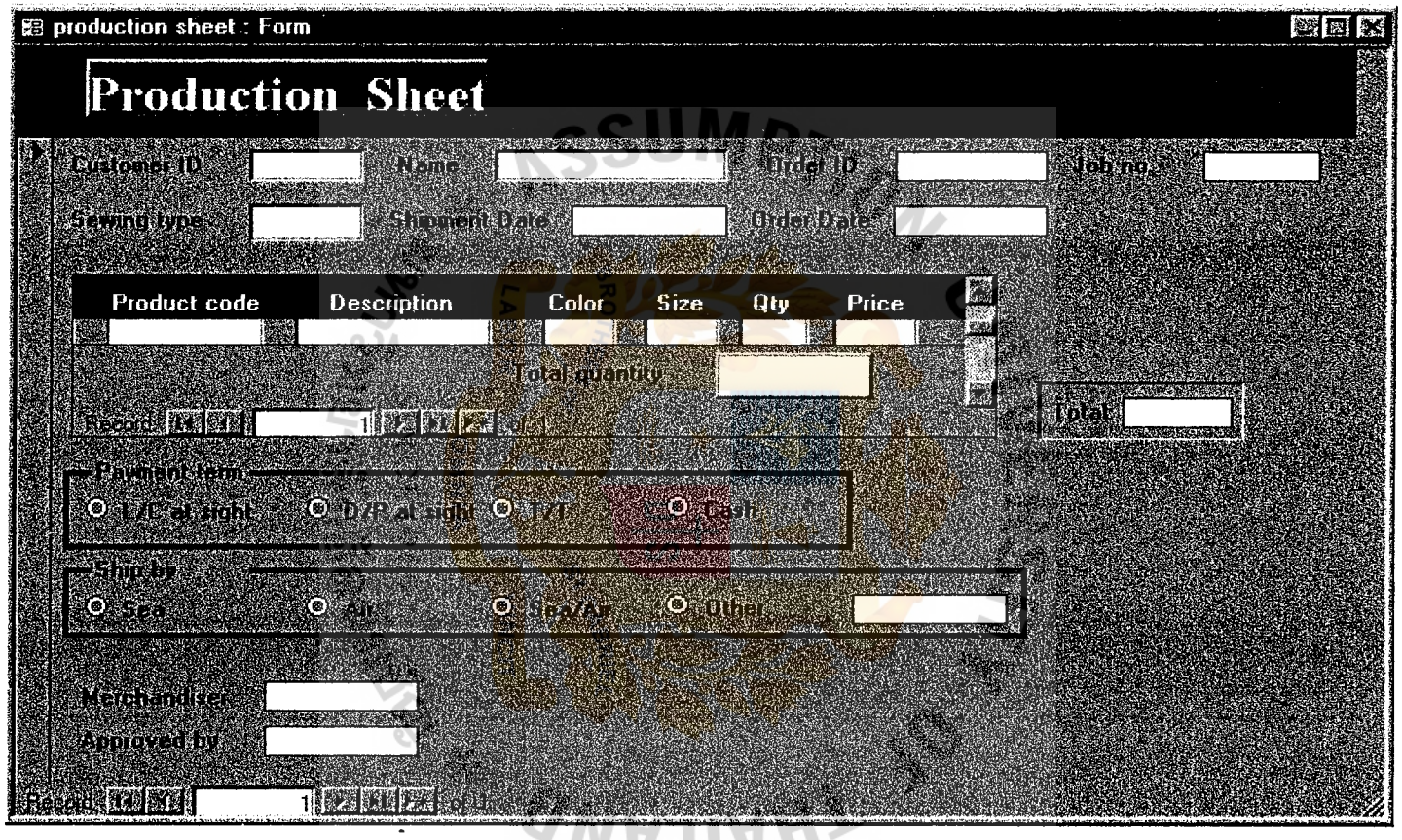

Figure A.8. Production Sheet Menu.

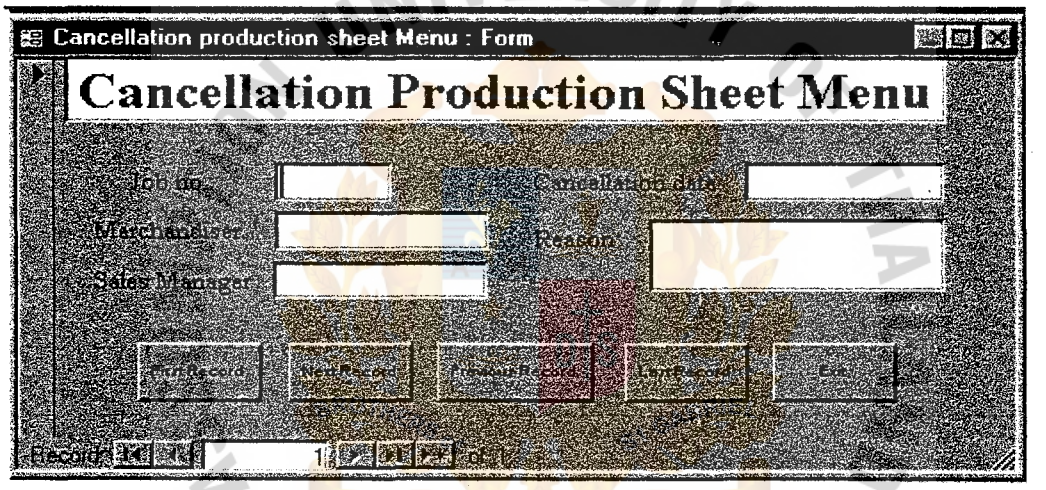

Figure A.9. Cancellation Production Sheet Menu.

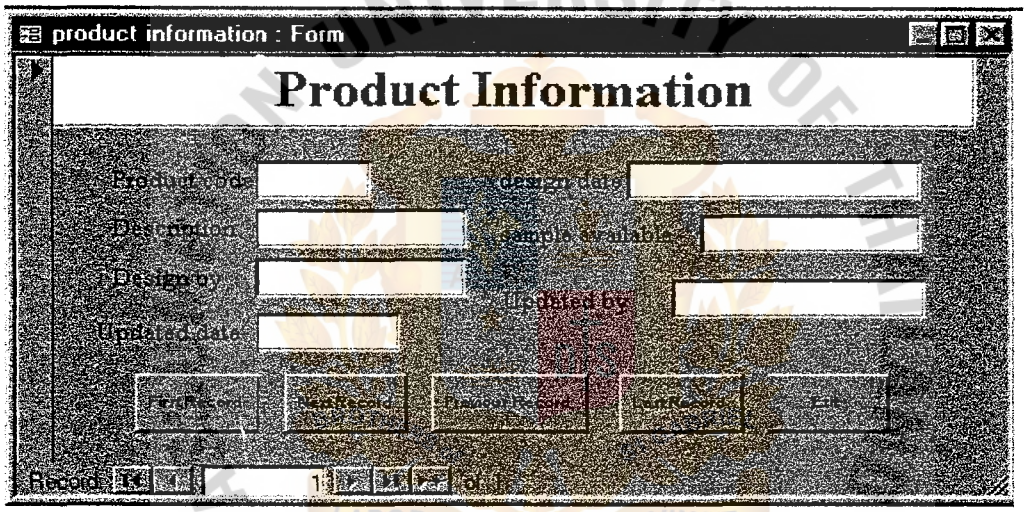

Figure A.10. Production Information Menu.

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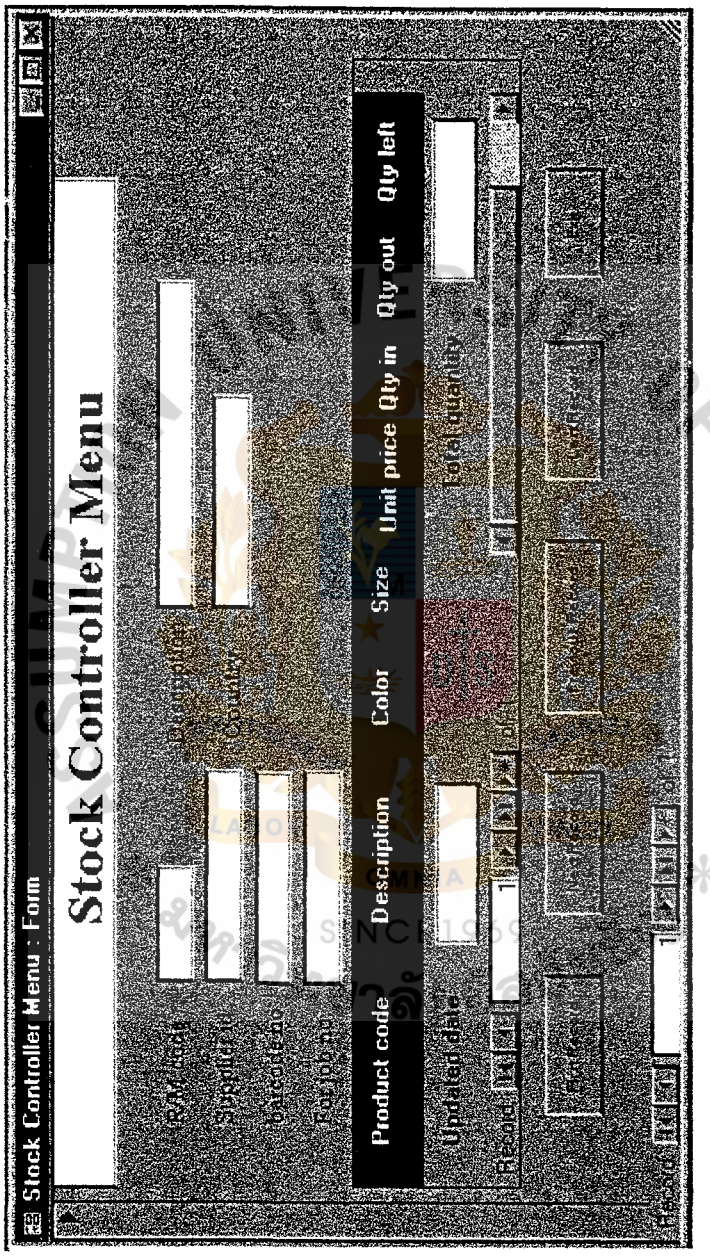

Figure A.11. Stock Controller Menu.

APPENDIX B

REPORT DESIGN

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Table B.1. Report of Customer Detail.

Customer Code	Name	Address	Phone	Fax	e-mail address	Contact
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

Table B.2. Report of Supplier Detail.

Supplier code	Name	Address	Phone	Fax	Contact

Table B.3. Report of Stock Detail.

R/M code	Description	Supplier code	color	Qty in	Qty out	balance	Date

Table B.4. Report of Product Detail.

Product no.	R/M code	Description	Unit price	Consumption per garment	Order Qty. In pcs.	Total cost per garment	Total R/M ordered

Table B.5. Report of Customer Order Detail.

Customer Code	Order no.	Product code	Total qty.	Unit price	Total amount	shipment

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Table B.6. Monthly Report of Shipment Detail.

No.	Customer code	Product code	Total qty.	Mode of shipment	Shipment date

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Table B.7. Report of Supplier Shipment Detail.

Required shipment	P/O no.	Supplier code	R/M code	Color	Total qty.	Mode of shipment

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Table B.8. Monthly Sales Report.

No.	Type of order (new/repeat)	Cust. Code	Product code	Qty.	Unit price	Total amt. In pcs	Total amt. In baht	Sewing Method	Order date	Shipment date
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										

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Table B.9. Report of Receiving R/M Status.

No.	R/M code	Supplier code	P/O no.	Total Qty.	Requested shipment date	Received date	Amt. Of receive	Balance

Table B.10. Annually Production/Sales Report.

Month	Production Capacity		Actual sales in pcs.		Actual sales in baht	
	Bra	Others	Bra	Others	Bra	Others
1	300,000	200,000				
2	300,000	200,000				
3	300,000	200,000				
4	300,000	200,000				
5	300,000	200,000				
6	300,000	200,000				
7	300,000	200,000				
8	300,000	200,000				
9	300,000	200,000				
10	300,000	200,000				
11	300,000	200,000				
12	300,000	200,000				
Total	3,600,000	2,400,000				

Remarks : Exchange rate =

Table B.11. Annual Sales Ranking Report.

Rank no.	Cust. name	Total amt. in pcs.		Total amt.in baht		Sales in baht
		Bra	Others	Bra	Other	
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
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32						
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APPENDIX C

DATABASE DESIGN

Table C.1. Customer Code File.

Field No.	Field description	Field name	Type	Width
1	Customer_code	cust_code	character	2
2	Customer name	Cust_name	character	40
3	Created_date	Created_date	character	6
4	Created_by	Created_by	character	20

Table C.2. Customer File.

Field No.	Field description	Field name	Type	Width
1	Customer name	Cust_name	character	40
2	Customer address	Cust_add1	character	40
3	Customer address	Cust_add2	character	40
4	Country	Country	character	20
5	Telephone number	Tel_no	character	12
6	Fax number	Fax_no	character	12
7	e-mail address	E_mail	character	30
8	contact person	contact	character	40
9	terms of payment	selling_term	character	20

Table C.3. Supplier Code File.

Field No.	Field description	Field name	Type	Width
1	Supplier name	Sup_name	character	40
2	Supplier code	Sup_code	character	3
3	Created Date	create_date	character	6
4	Created by	create_by	character	20

Table C.4. Supplier File.

Field No.	Field description	Field name	Type	Width
1	Supplier name	Sup_name	character	40
2	Supplier address	Sup_add1	character	40
3	Supplier address	Sup_add2	character	40
4	Country	Country	character	20
5	Telephone number	Tel_no	character	12
6	Fax number	Fax_no	character	12
7	e-mail address	E_mail	character	30
8	contact person	contact	character	40
9	terms of payment	buying_term	character	20

Table C.5. Purchasing Order File.

Field No.	Field description	Field name	Type	Width	decimal
1	Raw material code	RM_code	character	8	
2	Supplier code	Sup_code	character	3	
3	Raw material name	RM_name	character	40	
4	Unit price	Unit_px	numeric	6	2
5	Quantity order	Qty_buy	numeric	8	2
6	Total cost	T_cost	numeric	8	2
7	Purchaser	Pur_name	character	20	
8	Order date	Order_date	character	6	

Table C.6. Raw Material Barcode File.

Field No.	Field description	Field name	Type	Width
1	Raw material code	RM_code	character	8
2	Supplier code	Sup_code	character	3
3	Color	Color	character	10
4	Created_date	Created_dat	character	6
5	Created_by	Created_by	character	20

Table C.7. Raw Material File.

Field No.	Field description	Field name	Type	Width	decimal
1	Raw material name	RM_name	character	40	
2	Raw material code	RM_code	character	8	
3	Quantity received	Qty_in	numeric	10	2
4	Quantity used	Qty_out	numeric	10	2
5	Unit price	Unit_px	numeric	6	2
6	Total cost	T_cost	numeric	8	2
7	Date received	Date_in	character	6	
8	Date sent	Date_out	character	6	
9	stock team	team	character	1	
10	Preparer name	Prepare_nar	character	20	

Table C.8. Stock Cutting File.

Field No.	Field description	Field name	Type	Width	decimal
1	Raw material name	RM_name	character	40	
2	Raw material code	RM_code	character	8	
3	Quantity received	Qty_in	numeric	10	2
4	Quantity used	Qty_out	numeric	10	2
5	Date received	Date_in	character	6	
6	Date sent	Date_out	character	6	
7	stock team	team	character	1	
8	Preparer name	Preparc_nar	character	20	

Table C.9. Product File.

Field No.	Field description	Field name	Type	Width
1	Product Code	Prod_code	character	8
2	Product Description	Prod_desc	character	40
4	Created_date	Created_date	character	6
5	Created_by	Created_by	character	20

Table C.10. Production File.

Field No.	Field description	Field name	Type	Width
1	Job no.	job_no	character	7
2	customer_code	cust_code	character	2
3	Product Code	Prod_code	character	8
4	Product Description	Prod_desc	character	40
5	Color Code	color	character	2
6	Order date	Order_date	character	6
7	Shipment date	Ship_date	character	6
8	Quantity	Qty	numeric	10
9	Merchandiser	Mer	character	20

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Table C.11. Color File.

Field No.	Field description	Field name	Type	Width
1	Color name	Color_name	character	20
2	Color code	Color	character	2
4	Created_date	Created_dat	character	6
5	Created_by	Created_by	character	20

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APPENDIX D

PROCESS SPECIFICATION

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PROCESS SPECIFICATION

Table D.1. Process Specification of Process 1.1.

Process Name:	Check Customer Data
Data In:	Customer Data
Data Out:	Customer information
	New Customer record
Process:	(1) Send New Customer Questionnaire
	(2) Receive filled questionnaire
	(3) Check Customer data
	(4) If Customer data is Valid then
	Do step x to y
	Else If Customer data is Invalid then
	Do step x to y
	(5) Edit Customer data into Sorted customer data
	(6) Send sorted customer data to verify customer
	Credit process
Attachment:	(1) Customer

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Table D.2. Process Specification of Process 1.2.

Process Name:	Verify Customer Credit
Data In:	Sorted Customer Data
Data Out:	Customer Information
Process:	(1) Receive sorted customer data
	(2) If customer credit is valid
	Do step x to y
	Else do step x to y
	(3) Edit Customer code number into Customer data
	(4) Store Customer Data to Customer file
	(5) Edit Customer Order into Reject Customer
	File
	(6) Return Reject Customer to Customer
	(7) Store Customer information to Customer file
	(8) Edit Customer Record into Customer Status
Attachment:	(1) Data Store (Customer file)

Table D.3. Process Specification of Process 2.1.

Process Name:	Check Raw Material Minimum
Data In:	Purchase Order
Data Out:	Minimum result
Process:	(1) Receive Purchase Order Request from
	Customer
	(2) Create Received Purchase Order
	Request
	(3) Check raw material minimum
	If minimum is valid then
	Do step x to y
	Else do step x to y
	(4) Send result of raw material minimum
	to accept purchasing order process
Attachment:	(1) Customer

Table D.4. Process Specification of Process 2.2.

Process Name:	Accept Customer order
Data In:	Received Purchase Order Request
Data Out:	Minimum information
	Supplier Information
Process:	(1) Receive Minimum information
	(2) Calculate raw material consumption
	According to purchasing order
	(3) Receive minimum record from supplier
	(3) Compare minimum of raw material from
	Different supplier
	If minimum is valid then
	Do step x to y
	Else do step x to y
	(4) Send product data to Issuing production
	Sheet process
Attachment:	(1) Product Data

Table D.5. Process Specification of Process 2.3.

Process Name:	Issuing Production Sheet
Data In:	Product Data
Data Out:	Product code
	New packing details Record
	New product Information Record
Process:	(1) Receive List of Product Name &
	Quantity from product data
	(2) Read Customer Information
	(3) Read Supplier Record from Supplier
	File
	(4) Create New Purchase Order Record
	(5) Store New Purchase Order Record to
	Purchase Order File
	(6) Create New Purchase Product Record
	(7) Store Product Information to
	Product File
	(8) Store Packing Details to Packing File
Attachment:	(1) Data Store (Packing File)
	(2) Data Store (Product File)

Table D.6. Process Specification of Process 3.1.

Process Name:	Determine Raw material Consumption
Data In:	Product Information
Data Out:	Raw Material Formula
Process:	(1) Receive type of raw material from
	Product File
	(2) Calculate consumption for each raw material
	(3) Create Product Control List (PCL)
	(4) Send PCL to check raw material in stock process
Attachment:	(1) Product File

Table D.7. Process Specification of Process 3.2.

Process Name:	Check raw material in Stock
Data In:	Old stock record
Data Out:	Production Sheet
	Raw material booking record
Process:	(1) Receive Raw Material Formula from
	Determine Raw Material Consumption process
	(2) Receive Old Stock record from
	Stock File
	(3) If R/M in stock is valid then
	Do step 4 to 5
	Else if R/M is Invalid then
	Do step 6 to 7
	(4) Create Raw material booking
	(5) Edit stock record
	(6) Create Production Sheet
	(7) Send raw material request to
	Purchasing Department
Attachment:	(1) Purchasing Department

Table D.8. Process Specification of Process 3.3.

Process Name:	Book Raw Material in Stock
Data In:	Raw material Request
Data Out:	New Stock record
Process:	(1) Receive Raw Material request from
	Check raw material in stock process
	(2) Create booking record
	(3) Edit stock record
	(4) Send new stock record to Stock File
Attachment:	Data Store (Stock File)

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Table D.9. Process Specification of Process 4.1.

Process Name:	Producing Process
Data In:	Raw material report
	Customer Record
	Supplier Record
	Product Record
	Purchase Order Record
Data Out:	Unpacked Finish goods report
Process:	(1) Receive Cutting report from cutting room
	Make production Plan
	(2) Read Customer Record
	from Customer File
	(3) Read Supplier Record
	from Supplier File
	(4) Read Product Record
	from Product File
	(5) Read Purchase Order Record
	from Purchase Order File
	(6) Make raw material into Finished product
	(7) Send unpacked product to packing process
Attachment:	(1) Purchasing Department

Table D.10. Process Specification of Process 4.2.

Process Name:	Packing Process
Data In:	Unpacked Finished goods
	Packing Requirement
Data Out:	Packed Finish goods
Process:	(1) Receive Unpacked Finished goods from
	Producing process
	(2) Receive packing requirement from
	Packing File
	(3) Issue purchasing order for packing accessories
	(4) Receive packing accessories
	(5) Pack Finished goods according to packing
	Requirement
	(6) Send Packed product to Customer
Attachment:	(1) Data Store (Packing File)
	(2) Customer

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APPENDIX E

DATA DICTIONARY

DATA DICTIONARY FROM DFD

Object Name : Customer Data

Object Type : Data Flow

Definition : All relevance customer data about

- what customer's brand is
- how big customer's order is
- how many shops they have
- which countries their main market is
- type of product they sell
- type of product they buy

Short definition : Customer data = Cust_name+ Cust_add + Tel_no+Fax_no+e_mail_no+contact_person

Object Name : Sorted Customer data

Object Type : Data Flow

Definition : collect all customer data and sort out all unnecessary Data and find more necessary data. Then prepare all Data into correct format to verify.

Object Name : Product Information

Object Type : Data Flow

Definition : All verification of product data that buyer ordered.

Short definition : Product Information = prod_name+prod_code+ unit_price+color+qty+cust_code+record_date

Object Name	:	Customer Information
Object Type	:	Data Flow
Definition	:	All verification of customer's data and make into useful format that everyone can use this record as reference
Short definition	:	Customer Information = Cust_name+Cust._code+ Cust_add1+Cust_add2+Tel_no+Fax_no+e_mail_no +contact_person+term of payment+record_date

Object Name	:	Purchasing order
Object Type	:	Data Flow
Definition	:	Information about product that the buyer would like to buy.
Short definition	:	Purchasing order = product_name+product._code+ qty+delivery+unit_price+ship_by+ship_date+ color+record_date

Object Name	:	Packing Information
Object Type	:	Data Flow
Definition	:	All paking requirement that the buyer would like us to make before shipment
Short definition	:	Packing Information = polybag+carton+hanger+ care label+size_label+ship_mark+packmethod + record_date

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Object Name	:	Product requirement
Object Type	:	Data Flow
Definition	:	All product requirements for fitting processes.
Short definition	:	Product requirement = Cust._code+product_code+ spec.+ Submit_date+order_size+color+rm_detail

Object Name	:	Production Sheet
Object Type	:	Data Flow
Definition	:	Details about quantity per size per order for each Customer according to customer purchasing order
Short definition	:	Production Sheet = Cust_name+Cust._code+ Product_code+qty+color+unit_price+ship_by+ Ship_date+term of payment+record_date

Object Name	:	Old stock record
Object Type	:	Data Flow
Definition	:	Current raw material quantity in stock
Short definition	:	Old stock record = RM_code+RM_name+bal_qty+ color_code+record_date+recorder

Object Name	:	Minimum pass
Object Type	:	Data Flow
Definition	:	Check R/M consumption comparing with minimum. We will check each R/M per color respectively.
Short definition	:	minimum pass = R/M_used > minimum

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Object Name	:	New Stock record
Object Type	:	Data Flow
Definition	:	Updated current raw material in stock
Short definition	:	New Stock record = RM_code+RM_name+ (bal_qty-Book_qty)+ color_code+ record_date+recorder

Object Name	:	R/M formula
Object Type	:	Data Flow
Definition	:	List of used R/M per 1 product
Short definition	:	R/M formula = RM_code+RM_name+ supplier_name+Supplier_code+prod_code+ record_date+recorder

Object Name	:	Enough R/M
Object Type	:	Data Flow
Definition	:	Request for stock booking
Short definition	:	Enough R/M = qty_used < bal_qty

Object Name	:	Raw material
Object Type	:	Data Flow
Definition	:	Raw material to be used in production
Short definition	:	raw material = RM_code+RM_name+qty+ color_code+ supplier_name+supplier_code+ record_date+ recorder

Object Name	:	Production Pattern
Object Type	:	Data Flow
Definition	:	master production pattern to be used for cutting process
Short definition	:	this production pattern will be in the form of paper pattern separate in pieces by size

Object Name	:	Packing requirements
Object Type	:	Data Flow
Definition	:	Modified packing information into company's form
Short definition	:	packing requirements = cust_code+product_code+ polybag+carton+hanger+carelabel +size_label+ ship_mark+ship_date+packmethod+record_date

Object Name	:	Unpacked finished goods
Object Type	:	Data Flow
Definition	:	Finished goods according to purchasing order
Short definition	:	unpack finished goods = cust_code+product_code+ ship_date+color

Object Name	:	Pack Finished goods
Object Type	:	Data Flow
Definition	:	Finished goods packed according to packing requirement

Object Name	:	Customer
Object Type	:	External Entity
Definition	:	A person who orders us to make products for them

Object Name	:	Product Department
Object Type	:	External Entity
Definition	:	This department does all the processes concerning about product development until all the products are approved for the production process

Object Name	:	Purchasing Department
Object Type	:	External Entity
Definition	:	This department does all the processes concerning about purchasing all raw materials for all products. They are also responsible for making all lab-dip and lab-test.

Object Name	:	Packing department
Object Type	:	External Entity
Definition	:	This department does all the processes concerning about purchasing packing accessories for all the products and pack unpacked finished goods according to packing detail

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Object Name	:	Customer file
Object Type	:	Data store
Definition	:	This file contains all customer data
Short definition	:	Cust_file = cust_code+cust_name+cust_add1+ cust_add2+Tel_no+fax_no+e-mail_no+country+ brand+ contactperson+termpayment

Object Name	:	Production File
Object Type	:	Data store
Definition	:	This file contains all product information
Short definition	:	Prod_file = cust_code+prod_code+color+qty+ Ship_date+ship_by

Object Name	:	Packing file
Object Type	:	Data store
Definition	:	This file contains all packing requirements
Short definition	:	Packing_file = cust_code+prod_code+polybag+ carton+hanger+carelabel +size_label+ship_mark+ packmethod+record_date

Object Name	:	Stock file
Object Type	:	Data store
Definition	:	This file contains all stocks information
Short definition	:	Stock_file = RM_code+RM_name+qty_in+qty_out+ bal_qty+ color_code+cust_no+record_date+recorder

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Object Name	:	Check Customer Data process
Object Type	:	Data Process
Definition	:	this process is to check all the submitted data from Customer and sorted into useful format.

Object Name	:	Verify Customer Credit process
Object Type	:	Data Process
Definition	:	this process is to verify customer credit whether it is in our requirements or not.

Object Name	:	Verify Customer order process
Object Type	:	Data Process
Definition	:	to sort out each necessary information from purchasing order to each related department.

Object Name	:	R/M Mgt. Process
Object Type	:	Data Process
Definition	:	this process will recheck R/M requested from stock system before issuing purchasing order to each supplier and control all R/M to come to warehouse in time.

Object Name	:	Finished goods process
Object Type	:	Data Process
Definition	:	this process is to produce finished goods according to customer requests and then pack all finished goods according to packing requirement before sending out to customer.

Object Name	:	New Customer process
Object Type	:	Data Process
Definition	:	this process is to screen out the customer data whether it is complete or not.

Object Name	:	Check R/M minimum process
Object Type	:	Data Process
Definition	:	this process is to check R/M consumption needs as per customer's order comparing with supplier minimum.

Object Name	:	Accept Customer Order process
Object Type	:	Data Process
Definition	:	After passing verifying customer credit, we will make order confirmation and send back to buyer

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Object Name	:	Issuing Production Sheet process
Object Type	:	Data Process
Definition	:	we will fill up production sheet for each product and Pass to each concerned department to proceed their works.

Object Name	:	Determine R/M consumption
Object Type	:	Data Process
Definition	:	we will make product check list to breakdown all R/M requested for each product

Object Name	:	Check R/M in stock
Object Type	:	Data Process
Definition	:	recheck with old stock record whether there is enough R/M in stock or not.

Object Name	:	Book R/M in stock
Object Type	:	Data Process
Definition	:	make R/M booking and cut balance from old stock record.

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