



Order Processing System for
Thai Plastic Supply Co., Ltd.

by
Ms. Parichat Pongpisit

A Final Report of the Six-Credit Course
CS 6998 - CS 6999 System Development Project

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

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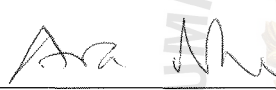



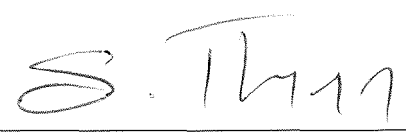
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Project Title	Order Processing System for Thai Plastic Supply Co., Ltd.
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Academic Year	July 20, 2003

The Graduate School of Assumption University has approved this final report of the six-credit course, CS 6998 – CS 6999 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 system development project presents the analysis and design of Order Processing System. The project is developed to reduce redundancy and improve the working process, to provide more accurate and up to date information for management.

The study of this project begins with the required definition and analysis of the existing system. Information system analysis and design tools such as context diagrams, data flow diagrams, data dictionaries, entity relationship diagram and structure charts are used to analyze both the existing and proposed systems. Candidate solution matrix is also used to compare various alternatives in order to come with the most effective solution. Capital budgeting models such as the payback method, the cost-benefit ratio, and the net present value are used to evaluate the proposed system.

It was found out that the new computerized system is implemented using 10Base-T LAN with 1 server, 3 clients, and 1 printer. Software for the proposed system are Windows 2000, MS Office 2000, and Microsoft Visual Basic 6.0. Based upon payback method, it shows that the initial investment will pay for itself after 1.3 years.

To further improve the proposed system, it is recommended that a Web-based solution should be developed and implemented. This will allow users and customers accessing the system more easily and faster.

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I. INTRODUCTION

1.1 Background of the Project

Nowadays, business is growing very fast. The competition among business is highly increasing. Improvement of the business process has become the way to compete with other business. With an efficient information system, it enables the organization to be competitive in the market. In addition, it will respond and satisfy the customer's expectation for products and services.

Thai Plastic Supply Co., Ltd. is a company which provides manufacturing products that has a connection with local customers. The company plays a role as a middle man between the customers and suppliers. In this business, the order processing system is a key component of the business process. The demand on the products has been increasing. Meanwhile, the company's performance has become lower, the business process is operated manually. For example, the recording of the customer's information and products are done unsystematically on paper and computer. Consequently, with the lack of systematic information, the management has to spend a large amount of time for searching the data.

The process cycle of order processing normally begins with receiving purchase order, checking product availability in stock, generating invoice and sending products to the customers. So, The organization needs to have a good information system in order to be able to get right products to the right order and deliver those products to the customers at the right time.

However, currently, this company separates in the manual manner which involves the paperwork of the order processing system. The existing system provides a lot of problems in accuracy, urgent response time, updating information and analysis of

sales volume.

From this problems, the company will use the computerized system to replace the manual process of the existing system and design the new system to make business process effective and efficient.

Therefore, the purpose of this project is to reduce the manual operation problems, to enhance the productivity, to use the database for keeping the data and to improve the response time in each process. Additionally, the new system establishes the network application with convenience to manage data.

1.2 Objectives of the Project

The objective of this system development project are as follows:

- (1) To analyze the problems of the existing system and to understand the user requirements.
- (2) To design the new system for the order processing system which improve the working process for more effective work.
- (3) To use a database system that provides more accurate and efficient information.
- (4) To eliminate errors which occur in manual system.
- (5) To share information among each departments.
- (6) To generate reports for use at management level for decision making.
- (7) To support the increase of data in the future.

1.3 Scope of the Project

The project will cover three major parts of order processing system that can be classified as follows:

(1) Sales System

The System designs a database to keep information of the customers

and customer order. If the customer is new, the sales officers will add the customer profile as a new record or if the customer information is changed, customer information needs to be updated by sales officers.

At the end of each month, The sales and marketing department need reports to analyze the sales volume for business plan and forecast the trend of the business. The sales officers can check the sales volume of all customers by generating the customer order report.

(2) Production System

The system will keep a record of the flow of ordered product. When production department receives the job order, the system will check and update the amount of products in the database. The system helps to manage the amount of products in the inventory and protects from minimum stock.

(3) Accounting System

When the customer places the order, the sales officers keep the order in the system and accounting department will generate invoice to inform the customers about the details and cost of products, when products are delivered to the customers.

For the customer's payment, the invoice are also issued to inform the due date, the customers make the payment for the product that they have ordered.

1.4 Deliverables

Deliverables can be separated into two parts. The first part is system analysis, which involves the indication of business problems and business requirement of the new system. In addition, this project displays Entity Relationship Diagram (ERD) for

database design, Data Flow Diagram for a process design.

The second part involves system design which will provide the solution for system specification, hardware and software requirement, feasibility analysis, and project implementation, Network Diagram, Structure Chart, File Layout and Process Specification.

1.5 Project Plan

The project plan of Order Processing System for Thai Plastic Supply Co., Ltd. is given in Figure 1.1.

The project was started on Friday 3 January 2003. The project plan has three phases, which are System Analysis Phase, System Design Phase and System Implementation Phase.

System Analysis Started from 3 January 2003. It needs 7 weeks to complete, which defines the objective and scope, plan the project, study the existing system, develop context diagram, and cost and benefit analysis.

The second phase is System Design that takes 3 weeks after the first phase has been finished. This phase has 4 activities which are network design, database design, interface design and process design.

The last phase is System Implementation, which is coding, testing, hardware and software installation, and conversion. It takes 8 weeks to complete this phase.

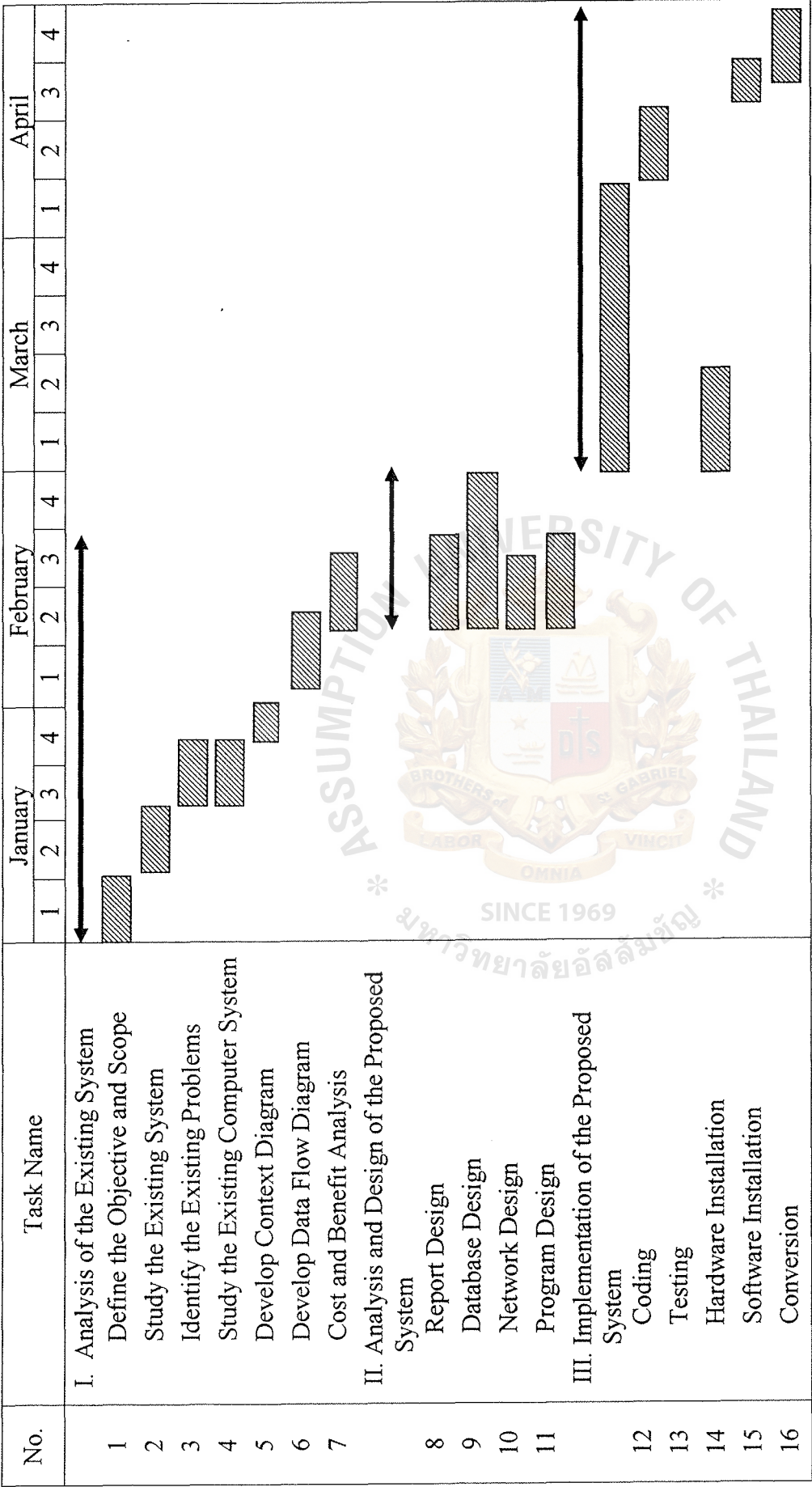


Figure 1.1. Project Plan.

II. THE EXISTING SYSTEM

2.1 Background of the Organization

Thai Plastic Supply Co., Ltd. was established in 2001 as a distributor of industrial equipment. The head office is located on 31,500 square metres of land in 40/6 Sukhumvit55 (Soi Thonglor), Sukhumvit Road, Klongton, Wattana, Bangkok.

The company has various types of products such as inkjet printer for industrial marking, vortex blower, air compressor, supper cold air unit, ceramic fibre, pipe fitting and valves. The customers are factories and companies.

Currently the existing system mainly is based on manual operation, which is not efficient to provide information accurately, and in time. However, the company's purpose is to increase the quality control of the products in order to satisfy customer needs. Moreover, it also helps to minimize cost.

2.2 Business Function

Thai Plastic Supply Co., Ltd. has 4 departments under the managements which are Sales and Marketing Department, Personnel Department, Accounting Department, and Production Department.

(1) Sales and Marketing Department

This department takes care of sale of products to customers. Sales officers receives the order request from the customer and approve the customer order. Sales officers will create the job order from the customer's purchase order and give it to the production department using to prepare the product. At the end of each month, the manager must create sales order report for helping to determine performance and to increase salary to sales officers.

(2). Production Department

This department is directly responsible to prepare the product required by customers and to deliver the products to customers. Additionally, the production department must take care of the minimum stock of product, when the amount of the product becomes minimum, they will create the purchase order and send for approval to the manager before sending it to the supplier.

(3) Accounting Department

The responsibilities of Accounting Department are checking payment of customers with invoice, recording all accounting transactions, generating receipts, etc. Moreover, it sets the company's budget and creates financial report.

(4) Personnel Department

This department is responsible for recruiting, keeping employee record, supporting payroll system, providing social welfare, and life insurance.

The organization chart will be shown in Figure 2.1.

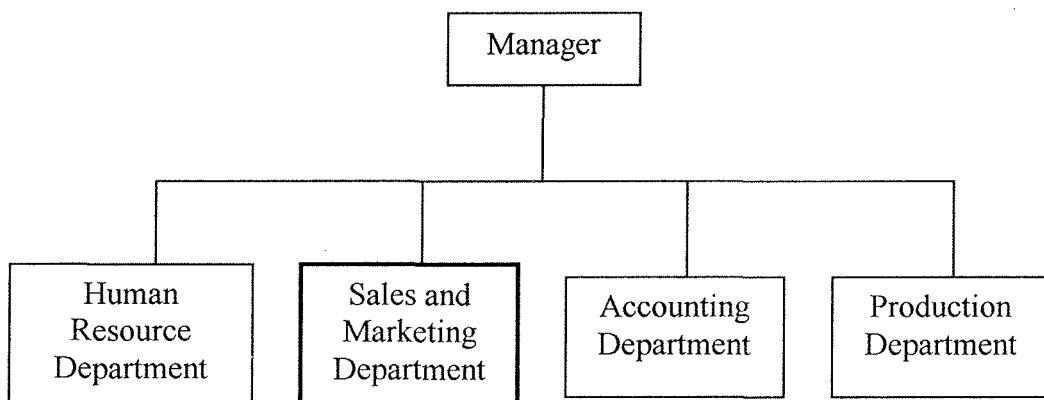


Figure 2.1. The Organization Chart of Thai Plastic Supply Co., Ltd.

2.3 Problem of Existing System

The existing system activities are manually operated. We have to receive the purchase order from the customers, issue invoice to the customers, and generate the product receipt to the customer. All documents are based on paperwork and use humans to manage the system. So, it can cause a lot of problems as listed below:

(1) Inaccurate data

Error in data entry can easily occur in manual system. Moreover, it can cause data inconsistency when the officers cannot completely update all relevant records.

(2) Time Consuming

The concerned process of order processing is slow in the manual system such as finding out customer purchase order consumes a lot of time to compete.

(3) Data Redundancy

Each department has its own data which is not linked together, so, it causes the redundancy problem.

(4) Data Updating

It is very difficult to update the data which has already been changed because it is kept in documents without a computerized system.

(5) Lack of capability to generate report

Reports are necessary information for organization's management. In the manual system, it takes a long time to generate report, so those reports may be out of date and unreliable.

(6) Difficult to control level of product in stock.

It is caused by stock report which is out of date.

III. THE PROPOSED SYSTEM

3.1 User Requirement

Using the well design system, the productivity of an organization will be enhanced. The computerized information system must increase the quality of existing business process and provide quicker response.

The proposed system needs to take the user requirement to guarantee the user satisfaction.

The requirements of order processing system of Thai Plastic Supply Co., Ltd. are the following:

- (1) To decrease incorrect and redundant data
- (2) To increase efficiency by using database system
- (3) To reduce the paper work and time waste
- (4) To increase speed and response time in order processing system
- (5) To provide more accurate information
- (6) To generate reports for decision making
- (7) To provide the interface for the user which will be easy to search for the required information

3.2 System Design

The proposed system is the computerized system focusing on the order processing system from the beginning step to receive order request and generate quotation, to receive purchase order from the customer, to generate invoice for the customer, to deal with the payment, and issue the summary sales report.

3.2.1 Network Architecture

The need to share expensive resource is another driving factor in the

development of the networks. The cost of processor hardware has dropped far more rapidly device. The result is a need to share these expensive devices among a number of users to justify the cost of the equipment. This sharing requires some sort of client-server architecture over a network that interconnects users and resources.

This architecture places the information system stored data on a server and business logic and user interfaces on the clients. The database will keep the customer, product, and ordering information in the database server that can be retrieved by client. The proposed system is using LAN network with star topology by connecting all client together with server via LAN SWITCH.

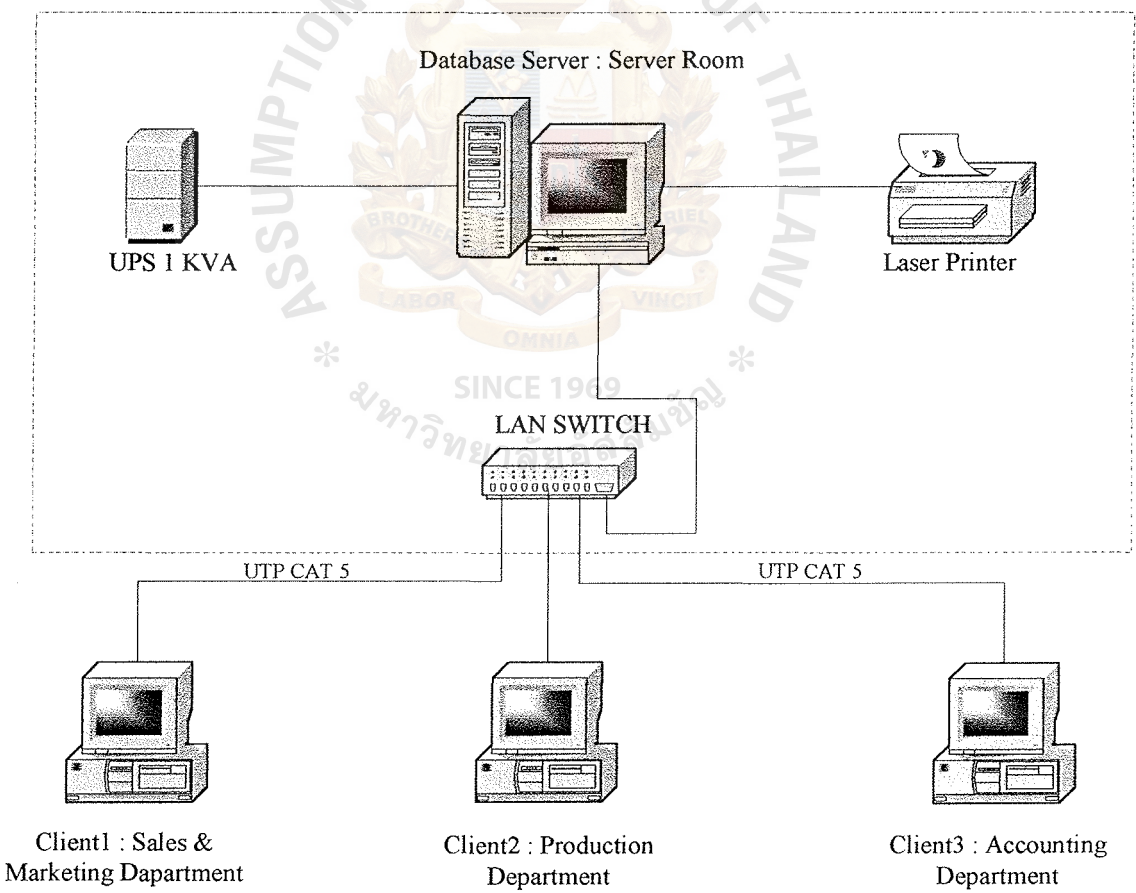


Figure 3.1. Network Configuration.

The reason to select the star topology for this computerized system is it is less expensive. In star topology, each computer needs only one link and one I/O port to connect it to any number of others. This factor also makes it easy to install and reconfigure. Another advantage, is if one link fails, the other link remain active.

3.2.2 Database Design

The proposed system uses the concept of the relational database management system to create a structure. We must consider and find their relation. We will keep the data in form of tables that are related to another tables via the key. We use ERD (Entity Relationship Diagram) depict data in terms of entities and relationship described by the data.

The good database design must normalize the tables to minimum redundancy.

3.2.3 Interface Architecture

Designing a good user interface is essential for the computerized system. It has resulted in either input and output. The interface architecture should be designed to be easier for the user, so, they will take a short period to be familiar with the new system.

The interface design method that we have chosen is “on-line processing”. For on-line method, it will be used in order to get the input and output within a short period of time. Once the user key-in the input, it will process immediately. The users don't have to spend much time waiting for the system to process like batch processing.

In the output design, it requires reports and screens that generate information for reporting. The example of output design is sales order report, sales of product report which categorizes information for managers.

The output requirements are the information that must be the result from the input requirements that can generate the various reports that support the management for a better and proper decision making.

3.3 System Candidate

For the proposed system, the system solution must be analyzed for feasibility. This approach discourages the user from prematurely making a decision concerning which candidate is the best. Table 3.1 shows that the task is triggered by the completion of each candidate solution.

Table 3.1. Candidate System Matrix.

Characteristics	candidate1	candidate2	candidate3
Portion of System Computerized Brief description of that would be computerized in this candidate.	Order Processing System computerized and work cooperatively for all departments.	Order Processing System computerized and work cooperatively for sales & marketing and production department.	Order Processing System computerized and work cooperatively for sales & marketing and accounting department.
Benefit Brief description of the benefits that would be realized for this candidate.	This solution can save a lot of time and reduce the number of officers and it can help officers to perform efficiently work for all functions of ordering process.	This solution can reduce the number of officers and save time to perform ordering process for sales & marketing and production department.	This solution can reduce the number of officers and save time to perform ordering process for sales & marketing and accounting department.
Server and Workstation A description of the servers and workstations needed to support this candidate.	MS Window 2000 Server and MS Window 2000 Professional.	MS Window 2000 Server and MS Window XP.	Same as candidate2
Software Tools Needed Software tools needed to design and build the candidate(e.g., database management system, emulators, operating systems, language, etc.).	MS Visual Basic 6.0 MS SQL Server 7.0	MS Visual Basic 6.0 Oracle	Same as candidate2
Output Devices and Implications A description of output devices that would be used, Special output requirements	(1) HP Laser Jet 2300	(1) HP Laser Jet 3300	(1) HP Laser Jet 4200

Table 3.1. Candidate System Matrix (Continued).

Characteristics	candidate1	candidate2	candidate3
Input Devices and implications A description of input methods to be used, input devices(e.g., keyboard, mouse, etc.), Special input requirements(e.g., new or revised forms from which data would be input), and input consideration	Keyboard & Mouse	Same as candidate1	Same as candidate1
Storage Device and Implications Brief description of what data would be accessed from existing stores, what storage media would be used, how much storage capacity would be needed, and how data would be organized.	MS SQL Server DBMS with 100 GB arrayed capacity	Same as candidate1	Same as candidate1

We can now compare the candidates and select one or more solutions to recommend to the system owners and users.

Table 3.2. is the feasibility analysis matrix that allow for comparison of different feasibility analysis for a number of candidates.

Table 3.2. Feasibility Analysis Matrix.

Feasibility Criteria	Wt.	candidate1	candidate2	candidate3
Operational Feasibility Functionality. A description of what degree the candidate would benefit the organization and how well the system would work. Political.	30%	Support Order Processing operation for all user requirements sale & marketing, production, accounting and manager Score:100	Support sales & marketing and production requirements. Score:65	Support sales & marketing and accounting requirements. Score:65
Technical Feasibility Technology. An assessment of the maturity, availability (or ability to acquire), and desirability of the computer technology needed to support this candidate. Expertise. An assessment of the technical expertise needed to develop, operate and maintain the candidate system.	30%	The company require to hire or pay for the development team to perform modification integration requirement. Score:70	The company require to hire or pay for the development team to perform modification integration requirement. Score:70	The company does not require to hire or pay for the development team to perform modification integration requirement. The vendor has the development team to support after development. Score:90
Economic Feasibility Cost to develop: Payback Period (Discounted):	30%	Approximately 350,000 Approximately 1 year 3 months Score:90	Approximately 375,000 Approximately 1 years 5 month Score:70	Approximately 420,000 Approximately 2 years. Score:60
Schedule Feasibility An assessment of how long the solution will take to design and implement.	10%	5 months Score:90	8 months Score:70	6 months Score:80
Ranking	100%	87	68.5	72.5

Since we are looking for the most feasible solution of those remaining, we will identify and recommend the candidate that offers the “best overall” combination of technical, operational, economic, and schedule feasibilities.

From Table 3.1. and Table 3.2, the organization can decide to choose the first development team which is the best candidate in all the criteria.

3.4 Hardware and Software Requirements

3.4.1 Hardware Requirements

In the proposed system, all computers are connected on LAN. The hardware requirement of the proposed system is presented in Tables 3.3 and 3.4.

Table 3.3. The Hardware Specification for the Client.

Hardware	Specification
CPU	Intel Celeron 1.7 GHz
Memory	128 MB
Hard disk	20 GB
CD-Rom Drive	50X
Floppy Drive	1.44 MB
Display card	Integrated AGP on board
Monitor	15’’ Digital

Table 3.4. The Hardware Specification for the Database Server.

Hardware	Specification
CPU	Intel Pentium 4 Processor 2.4 GHz
Memory	256 MB
Hard disk	40 GB
CD-Rom Drive	52X
Display card	AGP 64 MB
Monitor	17’’ Digital
LAN CARD	Ethernet 10/100 MBPS
UPS	1 KVA

3.4.2 Software Requirements

The software requirement of the proposed system can be considered as following:

- (1) Operating system
 - (a) Microsoft Windows 2000 Professional Edition for Server
 - (b) Microsoft Windows 2000 Professional Edition for Client
- (2) Database Management System (DBMS)
 - (a) Microsoft SQL Server version 7.0
- (3) Application Program
 - (a) Visual Basic Professional 6.0

3.5 Security and Control

This factor will help the company to increase efficient security and control as follows:

- (1) To protect accessing through the data by unauthorized persons
- (2) To maintain the correction of data in the computerized system
- (3) To protect the lost of data

To avoid those problems, the organization needs to set up security and controls by:

- (1) Assigning user name and password to authorized employees.
- (2) Assigning a level of access through the system based on priority of employees. For example, a manager has higher priority to access into database than the staff.
- (3) Allow only authorized employees to make data entry and modification on the database.
- (4) Provide automatic log if unauthorized employee attempt to access the system.

- (5) Prepare training course for employees to work together with the new system.
- (6) Prevent computer from infecting viruses by using updated virus protection software.
- (7) To prevent loss of data during a power failure, an UPS (Uninterrupted Power Supply) is recommended.
- (8) Backup copies will be created when the database is updated or modified.

3.6 System Cost Analysis

Cost analysis is the important factor that we must consider before implementing the new system; we have to compare the cost between the existing and the proposed system.

3.6.1 Cost Analysis

In cost analysis issue, there are two major cost categories that concerned: Development Cost and Operating Cost. Development cost is associated with the system development, and operational costs are related to the day to day operation of information system.

Development Cost

To analyze development cost, the investment cost is the first direct cost that is concerned with the following:

- (a) Hardware Cost
- (b) Software Cost
- (c) Personnel hour for developer
- (d) Documentation Cost
- (e) Conversion from old to new system

Operating Cost

The recurring cost can be determined as the followings:

- (a) Day to day operation, including system administrator operation and end-user operation.
- (b) Training

3.6.2 Tangible and Intangible Benefits of the System

The benefits of the proposed system over the existing system can be classified into two categories: tangible and intangible benefits.

(1) Tangible Benefits

Tangible benefits are usually measured in terms of monthly or annual saving.

Some example of tangible benefits are:

- (a) Increased Throughput
- (b) Decrease response time
- (c) Eliminate the redundancy job
- (d) Reduce processing error
- (e) Reduced credit losses
- (f) Reduced expense in the system

(2) Intangible Benefits

Intangible benefits can be classified as follows:

- (a) Better response to the customer
- (b) Better information for the manager in decision making
- (c) Improve customer goodwill
- (d) Improve security and control
- (e) Future expansion capabilities

3.6.3 Cost/Benefit Analysis

Generally developing the proposed system is a long-term investment which tends to measure relevant cash flow and applying appropriate decision making. For the investment, the budget is the main point of evaluation.

The payback period analysis and the breakeven analysis are the popular tool to evaluate.

(1) Payback Period Analysis

The payback analysis technique is a method for determining when an investment will pay for itself. Because system development costs incurred long before benefits begin to accrue, it will take some time for the benefit to overtake the costs.

After implementation, we will incur additional operating expenses that must be recovered. Payback analysis determines how much time will lapse before accrued benefits overtake accrued and continuing costs. This period of time is called "Payback Period".

Payback period is based on the value of money we earn today. So, we focus on the fact that the value of money we earn today is more valuable than the value of money we earn from now.

We need to adjust the value of money from the discount rate. So, we need to adjust the costs and benefits from discount rate. The discount rate is a percentage similar to interest rates that we earn on our saving account.

Table 3.5. Payback Analysis for the Order Processing System, Baht.

Cost Items	Years				
	1	2	3	4	5
<u>Existing System</u>					
Labor and operating cost	1,524,000.00	1,676,400.00	1,844,040.00	2,028,444.00	2,231,288.40
Discount factor for 10%	1.000	0.909	0.826	0.751	0.683
Time-adjusted cost(adjust to present value)	1,524,000.00	1,523,847.60	1,523,177.04	1,523,361.44	1,523,969.98
Cumulative time-adjusted costs over lifetime of the existing system	1,524,000.00	3,047,847.60	4,571,024.64	6,094,386.08	7,618,356.06
<u>Proposed System:</u>					
Development Cost	350,000.00				
Operation & maintenance cost	1,328,690.00	1,460,900.00	1,593,485.00	1,738,903.25	1,898,416.81
Discount factor for 10%	1.000	0.909	0.826	0.751	0.683
Time-adjusted cost(adjust to present value)	1,678,690.00	1,327,958.10	1,316,218.61	1,305,916.34	1,296,618.68
Cumulative time-adjusted costs over lifetime of the proposed system	1,678,690.00	3,006,648.10	4,322,866.71	5,628,783.05	6,925,401.73
Cumulative time-adjusted costs over lifetime of the existing system -the proposed system	-154,690.00	41,199.50	248,157.93	465,603.03	692,954.33

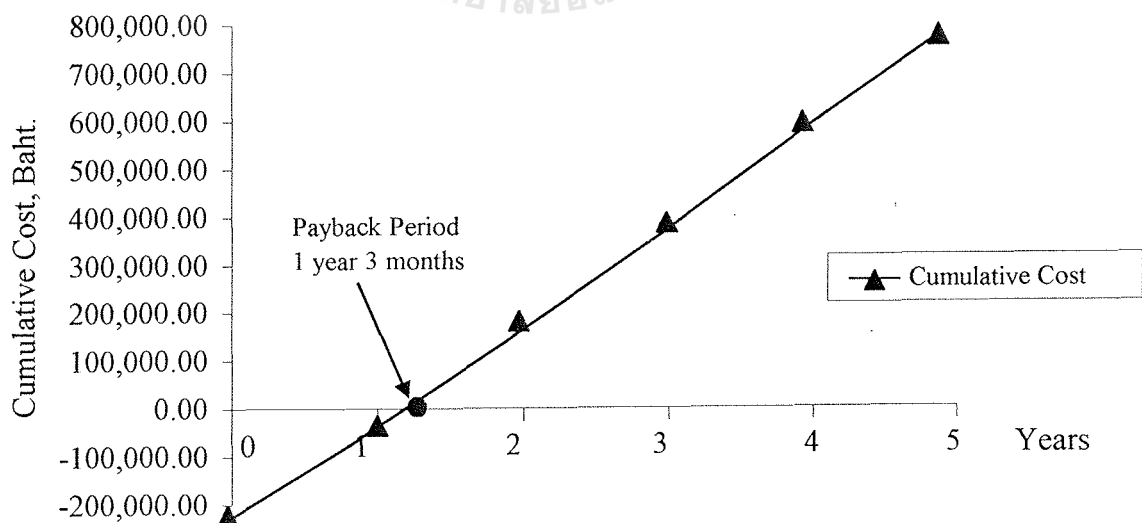


Figure 3.2. Payback Analysis.

(2) Breakeven Analysis

Break-even point is the simplest form of cost comparison. We examine break-even point when the cost of the new system intersects the costs of the old system. At the point of intersection, the proposed system begins to generate a revenue when compared with the old system. From now, the new system will help the organization by saving cost.

At the first year the cost of the new system will be increased because of the hardware and software installation. From the second year onwards, the cost will decrease slightly and continuously.

Table 3.6. shows the cost of manual system that will be less than the proposed system in the first year. But after the first year, the cost of the proposed system will be less and less than the existing system.

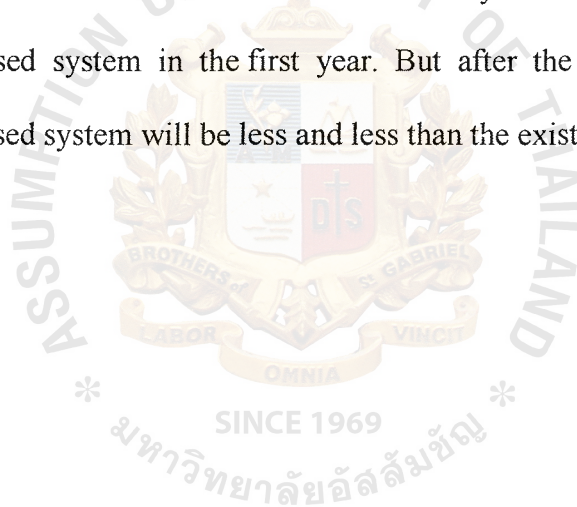


Table 3.6. Manual System Cost Analysis, Baht.

Cost Items	Years				
	1	2	3	4	5
<u>Operating Cost</u>					
Salary Cost (increase 10%per year)					
Supervisor 1 person	30,000.00	33,000.00	36,300.00	39,930.00	43,923.00
Staff	0.00	0.00	0.00	0.00	0.00
Sale Staff 4 person (1 per 18,000)	72,000.00	79,200.00	87,120.00	95,832.00	105,415.20
Total Salary Cost	102,000.00	112,200.00	123,420.00	135,762.00	149,338.20
Total Annual Salary Cost	1,224,000.00	1,346,400.00	1,481,040.00	1,629,144.00	1,792,058.40
<u>Office Suppliers & Miscellaneous Cost:</u>					
Stationary 5,000 Per Annual	5,000.00	5,500.00	6,050.00	6,655.00	7,320.50
Paper 10,000 Per Annual	10,000.00	11,000.00	12,100.00	13,310.00	14,641.00
Utility 5,000 Per Annual	5,000.00	5,500.00	6,050.00	6,655.00	7,320.50
Miscellaneous 5,000 Per Annual	5,000.00	5,500.00	6,050.00	6,655.00	7,320.50
Total Office Supplies & Miscellaneous	25,000.00	27,500.00	30,250.00	33,275.00	36,602.50
Total Annual Office Operating Cost	300,000.00	330,000.00	363,000.00	399,300.00	439,230.00
Total Manual System Cost	1,524,000.00	1,676,400.00	1,844,040.00	2,028,444.00	2,231,288.40

Table 3.7. Five Years Accumulated Manual system Cost, Baht.

Year	Total Manual Cost	Accumulated Manual Cost
1	1,524,000.00	1,524,000.00
2	1,676,400.00	3,200,400.00
3	1,844,040.00	5,044,440.00
4	2,028,444.00	7,072,884.00
5	2,231,288.40	9,304,172.40

Table 3.8. Computerized System Cost Analysis, Baht.

Cost Items	Years				
	1	2	3	4	5
<u>Fixed Cost</u>					
Hardware Cost:					
Server And Workstation cost	124,690.00	-	-	-	-
Total Hardware Cost	124,690.00	-	-	-	-
Maintenance cost	-	50,000.00	50,000.00	50,000.00	50,000.00
Software Cost:					
Total Software Cost	85,000.00				
Training Cost	25,000.00	-	-	-	-
System Designer 1 person 32,000 for 3 months	96,000.00	-	-	-	-
Database Programmer 1 person 28,000 per month	28,000.00	-	-	-	-
Total Implementation Cost	149,000.00	-	-	-	-
Office Equipment Cost:					
Printer 15,000 per unit	30,000.00	-	-	-	-
Total Office Equipment Cost	30,000.00	-	-	-	-
Total Fixed Cost	388,690.00	50,000.00	50,000.00	50,000.00	50,000.00
<u>Operating Cost</u>					
Staff:					
Sales Staff 4 persons (1 per 18,000)	72,000.00	79,200.00	87,120.00	95,832.00	105,415.20
System Administrator 1 person	22,000.00	24,200.00	26,620.00	29,282.00	32,210.20
Total Monthly Salary	94,000.00	103,400.00	113,740.00	125,114.00	137,625.40
Total Annual Salary Cost	1,128,000.00	1,240,800.00	1,364,880.00	1,501,368.00	1,651,504.80
Office Supplies & Miscellaneous Cost					
Stationary 1,500 per month	1,500.00	1,575.00	1,653.75	1,736.44	1,823.26
Paper 2,000 per month	2,000.00	2,100.00	2,205.00	2,315.25	2,431.01
Utility 5,000 per month	5,000.00	5,250.00	5,512.50	5,788.13	6,077.53
Miscellaneous 5,000 per month	5,000.00	5,250.00	5,512.50	5,788.13	6,077.53
Annual Office Supplies & Miscellaneous Cost	162,000.00	170,100.00	178,605.00	187,535.25	196,912.01
Total Operating Cost	1,290,000.00	1,410,900.00	1,543,485.00	1,688,903.25	1,848,416.81
Total Computerized System Cost	1,678,690.00	1,460,900.00	1,593,485.00	1,738,903.25	1,898,416.81

Table 3.9. Five Years Accumulated Computerized Cost, Baht.

Year	Total Computerized Cost	Accumulated Computerized Cost
1	1,678,690.00	1,678,690.00
2	1,460,900.00	3,139,590.00
3	1,593,485.00	4,733,075.00
4	1,738,903.25	6,471,978.25
5	1,898,416.81	8,370,395.06

The break-even point is defined as the point where sales or revenue is equal to expenses.

This figure shows that after 1 year of operation, the proposed system will reach the break-even point, where sales or revenue is equal to the cost of building the system.



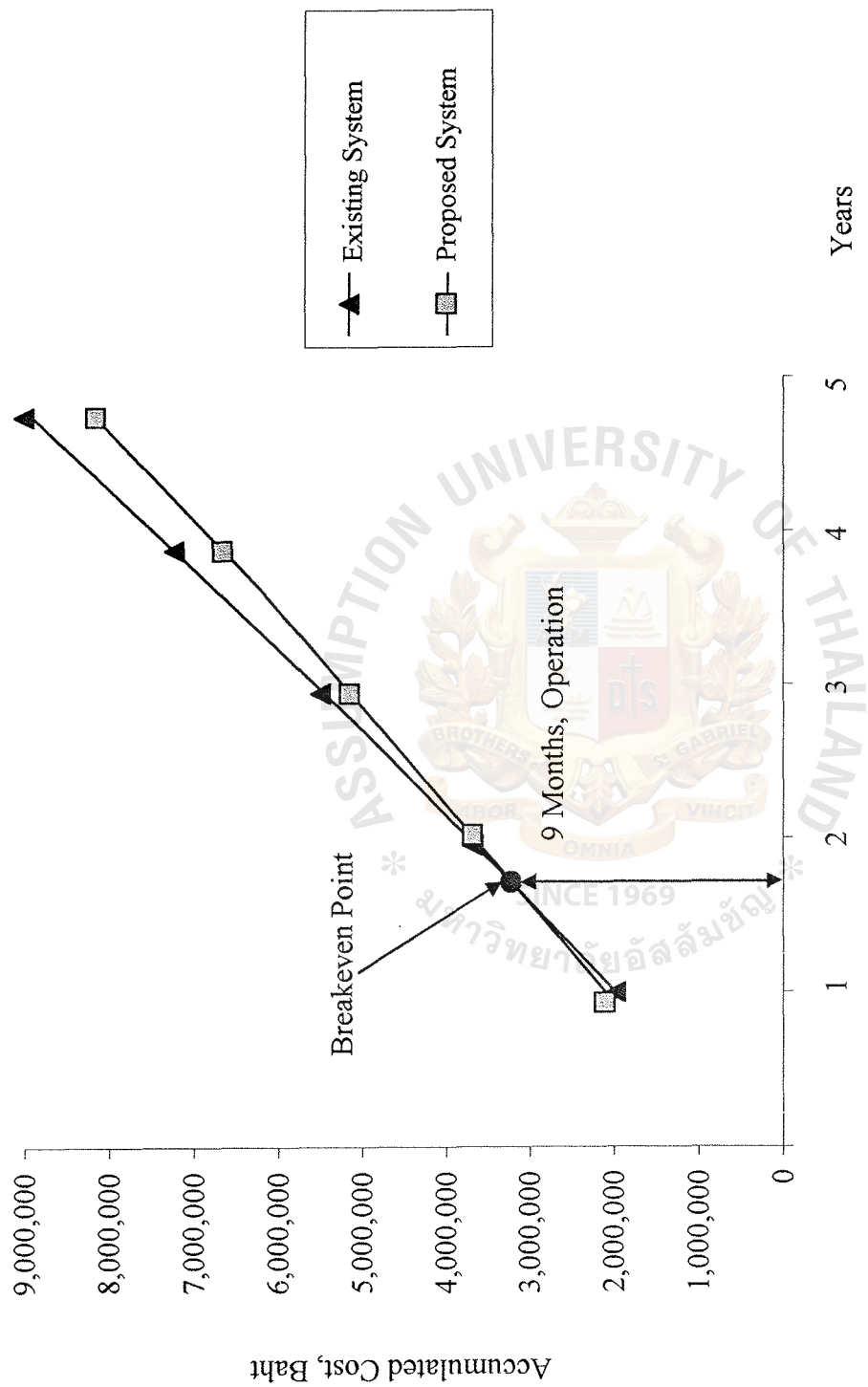


Figure 3.3. Break Even Point Analysis.

IV. PROJECT IMPLEMENTATION

4.1 Overview of Project Implementation

Project implementation is the conversion from a current existing system to the new proposed information system. The design of the new system should be evaluated first to make sure that the new proposed system can meet the desired goals.

The implementation process will involve the software development, training users, documentation and solving problems that maybe occur. Moreover, the project implementation should use the parallel concept for running both the new system and the old system to see any effects of the proposed system and to solve those problems before the old system is discarded.

4.2 Stage of Implementation

The proposed application for the project use Microsoft Visual Basic 6.0 Enterprise Version as front-end because it completely provides the function necessary to develop the system. Visual Basic is more suitable and popular than the other development tools. By this development tool, we can use visualized technology to build up application program. We selected the appropriate control and build in the form, and then display on the monitor that the end-users can easily use and enter the data.

Visual Basic can be used to create application to connect database management system (DBMS) to insert, update, delete, and retrieve the data. We used SQL Server Version 7.0 as back-end computer which handles database. The programming is developed from data flow diagrams, entity relationship diagram and structure charts.

There are five stages in order to implement the system which are installation, conversion, user training, testing, and documentation.

4.2.1 Installation

Since the old system is the manual system, when the hardware is completely set up and network configuration is absolutely finished, the software or application programs would be installed. We use Microsoft SQL Server 7.0 to manage all the data in the new computerized system such as Customer information, Product information, and Supplier information, etc.

In the similar way, we install the application programs in the computer to populate the new database with restructured existing data. The users will use the application program to manage the data and also keep the required data in the database. The application programs will retrieve the information from database to generate quotation, job order, invoice, and report.

4.2.2 Conversion

From the manual system that uses paper to the new system that uses computerized, conversion is an important phase. We convert the data from paper format to computer by entering the data via application programs. We also backup the old data to recover if there are the problems after converting.

Data conversion must be carefully planned and should be done step by step. We will use the parallel system to duplicate work. The parallel system, both the old and new are operated for some time period. This ensures that all major problems in the new system have been solved before the old system is discarded. We compare reports of the new system with reports of the old system for testing the completeness conversion of information. The parallel system is safe but it also means the cost of running two system over some period must be incurred.

4.2.3 User Training

Converting to a new system necessitates that system users be trained and provided with documentation that guides them through using the new system. Training user can be performed one on one; however, group training is generally preferred. The system owner must support this activity. They must be willing to approve the release time necessary for the employee to obtain the training needed to become successful users of the new system. The user must be trained to use equipment and to follow the procedures required of the new system. We should divide user training into 2 categories: System Administration and System User.

System Administration

System Administration has the responsibility to cope with the security policy, network configuration to work correctly and effectively. System Administration must define the authorized person to be responsible for his works, supervise the operating of application and database programs.

The training involves the responsibility for keeping the system running, providing the necessary service, or introducing the application to end-users and concerning how to load file, copy file, and backup data file. The staffs have to know which procedures are appropriate when the problems occur and how to accomplish them, how to detect them and what step to follow when they arise.

System User

User training will involve the fundamental of using new computerized system. The users need to know how to turn on a computer, how to insert a diskette and how to load a program to start their work. They also want to be sure when it is safe to take certain action without risking a loss of data.

User training includes both of learning how to enter data, how to add data or edit it, formulate inquiries to retrieve specification information, and delete records of data.

The project developer should make sure that once the staff can work by themselves, they will be able to utilize the system as it has been designed. To evaluate the effectiveness of the training, some testing on whether the users understand all the functions are recommended.

4.2.4 Testing

Testing is very important for the development of the proposed system because it can be used to find any errors before the system is actually used. If the new application calls for networks, network must be normally be implemented before building and testing databases and writing or installing computer programs that will use those networks. For network testing, we should ensure that each computer can share the important data, database server and printer can share to work properly. For database testing, users may also involved in this task by providing or approving the test data to be used in the database. Sample data from production database may be loaded into tables for testing the databases. After network and database testing, we will test the system, which can divide into 3 parts as follows:

Data Input

Test for data input while entering data such as data validations, and check digits of data fields.

Data Processing

This part tests to ensure that the program is working properly, ensure that data tables are accurately updated and the calculation of mathematical process are correct.

Data Output

Data output tests to ensure that the report is in the proper format and provide the proper information. For any data queries, testing should be done to ensure that can retrieve all selected records.

4.2.5 Documentation

Documentation of the system will be separated into two types. For the users, the document describes that method of how to use the application program in each process. For the programmers, the document describes the flow of the system and the data dictionary, this will help the programmer to expand and maintain the system.

4.3 Overall Evaluation

After implementation for the new system, the management should evaluate all factors related to the system.

The objective will be considered as following:

- (1) The new system should increase the productivity and reduce cost.
- (2) The ordering process has to perform in a specific time to fulfill the user requirement.
- (3) The new system should help to reduce redundant job and increase efficiency of the working process.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The purpose of this system development project is to analyze, design and implement the new Order Processing System of Thai Plastic Supply Co., Ltd. in terms of providing customer database, product database, customer order, stock control, print job order and invoice and generate report.

The system development could be succeeded if the staffs see importance and usefulness of the computer information system. The main task is manually performed by staff, so, there are many redundant processes that occur which are time-consuming.

The proposed system can provide more efficient process for the staff to perform their task. It reduces the times wasted from the manual system. The proposed system involves the analysis of process in the way of dataflow diagram, process specification, file design, table design, input and output screen, output report, hardware and software specification, cost & benefit analysis, security control and project implementation. The proposed system is built to support the Local Area Network that able to share the resource.

Computer information system is used as the strategy in business process. So, the business can be successful with the use of computer.

Table 5.1. Degree of Achievement between the Current system and the Proposed System.

Process	Existing system (Time Spent)	Proposed system (Time Spent)
Process Request Order	1 hr.	20 mins.
Process Confirm Order	30 mins.	10 mins.
Process Generate Invoice	30 mins.	15 mins.
Process Generate Report	3 hrs.	30 mins.

From Table 5.1. the proposed system is much faster than the existing system and reduces time in the ordering process. In the existing system, there are the problems from paper work and human error. In the verify customer order process, a sales person must find the customer details in the old paper file, checking file specification of the products and keeping the order in the paper. But, in the proposed system, the sales officer can check the customer's information by typing the customer's id and checking the information of customer.

For the manual system, the ordering process takes a lot of time to generate the summary report, product lists, and etc. The staff must collect the data to generate reports for analysis. But, in the proposed system, the staff can generate the report more easily.

Therefore, in the proposed system, it can save the operation time and is more accurate, and increases work efficiently.

5.2 Recommendations

The company should adapt the computerized system to other sections in the company especially the sections that are involved with this proposed system such as accounting system and the company can expand the business in the future for effectiveness and competitiveness.

The company should introduce new technology to the Order Processing System by using bar reader and scanner to reduce mistakes and easily keeping the product information.

Furthermore, it is recommended that web-based solution should be developed and implemented to allow users and customers accessing the system more easily and faster.

APPENDIX A
CONTEXT DIAGRAM AND DATA FLOW DIAGRAMS



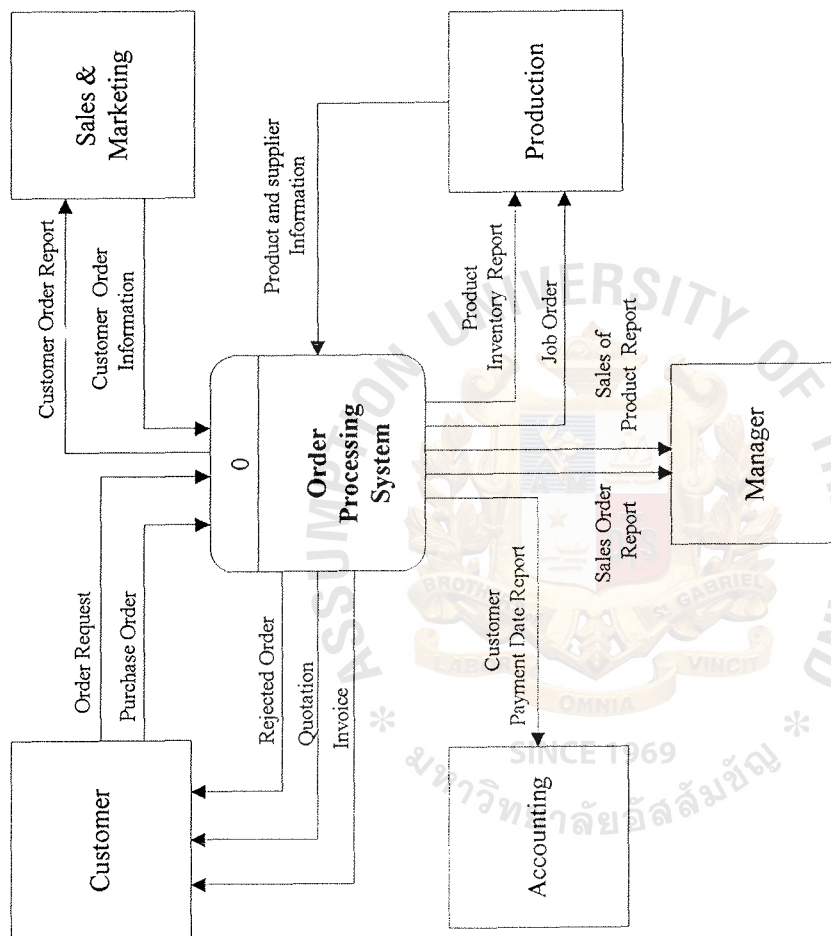


Figure A.1. The Context Diagram of Order Processing System.

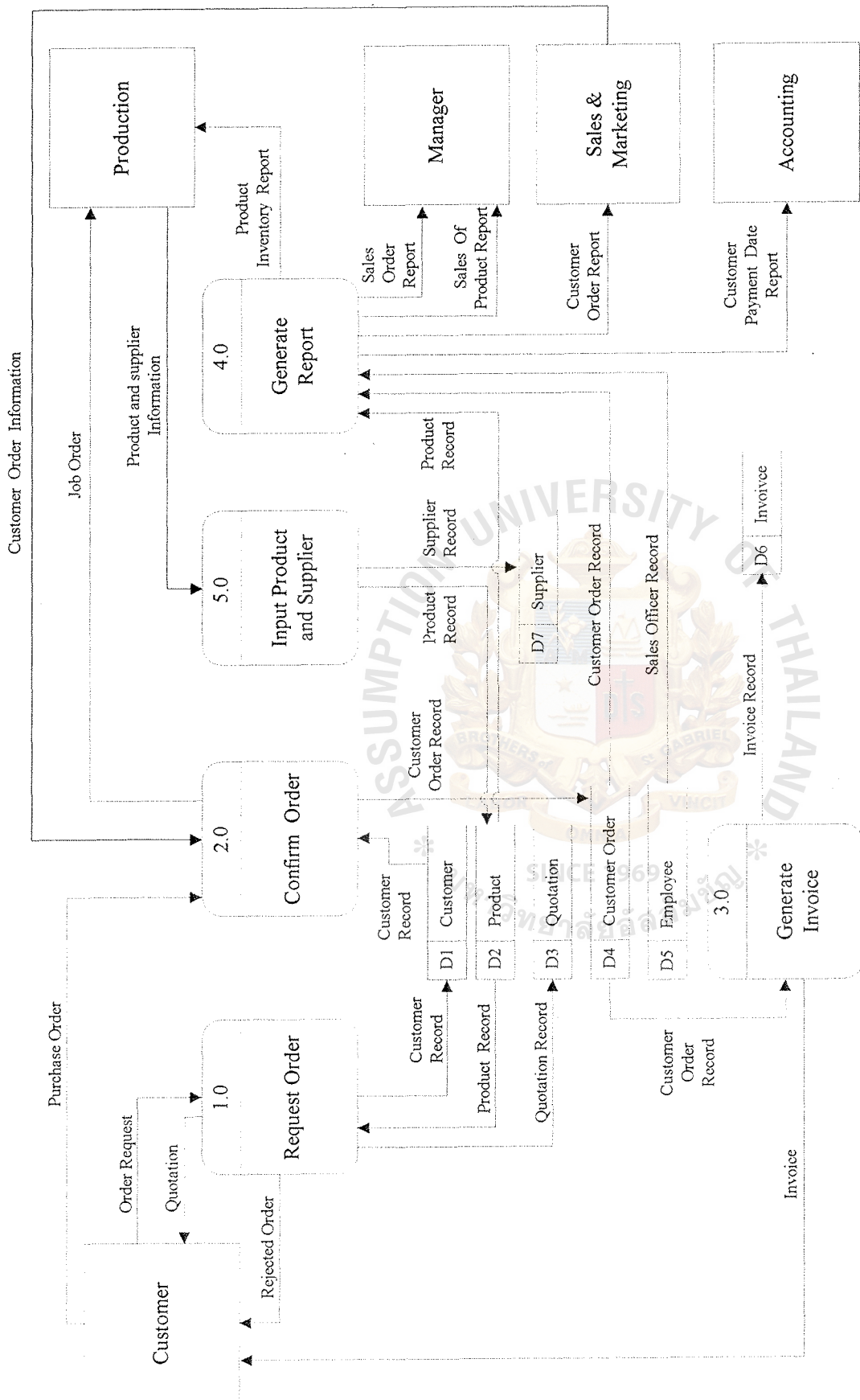


Figure A.2. Data Flow Diagram Level 0.

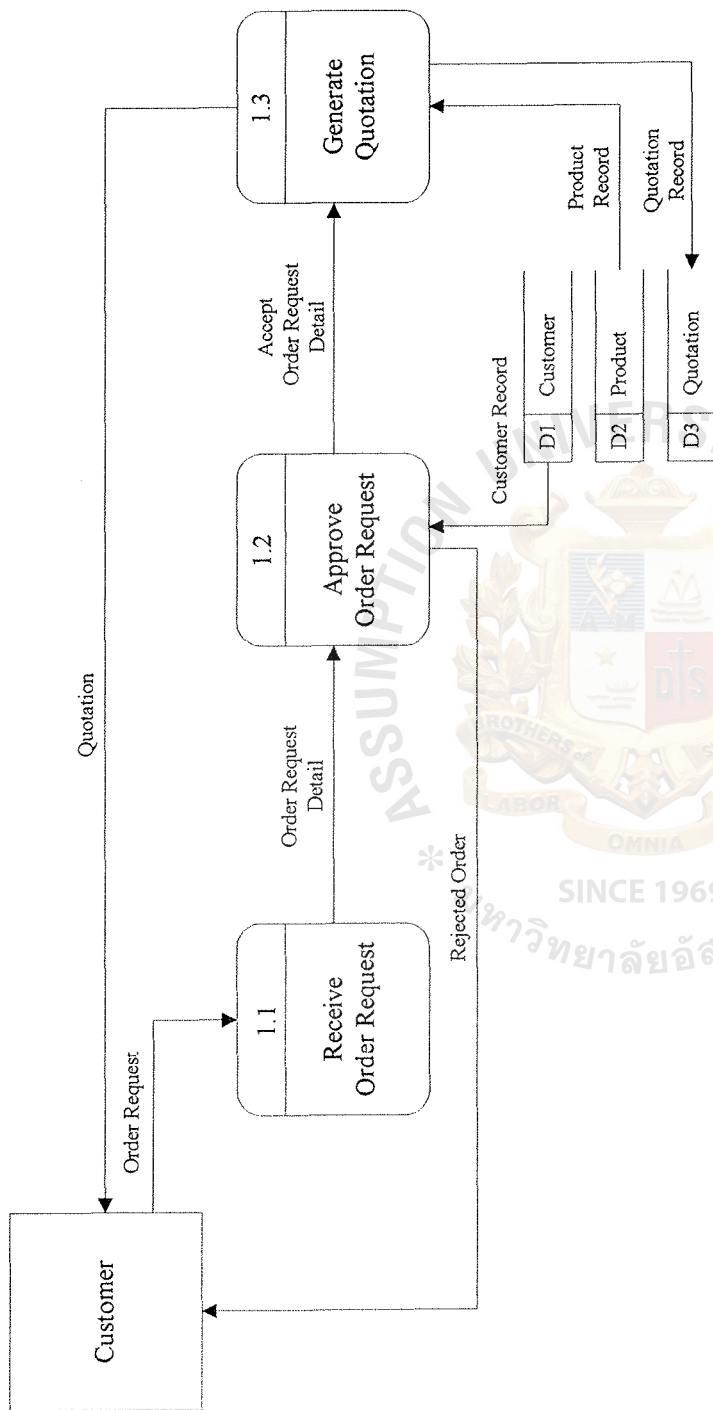


Figure A.3. Data Flow Diagram Level 1.0 of Request Order.

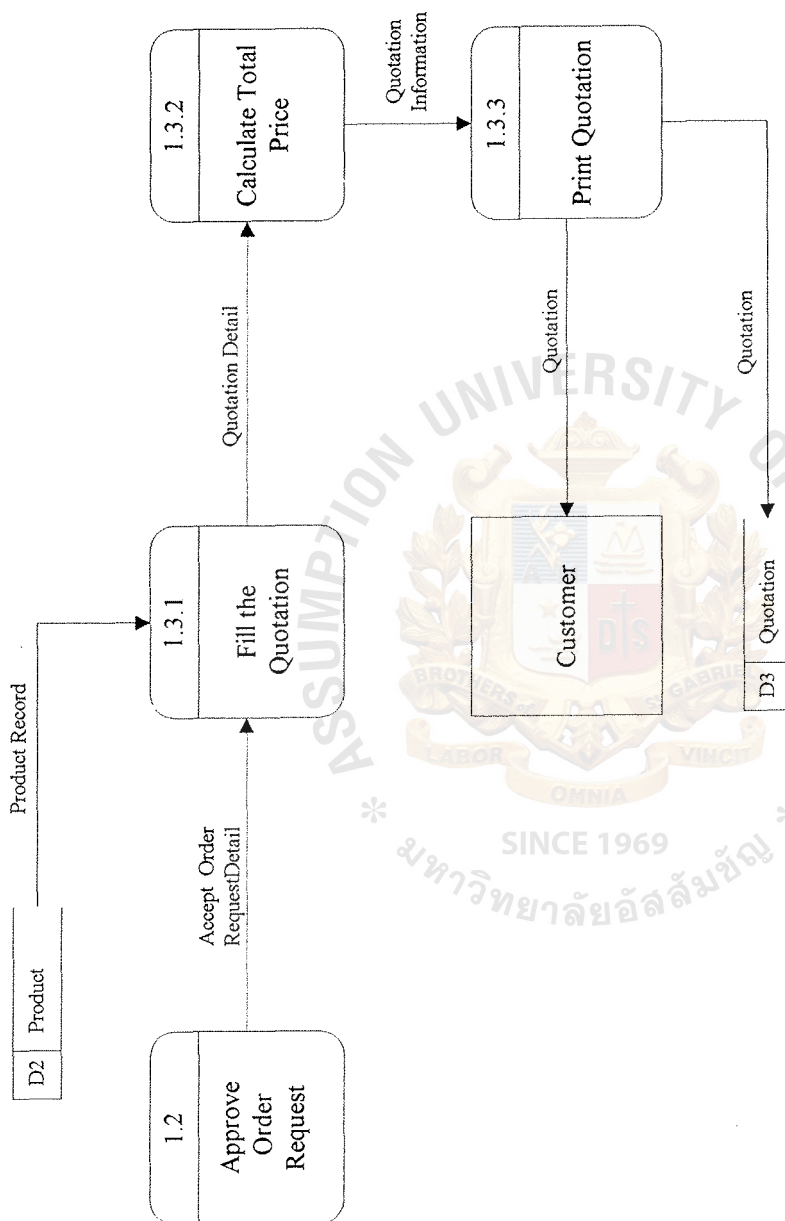


Figure A.4. Data Flow Diagram Level 2.0 of Request Order.

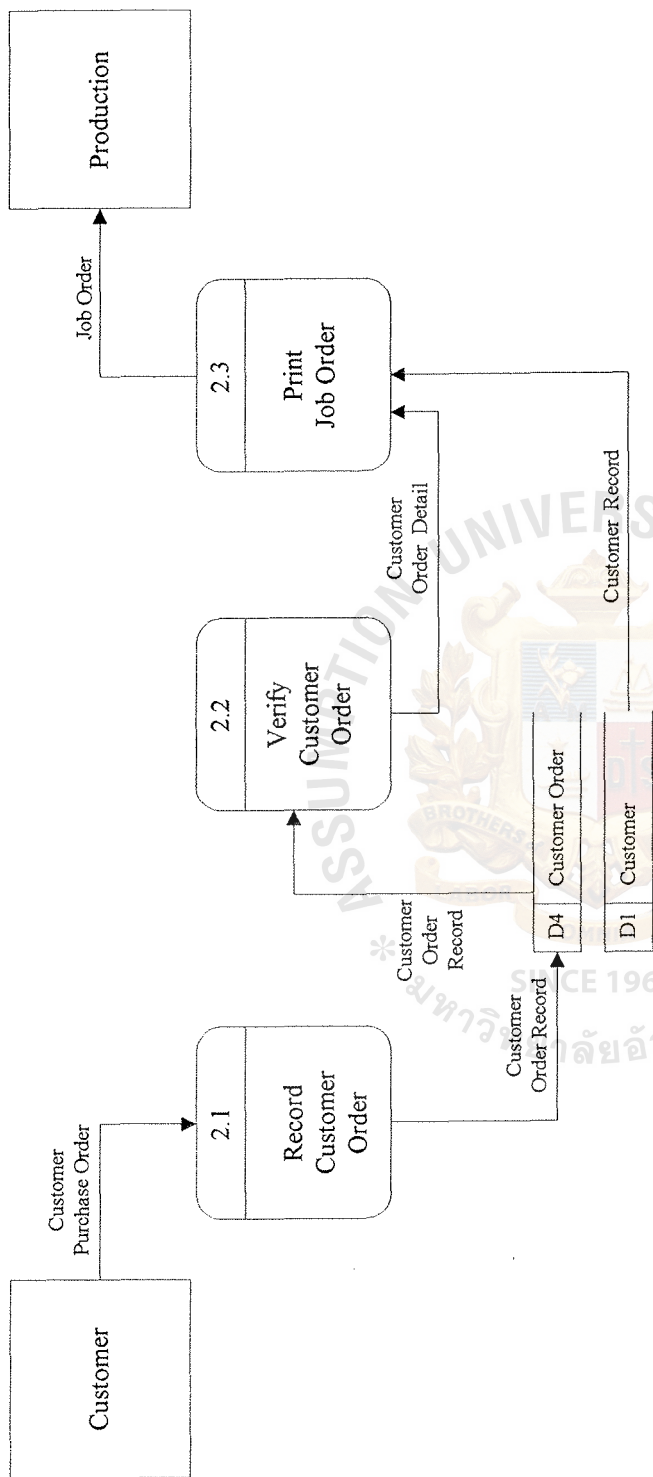


Figure A.5. Data Flow Diagram Level 1.0 of Confirm Order.

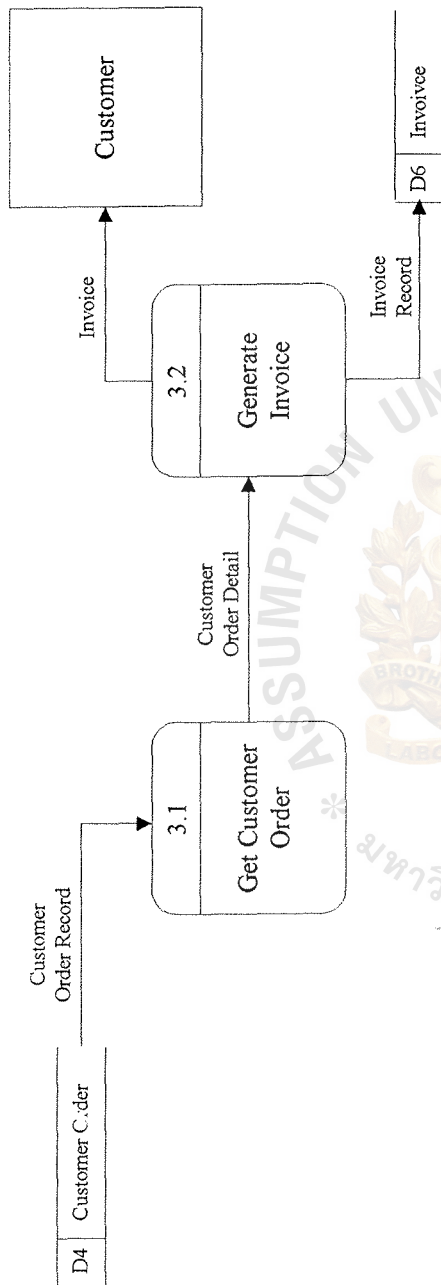


Figure A.6. Data Flow Diagram Level 1.0 of Generate Invoice.

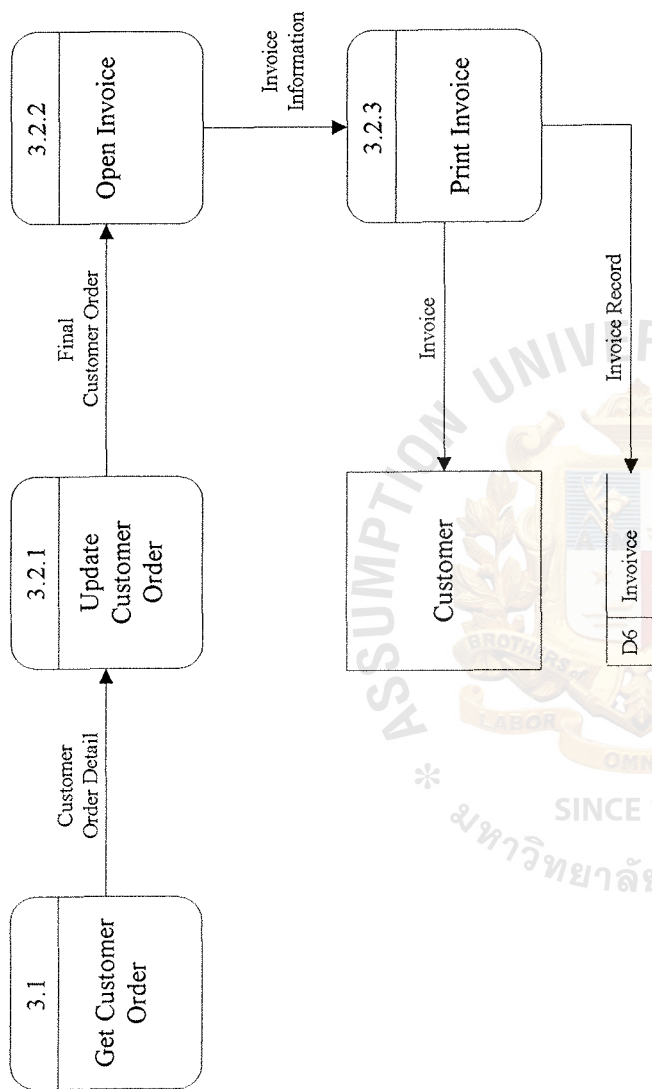
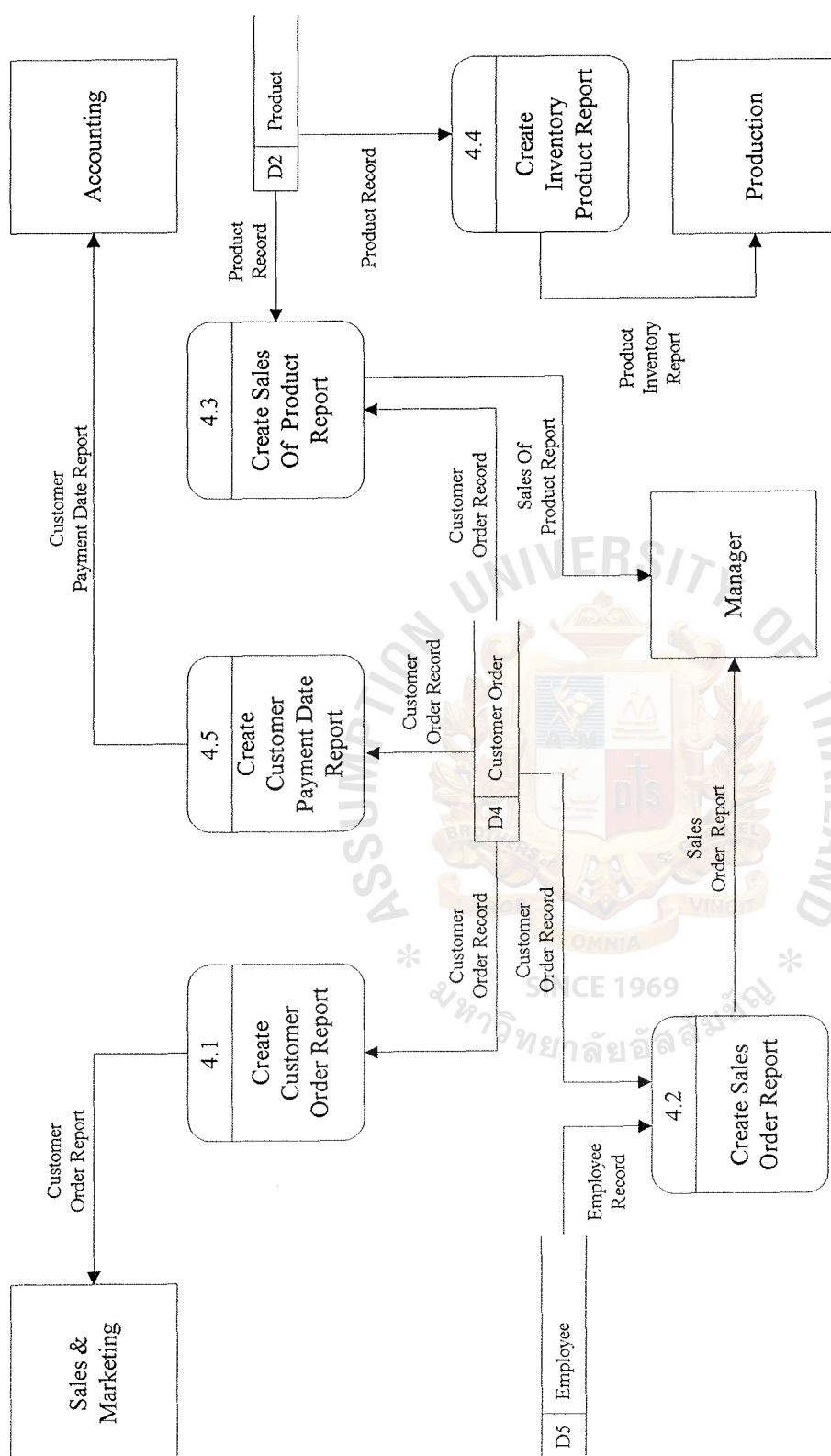


Figure A.7. Data Flow Diagram Level 2.0 of Generate Invoice.



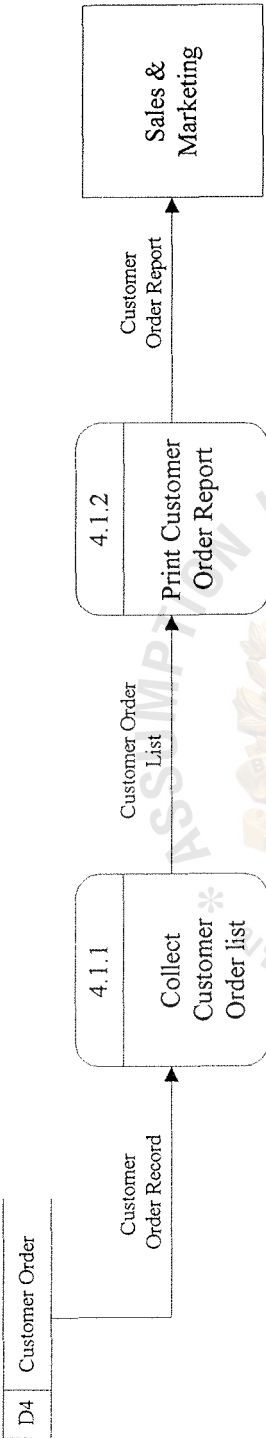


Figure A.9. Data Flow Diagram Level 2.0 of Create Customer Order Report.

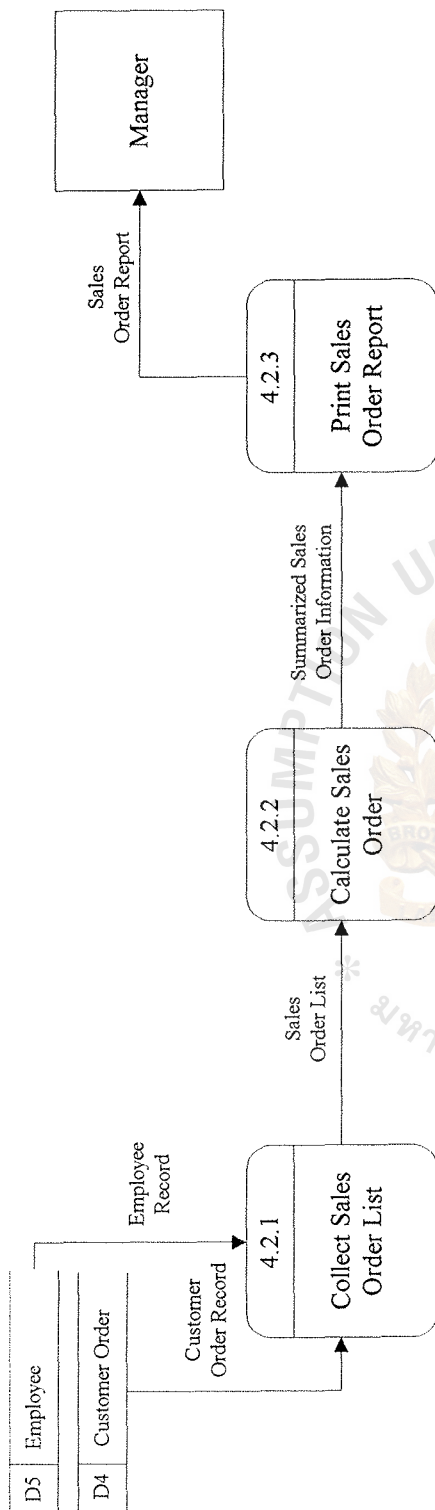


Figure A.10. Data Flow Diagram Level 2.0 of Create Sales Order Report.

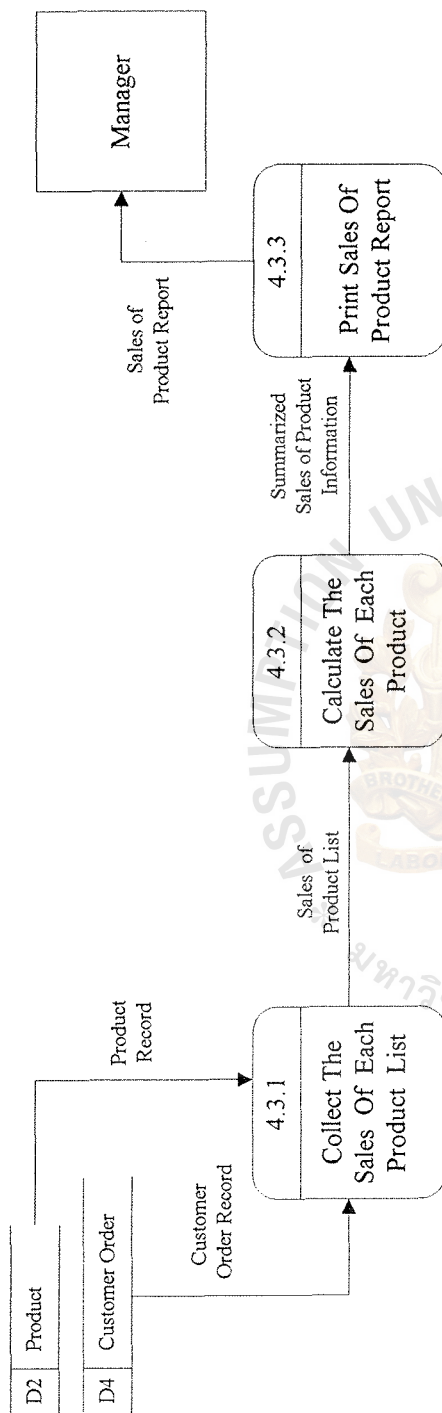


Figure A.11. Data Flow Diagram Level 2.0 of Create Sales of Product Report.

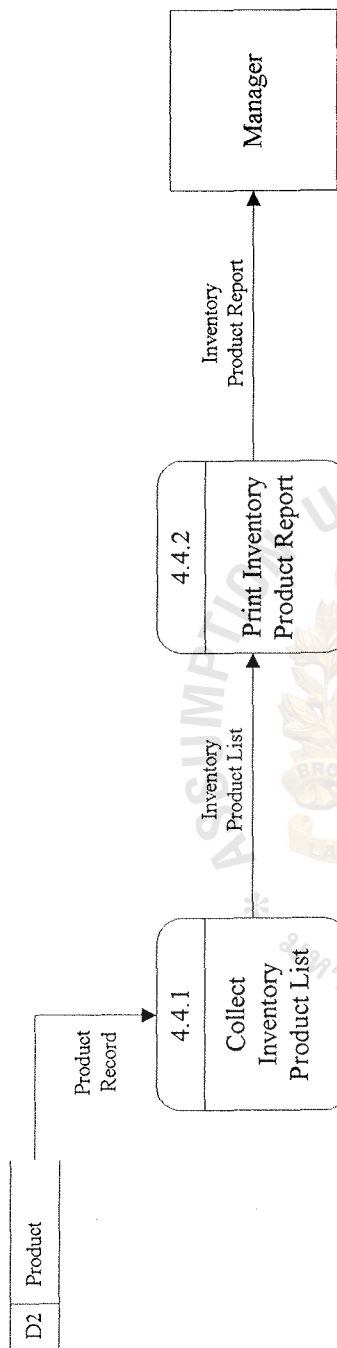


Figure A.12. Data Flow Diagram Level 2.0 of Create Inventory Product Report.

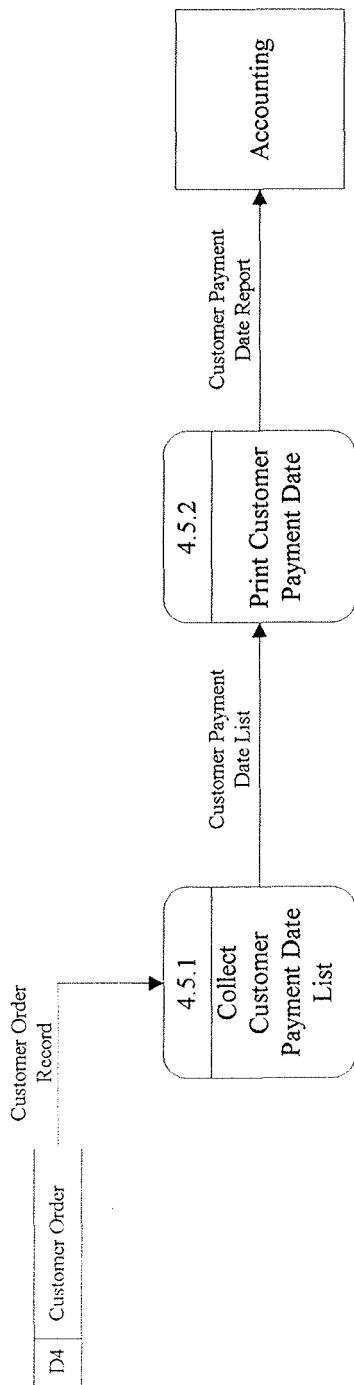


Figure A.13. Data Flow Diagram Level 2.0 of Create Customer Payment Date Report.

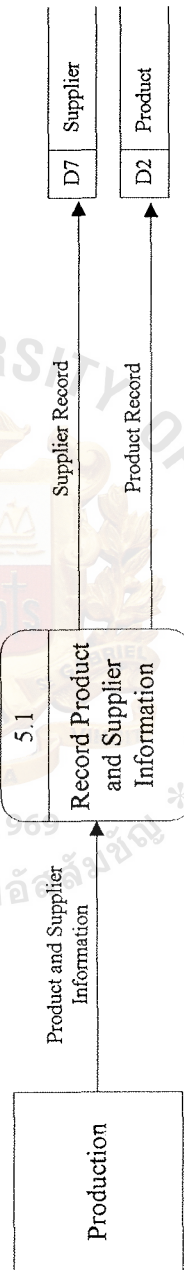


Figure A.14. Data Flow Diagram Level 1.0 of Record Product and Supplier Information.



APPENDIX B

INPUT DASIGN

Input login and password

Thai Plastic Supply

Order Processing System



Input Login name and Password

Login Name

Password

Figure B.1. Login Screen.

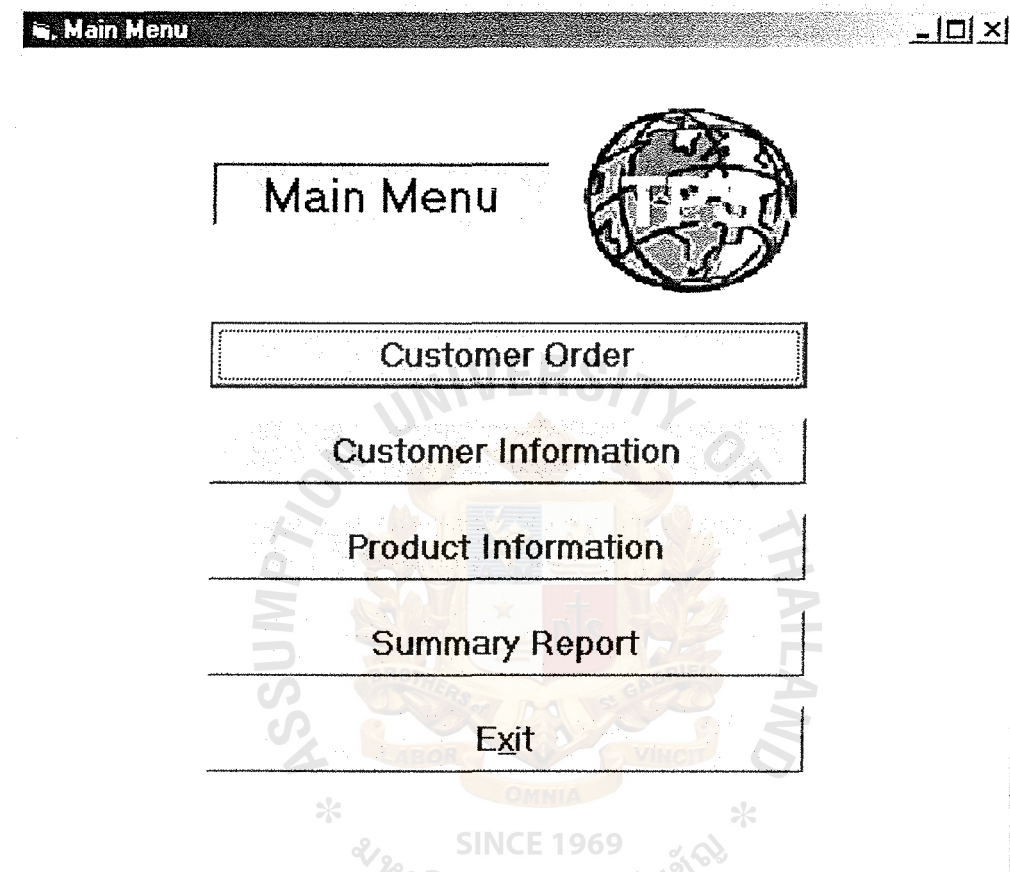


Figure B.2. Main Menu Screen.

Customer Order

Customer ID

0112

Date of Quotation

March 13,2003

Company Name

Thai Laminate Co.,Ltd.

Date of P/O

March 15,2003

Contract Person

Piriya Kunakarn

Delivery Date

March 17,2003

Payment Type

Cash

Employee ID

017

Delivery Place

Boonpong Building, 7th Floor, Silom Road

Due Date

March 24,2003

Requested Product

Product ID	Product Name	Quantity	Unit Price	Total
c06	Ceramic sealing rope	5	6,500	32,500.00

Total

32,500.00

Discount

5%

Save

New

Exit

After Discount

30,875.00

VAT(7%)

2,161.25

Print Quotation

Print Job Order

Print Invoice

Total Price

33,036.25

Figure B.3. Customer Order Screen.

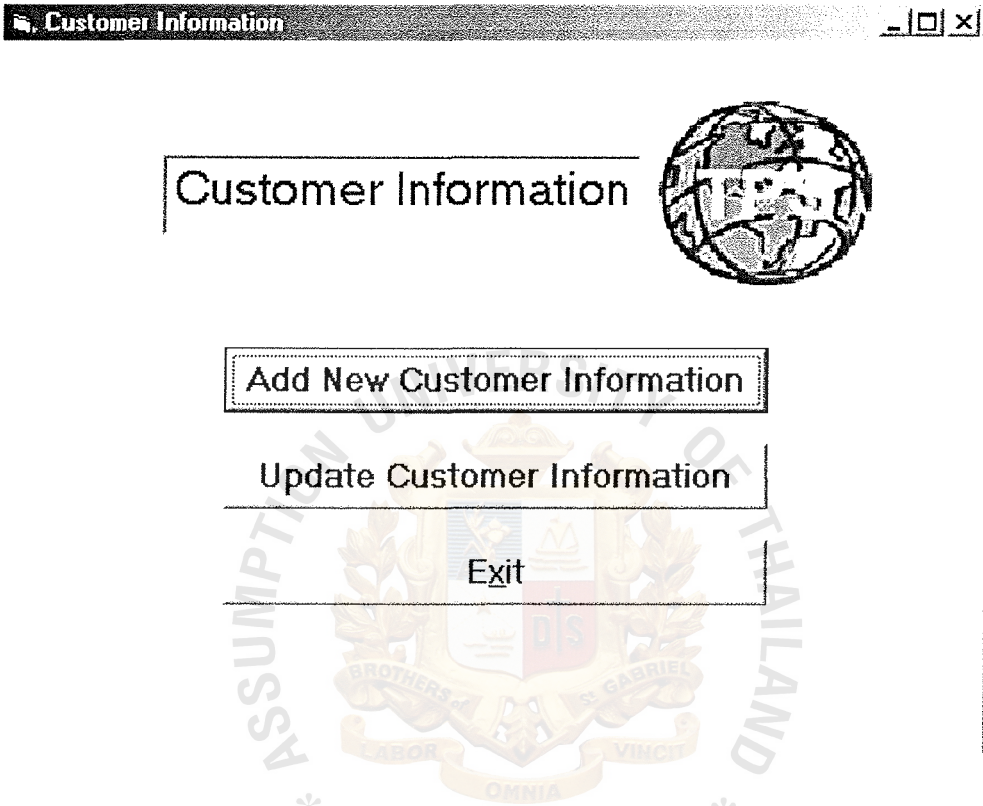


Figure B.4. Customer Information Submenu Screen.

Add New Customer

Customer ID	0145	Employee ID	014	Country	Thailand
Company Name	Yanapan Co.,Ltd		Zip Code	10330	
Contract Person	Pongpan Sichapan		Telephone	(02)276-4548-52	
Address	956 Sukhumvit71 Klongton		Fax	02-276-4553	
			E-mail Address	Yanapan@hotmail.com	
Province	Bangkok		Discount Rate	5%	
<input type="button" value="Save"/>			<input type="button" value="Reset"/>		
			<input type="button" value="Exit"/>		

Figure B.5. Add New Customer Screen.

Update Customer Information

Update Customer Information

Customer ID

0114

Employee ID

021

Country

Thailand

Company Name

Sun Lighting Co.,Ltd.

Zip Code

10230

Contract Person

Weera Manapong

Telephone

(02)510-6870-73

Address

56/45 Soi Ramindra44 Bangkok

Fax

(02)510-6869

E-mail Address

weera@yahoo.com

Province

Bangkok

Discount Rate

7%

Search

Save

Delete

Reset

Exit

Figure B.6. Update Customer Information Screen.

Product Information



Add New Product Information

Update Product Information

Supplier Information

Exit

Figure B.7. Product Information Submenu Screen.

Add New Product

Add New Product

Product ID	<input type="text" value="c06"/>	Supplier ID	<input type="text" value="s02"/>
Product Name	<input type="text" value="Ceramic sealing rope"/>	Unit	<input type="text" value="PCS"/>
Unit Price	<input type="text" value="6,500.00"/>		

Figure B.8. Add New Product Screen.

Update Product Information

Product ID	<input type="text" value="f02"/>	Supplier ID	<input type="text" value="s05"/>
Product Name	<input type="text" value="Gear Pump"/>	Amount in Stock	<input type="text" value="14"/>
Unit Price	<input type="text" value="12,500.00"/>	Unit	<input type="text" value="PCS"/>

Figure B.9. Update Product Information Screen.

Supplier Information

Supplier Information

Supplier ID	s05	Province	Bangkok
Company Name	Longwoo International Co.,Ltd.	Zip Code	10900
Contract Person	Sanya Nimanon	Telephone	(02)513-7486-90
Address	25 Soi Sam Ladyao Jatujak	Fax	(02)513-7485
		E-mail Address	Sanya@yahoo.com

Search	Reset	Exit
New	Save	Delete

Figure B.10. Supplier Information Screen.

Order Processing Report



Customer Order Report
Sales Order Report
Sales of Product Report
Inventory Product Report
Customer Payment Date Report
Summary Report
Exit

Figure B.11. Order Processing Report Submenu Screen.

Customer Order Report

Customer Order Report

Date

21/02/2003

To

21/03/2003

Ordered By Invoice ID :

00101

TO

00115

Ordered By Sales Volume :

TO

OK

Clear

Exit

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มหาวิทยาลัยอัสสัมชัญ

Figure B.12. Customer Order Report Screen.

Sales Order Report

Date To

Ordered By Sales Volume : TO

Ordered By Invoice ID : TO

Figure B.13. Sales Order Report Screen.

Sales Of Product Report

Date To

Ordered By Product ID: TO

Ordered By Sales Volume : TO

OK

Clear

Exit

Figure B.14. Sales of Product Report Screen.

Inventory Product Report

Inventory Product Report

Ordered By Product ID:

b01

 TO

t05

OK

Clear

Exit

Figure B.15. Inventory Product Report Screen.

Customer Payment Date Report

Date : TO

Figure B.16. Customer Payment Date Report Screen.

Summary Sales Order Report [min] [max] [close]

Summary Sales Order Report

Date : TO

Figure B.17. Summary Sales Order Report Screen.

Summary Sales of Product

Summary Sales Of Each Product Report

Date : TO

Figure B.18. Summary Sales of Product Report Screen.



APPENDIX C
OUTPUT DESIGN


<div> Thai Plastic Supply Co.,Ltd.  </div>			
<div> Customer Order Report From February 21, 2003 to March 21, 2003 </div>			
March 21, 2003			
Invoice ID	Customer ID	Company Name	Amount
00101	0125	Thai J Press	32,000.00
00102	0110	B.C Supply Chain	46,000.00
00103	0115	S.D. Advance	38,000.00
00104	0113	Hoyong Plastic	26,000.00
00105	0132	Bangkok Screen Co.,Ltd.	53,000.00
00106	0129	Royal Frame	23,500.00
00107	0121	Namsin International	18,000.00
00108	0117	T.M.D.Co.,Ltd	32,600.00
00109	0119	Mass Supply Service Co.,Ltd.	59,000.00
00110	0114	Sun Lighting Co.,Ltd.	46,500.00
00111	0118	Vabor Marking System	34,200.00
00112	0127	Shower King Co.,Ltd.	25,800.00
00113	0123	Laphatai Co.,Ltd.	17,600.00
00114	0120	View & C.S.Co.Ltd.	26,800.00
00115	0112	Thai Laminate Co.,Ltd.	45,600.00

Figure C.1. Customer Order Report Ordered by Invoice ID.


<div> Thai Plastic Supply Co.,Ltd.  </div>			
<div> Customer Order Report From February 21, 2003 to March 21, 2003 </div>			
March 21, 2003			
Invoice ID	Customer ID	Company Name	Amount
00109	0119	Mass Supply Service Co.,Ltd.	59,000.00
00105	0132	Bangkok Screen Co.,Ltd.	53,000.00
00110	0114	Sun Lighting Co.,Ltd.	46,500.00
00102	0110	B.C Supply Chain	46,000.00
00115	0112	Thai Lamine Co.,Ltd.	45,600.00
00103	0115	S.D. Advance	38,000.00
00111	0118	Vabor Marking System	34,200.00
00108	0117	T.M.D.Co.,Ltd.	32,600.00
00101	0125	Thai J Press	32,000.00
00114	0120	View & C.S.Co.Ltd.	26,800.00
00104	0113	Hoyong Plastic	26,000.00
00112	0127	Shower King Co.,Ltd.	25,800.00
00106	0129	Royal Frame	23,500.00
00107	0121	Namsin International	18,000.00
00113	0123	Laphatai Co.,Ltd.	17,600.00

Figure C.2. Customer Order Report Ordered by Sales Amount.


<div> Thai Plastic Supply Co.,Ltd.  </div>				
Sales Order Report				
From February 21, 2003 to March 21, 2003				
March 21, 2003				
Invoice ID	Customer ID	Employee Name	Company Name	Amount
00109	0119	Suwanee	Mass Supply Service Co.,Ltd.	59,000.00
00105	0132	Vipawee	Bangkok Screen Co.,Ltd.	53,000.00
00110	0114	Montree	Sun Lighting Co.,Ltd.	46,500.00
00102	0110	WanChai	B.C Supply Chain	46,000.00
00115	0112	Vipawee	Thai Laminate Co.,Ltd.	45,600.00
00103	0115	Montree	S.D. Advance	38,000.00
00111	0118	Vipawee	Vabor Marking System	34,200.00
00108	0117	Suwanee	T.M.D.Co.,Ltd.	32,600.00
00101	0125	Montree	Thai J Press	32,000.00
00114	0120	WanChai	View & C.S.Co.Ltd.	26,800.00
00104	0113	Suwanee	Hoyong Plastic	26,000.00
00112	0127	Suwanee	Shower King Co.,Ltd.	25,800.00
00106	0129	WanChai	Royal Frame	23,500.00
00107	0121	Montree	Namsin International	18,000.00
00113	0123	WanChai	Laphatai Co.,Ltd.	17,600.00

Figure C.3. Sales Order Report Ordered by Sales Amount.


Thai Plastic Supply Co.,Ltd. Sales Order Report From February 21, 2003 to March 21, 2003 				
March 21, 2003				
Invoice ID	Customer ID	Employee Name	Company Name	Amount
00101	0125	Montree	Thai J Press	32,000.00
00102	0110	WanChai	B.C.Supply Chain	46,000.00
00103	0115	Montree	S.D. Advance	38,000.00
00104	0113	Suwanee	Hoyong Plastic	26,000.00
00105	0132	Vipawee	Bangkok Screen Co.,Ltd.	53,000.00
00106	0129	WanChai	Royal Frame	23,500.00
00107	0121	Montree	Namsin International	18,000.00
00108	0117	Suwanee	T.M.D.Co.,Ltd.	32,600.00
00109	0119	Suwanee	Mass Supply Service Co.,Ltd.	59,000.00
00110	0114	Montree	Sun Lighting Co.,Ltd.	46,500.00
00111	0118	Vipawee	Vabor Marking System	34,200.00
00112	0127	Suwanee	Shower King Co.,Ltd.	25,800.00
00113	0123	WanChai	Laphatai Co.,Ltd.	17,600.00
00114	0120	WanChai	View & C.S.Co.Ltd.	26,800.00
00115	0112	Vipawee	Thai Laminate Co.,Ltd.	45,600.00

Figure C.4. Sales Order Report Ordered by Invoice ID.

Thai Plastic Supply Co.,Ltd.
Sales of Product Report
From February 21, 2003 to March 21, 2003



March 21, 2003

Product ID	Customer ID	Company Name	Amount
b02	0114	Sun Lighting Co.,Ltd.	25
b02	0112	Thai Laminate Co.,Ltd.	25
b03	0115	S.D. Advance	21
b04	0119	Mass Supply Service Co.,Ltd.	17
c01	0127	Shower King Co.,Ltd.	12
c02	0127	Shower King Co.,Ltd.	10
c05	0129	Royal Frame	15
c06	0121	Namsin International	11
c10	0117	T.M.D.Co.,Ltd	8
c13	0117	T.M.D.Co.,Ltd	9
f02	0120	View & C.S.Co.Ltd.	14
f04	0113	Hoyong Plastic	18
p02	0110	B.C.Supply Chain	22
p02	0118	Vabor Marking System	23
p02	0123	Laphatai Co.,Ltd.	16
p02	0125	Thai J Press	12
p03	0125	Thai J Press	15

Figure C.5. Sales of Product Report Ordered by Product ID.


<div> <div> Thai Plastic Supply Co.,Ltd. Sales of Product Report From February 21, 2003 to March 21, 2003 </div>  </div>			
March 21, 2003			
Product ID	Customer ID	Company Name	Amount
b02	0114	Sun Lighting Co.,Ltd.	25
b02	0112	Thai Laminate Co.,Ltd.	25
p02	0118	Vabor Marking System	23
p02	0110	B.C.Supply Chain	22
b03	0115	S.D. Advance	21
f03	0132	Bangkok Screen Co.,Ltd.	20
f04	0113	Hoyong Plastic	18
b04	0119	Mass Supply Service Co.,Ltd.	17
p02	0123	Laphatai Co.,Ltd.	16
c05	0129	Royal Frame	15
p03	0125	Thai J Press	15
f02	0120	View & C.S.Co.Ltd.	14
c01	0127	Shower King Co.,Ltd.	12
p02	0125	Thai J Press	12
c06	0121	Namsin International	11

Figure C.6. Sales of Product Report Ordered by Product Amount.

<div> <div>Thai Plastic Supply Co.,Ltd.</div> <div>Product Inventory Report</div> <div>From February 21, 2003 to March 21, 2003</div> <div>March 21,2003</div> </div>			
Product ID	Product Name	Unit	Amount in stock
b01	Vortex Blower(Negative Pressure)	pcs.	50
b02	Vortex Blower(Positive Pressure)	pcs.	55
b03	Hitachi Blower(Negative Pressure)	pcs.	38
b04	Hitachi Blower(Positive Pressure)	pcs.	42
c01	Ceramic fibre twisted	pcs.	35
c02	Woven ceramic fibre cloth	pcs.	22
c03	Ceramic woven fibre tape	pcs.	27
c04	Ceramic fibre tadpole tape	pcs.	28
c05	Ceramic fibre braided sleeve	pcs.	33
c06	Ceramic sealing rope	pcs.	31
c10	Ceramic fibre braided packing	pcs.	44
c13	Ceramic fibre tacky	pcs.	58
f02	Gear pump	pcs.	47
f04	Pacific pump	pcs.	38
p01	Upvc plastic pump	pcs.	29
p02	Pp plastic pump	pcs.	27
t01	Gripper chain	pcs.	34
t02	Multiflex chain	pcs.	45
t03	Modular belt	pcs.	32

Figure C.7. Product Inventory Report Ordered by Product ID.

Thai Plastic Supply Co.,Ltd.
Customer Payment Date Report
From February 21, 2003 to March 21, 2003



March 21, 2003

Invoice ID	Customer ID	Company Name	Due Date
00101	0125	Thai J Press	23-ก.พ.-2003
00102	0110	B.C.Supply Chain	25-ก.พ.-2003
00103	0115	S.D. Advance	25-ก.พ.-2003
00104	0113	Hoyong Plastic	26-ก.พ.-2003
00105	0132	Bangkok Screen Co.,Ltd.	1-มี.ค.-2003
00106	0129	Royal Frame	8-มี.ค.-2003
00107	0121	Namsin International	10-มี.ค.-2003
00108	0117	T.M.D.Co.,Ltd.	13-มี.ค.-2003
00109	0119	Mass Supply Service Co.,Ltd.	15-มี.ค.-2003
00110	0114	Sun Lighting Co.,Ltd.	16-มี.ค.-2003
00111	0118	Vabor Marking System	18-มี.ค.-2003
00112	0127	Shower King Co.,Ltd.	19-มี.ค.-2003
00113	0123	Laphatai Co.,Ltd.	20-มี.ค.-2003
00114	0120	View & C.S.Co.Ltd.	21-มี.ค.-2003
00115	0112	Thai Laminate Co.,Ltd.	21-มี.ค.-2003

Figure C.8. Customer Payment Date Report.

<p style="text-align: center;">Thai Plastic Supply Co.,Ltd. Summary Sale Order Report From February 21, 2003 to March 21, 2003</p> <p style="text-align: right;">March 21, 2003</p>		
Employee ID	Employee Name	Amount
014	Montree	134,500.00
017	Suwanee	143,400.00
021	Vipawee	132,800.00
022	WanChai	113,900.00
Total		524,600.00

Figure C.9. Summary Sales Order Report.

Thai Plastic Supply Co.,Ltd.
Summary Sale Of Product Report
From February 21, 2003 to March 21, 2003



March 21, 2003

Product ID	Product Name	Amount
p02	Pp plastic pump	73
b02	Vortex Blower(Positive Pressure)	50
b03	Hitachi Blower(Negative Pressure)	21
t03	Modular belt	20
f04	Pacific pump	18
b04	Hitachi Blower(Positive Pressure)	17
c05	Ceramic fibre braided sleeve	15
f02	Gear pump	14
c01	Ceramic fibre twisted	12
c06	Ceramic sealing rope	11
c02	Woven ceramic fibre cloth	10

Figure C.10. Summary Sales of Product Report.



APPENDIX D

DATABASE DESIGN

Database Design

The database model for the system is a relational database and each table is kept in a separate file. The normalization is attempted in the design of master file and other related file.

Entity relationship diagram

The summary of Entity Relationship Diagram is shown as below



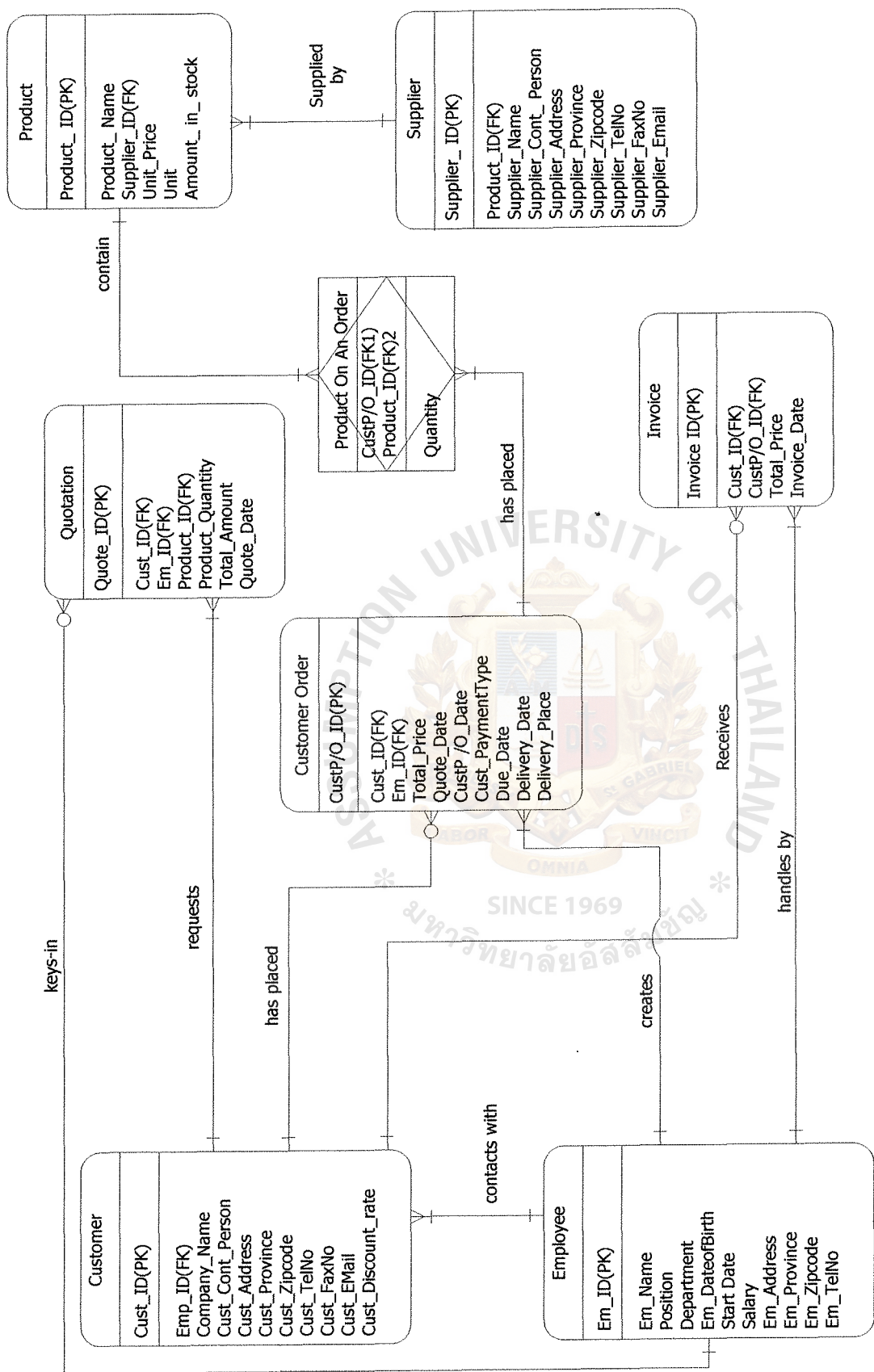


Figure D.1. Entity Relationship Diagram.

File Layout

Table D.1. File Layout of Customer.

Field Name	Type	Size
Cust_ID	Character	5
Emp_ID	Character	3
Company_Name	Character	50
Cust_Cont_Person	Character	30
Cust_Address	Character	100
Cust_Province	Character	15
Cust_Zipcode	Character	5
Cust_TelNo	Character	20
Cust_FaxNo	Character	20
Cust_Email	Character	30
Cust_Discount_rate	Numeric	5

Table D.2. File Layout of Product.

Field Name	Type	Size
Product_ID	Character	5
Product_Name	Character	30
Supplier_ID	Character	5
Unit_Price	Numeric	10
Unit	Character	10
Amount_in_stock	Numeric	5

Table D.3. File Layout of Supplier.

Field Name	Type	Size
Supplier_ ID	Character	5
Product_ ID	Character	5
Supplier_ Name	Character	30
Supplier_ Cont_ Person	Character	30
Supplier_ Address	Character	100
Supplier_ Province	Character	15
Supplier_ Zipcode	Character	5
Supplier_ TelNo	Character	20
Supplier_ FaxNo	Character	20
Supplier_ Email	Character	30

Table D.4. File Layout of Employee.

Field Name	Type	Size
Emp_ID	Character	3
Emp_Name	Character	30
Position	Character	20
Department	Character	20
Emp_DateofBirth	Date	-
Start_Date	Date	-
Salary	Numeric	10
Emp_Address	Character	100
Emp_Province	Character	15
Emp_Zipcode	Character	5
Emp_TelNo	Character	20

Table D.5. File Layout of Quotation.

Field Name	Type	Size
Quote_ID	Character	5
Cust_ID	Character	5
Emp_ID	Character	3
Product_ID	Character	5
Product_Quantity	Numeric	10
Total_Price	Numeric	10
Quote_Date	Date	-

Table C.6. File Layout of Customer Order.

Field Name	Type	Size
CustP/O_ID	Character	5
Cust_ID	Character	5
Emp_ID	Character	3
Total_Price	Numeric	10
Quote_Date	Date	-
CustP/O_Date	Date	-
Cust_PaymentType	Character	10
Due_Date	Date	-
Delivery_Date	Date	-
Delivery_Place	Character	100

Table D.7. File Layout of Invoice.

Field Name *	Type *	Size
Invoice ID	Character	5
Cust_ID	Character	5
CustP/O_ID	Character	5
Total_Price	Numeric	10
Invoice_Date	Date	-



APPENDIX E
PROCESS SPECIFICATION

PROCESS SPECIFICATION

Process 1.0 Process Request Order

Table E.1. Process Specification of Process 1.1.

Items	Description
Process Name:	Received Order Request
Data In:	Order Request
Data Out:	Order Request Detail
Process:	1.Get the order request from the customer

Table E.2. Process Specification of Process 1.2.

Items	Description
Process Name:	Approve Order Request
Data In:	Customer Record Order Request Detail
Data Out:	Accepted Order Request Detail Rejected Order
Process:	1.Receive the customer information from process 1.1. 2.Receive the order request detail from process 1.1.

Table E.3. Process Specification of Process 1.3.

Items	Description
Process Name:	Generate Quotation
Data In:	Accepted Order Request Detail
Data Out:	Quotation
Process:	1.Receive the accepted order request detail from process 1.2.

Process 2.0 Process Confirm Order

Table E.4. Process Specification of Process 2.1.

Items	Description
Process Name:	Record Customer Order
Data In:	Customer Purchase Order
Data Out:	Customer Order Record
Process:	<ol style="list-style-type: none"> 1.Get the purchase order from the customer 2.Record the detail of customer purchase order

Table E.5. Process Specification of Process 2.2.

Items	Description
Process Name:	Verify Customer Order
Data In:	Customer Order Record
Data Out:	Customer Order Detail
Process:	<ol style="list-style-type: none"> 1.Get customer order record 2.Check customer ID and product ID

Table E.6. Process Specification of Process 2.3.

Items	Description
Process Name:	Print Job Order
Data In:	Customer Order Detail
Data Out:	Job Order
Process:	<ol style="list-style-type: none"> 1.Create the job order 2.Submit job order to production department

Process 3.0 Generate Invoice

Table E.7. Process Specification of Process 3.1.

Items	Description
Process Name:	Get Customer Order
Data In:	Customer Order Record
Data Out:	Customer Order Detail
Process:	1.Get Customer order detail 2.Check the Product ID and amount in stock

Table E.8. Process Specification of Process 3.2.

Items	Description
Process Name:	Generate Invoice
Data In:	Customer Order Detail
Data Out:	Invoice
Process:	1.Get Product ID and product amount 2.Calculate total amount and discount 3.Print invoice

Process 4.0 Generate Report

Table E.9. Process Specification of Process 4.1.

Items	Description
Process Name:	Create Customer Order Report
Data In:	Customer Order Record
Data Out:	Customer Order Report
Process:	1.Read customer order record from the database 2.Create customer order list 3.Send customer order list to process 4.1.1.

Table E.10. Process Specification of Process 4.2.

Items	Description
Process Name:	Create Sales Order Report
Data In:	Customer Order Record Employee Record
Data Out:	Sales Order Report
Process:	1.Read customer order record and employee record from the database 2.Create sales order list 3.Send sales order list to Process 4.2.1.

Table E.11. Process Specification of Process 4.3.

Items	Description
Process Name:	Create Sales Of Product Report
Data In:	Customer Order Record Product Record
Data Out:	Sales of Product Report
Process:	1.Read customer order record and employee record from the database 2.Create Sales Of Product list 3.Send Sales Of Product list to Process 4.3.1.

Table E.12. Process Specification of Process 4.4.

Items	Description
Process Name:	Create Inventory Product Report
Data In:	Product Record
Data Out:	Product Inventory Report
Process:	1.Read product record from the database 2.Create inventory product list 3.Send inventory product list to Process 4.4.1.

Table E.13. Process Specification of Process 4.1.1.

Items	Description
Process Name:	Collect Customer Order List
Data In:	Customer Order Record
Data Out:	Customer Order
Process:	1.Collect the customer order list 2.Send customer order list to process 4.1.2.

Table E.14. Process Specification of Process 4.1.2.

Items	Description
Process Name:	Print Customer Order Report
Data In:	Customer Order
Data Out:	Customer Order Report
Process:	1.Get the customer order list 2.Printed out the customer order list

Table E.15. Process Specification of Process 4.2.1.

Items	Description
Process Name:	Collect Sales Order List
Data In:	Customer Order and Employee Record
Data Out:	Sales Order List
Process:	1.Collect sales order list 2.Send sales order list to process 4.2.2.

Table E.16. Process Specification of Process 4.2.2.

Items	Description
Process Name:	Calculate Sales Order
Data In:	Sales Order list
Data Out:	Summarized Sales Order Information
Process:	1.Calculate sales order for each sales person 2.Send summarized sales order information to process 4.2.3.

Table E.17. Process Specification of Process 4.2.3.

Items	Description
Process Name:	Print Sales Order Report
Data In:	Summarized Sales Order Information
Data Out:	Sales Order Report
Process:	1.Get summarized sales order 2.Printed out the sales order report

Table E.18. Process Specification of Process 4.3.1.

Items	Description
Process Name:	Collect The Sales of Each Product List
Data In:	Customer Order and Product Record
Data Out:	Sales of Product List
Process:	1.Collect the sales of each product list 2.Send the sales of each product list to process 4.3.2

Table E.19. Process Specification of Process 4.3.2.

Items	Description
Process Name:	Calculate Sales of Each Product
Data In:	Sales of Product List
Data Out:	Summarized Sales of Product information
Process:	1.Calculate sales of each product 2.Send sales of product list to process 4.3.3.

Table E.20. Process Specification of Process 4.3.3.

Items	Description
Process Name:	Print Sales of Product Report
Data In:	Summarized Sales of Product information
Data Out:	Sales of Product Report
Process:	1.Get the Summarized Sales of Product Information 2.Printed out the Sales of Product Report

Table E.21. Process Specification of Process 4.4.1.

Items	Description
Process Name:	Collect Inventory Product List
Data In:	Product Record
Data Out:	Inventory Product list
Process:	1.Collect the inventory product list 2.Send inventory product list to process 4.4.2.

Table E.22. Process Specification of Process 4.4.2.

Items	Description
Process Name:	Print Inventory Product Report
Data In:	Inventory Product list
Data Out:	Inventory Product Report
Process:	1.Get the Inventory Product list 2.Printed out the Inventory Product Report



APPENDIX F
DATA DICTIONARY

DATA DICTIONARY

Table F.1. Data Dictionary of Customer.

Field Name	Meaning
Cust_ID	Customer's identification number
Emp_ID	Employee's identification number
Company_Name	Name of customer's company
Cust_Cont_Person	Name of contact person
Cust_Address	Address of customer
Cust_Province	Province of customer's company
Cust_Zipcode	Zip Code of customer's company
Cust_TelNo	Telephone No. of customer's company
Cust_FaxNo	Fax No. of customer's company
Cust_Email	E-Mail address of customer
Cust_Discount_rate	Discount rate for customer

Table F.2. Data Dictionary of Product Inventory.

Field Name	Meaning
Product_ID	Product's identification number
Product_Name	Product name
Supplier_ID	Supplier's identification number
Unit	Unit of the product
Unit_Price	Selling price of product
Amount_in_stock	Amount of product in stock

Table F.3. Data Dictionary of Supplier.

Field Name	Meaning
Supplier_ID	Supplier's identification name
Product_ID	Product's identification number
Supplier_Name	Name of supplier's company
Supplier_Cont_Person	Name of contact person
Supplier_Address	Address of supplier
Supplier_Province	Province of supplier's company
Supplier_Zipcode	Zip code of supplier's company
Supplier_TelNo	Telephone no. of supplier's company
Supplier_FaxNo	Fax no. of supplier's company
Supplier_Email	E-mail of supplier's contact person

Table F.4. Data Dictionary of Employee.

Field Name	Meaning
Emp_ID	Employee's identification number
Emp_Name	Employee name
Position	Employee's position
Department	Employee's department
Emp_Dateofbirth	Employee's birthday
Start_Date	Starting date of the employee
Salary	Starting salary for the employee
Emp_Address	Address of employee
Emp_Province	Province of employee's address
Emp_Zipcode	Zip code of employee's address
Emp_TelNo	Telephone of employee

Table F.5. Data Dictionary of Quotation.

Field Name	Meaning
Quote_ID	Quotation's identification number
Cust_ID	Customer's identification number
Emp_ID	Employee's identification number
Product_ID	Product's identification number
Product_Quantity	Amount of product that the customer request
Total_Price	Total price of product
Quote_Date	Date of the quotation

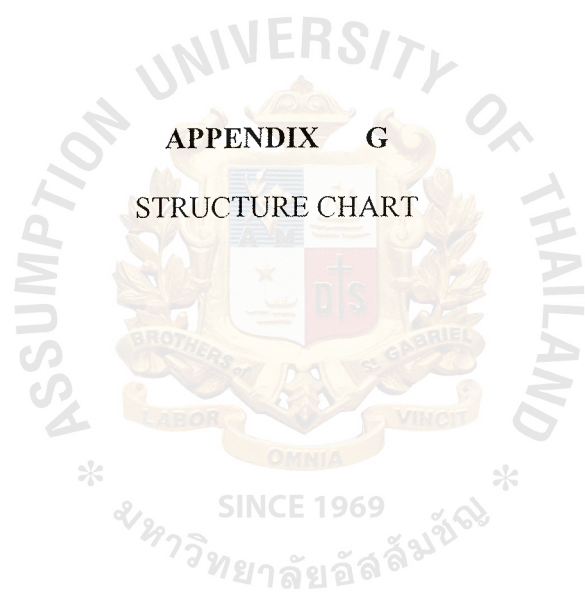
Table F.6. Data Dictionary of Customer Order.

Field Name	Meaning
CustP/O_ID	Customer's purchase order identification number
Cust_ID	Customer's identification number
Emp_ID	Employee's identification number
Total_Price	Total price of product
Quote_Date	Date of quotation
CustP/O_Date	Date of customer purchase order
Cust_PaymentType	Payment type of customer
Due_Date	Demand date of Payment
Delivery_Date	Date of delivery
Delivery_Place	Place of delivery

Table F.7. Data Dictionary of Invoice.

Field Name	Meaning
Invoice_ID	Invoice's identification number
Cust_ID	Customer's identification number
CustP/O_ID	Customer's purchase order identification number
Total_Price	Total price of product
Invoice_Date	Date of issuing invoice





APPENDIX G
STRUCTURE CHART

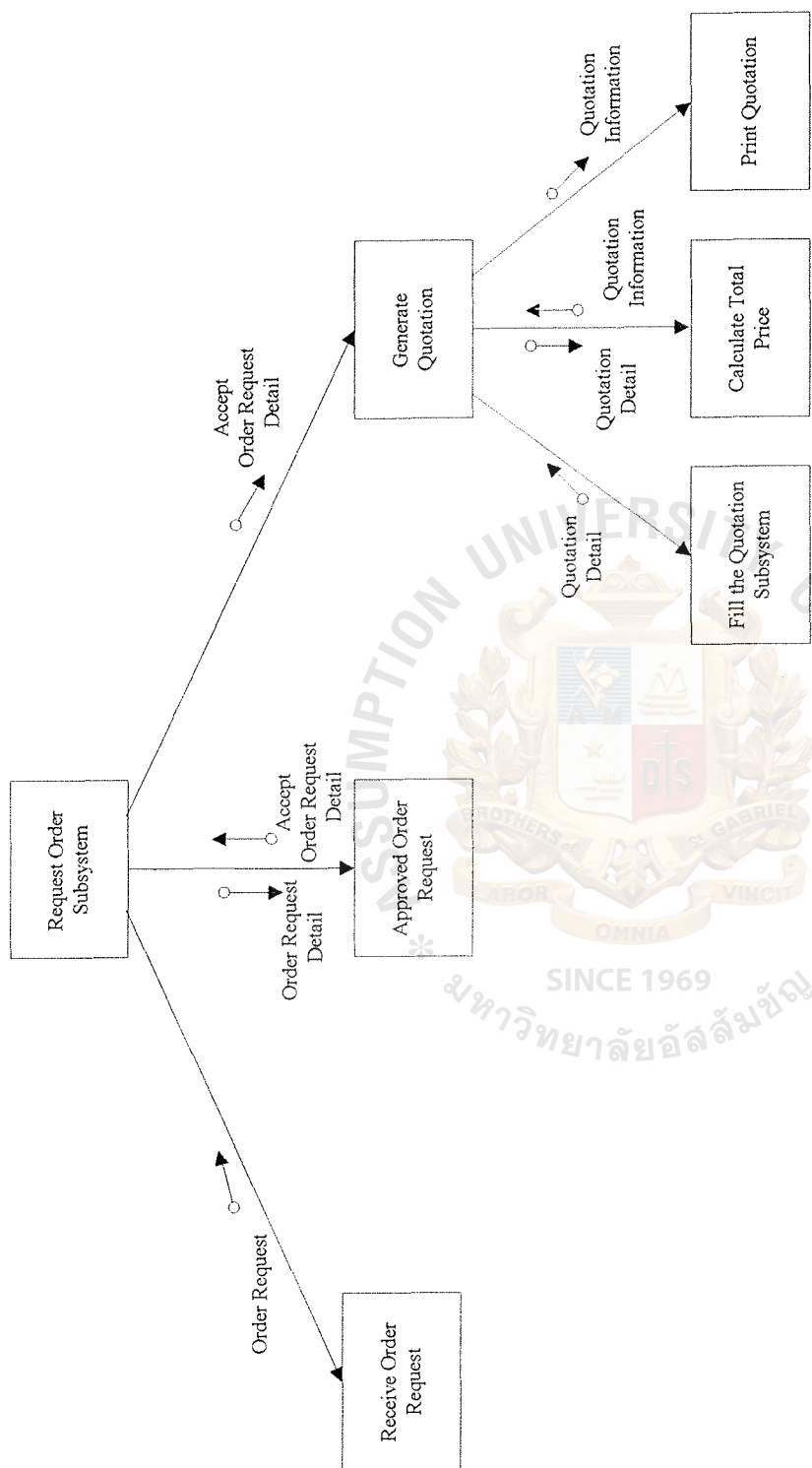


Figure G.1. Structure Chart of Request Order Process.

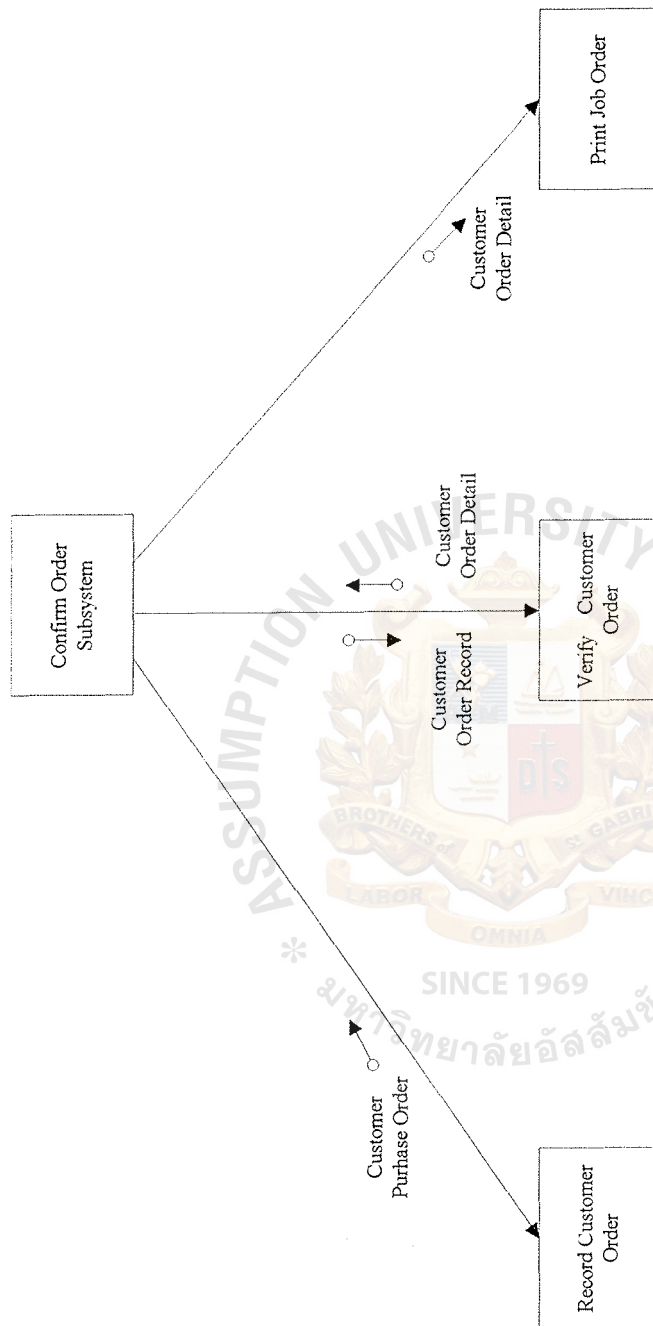


Figure G.2. Structure Chart of Confirm Order Process.

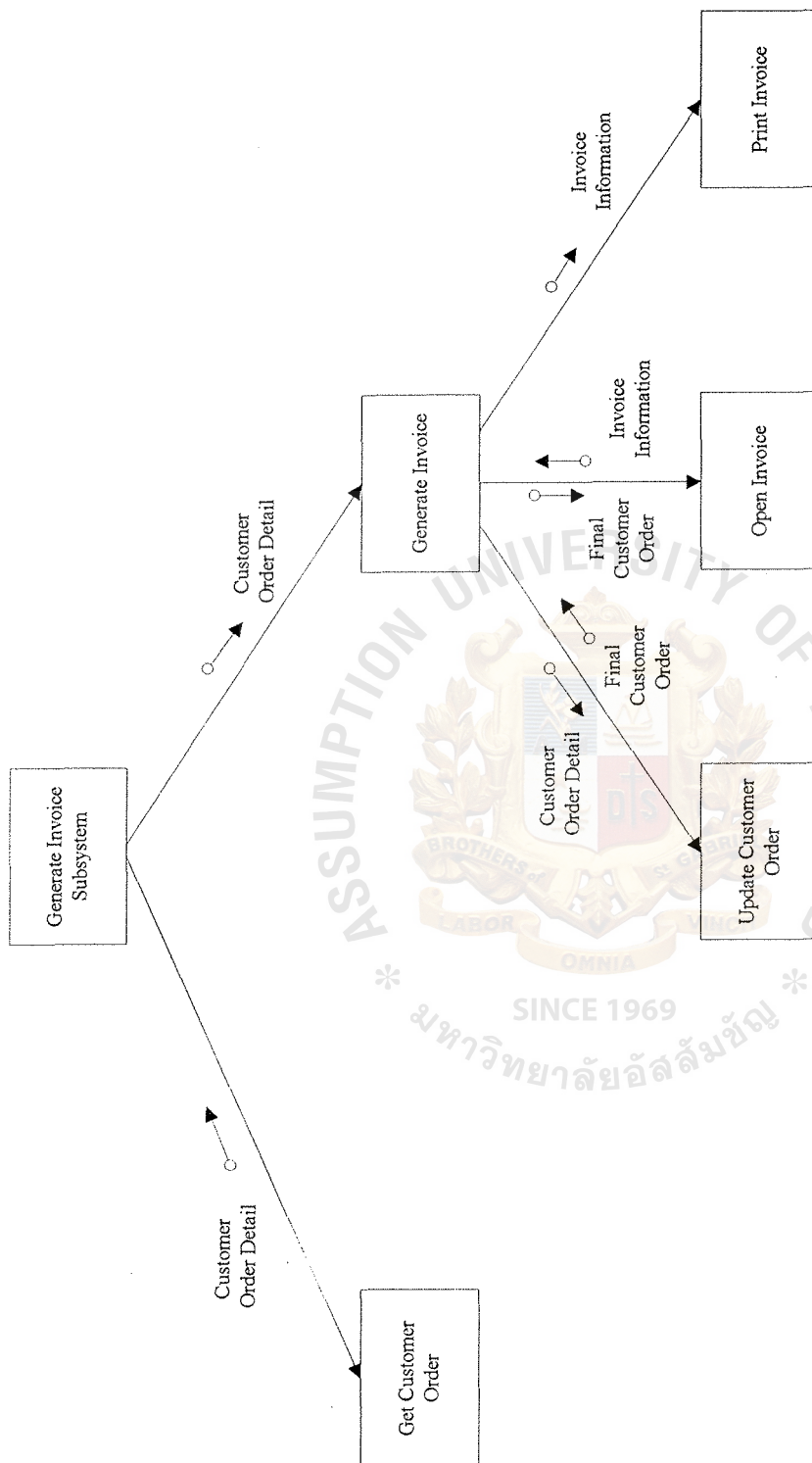


Figure G.3. Structure Chart of Generate Invoice Process.

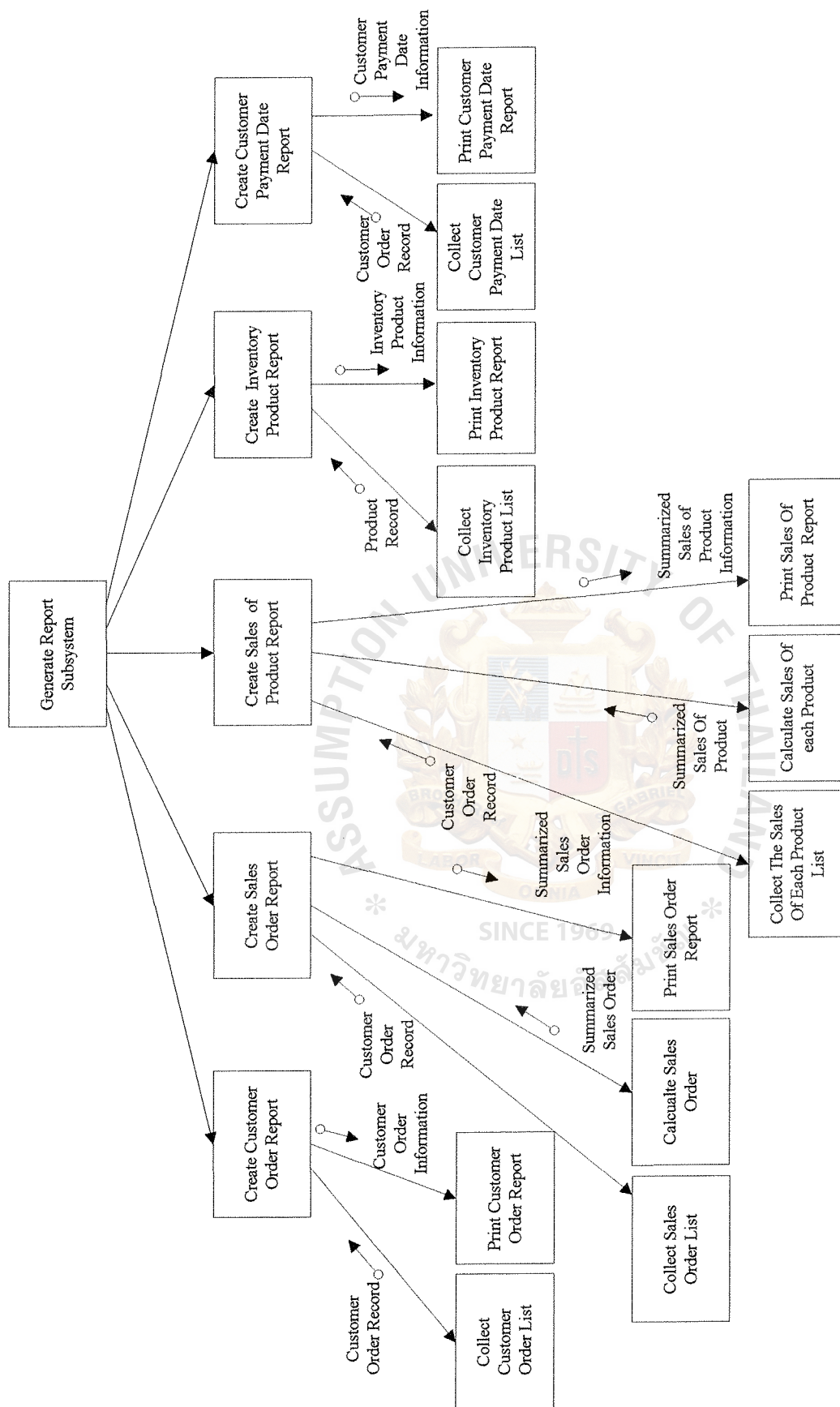


Figure G.4. Structure Chart of Generate Report Process.

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