



Sales Information System for Wine Gallery Co., Ltd.

by

Ms. Sudarat Jewpairojki

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

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Project Title Sales Information System for Wine Gallery Co., Ltd.

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The Graduate School of Assumption University has approved this 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.

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ABSTRACT

Wine Gallery Co., Ltd. is a small importer of fine wines that is very fast growing in the wine market and has greater volumes of sales every year. In order to compete with bigger enterprises, the sales information system is developed to improve the existing system which currently done manually.

One said “Wine is life. When you offer wine to someone, you give him life.” It implies that the wine features keep changing from time to time. Therefore, information regarding its characteristic should be accurate in order to inform customers. It is one of the most important issues in selling wines, besides knowing stock on hand for sales in the inventory. The current manual system has insufficient capability to transfer those delicate information to the customers promptly. It is because most of data are stored on paper. It requires some times to search and collect data for customer’s queries, and has to face the general problems of manual system, which are error-prone and having a high maintenance cost.

The new proposed Sales Information System will be developed to replace the manual as well as will improve for better operation and service. It does not only become the benefit for the routine operation officers but it also helps the company to achieve higher customer’s satisfaction.

The necessary data is stored in the database which will be designed to retrieve easily by user friendly interface when there is a customer’s inquiry. The sales officer will be able to response the queries shortly with accurate answer. It can reduce sales processing time for each customer. The new system also can provide several reports for being as a part of the management’s planning, forecasting, and decision making process.

It will reduce the number of administrative staffs, solve the problem of manual system and decrease the high maintenance cost.



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She remains deeply indebted to her manager and her friends for their invaluable assistance in offering her contributions and information regarding sales operation required for her project.

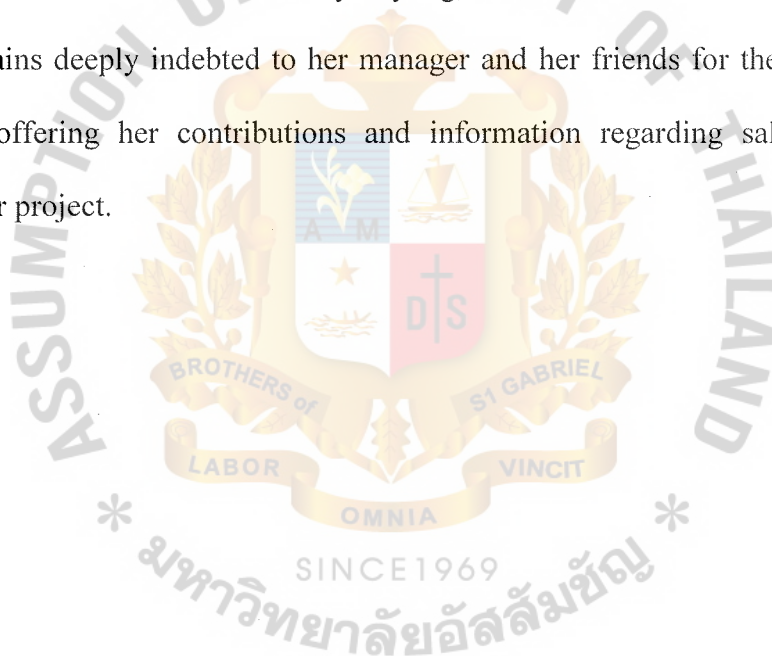


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I. INTRODUCTION

1.1 Background of the Project

The key objective of today's high-growth business is centered on selling more and selling faster. But this goal is more complicated now, because both the buying and selling environments have changed in terms of higher competitive market, more alternatives of same product lines, more effective marketing strategies, etc. Those obviously need information that is acquired at the right time to survive in the market. The information is needed for analysis, planning, organizing, and controlling.

Although Wine Gallery is a company which has been established for only seven years, its sales volume has not only expeditiously increased but also had more customers every year. Consequently, there is more information regarding sales for sales department to manage. Moreover, since we are a small company, sales operation is our essential activity to make maximum profit. Therefore, Sales Information System is the first phase to be proposed and designed. Manual sales operation we are using causes us to have paper problem, inconvenience in working, slow response to customer, customer's dissatisfaction, less sales than expected and so on.

The proposed sales information system offers several advantages to sales officers and management team. Sales information will be stored in database and be able to be retrieved within a minute by user friendly interface. The management and employees can aware of right information at the right time. It is a key strategic weapon for the modern sales operation management. The computerized system does not only reduce labor intensive works in producing and keeping documents, it also provides sales reports in several formats for management to analyze, evaluate, plan objective, and make decision in many areas of the company.

This sufficient information at the right time does not only provide the effectiveness and efficiency to the routine operation but it also results in customer satisfaction. The capability of Information Technology (IT) is able to support a small company to compete bigger company in the high competitive market.

1.2 Objectives of the Project

The company has set several objectives of the project on Sales Information System as follows:

- (1) To study the existing manual system and design the new computerized system for sales department and to allow it to integrate with other systems.
- (2) To analyze the present problems and user's requirements.
- (3) To provide better service and accurate information for customers during sales operation in shorter time than what we operate now.
- (4) To replace some manual processes in the system by migration that activities to computerized system process instead.
- (5) To provide accurate information and report on a timely basis for production and accounting area in order to support managerial decision making process.
- (6) To reduce redundancy and inaccuracy caused by manual works.
- (7) To implement the proposed system for the competitive advantage and maximum profit.
- (8) To assist salespeople to be able to increase productivity and close more business.

1.3 Scope of the Project

The project of proposed Sales Information System covers some relevant activities that can be summarized as follows:

(1) Order Processing

Customer order will be input into the system for sales department to generate the sales order. Accounting department prepares the invoice according to the sales order by computerized system and sent to warehouse department for shipment. The system consists of open order, add order, change order, cancel order, and update stock automatically.

(2) Customer Payment

Sales Information System can collect information of customer buying transaction and customer payment transaction automatically when the system produces the invoice, and when the invoices are settled respectively.

(3) Inventory Control

The system can be implemented to estimate stock balance of each time. The system can reduce the stock when invoice is issued and increase the stock when credit note is generated.

(4) Sales Analysis

The Sales Information System can print out the paper report for management officers.

1.4 Deliverables

The deliverables of the project are as follows:

- (1) The computerized system designed to meet the user's requirements
- (2) Data Flow Diagram
- (3) Entity-relationship Model

- (4) User Interface Design
- (5) Process Description
- (6) Data Dictionary
- (7) Various hard copy formats
 - (a) Sales Order
 - (b) Inventory Stock Status Report
 - (c) Customer Profile
 - (d) Salesperson Commission Earned Report
 - (e) Sales Report by Customer
 - (f) Sales Report by Product
 - (g) Sales Report by Salesman
 - (h) Outstanding Debtors
 - (i) Returned Product Report
 - (j) Picking Ticket Report

1.5 Project Plan

The proposed system is defined the schedule operations and plans completed within five months. The plan and schedules is presented in Gantt Chart as show in Figure 1.1.

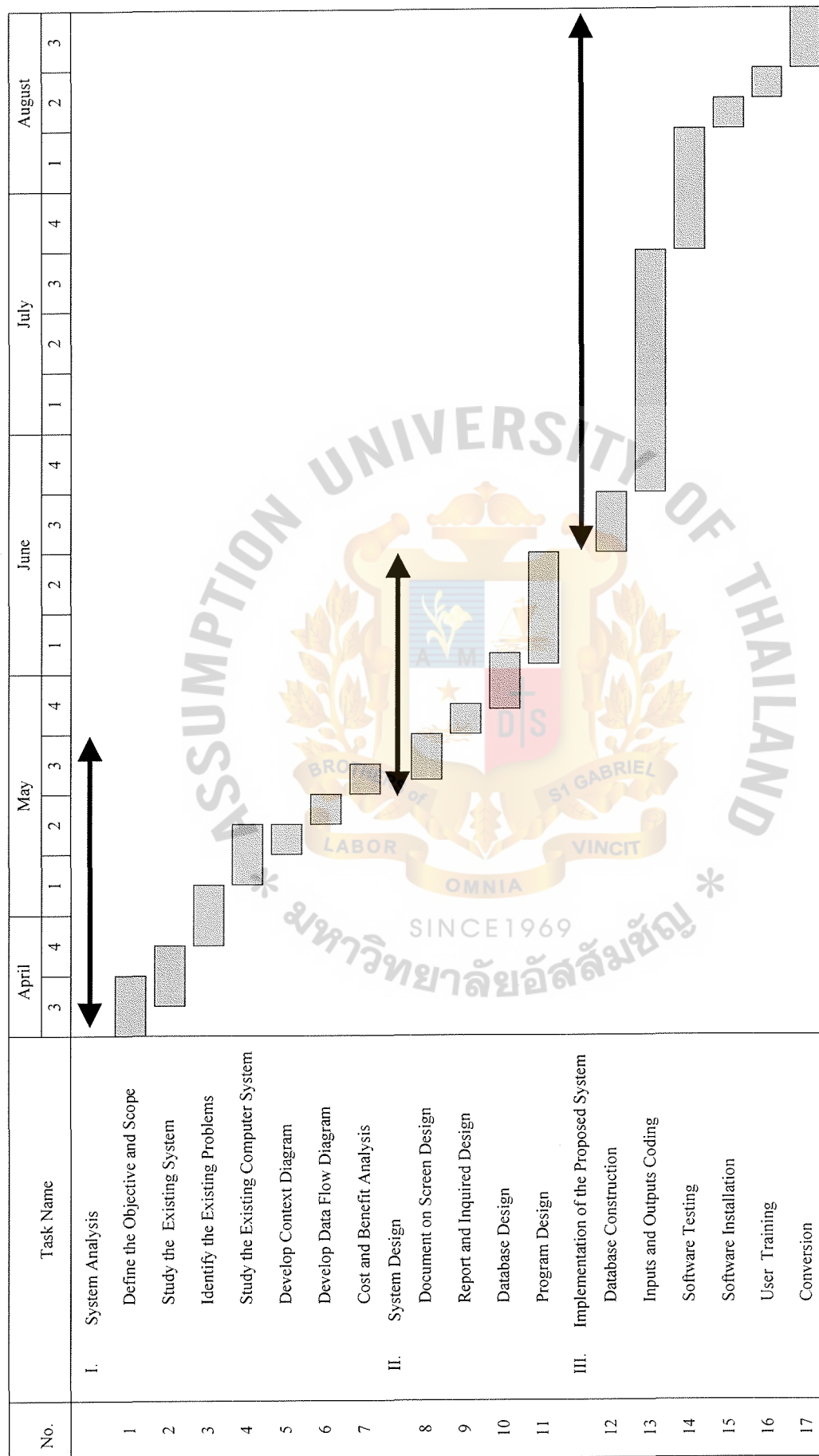


Figure 1.1. Project Plan of Sales Information System.

II. THE EXISTING SYSTEM

2.1 Background of the Organization

Thai people are discovering that the pleasures of meal are enhanced by fine wines, although this pairing has been enjoyed by fine cuisine and good wines, especially, from France.

This is the inspiration for Thananan Vilailuck; the Director of the Wine Gallery who adores a good wine, would like to share his personal interest that we could have the inexpensive quality wines to the public who have thought that wine is always expensive.

In May 1994, Wine Gallery is launched in as an Importer & Sole Agent of Fine Wines who import the excellent wines from the famous company in France, California, Australia, South Africa, Chile, Italy, and Spain. Wine Gallery is the one of the fastest growing and most highly regarded quality wineries. All of the wines were imported by the refrigerated containers.

We could say that nowadays Thai people who are as well familiar to fine wines accept that Thai food could go along as well with this products of French wines. To support this idea, Wine gallery has provided premium variety wines at every day affordable prices. Most of their clients are various such as their wines; i.e. the famous governors, bankers, businessmen, big companies, hotels, airlines, restaurants, and many little shops who require to be our consignment agencies excluded the walk-in guests.

2.2 Existing Business Functions

There are now 14 employees working in the company. Its organization chart, as shown on Figure 2.1, grouping similar and related functions together. There are four departments within the company that has the following responsibilities:

(1) Financial and Accounting Department

Financial and Accounting Department is responsible for:

- (a) Record Accounting System
- (b) Take care of financial status of the company
- (c) Calculate and prepare salaries for all workers
- (d) Prepare cheques for expenses occurred in Thailand to suppliers when invoice due.
- (e) Settle payments to wine suppliers or wine brokers abroad by transferring money according to term of payment contacted.
- (f) Pay the expenses incurred each day.
- (g) Collect money from customers
- (h) Calculate and prepare commissions for sales persons.

(2) Sales Department

Sales Department is responsible for:

- (a) Plan and prepare wine promotion with general manager
- (b) Receive orders from customers
- (c) Keep in touch with customers by keeping them informed about new arrivals, new promotion, and wine tasting events.
- (d) Sell wines to meet the customer needs.
- (e) Collect money, for sales representatives, from their own customers.
- (f) Report sales movement and sales plans to general manager.

- (g) Prepare amount of sales, for sales representatives, to accounting department for commissions.

(3) Purchasing Department

Purchasing Department is responsible for:

- (a) Contact and select the best suppliers
- (b) Prepare purchase order when ordering goods
- (c) Order goods and monitor the status of that order from suppliers
- (d) Check inventory balance whether meets reorder point or not
- (e) Prepare import documents and permit documents to submit Excise Department
- (f) Contact forwarder companies and shipping companies when the orders are arriving to warehouse.

(4) Warehouse Department

Warehouse Department is responsible for:

- (a) Take care of inventory transaction
- (b) Check goods returned from customers in case end of promotion, end of consignment, spoiled wines, etc.
- (c) Prepare goods for delivery according to customer invoices
- (d) Keep checking the inventory
- (e) Receive goods and check them against the permit document when wines arrive the warehouse

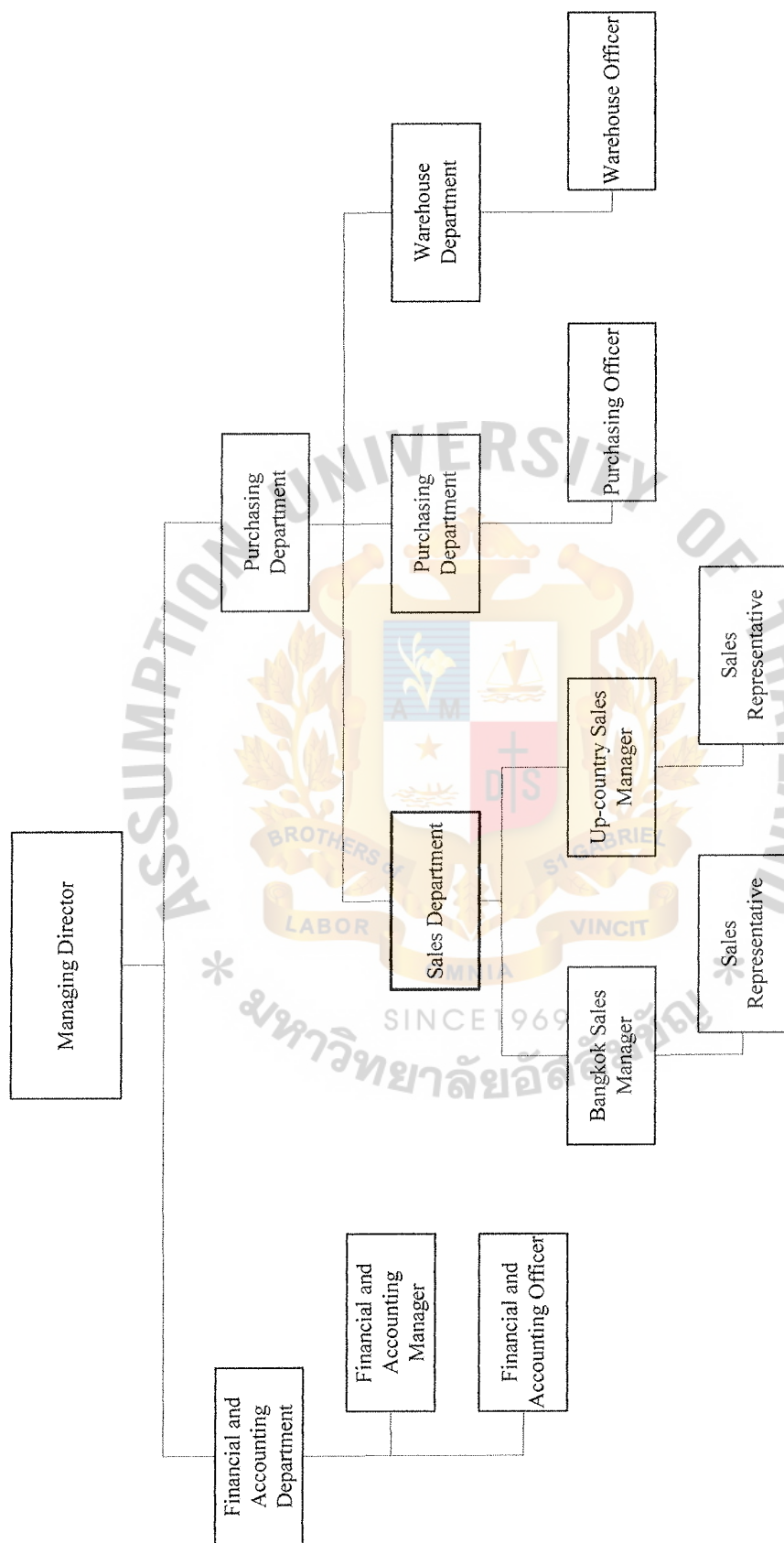


Figure 2.1. Organization Chart of Wine Gallery Company Limited.

Since the company faces with many problems on sales and marketing operations, for example, competition to different line of products, delay in order processing, not-up-to-date on inventory, credit control and discount agreement of customers, and so on, then the computerized sales information system is proposed by transferring some manual sales process into the computerized one. The management expects that it can solve those problems and make sale operation cycle shorter, reduce employee workload, and increase the level of customer satisfaction.

2.4 Current Problems and Areas for Improvement

The current system of the company causes many problems as follows:

(1) Insufficient Data for Order Processing

There are many types of customers (restaurant, hotel, retailer, private, etc.) and each type has different discount rates and term of payment. By recording manually cannot provide sufficient information for sales department to do order processing.

(2) Data Inaccuracy

Manual operation has high chance to produce mistake especially while having high workload and limitation of time. It causes the staff possibly to create errors easily and these errors may effect on other department to have mistakes either.

(3) Insufficient Information for Management Analysis

Information gathered from the manual operation may not be complete and not be sufficient for management requirements to plan, forecast, determine market trend, and generate sales and marketing activities for each fiscal year.

(4) Time Consumption and Slow Response to Customer Order

When receive customer order, sales department manually verifies the order details with price list, customer discount card, term of payment book, that are paper work. These activities waste times and complicated. It is very slow to respond customer's requisition.

(5) Bundle of Paper Work

Paper work is excessive due to wide rage of the wines, many types of promotion for different customers while there are few officers to handle all administration work

(6) Slow and Unreliable Report Generation

When management needs any information, it takes more than an hour to gather the information. Every data item has to be listed out and rearranged in order to get the information required.

(7) Error in Invoices

Error invoices may come from giving wrong discount, incorrect credit term, wrong address, etc. These errors can result in customer dissatisfaction, and waste the time to issue the revised invoice.

From studying the problems of the current system, there are several areas for improvement that can be summarized as follows:

- (1) The data must be kept in the Relational Database from that can provides the data integrity, accuracy, non-redundancy, and easy to manipulate.
- (2) The system must be designed to support the ease of use for friendly user interface.
- (3) The system must provide sufficient information for management and reduce time for report generation.

- (4) The data, which are related to order, sales record, customer payment, and stock, must be updated automatically at the time the system generates the invoice for a particular customer.
- (5) The system must reduce paper work and work load of employees.

2.4 Existing Computer System

The objectives of this section of the existing system study is a complete understanding of the present operation of the area under study. It provides a “benchmark” for measurement: a clear picture of the present sequence of operation, work volume being handled and existing cost. The analyst must obtain an understanding of the existing systems for use as a reference point in determining how much improvement can be made with new system.

The sales system the organization currently uses is processed by manual. The existing workflow is displayed in Figure 2.2, Context Diagram of existing system, and Figure 2.3, Data Flow Diagram level 0 of existing system.

There are five processes in DFD level 0 as follows:

Process 1.0 Receive Order

Customers can places orders to the sales department by faxing their purchase order, calling, or passing to sales representatives. This process accepts all the order which should contain purchase order number, unit purchase, price per unit sold, delivery date, etc. Sales officers can reject the orders if they surely find that one of the essential information is omitted. The sales officer will inform the customer about their unaccepted orders.

Process 2.0 Approve Order

- (1) Sales officer and general manager review the customer's order to verify that it contains correct information or it follows our agreements.
- (2) Sales officer or general manager accepts the customer's order by filling the order information in sales order form. The sales order will be signed by an authorized person for approval.
- (3) In case there is an error in the customer's order, rejection of order information will be sent back to the customer for correction.
- (4) The sales order copy is sent to Financial & Accounting Department for producing invoices.

Process 3.0 Delivery Goods

- (1) Financial & Accounting Department gives the driver invoice and assigns delivery details for the driver to deliver goods to the customer on the delivery date.
- (2) As soon as receiving the product, the customers have to sign their names on the invoice and return the copies of the invoice back to the sender.
- (3) The driver has to return the second copy of the invoice which is acknowledged by the customer signature to the Sales Department and return the third copy of the invoice which also is signed by the customer to the Financial & Accounting Department.

Process 4.0 Collect Payment

- (1) When the payment is due, Financial & Accounting Department will assign the sales officer or sales representatives to collect customer payment
- (2) After the sales department has customer's payment, sales officer has to send receipt copy to Financial & Accounting Department.

Process 5.0 Prepare Sales Report

Financial & Accounting department and Sales department prepare sales report for general manager at the time needed by manual process. The sales report is generated on the customer card and payment card booking report and presents to the manager by manual delivery.



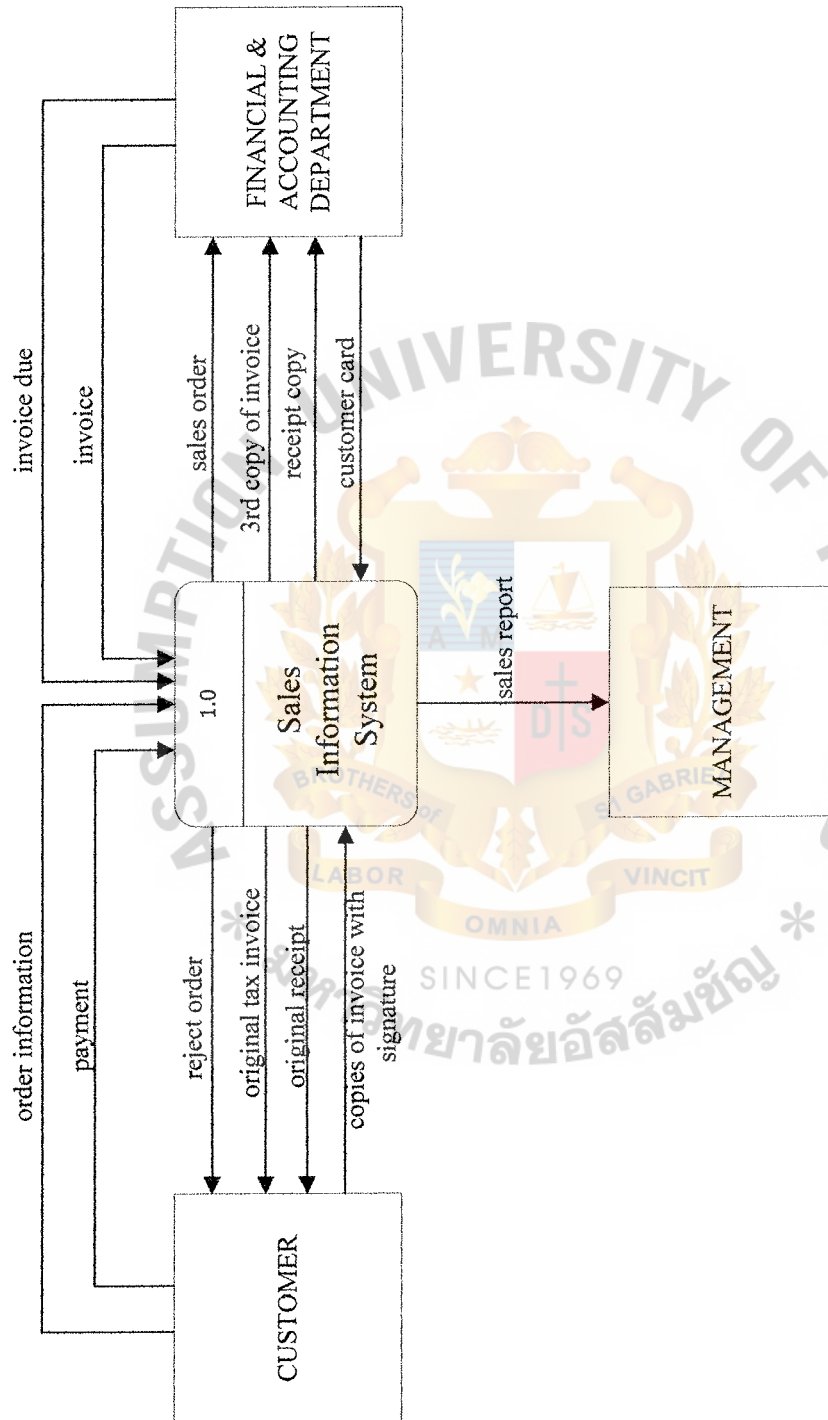


Figure 2.2. Context Diagram for Existing System.

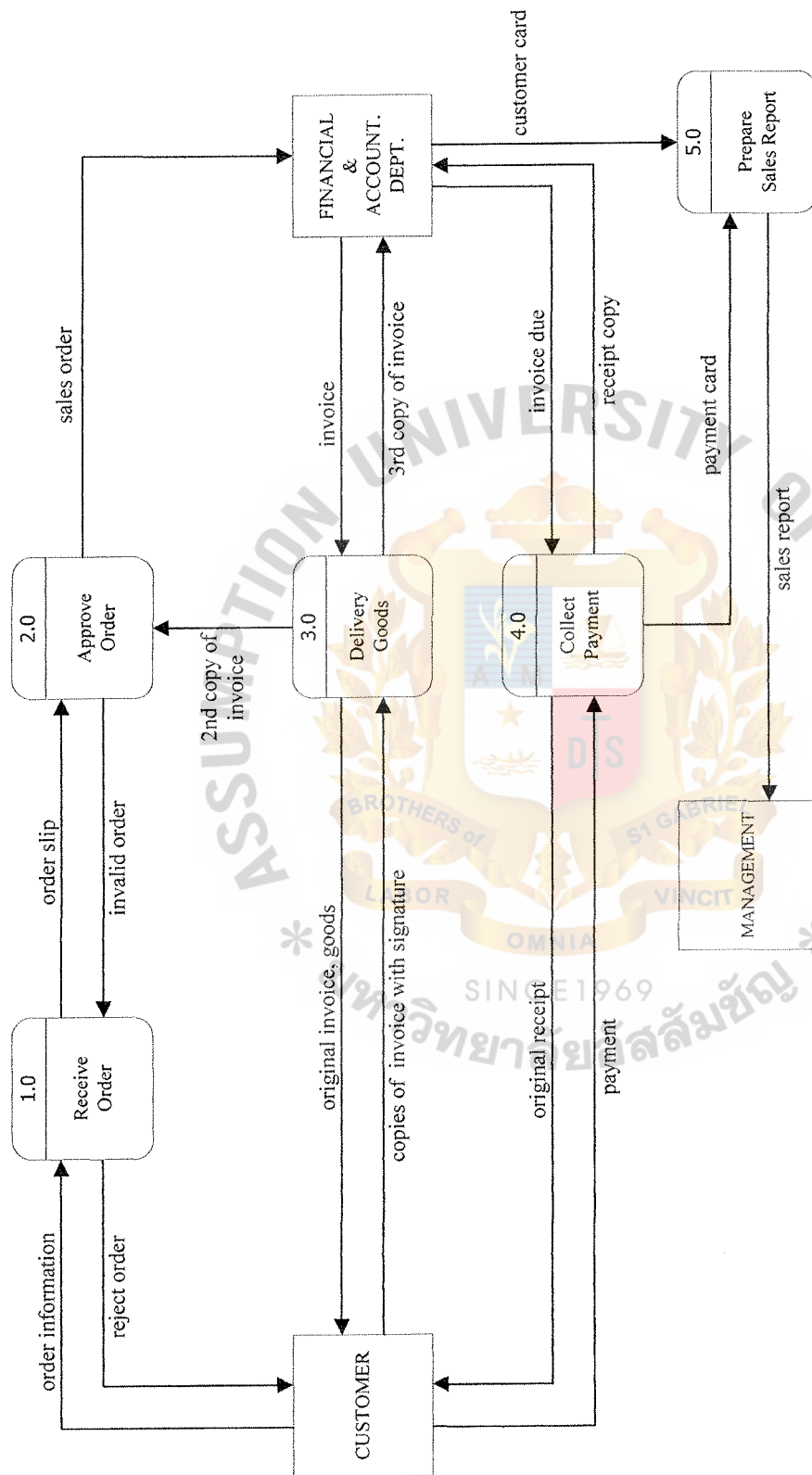


Figure 2.3. Data Flow Diagram Level 0 for Existing System.

III. THE PROPOSED SYSTEM

3.1 System Specification

System specification is the responsibility of system analysts who have to communicate with the end-users and the system owner regarding their requirements, what they need from the proposed system. It is an essential issue in the system analysis section. Then, the system analyst will transform those requirements to computer programmers and information technologists so that they can design the effective and efficient system for all users.

There are several user requirements that will further identify the system specification as follows:

- (a) Data must be consistency.
- (b) Data must be accuracy.
- (c) Data must be easy to access.
- (d) User Interface must be easy-to-use.
- (e) The new system must reduce sales processing time.
- (f) The system must display accurate outputs and in desired formats.
- (g) The system must help the user make sales more easily.

In addition to the user requirements, system requirements are also useful to develop the proposed system specification. They are as follows;

- (a) The new system must be compatible with the other legacy systems.
- (b) The system must be able to add and edit tables and fields when data change.
- (c) The system must be automatically run sales reports.
- (d) The system must transfer accurate data to other departments.
- (e) All data must have back-up file.

- (f) The system must have good security.
- (g) The system must achieve all users' satisfaction.
- (h) The system must be able to be enhanced in the future.

3.2 System Design

While systems analysis describes what a system should do to meet system requirements, systems design shows how the system will fulfill this objective. The design of the proposed system is the overall model for the computerized system. It consists of all specifications that give the system its form and structure.

In this project, the systems analyst team begins to design the proposed system by starting from the system process design, the system database design, system input design, and system output design respectively.

3.2.1 Context Diagram

Context Diagram is structured to show the highest level model of the proposed system. They are used to represent the scope of the system.

The context diagram is shown in Figure 3.1.

The Context Diagram of Sales Information Systems displays the relationship in terms of information flows among five external entities: Customer, Financial & Accounting Department, Purchasing Department, Management, and Warehouse. The information on Context Diagram are as follows:

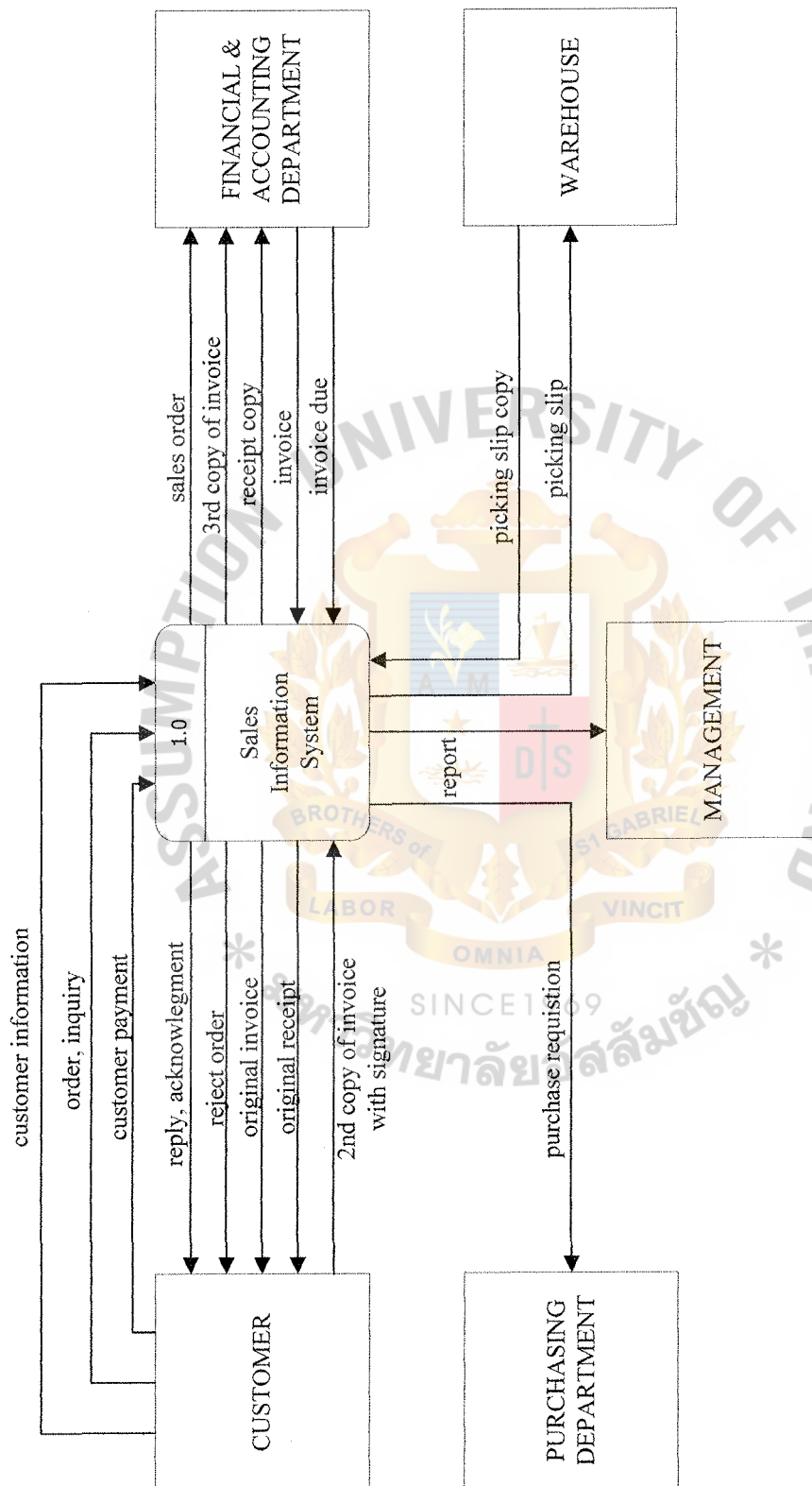


Figure 3.1. Context Diagram for Proposed System.

Input Information to the system are:

- (1) Customer information from customers.
- (2) Customer order or customer inquiry from customers.
- (3) Customer payment in terms of Invoice due information from Financial & Accounting Department regards to invoices which their term of payment is due and should be paid by the customers.
- (4) Second copy of invoice with customer's signature from customer in order to acknowledge that the product has been accepted.
- (5) Invoice that is produced by Financial & Accounting Department.
- (6) Invoice due from Financial & Accounting Department so that Sales Department requests payment from Customer.
- (7) Picking slip copy from the warehouse which transfers the information about delivery details to the Sales Information System.

Outputs from the system are:

- (1) Customer reply or/and acknowledgement from Sale Information System to response a customer's order and a customer's inquiry.*
- (2) Reject order to Customer
- (3) Original invoice to Customer
- (4) Original receipt to Customer
- (5) Sales order to Financial & Accounting department
- (6) Third copy of invoice to Financial & Accounting department
- (7) Receipt copy to Financial & Accounting department
- (8) Picking slip to Warehouse
- (9) Report to Management
- (10) Purchase requisition to Purchasing department

3.2.2 Decomposition Diagram

The design should be first consider the main function of the proposed system then break this function into sub-functions and decompose each sub-function until the lowest level of detail has been reach. Decomposition Diagram is a top-down chat, showing each level of design, its relationship to other levels, and its place in the overall design structure.

Decomposition Diagram of the proposed computerized system is shown in Figure 3.2 to Figure 3.5.

3.2.3 Data Flow Diagram

The data flow diagrams (DFD) show how data flow to, from, and within an information system and the processes that transform the data.

Data Flow Diagram Level 0 of Sales Information System is shown in the Figure 3.6.

This data flow diagram level0 consists of 7 processes to operate Sales Information System.

Process 1.0: Maintain Customer

This process is responsible for maintaining accurate details of customer information. The information is saved in the customer master file which can be updated, and added new record if there is any change or there is new customer information,

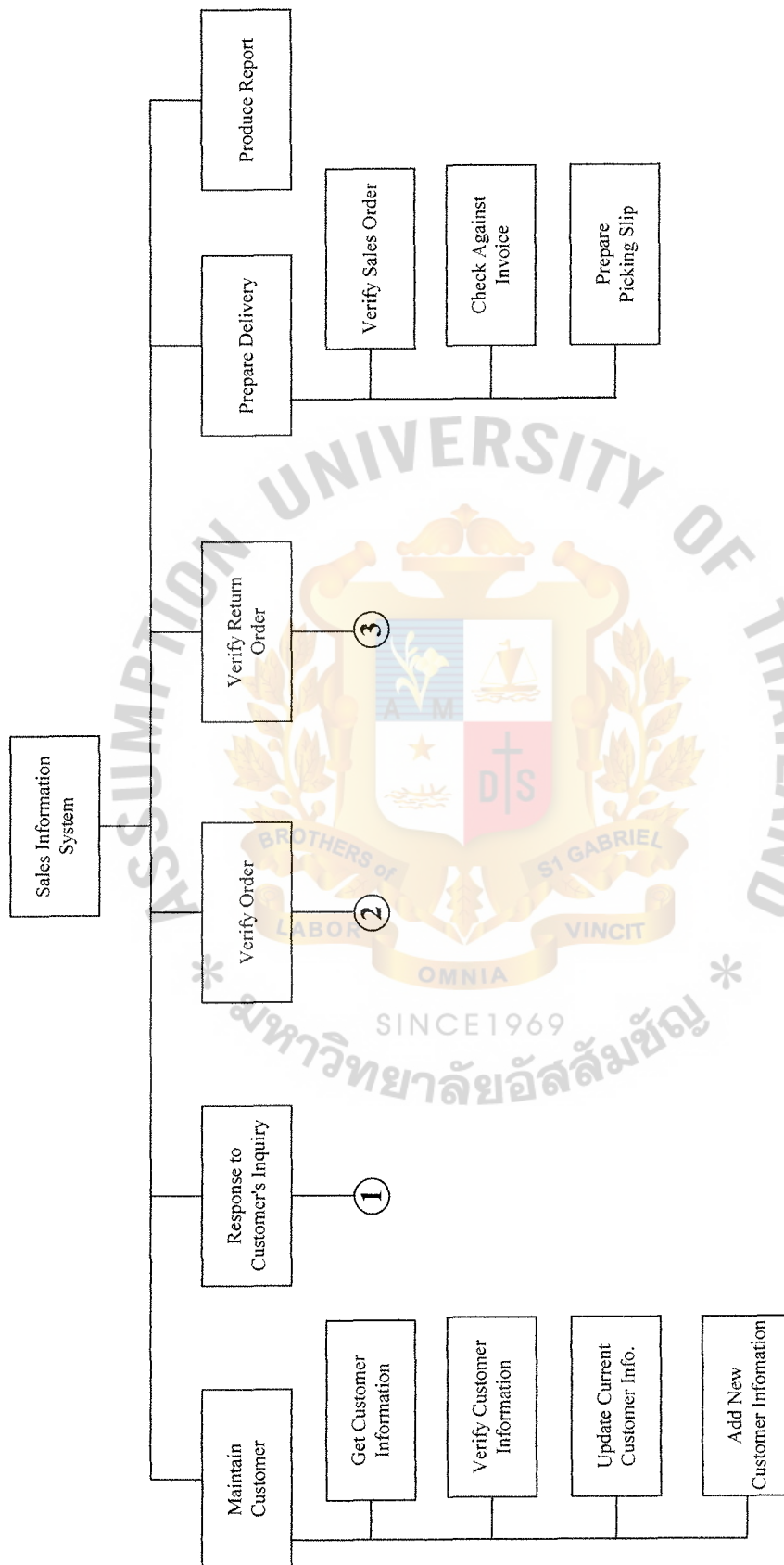


Figure 3.2. Decomposition Diagram of Proposed Sales Information System.

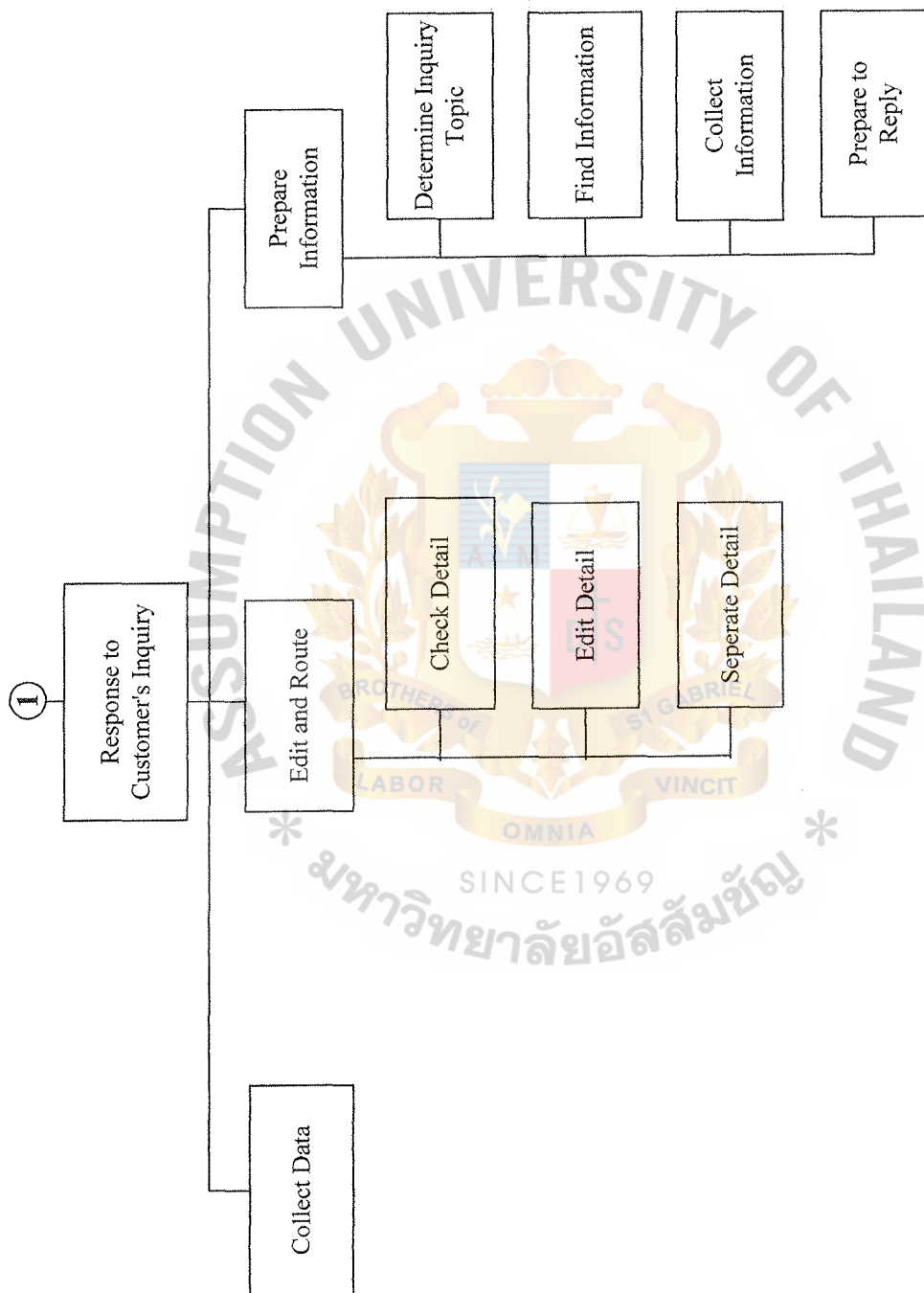


Figure 3.3. Decomposition Diagram for Proposed System of Response to Customer's Inquiry Process.

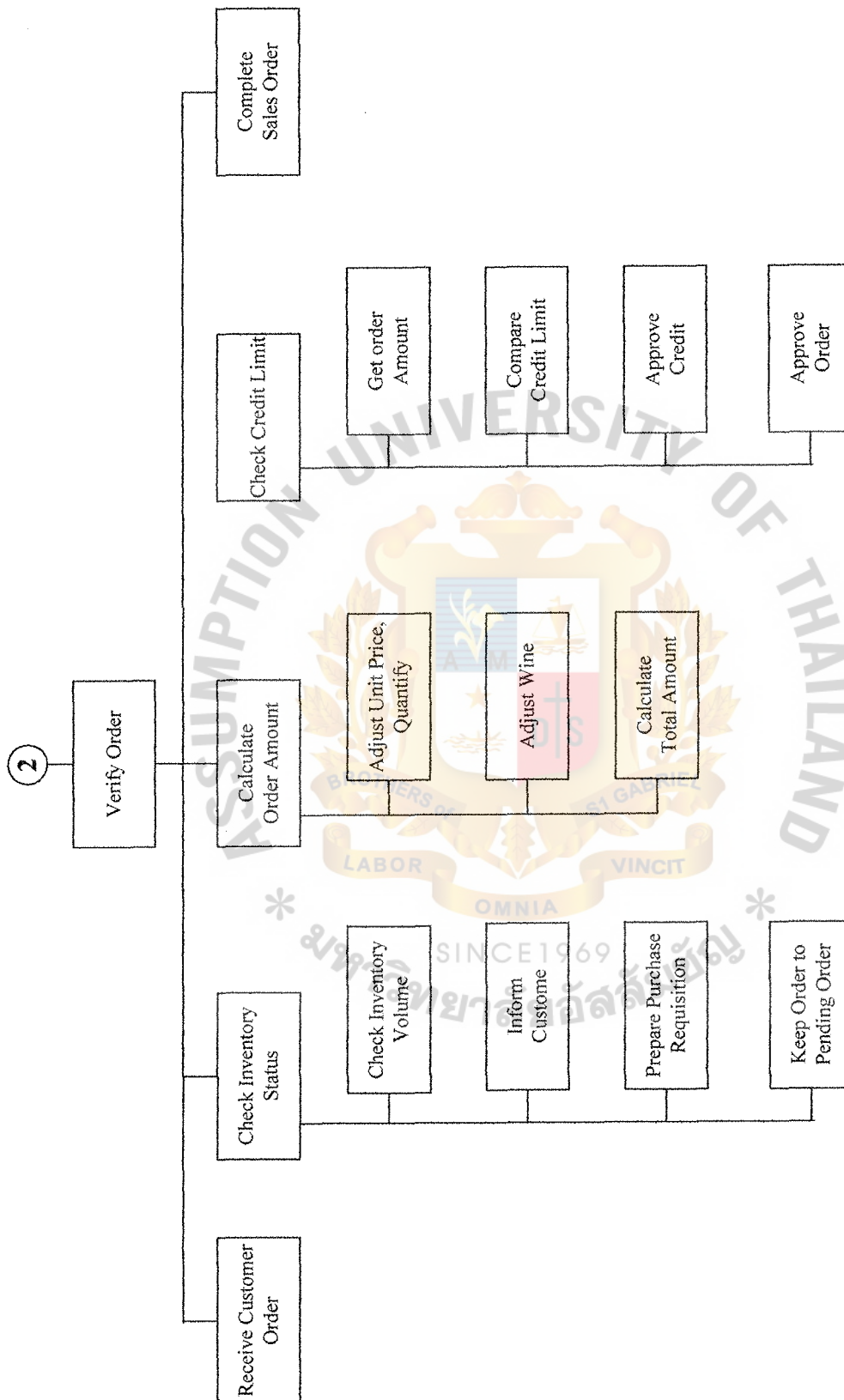


Figure 3.4. Decomposition Diagram for Proposed System of Verify Order Process.

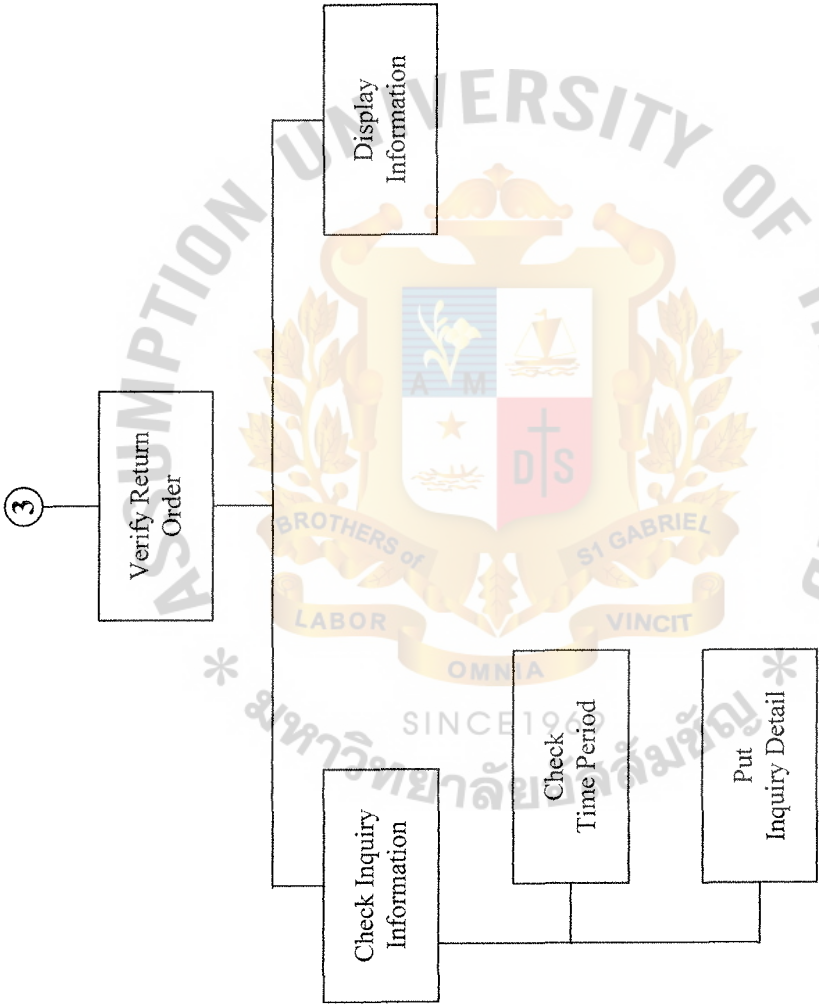


Figure 3.5. Decomposition Diagram for Proposed System of Verify Return Order.

respectively. As soon as a customer's order is verified, the information will be retrieved from the file to process the sales order. Whenever a customer's return-order requisition is accepted, the file is also retrieved to issue return-order form.

As Figure 3.6, the maintain customer process involves one external entity, which is Customer. It also relates to one data store, which is customers.

Inputs to Process 1.0 is:

- (1) Customer information from customers.

Outputs from Process 1.0 are as follows:

- (1) Name or address change confirmation to Customer
- (2) New customer information to Customer Master File
- (3) Up-date customer information to Customer Master File

Process 2.0: Response to Customer's Inquiry

The selling firstly starts from this process. The process receives various inquiries from the customers regarding wine details, their back orders, product prices, inventory status, etc. All inquiries should be replied and advised by salespersons. The users can search for requested information to Sales Information System directly.

When the customer calls for placing the order or sends purchase order to the company, the process will receive and transfer the order information to verify for correct details. Similarly, if the customer would like to return some items of purchased products in case of finished consignment, promotion end, spoiled wines, defective products, the process will receive their information for further processes.

For Figure 3.6, process 2.0 relates to external Customer entity, process 3.0 (Verify Order), process 4.0 (Verify Return Order), Wine Information File, Product Inventory File, and Pending Order File.

Inputs to Process 2.0 are as follows:

- (1) Customer inquiry from Customer
- (2) Customer order from Customer
- (3) Wine information from Wine Information File
- (4) Inventory status from Product Inventory File
- (5) Pending order information from Pending Order File
- (6) Approved order information from Sales Order File

Outputs from Process 2.0 are as follows :

- (1) Reply to Customer
- (2) Order information to Process 3.0 (Verify Order)
- (3) Return-order requisition to Process 4.0 (Verify Return Order)

Process 3.0: Verify Order

As soon as receiving the order, the users key the purchase order data into the system such as the product description, unit sold, price per unit, delivery date, and so on. The system will match the input data with the product inventory file, the customer account file, and pending order file. If the demanded product is unavailable in the stock, the salesperson will inform the customer whether he would prefer to cancel the ordered product or to keep the product as pending order. This process will send purchase requisition to purchasing department. The system also verifies the purchase order data with the customer account file to make sure that the customer does not exceed his credit limit. In case of having a mistake, the salesperson will promptly inform the customer for correction. If all information are correct, the system will issue sales order form and send to accounting department for processing the invoice.

For Figure 3.6, process 3.0 relates to Process 2.0 (Response to Customer's Inquiry), 4 data stores which are customers, product inventories, pending orders and customer accounts, and 2 external entities which are Purchasing Department, and Customer.

Inputs to Process 3.0 are as follows:

- (1) Order information from Process 2.0 (Response to Customer's Inquiry)
- (2) Accurate customer information from Customer File
- (3) Inventory status from Product Inventory File
- (4) Outstanding payment from Customer Account File
- (5) Pending order information from Pending Order File

Outputs from Process 3.0 are as follows:

- (1) Purchase requisition to Purchasing Department
- (2) Waiting order to Pending Order File
- (3) Updated sales order to Sales Order File
- (4) Customer acknowledgement to Customer
- (5) Approved sales order to Financial & Accounting Department
- (6) Sales order copy to Process 5.0 (Prepare Delivery)

Process 4.0: Verify Return Order

Once receive a return-goods requisition from the customer, the user has to check the requisition information with sales order file whether the return-product is issued in which sale order, on what issued date, at what price, etc. The process will issue return-order form to send to financial & accounting department for process credit note. The return-order information has to be saved in return order file.

As Figure 3.6, the process 4.0 has relation with Process 2.0 (Response to Customer's Inquiry and 3 data stores which are customers, sales orders, and return orders.

Inputs to Process 4.0 are as follows:

- (1) Return-order requisition from Process 2.0 (Response to Customer's Inquiry
- (2) Sales order information from Sales Order File
- (3) Accurate customer information from Customer File

Outputs from Process 4.0 is updated return-order information to Return Order File.

Process 5.0: Prepare Delivery

After receiving the invoice from financial & accounting department, the salesperson has to check the information in the invoice against the information in the sales order copy to make sure that there is no mistake. If all information are correct, the user will issue picking slip and send it to warehouse department for arranging the delivery.

According to process 5.0 involves to Process 3.0 (Verify Order), 2 external entities which are financial & accounting department and warehouse department, and one data stores which is picking slips.

Inputs to Process 5.0 are as follows:

- (1) Sales order copy from Process 3.0 (Verify Order)
- (2) Invoice from Financial & Accounting Department

Outputs from Process 5.0 are as follows:

- (1) Picking slip to Warehouse Department
- (2) Updated-picking slip information to Picking Slip File

Process 6.0: Produce Report

This process is responsible to provide reports on timely basis or at the time of need for the management to see the movement of the product, analyze income, evaluate sales transaction, etc. The Sales Information System generates reports from retrieving information from sales order file, product inventory file, customer account file, return-order file. The reports are generated by the system are, for example, outstanding debt by customer, returned product report, picking ticket report, etc.

As Figure 3.6, process 6.0 relates to an external entity which is Management and 5 data stores which are sales orders, return orders, product inventories, customer accounts, and picking slips.

Inputs to Process 6.0 are as follows:

- (1) Internal Inquiry from Management
- (2) Sales transaction from Sales Order File
- (3) Return-order information from Return Order File
- (4) Inventory status from Product Inventory File
- (5) Payment information from Customer Account File
- (6) Picking information from Picking Slip File

Output from Process 6.0 is printed report to Management.

The DFD Level 0 can be broken down into successive levels of detail. Each subsystem also can be divided into additional subsystems with the lower-level until the lowest level of detail has been reached.

Figure 3.7 Data flow diagram level 1 which decomposes Process 1.0 of Figure 3.6.

Figure 3.8 Data flow diagram level 1 which decomposes Process 2.0 of Figure 3.6.

- Figure 3.9 Data flow diagram level 2 which decomposes Process 2.2 of Figure 3.8.
- Figure 3.10 Data flow diagram level 2 which decomposes Process 2.3 of Figure 3.8.
- Figure 3.11 Data flow diagram level 1 which decomposes Process 3.0 of Figure 3.6.
- Figure 3.12 Data flow diagram level 2 which decomposes Process 3.2 of Figure 3.11.
- Figure 3.13 Data flow diagram level 2 which decomposes Process 3.3 of Figure 3.11.
- Figure 3.14 Data flow diagram level 2 which decomposes Process 3.4 of Figure 3.11.
- Figure 3.15 Data flow diagram level 1 which decomposes Process 4.0 of Figure 3.6.
- Figure 3.16 Data flow diagram level 2 which decomposes Process 4.1 of Figure 3.15.
- Figure 3.17 Data flow diagram level 2 which decomposes Process 4.2 of Figure 3.15.
- Figure 3.18 Data flow diagram level 1 which decomposes Process 5.0 of Figure 3.6.
- Figure 3.19 Data flow diagram level 1 which decomposes Process 6.0 of Figure 3.6.

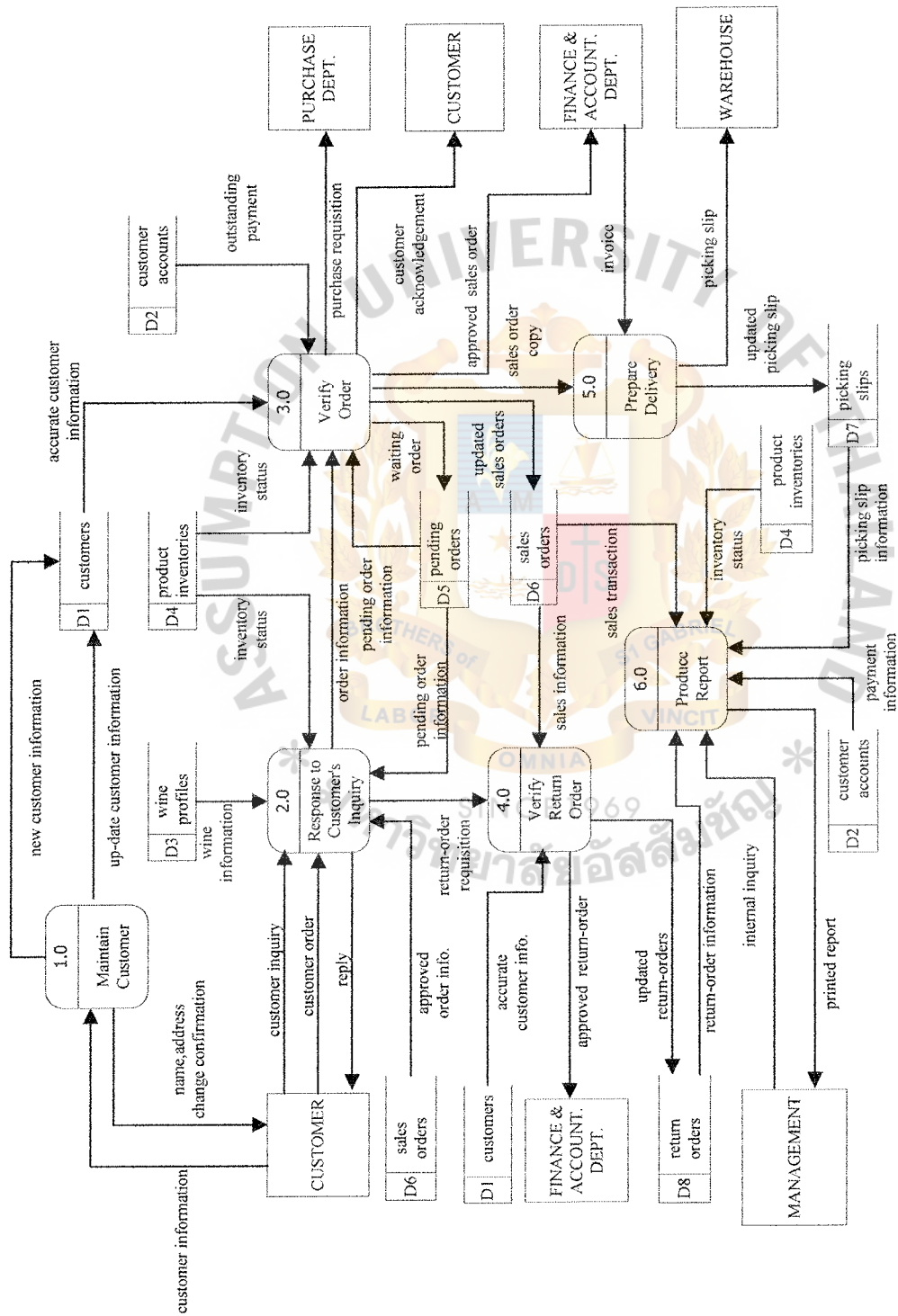


Figure 3.6. Data Flow Diagram Level 0 for Proposed Sales Information System.

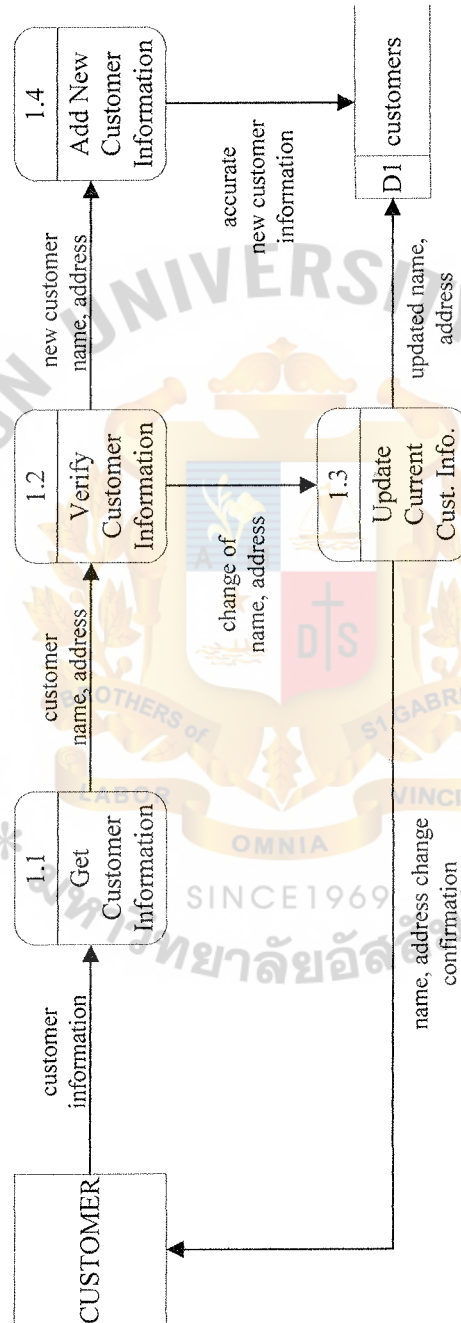


Figure 3.7. Data Flow Diagram Level 1 for Process 1.0: Maintain Customer.

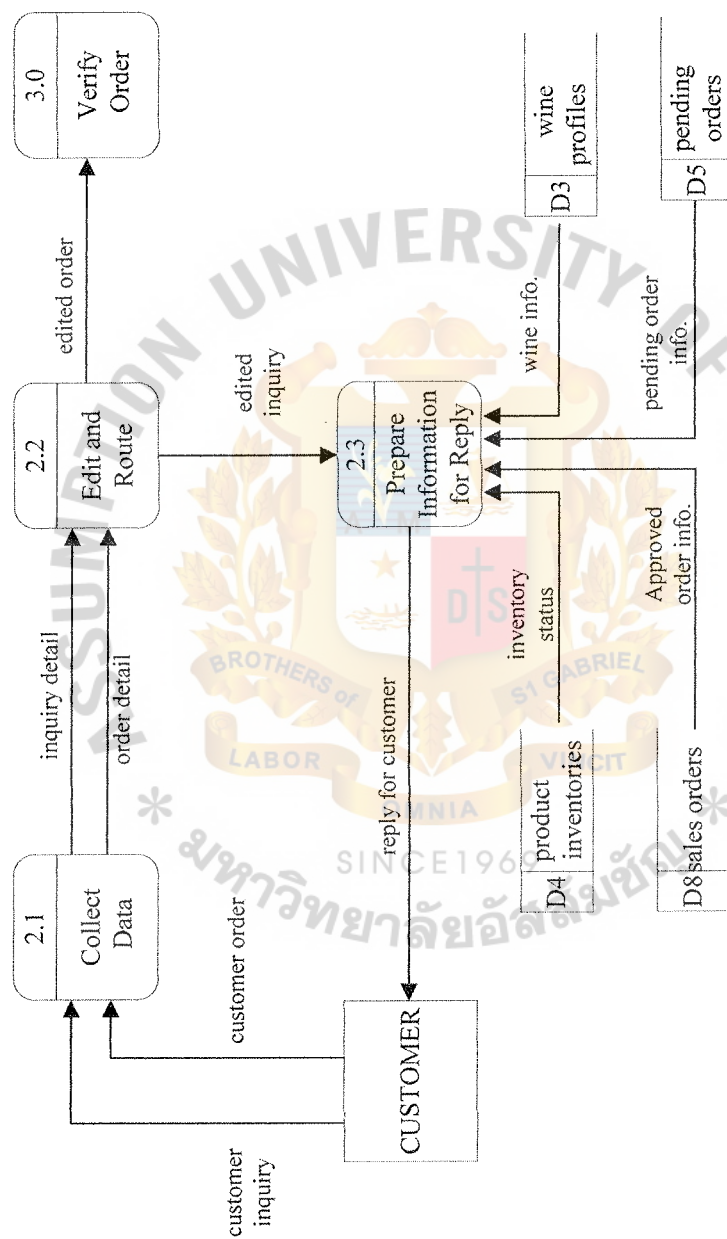


Figure 3.8. Data Flow Diagram Level 1 for Process 2.0: Response to Customer Inquiry.

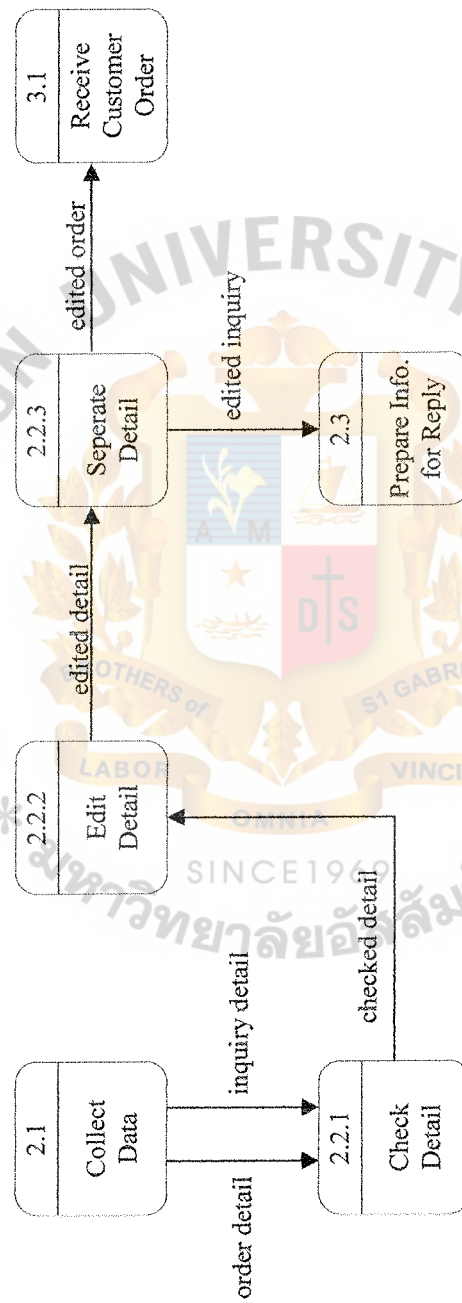


Figure 3.9. Data Flow Diagram Level 2 for Process 2.2: Edit and Route.

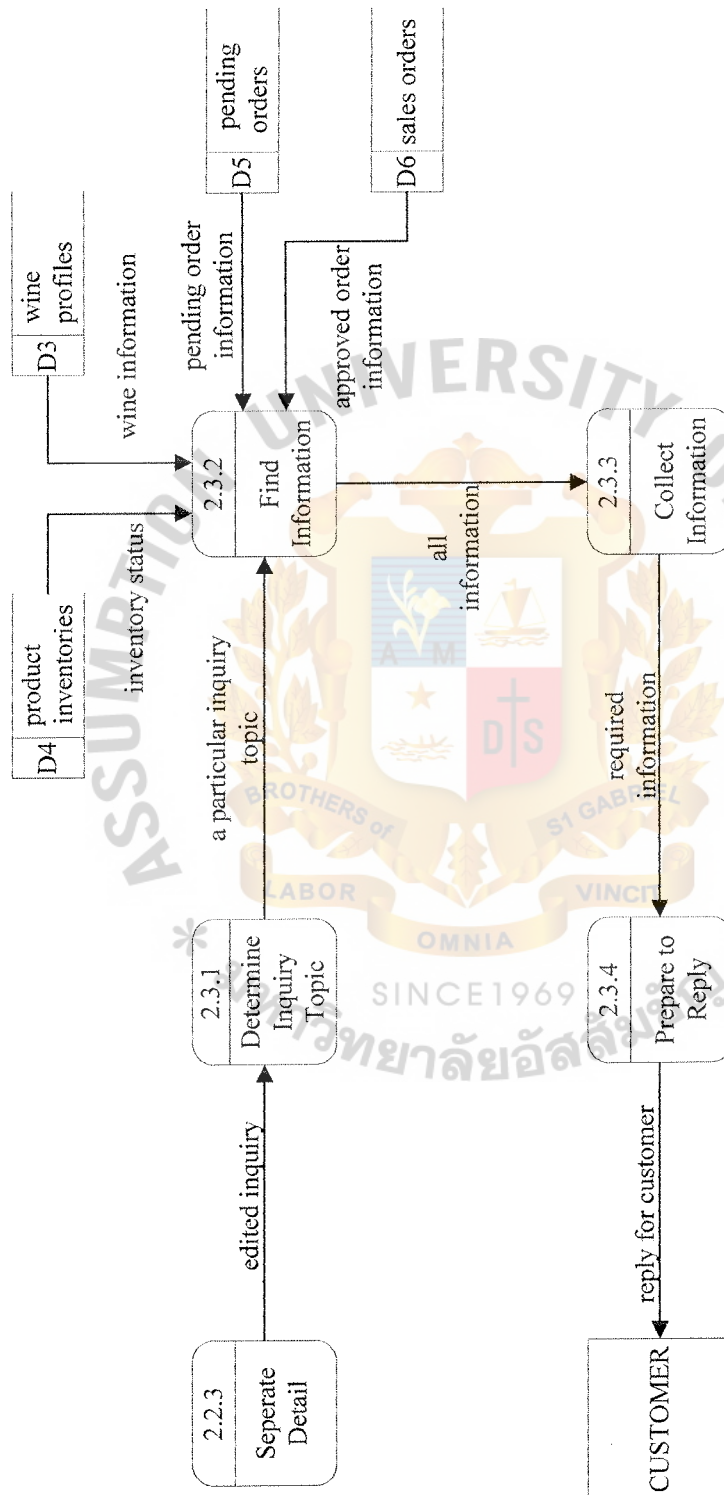


Figure 3.10. Data Flow Diagram Level 2 for Process 2.3: Prepare Information for Reply.

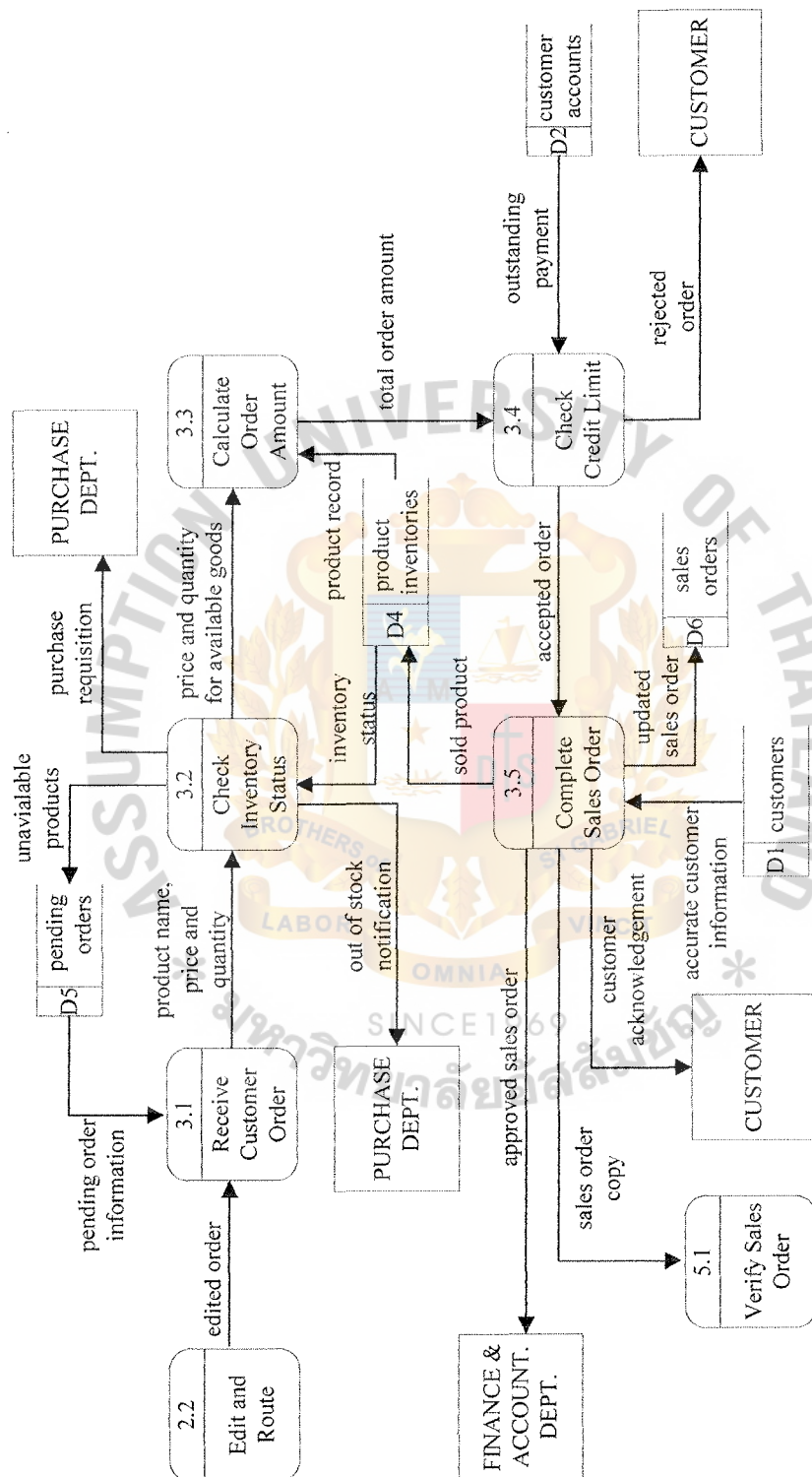


Figure 3.11. Data Flow Diagram Level 1 for Process 3.0: Verify Order.

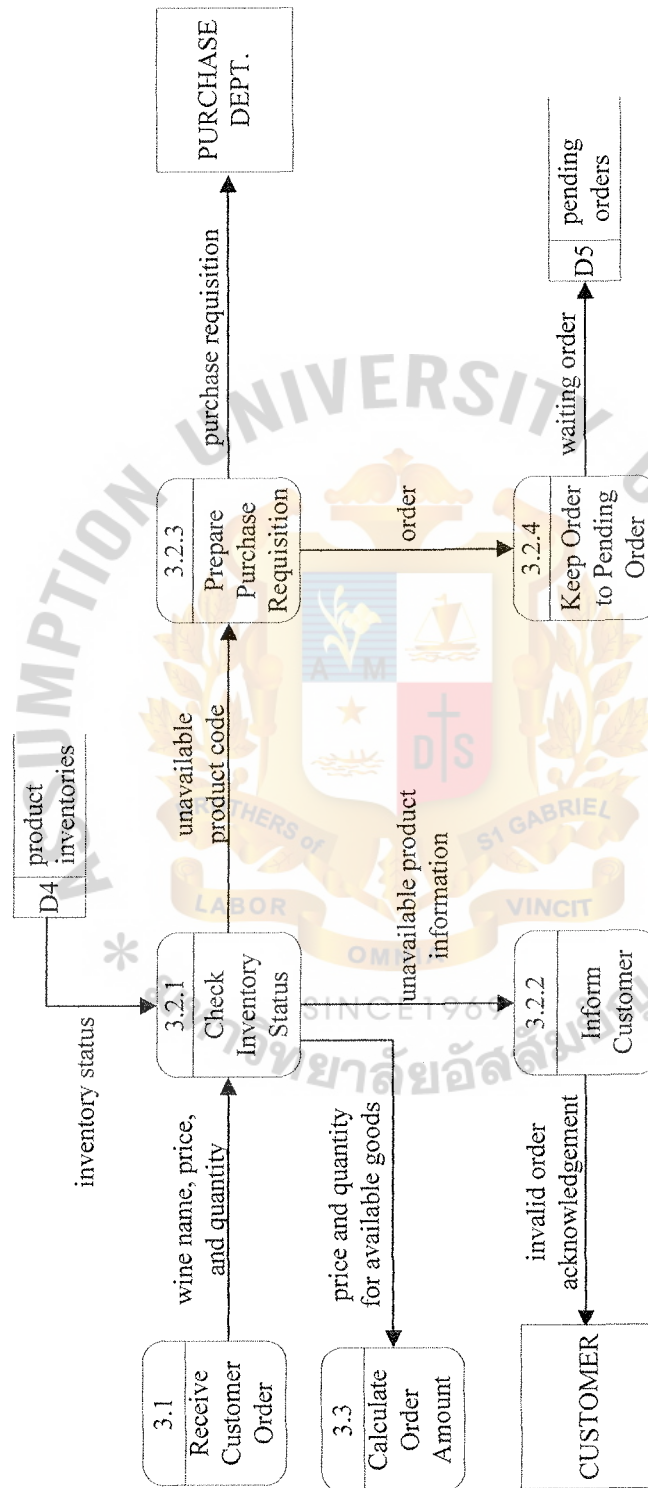


Figure 3.12. Data Flow Diagram Level 2 for Process 3.2: Check Inventory Availability.

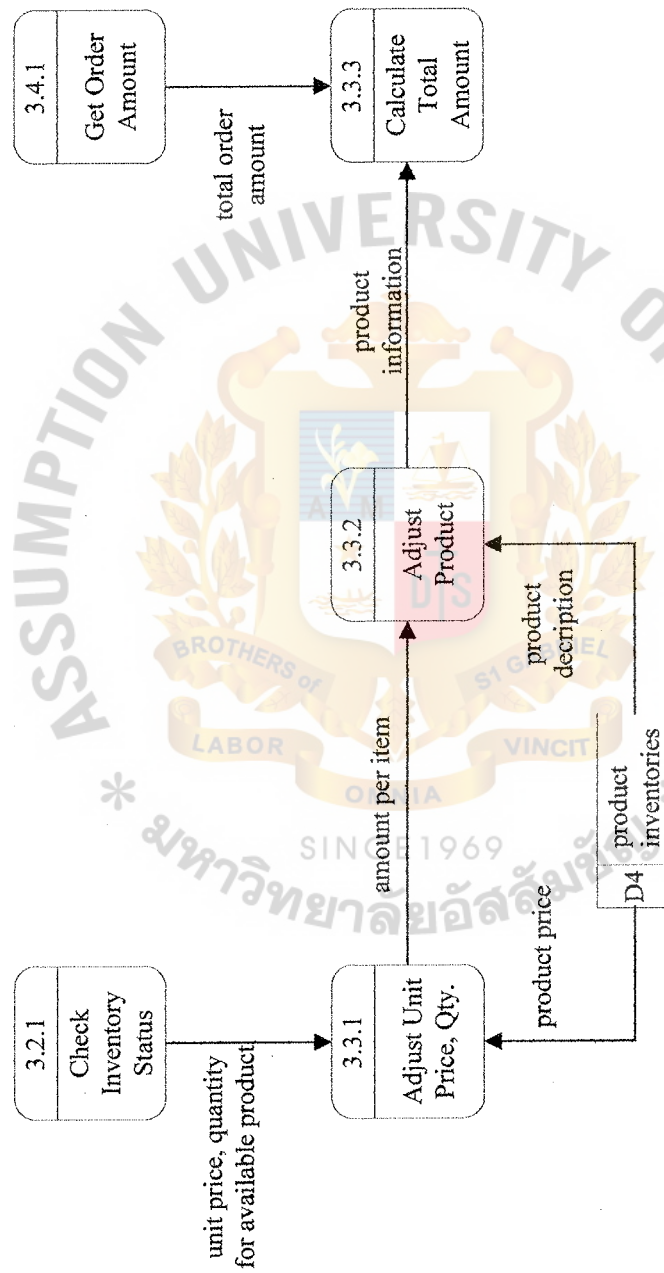


Figure 3.13. Data Flow Diagram Level 2 for Process 3.3: Calculate Order Amount.

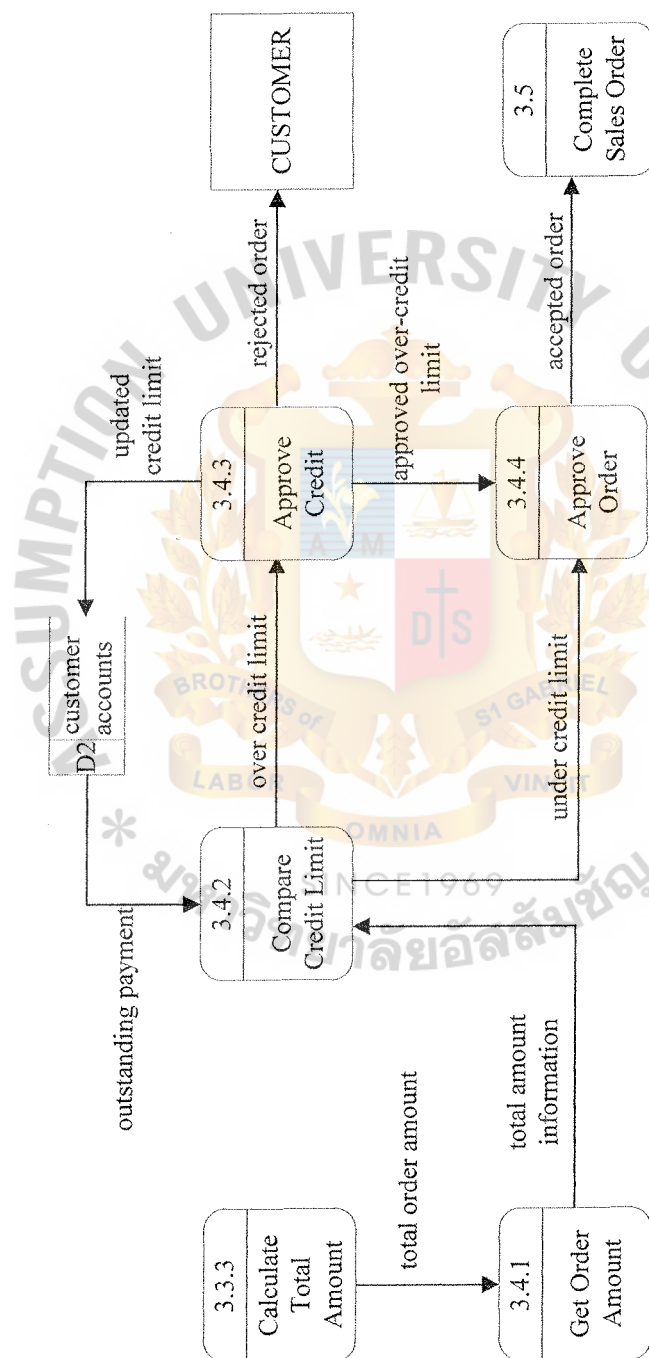


Figure 3.14. Data Flow Diagram Level 2 for Process 3.4: Check Credit Limit.

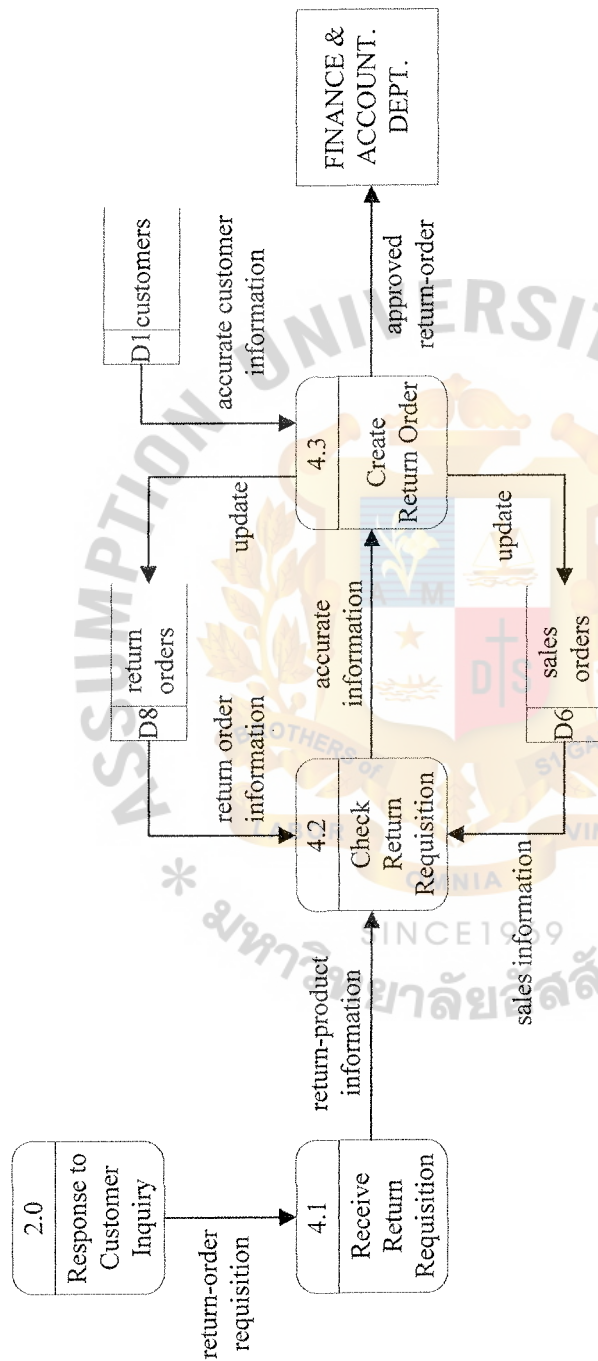


Figure 3.15. Data Flow Diagram Level 1 for Process 4.0: Verify Return Order.

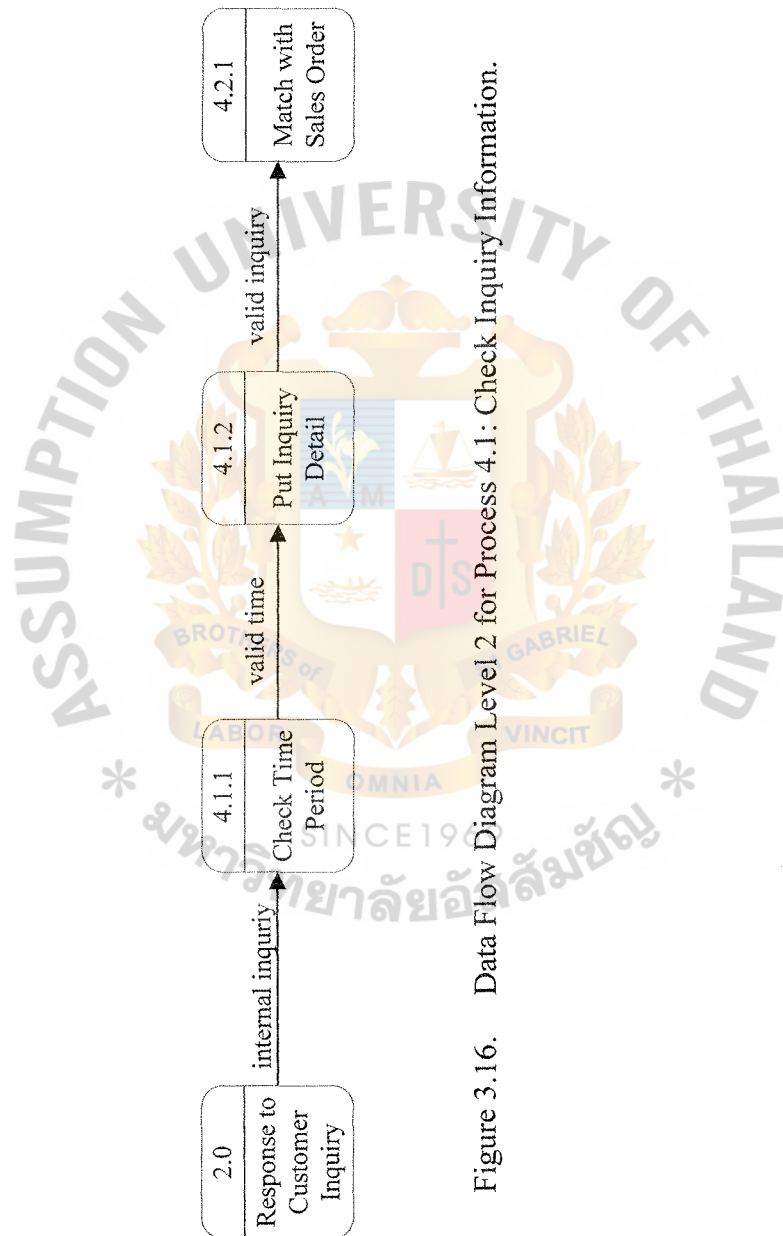


Figure 3.16. Data Flow Diagram Level 2 for Process 4.1: Check Inquiry Information.

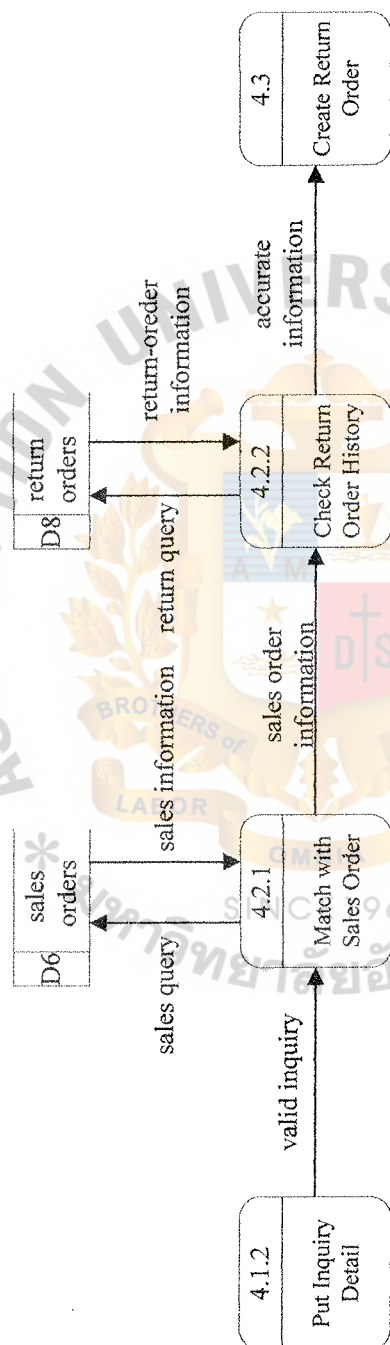


Figure 3.17. Data Flow Diagram Level 2 for Process 4.2: Check Return Requisition.

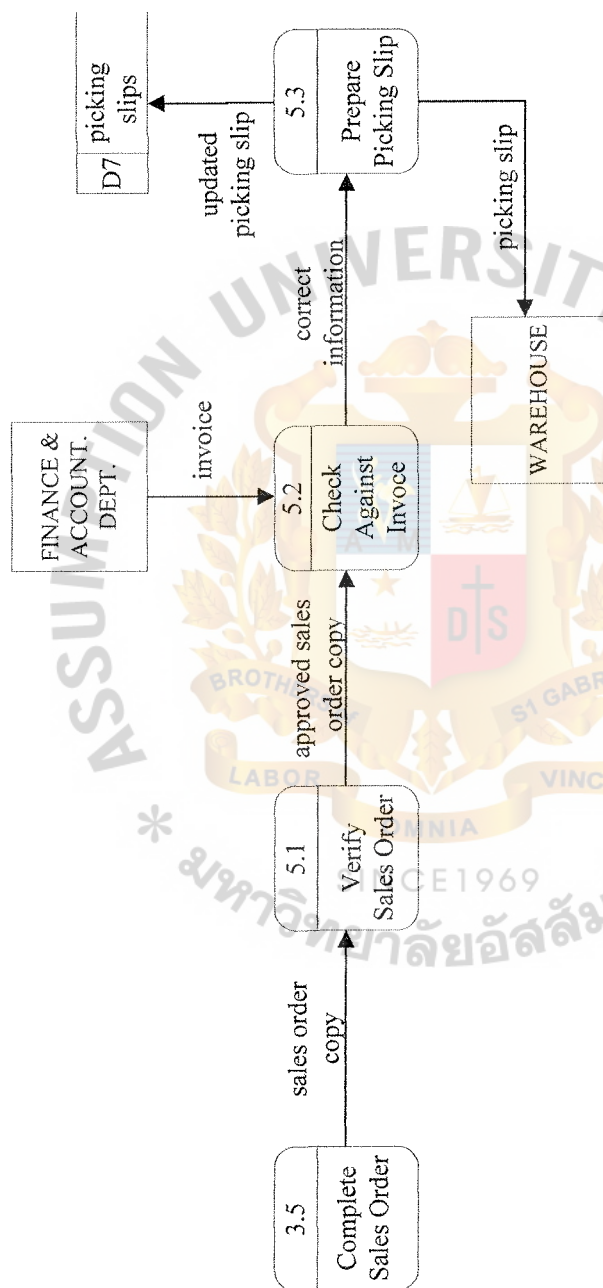


Figure 3.18. Data Flow Diagram Level 1 for Process 5.0: Prepare Delivery.

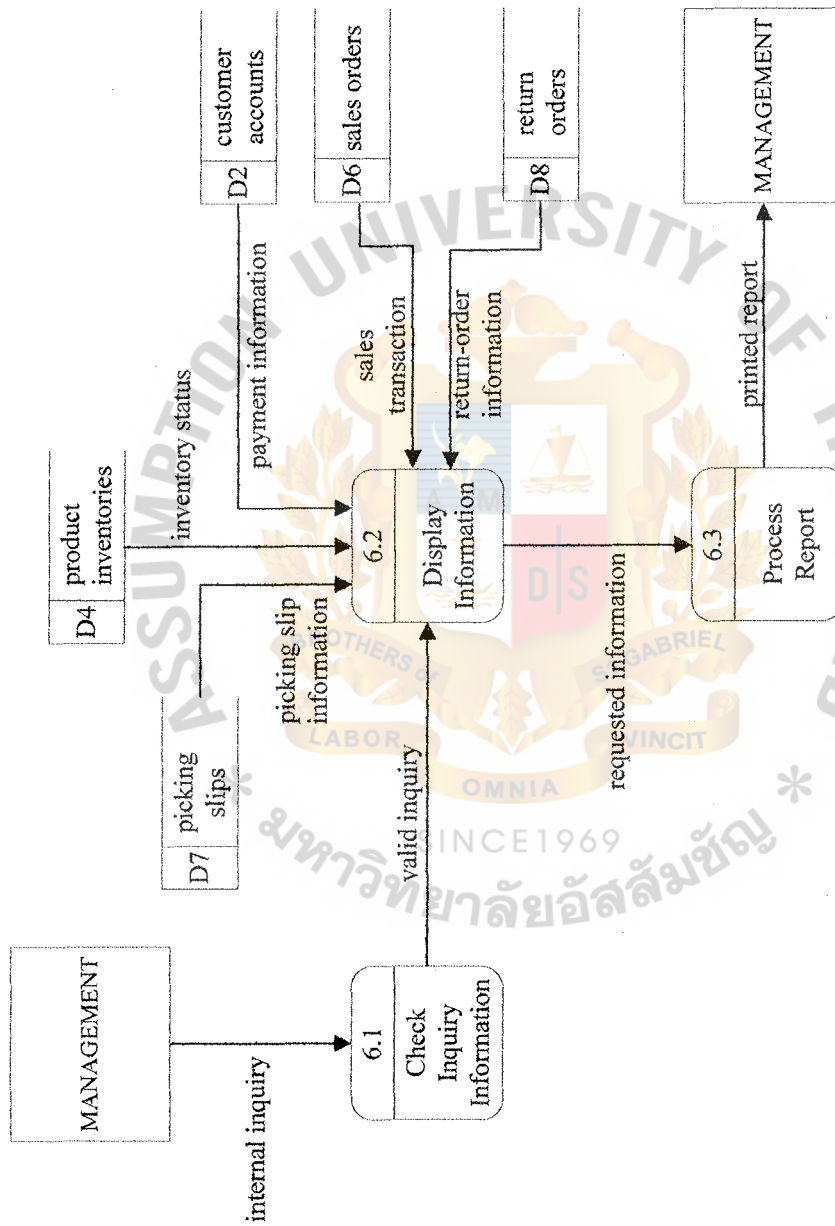


Figure 3.19. Data Flow Diagram Level 1 for Process 6.0: Produce Report.

Besides Data flow diagram of the proposed system, in Appendix D shows process description for data elements of all processes.

Analyst team starts database design in this phase by finding all entities involved in the sales function, such as products, customers, sales order, etc. Those entities must be related to each other. The analyst team designs database by using Entity Relation Database model which is show in Appendix C, Figure C.1. Besides, in Appendix C, it also shows the structure of each field of all entities. The meaning of all attributes is also shown in Appendix E.

Then, it is the time for the analyst team to initial the input and output design. The team will use prototype to identify end-user's satisfaction as much as they can before start designing the graphic user interface to be used for the real proposed system. There will not be any problem occurred after implementing the proposed system. Interface design or screen design is show in Appendix A. The output design or form and report design is shown in Appendix B.

3.3 Hardware and Software Requirement

The enterprise networking of our proposed system is the Client/Server model which is the primary way of delivering computing power to the desktop. In the client/server model, computer processing is split between client machines and server machines, with each machine handling those tasks for which it is best suited. It supports the business environment of flattening organizations and decentralized management.

The network architectures for client/server computing of this new proposed system is Distributed Database Computing, sometimes called two-tiered client/server. This architecture places the sales information system's stored data or database server on a server and the business logic and user interface on the clients. The clients send their database queries to the server which it executes all instructions and sends the results

back to the clients. Therefore, database server can reduce traffic problem. For this distributed data purpose, Local Area Network (LAN) is used for the telecommunications network. LAN allows the organizations to share expensive hardware and software. For instance, several PCs can share a single printer by being tied together in a LAN. It can promote productivity because users are no longer dependent on a centralized computer system or on the availability of a single peripheral device.

The network topology used for the proposed system is Star network. This topology is useful for the applications in which some processing must be centralized and some can be performed locally.

For the data architectures, we implement Relational Database with Relational Database Management System (RDBMS) to controls access to and maintenance of the stored data. It also provides for backup, recovery, and security.

Regarding inputs, outputs, and intersystem connections, batch processing is suitable for the system and not obsolete. It is because the transaction file is created or updated by the transactions. Also, the output tend to be generated to paper on a scheduled basis, such as sales volume, total sales amount, commission, etc.

3.3.1 Hardware Requirement

The hardware requirement for the proposed system can be as follows:

(a) Server

(1) Processor: Intel PentiumIII Xeon

Code Speed 600 MHz, Bus Speed 133 MHz FSB, Level2 Cache 256 KB, Validated Intel 840 AGP Chipset, Processor Package Slot 2.

- (2) Motherboard: Iwill DCA200
128 MB with ECC, Chipset on mainboard Intel 840 AGPset, ATX Form Factor.
- (3) Memory: Kingstone 128MB DIMM ECC SDRAM
128 MB, Error Correction ECC Capacity SDRAM, Packaging 168-PIN DIMM, PC133, Speed 5.4 ns, Voltage 3.3Volts, Unbuffered, 133 MHz., Gold Contact Metal.
- (4) Hardisk: Seagate ST318406LC Cheetah 36ES
Capacity 18.4 GB, Speed 10000 rpm, Seek time 5.2 ms avg, Interface SCSI Ultra320, Data rates up to 63.2 MB/sec, SAMS, SeaShell, G-Force Protection, Data Integrity up to 320 MB/sec transfer rate, Cables 15 device, up to 12 meters.
- (5) Graphic Card: S3 Trio3D (AGP 2X)
2MB video SDRAM, AGP Bus, Max solution 1280 x 1024, Max colors 16.7 M, Direct 3D Support Tri Linear Filtering Perspective Correction Transparency Fog Z-Buffering.
- (6) Casing: ATX
300 watts, ATX power supply for AMD, Pentium III, and IV.
- (7) Network Interface Card: 3Com 3C908-TXM
EtherLink Server 10/100 PCI NIC, media 10base-T, connector RJ-45, bus PCI hot-plug, data path 32 bit, 33 MHz.
- (8) SCSI Interface:
Integrated PCI Ultra-Wide SCSI controller

(9) BIOS (Flash):

4 MB Phoenix with flash password protector and shadow function

(10) External Port:

Enhanced parallel (ECP/EPP): 1 D-type female 25-pin (bidirectional)

High-speed 16550-compatible serial: 2 D-type male 9-pin

Universal Serial Bus: 2 USB ports

SVGA graphics: 1D-type female 15-pin

Keyboard: 1 PS/2-compatible 6-pin mini-DIN

Mouse: 1 PS/2-compatible 6-pin mini-DIN

Ultra-Wide SCSI: 2 68-pin SCSI knockouts

Ethernet: 1 10/100Base-T RJ-45 connector

(11) Power Supply:

300 Watts auto-ranging 110/220V (5V/3.3V output)

(12) Monitor: MAG 570V

15" Flat Screen, resolution 1280x1024

(13) Other Standard Features:

On-line technical reference on CD-ROM

Windows95 keyboard

Mouse

Internal Fax Modem 56K

1.44 MB built-in floppy disk drive

48X-Speed CD-ROM drive

Uninterrupted Power Supply (UPS)

(b) 7 sets of client machines

(1) Processor: Intel Pentium III

100 MHz FSB, Intel 810e chipset with 32-bit, 133MHz Host Bus & Display Cache Bus, 64-bit. 100 MHz System Memory Bus, 32-bit 33MHz Hub Interface & FWH Bus and 133/100/66 MHz FSB, Slot1.

(2) Motherboard: ASUS P3W

3x DIMM sockets for 3.3V PC-100 SDRAM, Dual UDMA/66 BM IDE Connection, Up to 6 PCI or optional 5 PCI and 1 ISA slots, Suspend to RAM, New AMR slot for Audio/Modem Adapter, JumperFree Setting for Ease of Overclocking

(3) Memory: Kingstone KVR100X642C2/32

32MB PC100 DIMM CL2, Maximum Memory 512 MB, Expansion 2 sockets, Host Type MotherBoard ATX, Bus Architecture PCI/ISA

(4) Hardisk: Seagate Barracuda ATAII ST310210A

10.2 GB, Ultra ATA/66 interface, 7200 rpm and 8.2 msec average seek time, 300 Gs nonoperating shock, 2 MB cache buffer, Ships with Seagate's exclusive 3D defense system.

(5) Graphic Card:

SiS-based graphics integrated with chipset, Unified Memory Architecture for 1 to 2.5 MB graphic memory, Supports up to 1024 x 768 @ 85 Hz

(6) Casing: ATX

ATX case 250 watts

- (7) Network Interface Card: 3Com 3C905-TX-M
EtherLink 10/100 PCI NIC for complete PC management, media 10Base-T/100Base-TX, connector RJ-45, bus 32 bit PCI, operating distance category 5UTP to 100 m.
- (8) BIOS:
4 MB Firmware BIOS and PC Health Monitoring
- (9) External Port:
Enhanced parallel (ECP/EPP, bi-directional centronics): 1 D-type female 25 pin
High-speed 16550-compatible serial: 2 D-type male 9-pin
Universal Serial Bus (USB): 2 USB ports
VGA graphics: 1 VGA graphics port
Keyboard: 1 PS/2-compatible 6-pin mini-DIN
Mouse: 1 PS/2-compatible 6-pin mini-DIN
- (10) Power Supply:
100 Watts; 110/120V or 220/240V (switch-selectable)
- (11) Monitor: MAG XJ570
15" SVGA color monitor (800 x 600, 256 color)
- (12) Other Standard Features:
Windows95 keyboard
Mouse
1.44 MB built-in floppy disk drive
40X-Speed CD-ROM drive
Uninterrupted Power Supply (UPS)

(13) Printer:

1 set of Dot Matrix Epson LQ-300

1 set of HP LaseJet 6P

1 set of Cannon BJC-5000 Color Bubble Jet

(14) Scanner:

Genius Vivid ProIII : 36 bit (600 x 1200, Parallel Port.

(15) Network Equipment:

UTP Cable (CAT5)

Figure 3.20 displays the hardware configuration of the proposed system.

3.3.2 Software Requirement

The software Requirement for the proposed system can be as follows:

(a) Sever unit

- (1) Operating System : Microsoft Windows NT Server 4.0
- (2) Application Software : Microsoft Office 97 Professional Edition
- (3) Database Sever : Microsoft SQL Sever Enterprise Edition 6.5
- (4) Internet Explorer version 5 or above
- (5) PhotoShop 5.5 or above
- (6) Norton AntiVirus

(b) Client machine

- (1) Operating System : Window NT Workstation 4.0
- (2) Application System : Microsoft Office 97 Professional Edition
- (3) Internet Explorer version 5 or above
- (4) Norton AntiVirus

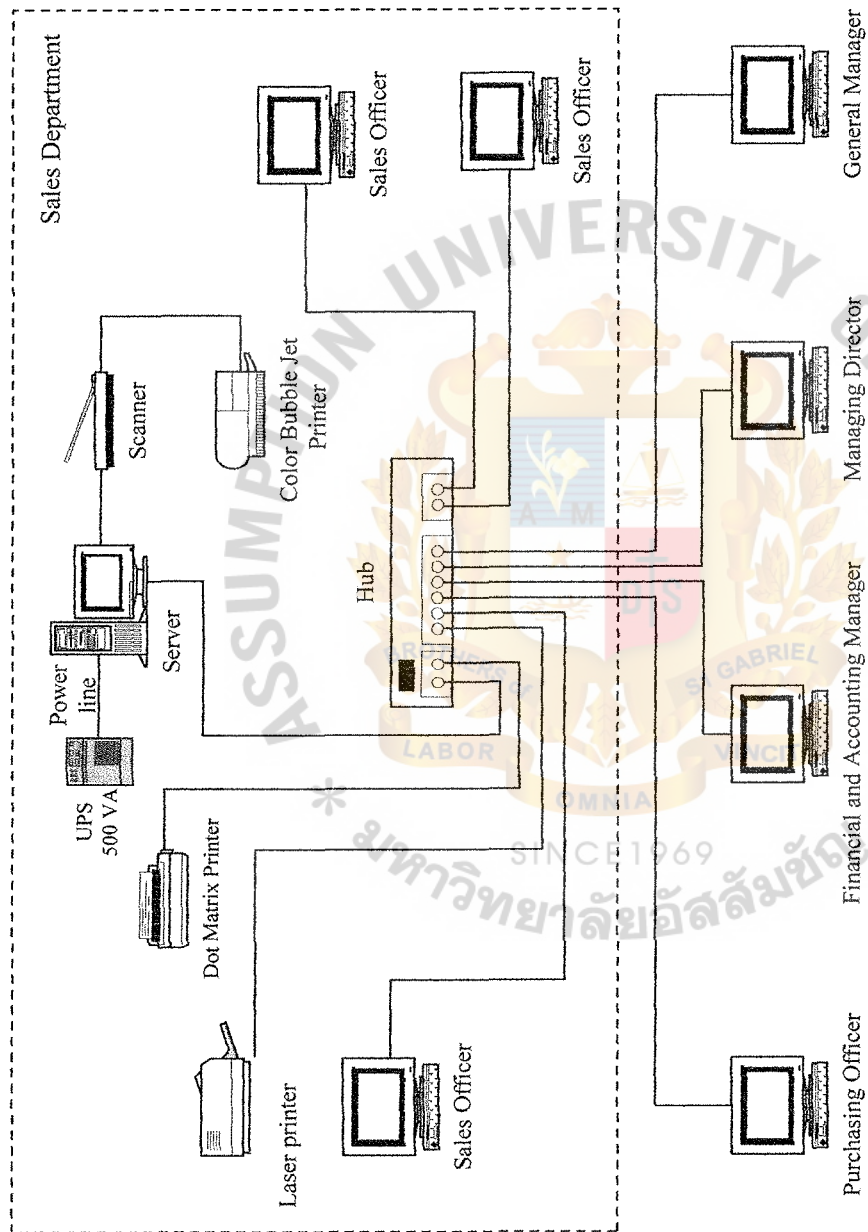


Figure 3.20. The Hardware Configuration of the Proposed Sales Information System.

The new work design is very important. We has set the benefits of this network system as follows:

(1) Resource Sharing

Users of network can access a variety of resources through the network. All users in the network can access to the network resources such as database files, printer, scanner, etc. Core benefit of resource sharing is to reduce maintenance cost of network equipment such as hardisk, printer, etc.

(2) Distribute the workload

The degree of function of workload for a single system can be moderated in a network, so the workload can be shifted from a heavily loaded system to an underutilized one.

(3) Expandability

This expansion capability of the network resources will be an advantage to the network management for adding new nodes equipment for meeting with a higher user requirement in the future.

(4) Increased Reliability

Since a computing network consists of more than one computing system, the failure of one system or of just one component need not block user from containing to compute.

3.4 Security and Control

Network operating systems provide more services for data security than do desktop operating systems. Since files and programs are shared in a LAN setting, there is a greater need for security in a network operating system. Network security measures are needed to protect data during their transmission. The area of network security is a broad one and encompasses physical and administrative controls as well as automated controls.

3.4.1 Security

Network security address three requirements as follows:

- (1) Secrecy: Requires that the information in a computer system only be accessible for reading by authorized parties. This type of access includes printing, displaying, and other forms of disclosure, including simply revealing the existence of an object.
- (2) Integrity: Requires that computer system assets can be modified only by authorized parties. Modification includes writing, changing, changing status, deleting, and creating.
- (3) Availability: Requires that computer system assets are available to authorized parties.

In order to establish the network security policy, the proposed system has to be firstly examined about security problems which can occur because of threats. There are two general threats which are possible experienced in the organization as follows:

(a) Natural Disasters:

Lightening, earthquake, tropical storm, fire, flood, dust, temperature, etc.

(b) Man-made Disasters:

Fire, espionage, conspiracy, virus, time bomb, steal, revenge, negligence, etc.

The security subject of this project is totally concerned with all the policies, procedures and technical tools used to safeguard and information system from unauthorized access to data and applications, alteration, theft, and physical damages. A network security policy is the foundation of security because it outlines what assets are worth protecting and what actions or inactions threaten the assets. The policy will weigh possible threats against the value of personal productivity and efficiency and identify the different corporate assets which need different levels of protection. Without a network security policy, a proper security framework cannot be established.

There are several common components of a network security policy of the proposed Sales Information System.

(1) Physical Security

This section will define which employees should be granted access to restricted areas such as server rooms and wiring closets. For examples, an authorized officer can only keep the key of the server room. The officer has to lock the room whenever he/she leaves the room

(2) Network Security

The network security section states how assets stored on the network will be protected. This section might include security measures regarding access controls, network auditing, remote access, and file system directory structures. For examples, the organization provides a proper location for the server computer with locked door. Moreover, the extinguishers, smoke

detector, and heat detector are also equipped near the area of the server room.

(3) Access Control

Access control determines who has access to what. There must be a proper procedure to ensure that only the right people have access to the right information or services. Good access control includes managing remote access and enabling administrators to be efficient in their work. It should not be so complex that it becomes easy to commit errors. For instances, the system has to be protected from an unauthorized person. If he/she could enter the computer room, don't allow him/her to logon the system by setting the password. If he/she could go through the system, don't let him/her to access the database by using data encryption.

(4) Authentication

Authentication is how users tell the network who they are. From their desk, a simple user id and password may be sufficient because of the accompanying physical security. However, the user name and password must be carefully protected adapting a set of procedures. The policy states that all authorized users whom are allowed to access the data have to change their own password every three months.

(5) Auditing and Review

Once a security policy has been implemented, it must be checked to ensure that all components and employees are in compliance. Without sufficient auditing, an organization may have no legal recourse if there is a security breach. Auditing can also identify problems before they turn into

security breaches. The policies must also be reviewed regularly to ensure that they are still relevant.

(6) Security Awareness

"Clueless users" are widely recognized as the most serious threat to network security. If employees do not understand the power and proper use of the network, they can unintentionally compromise security (or be duped into it). In particular, employees must manage passwords properly and be aware of "social engineering" attacks.

(7) Incident Response & Disaster Contingency Plan

The organization is most vulnerable when it detects an intrusion or when it is faced with a disaster. The disaster contingency plan explains how an organization will recover from any type of natural disaster or attack, including attacks from hackers and employees. For example, the system administrator will measures back up two copies of servers every week, and back up two copies for data every day. One back-up set (server and data) has to be stored in a safety locker to prevent from stealing and fire. The other set is kept in separating place. In case of one of the set disappears or lost, we will still have the other set used to be reinstalled. In addition, the data is printed into hardcopy format on schedule basis. The hardcopy is also stored in a secured place. It can be used to be the input data in case of all backup lost.

(8) Software Security

The managing director is the only person who will be able to approve software procurement requisition. The reliable system administrators is persons who will be assigned by the managing director in selecting the

software and installing it into the system as well as offering users training about the new applications. Moreover, the policy states the system must be scanned twice a month in order to check whether software is infected by viruses or not.

(9) Manual/Programmatic Security Procedures

The manual security measure includes requiring users to log off the system when leaving their microcomputers. A programmatic procedure to enhance security is to automatically log a user off if no input is received from the user's terminal over some period of time.

3.4.1 Control

Control consists of all manual and automated methods, policies, and organizational procedures used to protect the organization's assets, the accuracy and reliability of the system operating their function effectively and efficiently. The control of the proposed sales information system can be as follows:

(a) General controls:

General controls apply to all computerized applications and consist of a combination of system software and manual procedures that create an overall control environment. It ensures the following:

- (1) Implementation Control: The system development process has to be performed according to the formal standard at various points.
- (2) Software Control: All kinds of software must be examined for security and reliability before installing into the proposed system.
- (3) Hardware Control: The hardware has to be protected from unauthorized access and any disaster. Also, the computer equipment should be checked for malfunction.

- (4) Computer Operation Controls: Programmed procedures are consistently and correctly applied to the storage and processing of data. There should be a document of user manual and sort code of the system.
 - (5) Data Security and Network Controls: All data files are not allowed to be accessed, edited, changed, updated, saved, or destructed by unauthorized person.
 - (6) Administrative Controls: All users have to perform their function with the system according to the organization's policy and procedures.
- (b) Application Control

There are three types of application controls, corresponding to the three basic steps in computing input, processing and output. At each step there are specific types of application control. It will check for an error, incompleteness of data when the data center for an information system processing controls ensure that the results of computer processing are accurate, complete, and properly distributed. The most important application control techniques are procedures for authorizing and valid dating input and output, and programmed edit checks.

An information system for the proposed system uses an established formal procedure in deal booking that allow only selected individuals to authorize input of transactions into a system and in dealing authorize to review system output to make user that it is complete and accurate. For programmed edit check, technique used are listed as follows:

- (1) Format Check: The system checks the contents, size, and sign of individual data files.
- (2) Existing Check: The system checks for valid codes by comparing input data files to tables or master files.
- (3) Reasonableness Check: The system checks to see if selected field falls within specified limits.
- (4) Check Digit: The check digit is an extra reference number added to an identification code bearing a mathematical relationship to the other digits. The check digit is input with the other data, re-computed by the computer, and compared with an original input.

3.5 Feasibility and Cost-Benefit Analysis

During the system selection phrase, there are three candidate system solutions for the organization to evaluate. The three candidates are listed in the table form, called candidate system matrix. It is displayed on Table 3.1. It documents similarities and differences between candidate systems.

User requirement matrix, which is shown in Table 3.2, determines what characteristics the three candidates are able to satisfy the end-user's requirements and identifies which candidate should be recommended.

Table 3.1. Candidate Systems Matrix.

Characteristics	Candidate 1	Candidate 2	Candidate 3
Portion of System Computerized Brief description of that portion of the system that would be computerized in this candidate.	Sales Information System would be developed and operated by outsourcing to reduce backlog in the department and to fulfill user requirements.	Sales Info. Sys. would be developed by purchased and customized to satisfy sales service required functionality.	Hire the consulting company to develop the proposed system
Benefits Brief description of the business benefits that would be realized for this candidate.	Fulfill user requirements and better system performance due to the sophisticated company and have skillful staff to operate the system	This solution can be implemented quickly because it is a purchased solution.	Have more efficient system by having expertise to develop the system.
Servers and Workstations A description of the servers and workstations needed to support this candidate.	Technically architecture dictates Pentium XeonIII, MS Windows NT servers, MS Windows NT 4.0 workstations.	Technically architecture dictates Pentium III, Sun Sparc Server, Windows98 workstations.	Technically architecture dictates PentiumIII, MS WindowsNT Servers, MS Windows NT 4.0 workstations.

Table 3.1. Candidate Systems Matrix (Continued).

Characteristics	Candidate 1	Candidate 2	Candidate 3
Software Tools Needed Software Tools needed to design and build the candidate (e.g., DBMS, emulators, OS, languages etc.) Not generally applicable if applications software packages are to be purchased.	MS Visual Basic 6.0 Internet Explorer Microsoft Access for customization of package to provide report writing and integration.	MS Visual Basic 6.0 System Architect Internet Explorer	Power Builder System Architect Internet Explorer
Application Software A description of the software to be purchased, built, accessed, or some combination of these techniques.	Custom Solution	Package Solution	Custom Solution

Table 3.1. Candidate Systems Matrix (Continued).

Characteristics	Candidate 1	Candidate 2	Candidate 3
Method of Data Processing Generally some combination of : on-line, batch, deferred batch, remote batch, and real-time.	Client/ Server	Client/ Server	Client/ Server
Output Devices and Implications A description of output devices that would be used, special output requirements (e.g., network, pre- printed forms, etc.), and output considerations (e.g., timing constraints).	(1) HP Laser Jet 5P Printer (1) Cannon Ink Jet BJC 5000 (1) Epson Dot Matrix LQ-300	(1) HP Laser Jet 5P Printer (1) Cannon Ink Jet BJC 5000 (1) Epson Dot Matrix LQ-300	(1) HP Laser Jet 5P Printer (1) Cannon Ink Jet BJC 5000 (1) Epson Dot Matrix LQ-300

Table 3.1. Candidate Systems Matrix (Continued).

Characteristics	Candidate 1	Candidate 2	Candidate 3
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 (e.g., timing of actual inputs).	- Keyboard & mouse (1) Scanner Genius Vivid Pro II	- Keyboard & mouse (1) Scanner Genius Vivid Pro II	- Keyboard & mouse (1) Scanner Genius Vivid Pro II
Storage Devices and Implications Brief description of what data would be stored, what data would be accessed from existing stores, how much storage capacity would be needed, and how data would be organized.	MS SQL Server DBMS with 18.4 GB arrayed capability	MS SQL Server DBMS with 18.4 GB arrayed capability	MS SQL Server DBMS with 18.4 GB arrayed capability

Table 3.2. User Requirement Matrix.

User Requirement List	Catagories	Candidate 1	Candidate 2	Candidate 3
1. There must be the reliability in terms of data processing and output	Essential	X	X	X
2. Information Security Control needed to prevent any access from any unauthorized party.	Essential	X	X	X
3. The system must be access to expected data easily	Essential	X	X	X
4. The system must be able to add and edit tables and fields when data change	Essential	X	X	X
5. The output must be documented as expected formats	Desired	X	-	X
6. The interface has to be well-organized and more user-friendly	Desired	X	-	X
7. The system must reduce sales processing time.	Optional	X	X	-

3.5.1 Feasibility Analysis

The proposed system is considered on feasibility analysis. The benefits or activities which occur in developing the proposed system will be measured. There are general four categories of feasibility tests as follows:

- (1) Operational feasibility: Determines whether a proposed system is desirable within the existing managerial and organization framework.
- (2) Technical feasibility: Determines whether a proposed system can be implemented with the available hardware, software, and technical resources.
- (3) Scheduled feasibility: Determines whether how reasonable timetable of a proposed system is.
- (4) Economic feasibility: Determines whether the benefits of a proposed system outweigh the costs.

All three candidates, shown in Table 3.1, has to depend on Feasibility Study shown in Table 3.3, called feasibility analysis matrix. It determines whether which candidate solution mentioned in the candidate systems matrix is feasible, or achievable, given the organization's resources and constraints. There are four major areas of feasibility must be addressed, as mentioned above, that are operational feasibility, technical feasibility, economic feasibility, and schedule feasibility. The candidates will be given scores for each criterion. After scoring, a final score is recorded in the last row for assessment. This matrix format can be most useful for defending our recommendation to management.

Table 3.4 to Table 3.6 show payback period for each client-server system of each candidate.

For Table 3.4, Net Present Value (NPV) is 536,896 baht and Return On Investment (ROI) is 80%.

For Table 3.5, Net Present Value (NPV) is 57,902 baht and Return On Investment (ROI) is 16.5%.

For Table 3.6, Net Present Value (NPV) is 368,228 baht and Return On Investment (ROI) is 56.30%.

Figure 3.21 to Figure 3.22 translate the payback analysis of Table 3.4 to Table 3.6 into payback analysis charts.

After analyzing the feasibility analysis matrix of each candidate, the first candidate is selected to propose to managing director for approval so that system design will be initiated.



Table 3.3. Feasibility Analysis Matrix.

Feasibility Criteria	Wt.	Candidate 1	Candidate 2	Candidate 3
<p>Operational Feasibility</p> <p>Functionality. A description of to of to what degree the</p> <p>Political. A description of how well received this solution would be from both user management user, and organization perspective.</p>	30%	<p>Fully supports user required functionality if we have clear and concise contract signing with the outsourcing company.</p> <p>Score : 100</p>	<p>Fully support user required functionality</p> <p>Score : 85</p>	<p>Fully support user required functionality in terms of the application software but not operating activities</p> <p>Score : 90</p>
<p>Technical Feasibility</p> <p>Technology. An assessment of the maturity, availability (or ability to acquire), and desirability of the computer technology needed to support this candidate.</p>	30%	<p>The system could be developed by sophisticated outsourcing staff who have technical knowledge in many areas effectively. It is difficult to make further system modification in the future.</p>	<p>The software package has to be updated on every specific time. Our company also has to be charged for monthly fee for technical support.</p>	<p>The contractor staff is well experience with Power Builder and its technology response to easy system development.</p>

Table 3.3. Feasibility Analysis Matrix (Continued).

Feasibility Criteria	Wt.	Candidate 1	Candidate 2	Candidate 3
Expertise. An assessment of the technical expertise needed to develop, operate, and maintain the candidate system.		Score : 97	MS Visual Basic 6.0 is a mature technology based on version number. Score : 95	Our current technical staff have to be advance trained to get better experience with Power Builder. Score : 87
Economic Feasibility Cost to develop : Payback period (discounted) : Net present value : Detailed calculations :	20%	Approximately:528,370 bht. Approximately : 3.4 years Approximately :536,896 bht See table 3- : Score : 90	Approximately:301,200 bht. Approximately : 5.3 years Approximately :57,902 bht. See table 3- : Score : 60	Approximately:432,544 bht. Approximately : 4.5 years Approximately :368,228 bht. See table 3- : Score : 70
Schedule Feasibility An assessment of how long the solution will take to design and implement.	20%	4 months Score : 95	2 months Score : 100	6 months Score : 85
Ranking	100%	96	86	84

Table 3.4. Payback Analysis for Client-Server System Alternative 1 (numbers rounded to the nearest 1 baht), Baht.

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Development cost:	-528370						
Operation and maintenance cost:		-22260	-24486	-26935	-29628	-32591	-35850
Discount factors for 5%:	1	0.952	0.907	0.864	0.823	0.784	0.746
Time-adjusted cost (Adjusted to Present Value):	-528370	-21200	-22210	-23267	-2375	-25536	-26752
Cumulative time-adjusted costs over lifetime:	-528370	-549570	-571780	-595047	-619422	-644958	-671710
Benefit derived from operation of new system:	0	200000	220000	240000	260000	250000	270000
Discount factors for 5%:	1	0.952	0.907	0.864	0.823	0.784	0.746
Time adjust benefits (Adjusted to Present Value):	0	190476	199546	207321	213903	195882	201478
Cumulative time-adjusted benefits over lifetime:	0	190476	390022	597344	811246	1007128	1208606
Cumulative lifetime time-adjusted costs + benefits:	-528370	-359094	-181758	2297	191824	362170	536896

Table 3.5. Payback Analysis for Client-Server System Alternative 2 (numbers rounded to the nearest 1 baht), Baht.

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Development cost:	-301200						
Operation and maintenance cost:		-28600	-31460	-34606	-38066.6	-41873	-46061
Discount factors for 5%:	1	0.952	0.907	0.864	0.823	0.784	0.746
Time-adjusted cost (Adjusted to Present Value):	-528370	-27238	-28535	-29894	-31317	-32809	-34371
Cumulative time-adjusted costs over lifetime:	-528370	-555608	-584143	-614037	-645355	-678163	-712535
Benefit derived from operation of new system:	0	140000	150000	160000	170000	180000	190000
Discount factors for 5%:	1	0.952	0.907	0.864	0.823	0.784	0.746
Time adjust benefits (Adjusted to Present Value):	0	133333	136054	138214	139859	141035	141781
Cumulative time-adjusted benefits over lifetime:	0	133333	269388	407602	547461	688496	830277
Cumulative lifetime time-adjusted costs + benefits:	-528370	-422275	-314755	-206435	-97894	10332	117742

Table 3.6. Payback Analysis for Client-Server System Alternative 3 (numbers rounded to the nearest 1 baht), Baht.

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Development cost:	-432544						
Operation and maintenance cost:		-20600	-22660	-24926	-27419	-30160	-33177
Discount factors for 5%:	1	0.952	0.907	0.864	0.823	0.784	0.746
Time-adjusted cost (Adjusted to Present Value):	-528370	-19619	-20553	-21532	-22557	-23632	-24757
Cumulative time-adjusted costs over lifetime:	-528370	-547989	-568542	-590074	-612632	-636263	-661020
Benefit derived from operation of new system:	0	180000	190000	200000	210000	220000	230000
Discount factors for 5%:	1	0.952	0.907	0.864	0.823	0.784	0.746
Time adjust benefits (Adjusted to Present Value):	0	171429	172336	172768	172768	172376	171630
Cumulative time-adjusted benefits over lifetime:	0	171429	343764	516532	689299	861675	1033305
Cumulative lifetime time-adjusted costs + benefits:	-528370	-376560	-224778	-73543	76668	225412	372284

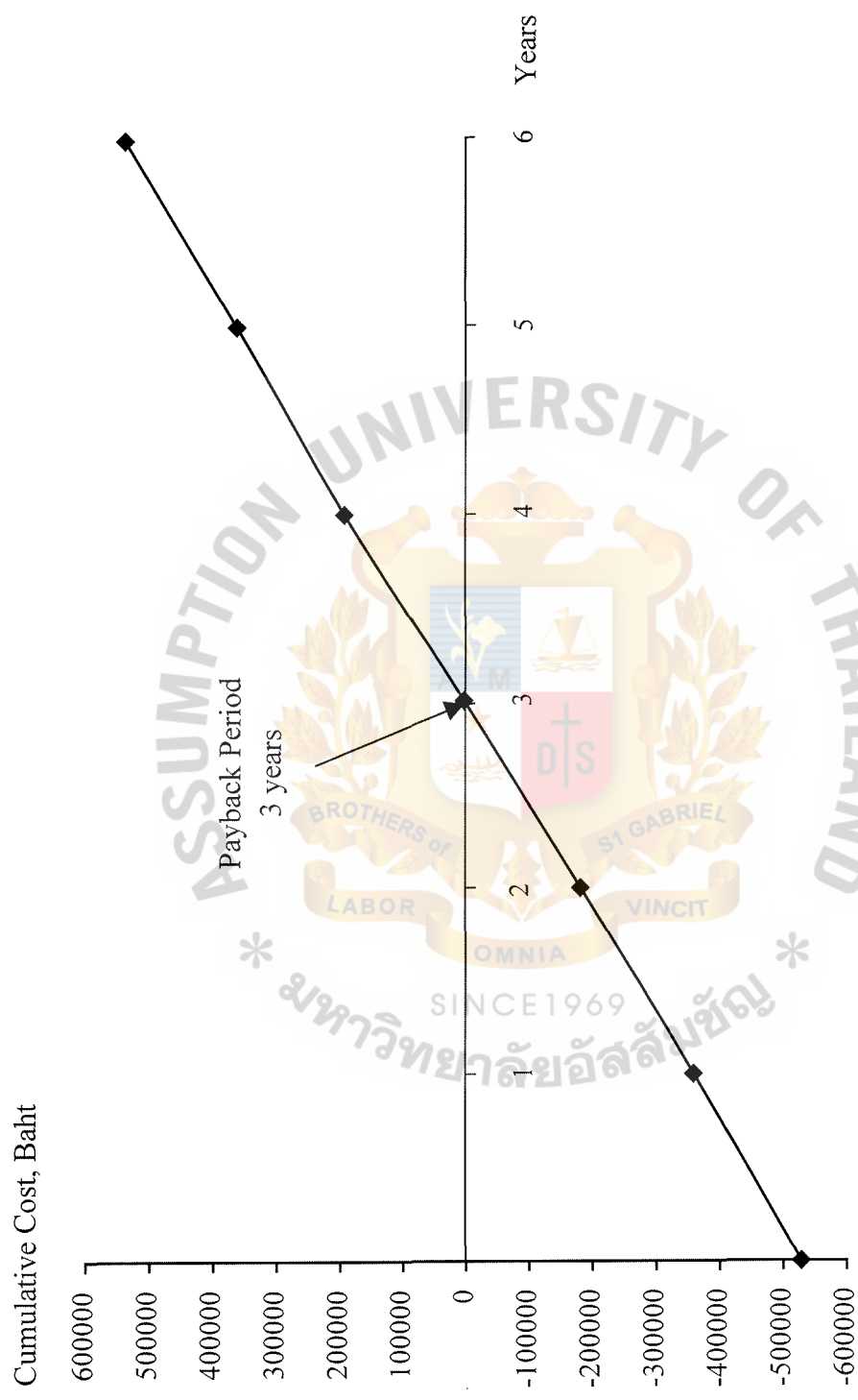


Figure 3.21. Payback Analysis Chart for Alternative 1.

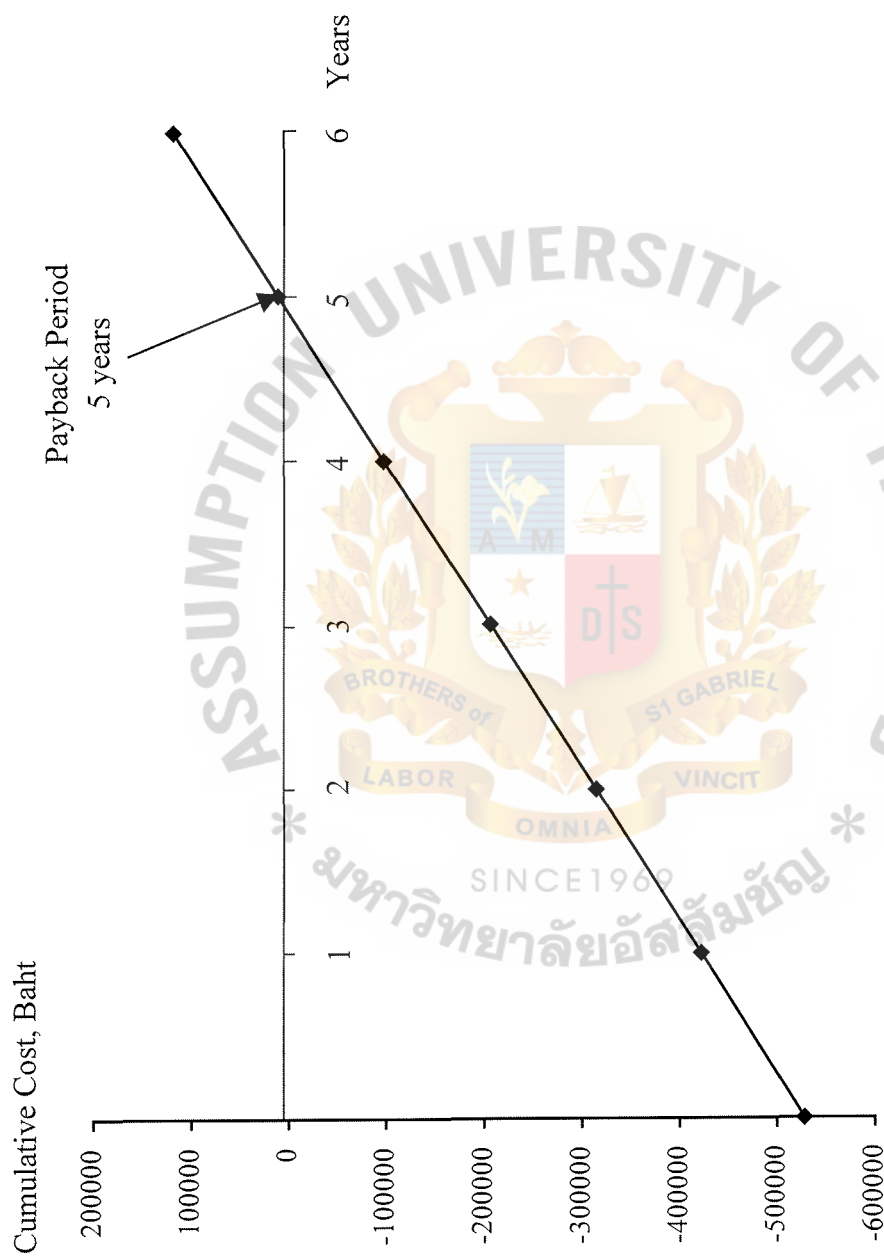


Figure 3.22. Payback Analysis Chart for Alternative 2.

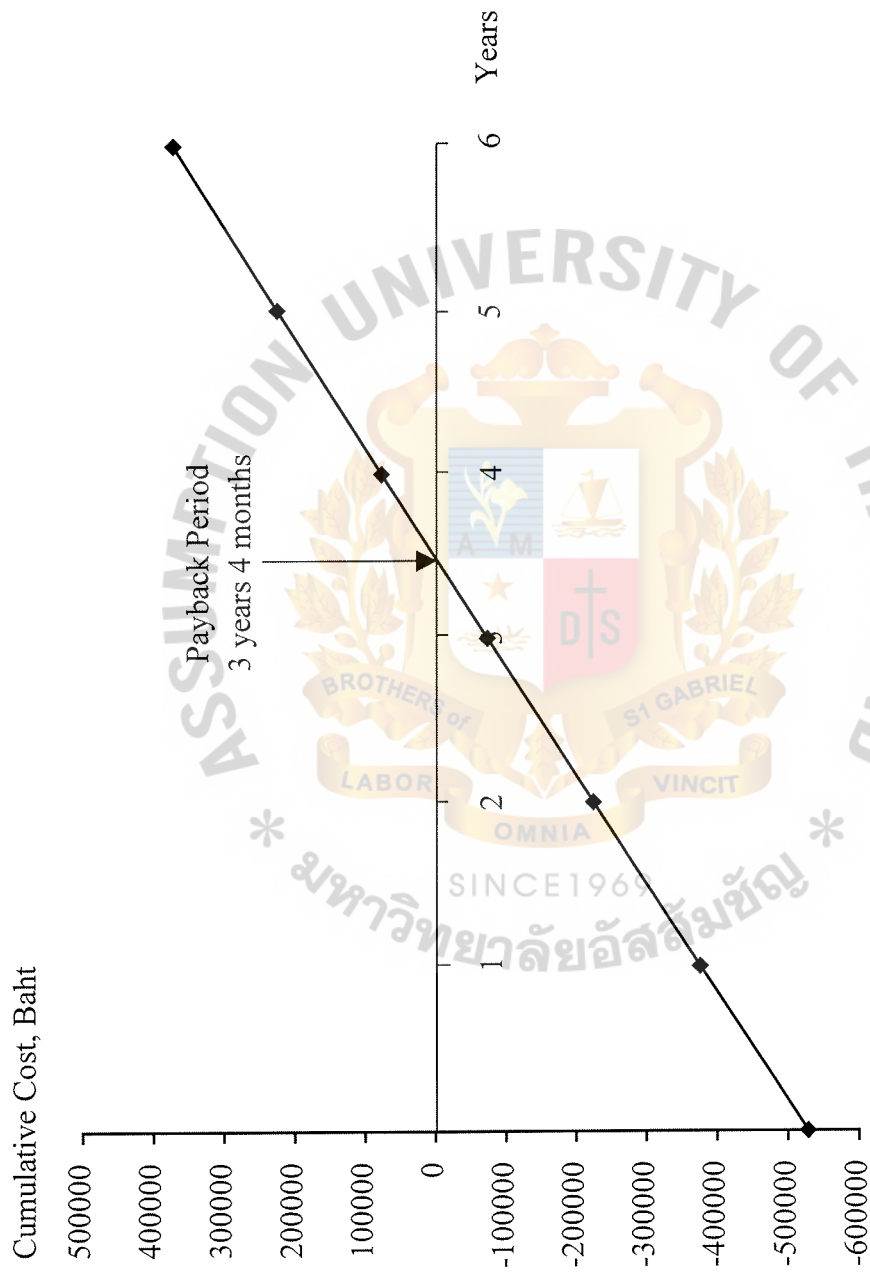


Figure 3.23. Payback Analysis Chart for Alternative 3.

3.5.2 Cost

The proposed system costs bases on two major cost categories that are one-time costs or development costs, and recurring costs or operational costs.

(1) One-time (development) costs:

They are associated with systems development. For instances, hardware purchase, software purchase, system conversion, etc.

(2) Recurring (operational) costs:

They often rise over time because of factors such as inflation and system deterioration. For instances, hardware and software maintenance, computer supplies, personnel costs, etc.

The cost of the proposed system can be described according to the two categories as below:

One-time Costs

(1) Hardware:

Server	85,000 Baht
Workstation (37,000 x 7 units)	276,500 Baht
Laser Printer	25,500 Baht
Dot Matrix Printer	22,000 Baht
Ink Jet Printer	9,500 Baht
Scanner	8,900 Baht
Network Accessories	45,000 Baht
Modem	10,000 Baht
UPS for server	20,000 Baht
UPS for clients (2,000 x 7 units)	14,000 Baht
Total Hardware Cost	523,900 Baht

(2) Software:

Microsoft Windows NT	30,000 Baht
Microsoft Office 98	20,000 Baht
Photoshop 5.5 (for server)	30,000 Baht
Norton AntiVirus	10,000 Baht
Total Software Cost	90,000 Baht

(3) Implementation:

User Training	12,000 Baht
Installation and Startup	7,000 Baht
Software Development	100,000 Baht
Site Preparation	30,000 Baht
Total Implementation Cost	149,000 Baht
Total One-time Costs	762,900 Baht

Operational Costs

A4 Paper	3,060 Baht
Continuous Paper	1,000 Baht
Hardware Maintenance	5,000 Baht
Software Maintenance	5,000 Baht
3 ½" Diskette	2,200 Baht
Computer Supplies	4,000 Baht
Utility	30,000 Baht
Miscellaneous	2,000 Baht
Total Annual Operating Costs	52,260 Baht

The cost of manual system is shown and analyzed following the expected system life year in the Table 3.7. Table 3.8 shows the Accumulated Manual System Cost.

The cost of computerized system is shown and analyzed following the expected system life year in Table 3.9. Table 3.10 shows the Accumulated Computerized System Cost.

Table 3.11 shows the Comparison of the Existing System cost and the Computerized System.



Table 3.7. Manual System Cost Analysis, Baht.

Cost Items	Years				
	1	2	3	4	5
One-time Costs					
Type Writer (2 x 5,700)/5	2,080.00	2,080.00	2,080.00	2,080.00	2,080.00
Calculator (7 x 1,800)/5	2,520.00	2,520.00	2,520.00	2,520.00	2,520.00
Total One-time Costs	4,600.00	4,600.00	4,600.00	4,600.00	4,600.00
Operational Costs					
Salary Cost:					
Managing Director (1 x 50,000)	50,000.00	52,500.00	55,125.00	57,881.25	60,775.31
General Manager (1 x 40,000)	40,000.00	42,000.00	44,100.00	46,305.00	48,620.25
Accounting Manager (1 x 35,000)	35,000.00	36,750.00	38,587.50	40,516.88	42,542.72
Sales Officer (5 x 10,000)	50,000.00	52,500.00	55,125.00	57,881.25	60,775.31
Purchasing Officer (2 x 10,000)	20,000.00	21,000.00	22,050.00	23,152.50	24,310.13
Total Montly Salary Cost	195,000.00	204,750.00	214,987.50	225,736.88	237,023.72
Total Annual Salary Cost	2,340,000.00	2,457,000.00	2,579,850.00	2,708,842.50	2,844,284.63
Office Supplies Cost:					
A4 Paper	7,140.00	7,854.00	8,639.40	9,503.34	10,453.67
Cabon Copy	360.00	396.00	435.60	479.16	527.08
Stationary	4,000.00	4,400.00	4,840.00	5,324.00	5,856.40
Printed Form	3,600.00	3,960.00	4,356.00	4,791.60	5,270.76
Miscellaneous	3,000.00	3,300.00	3,630.00	3,993.00	4,392.30
Total Annual Office Supplies	18,100.00	19,910.00	21,901.00	24,091.10	26,500.21
Utility Cost:					
Electricity	5,000.00	5,500.00	6,050.00	6,655.00	7,320.50
Telephone	7,000.00	7,700.00	8,470.00	9,317.00	10,248.70
Total Annual Utility Cost	12,000.00	13,200.00	14,520.00	15,972.00	17,569.20
Total Operational Cost	2,370,100.00	2,490,110.00	2,616,271.00	2,748,905.60	2,888,354.04
Total Manual System Cost	2,374,700.00	2,494,710.00	2,620,871.00	2,753,505.60	2,892,954.04

Table 3.8. Five Years Accumulated Manual System Cost, Baht.

Year	Total Manual Cost	Accumulated Cost
1	2,393,100.00	2,393,100.00
2	2,490,110.00	4,883,210.00
3	2,616,271.00	7,499,481.00
4	2,748,905.60	10,248,386.60
5	2,888,354.04	13,136,740.64
Total	13,136,740.64	-



Table 3.9. Computerized System Cost Analysis, Baht.

Cost Items	Years				
	1	2	3	4	5
<u>One-time Costs</u>					
<u>Hardware Cost:</u>					
Server	17,000.00	17,000.00	17,000.00	17,000.00	17,000.00
Workstation (7 units x 39500)/5	55,300.00	55,300.00	55,300.00	55,300.00	55,300.00
Laser Printer	5,100.00	5,100.00	5,100.00	5,100.00	5,100.00
Dot Matrix Printer	4,400.00	4,400.00	4,400.00	4,400.00	4,400.00
Ink Jet Printer	3,400.00	3,400.00	3,400.00	3,400.00	3,400.00
Scanner	1,780.00	1,780.00	1,780.00	1,780.00	1,780.00
Network Accessories	9,000.00	9,000.00	9,000.00	9,000.00	9,000.00
Modem	2,000.00	2,000.00	2,000.00	2,000.00	2,000.00
UPS for server	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00
UPS for clients (7 units x 2000)/5	2,800.00	2,800.00	2,800.00	2,800.00	2,800.00
Total Hardware Cost	104,780.00	104,780.00	104,780.00	104,780.00	104,780.00

Table 3.9. Computerized System Cost Analysis, Baht (Continued).

Cost Items	Years				
	1	2	3	4	5
Total Hardware Cost	104,780.00	104,780.00	104,780.00	104,780.00	104,780.00
<u>Software Cost:</u>					
Microsoft Windows NT	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00
Microsoft Office 98	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00
Photoshop 5.5	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00
Norton AntiVirus	2,000.00	2,000.00	2,000.00	2,000.00	2,000.00
Total Software Cost	18,000.00	18,000.00	18,000.00	18,000.00	18,000.00
<u>Implementation Cost:</u>					
User Training	2,400.00	2,400.00	2,400.00	2,400.00	2,400.00
Installation and Startup	1,400.00	1,400.00	1,400.00	1,400.00	1,400.00
Software Development	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00
Site Preparation	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00
Total Implementation Cost	29,800.00	29,800.00	29,800.00	29,800.00	29,800.00
Total One-time Costs	152,580.00	152,580.00	152,580.00	152,580.00	152,580.00

Table 3.9. Computerized System Cost Analysis, Baht (Continued).

Cost Items	Years				
	1	2	3	4	5
<u>Operational Costs</u>					
<u>People-Ware Cost:</u>					
Managing Director 1 person x 50,000	50,000.00	52,500.00	55,125.00	57,881.25	60,775.31
General Manager 1 person x 40,000	40,000.00	42,000.00	44,100.00	46,305.00	48,620.25
Accounting Manager 1 person x 35,000	35,000.00	36,750.00	38,587.50	40,516.88	42,542.72
Sales Officer 2 persons x 10,000	20,000.00	21,000.00	22,050.00	23,152.50	24,310.13
Purchasing Officer 1 person x 10,000	10,000.00	10,500.00	11,025.00	11,576.25	12,155.06
Total Monthly Salary Cost	155,000.00	162,750.00	170,887.50	179,431.88	188,403.47
Total Annual Salary Cost	1,860,000.00	1,953,000.00	2,050,650.00	2,153,182.50	2,260,841.63

Table 3.9. Computerized System Cost Analysis, Baht (Continued).

Cost Items	Years				
	1	2	3	4	5
Total One-time Costs	105,674.00	105,674.00	105,674.00	105,674.00	105,674.00
Total Annual Salary Cost	1,896,000.00	1,990,800.00	2,090,340.00	2,194,857.00	2,304,599.85
<u>Office Supplies Cost:</u>					
A4 Paper	3,060.00	3,366.00	3,702.60	4,072.86	4,480.15
Continuous Paper	1,000.00	1,100.00	1,210.00	1,331.00	1,464.10
Hardware Maintenance	5,000.00	5,500.00	6,050.00	6,655.00	7,320.50
Software Maintenance	5,000.00	5,500.00	6,050.00	6,655.00	7,320.50
3 1/2" Diskette	2,200.00	2,420.00	2,662.00	2,928.20	3,221.02
Computer Supplies	4,000.00	4,400.00	4,840.00	5,324.00	5,856.40
Miscellaneous	2,000.00	2,200.00	2,420.00	2,662.00	2,928.20
Total Annual Office Supplies Cost	22,260.00	24,486.00	26,934.60	29,628.06	32,590.87
<u>Utility Cost:</u>					
Electricity	20,000.00	22,000.00	24,200.00	26,620.00	29,282.00
Telephone	10,000.00	11,000.00	12,100.00	13,310.00	14,641.00
Total Annual Utility Cost	30,000.00	33,000.00	36,300.00	39,930.00	43,923.00
Total Annual Operational Cost	1,912,260.00	2,010,486.00	2,113,884.60	2,222,740.56	2,337,355.49
Total Computerized System Cost	2,064,840.00	2,163,066.00	2,266,464.60	2,375,320.56	2,489,935.49

Table 3.10. Five Years Accumulated Computerized System Cost, Baht.

Year	Total Computerized Cost	Accumulated Cost
1	2,675,160.00	2,675,160.00
2	2,010,486.00	4,685,646.00
3	2,113,884.60	6,799,530.60
4	2,222,740.56	9,022,271.16
5	2,337,355.49	11,359,626.65
Total	11,359,626.65	-

Table 3.11. The Comparison of the Existing System Cost and the Computerized System Cost, Baht.

Year	Total Accumulated Manual Cost	Total Accumulated Computerized Cost
1	2,393,100.00	2,675,160.00
2	4,883,210.00	4,685,646.00
3	7,499,481.00	6,799,530.60
4	10,248,386.60	9,022,271.16
5	13,136,740.64	11,359,626.65

Break-even Analysis

It is possible to apply the concept of break-even analysis to compare between the existing system and the proposed system. The break-even analysis in this area, we will be comparing the cost of an existing system to the cost of computerized system in order to determine the point at which the new systems cost intersects the current system cost.

Figure 3.24 shows Break-even analysis. The breakeven point is the exact point in time (5 years) that separates investment and return periods.

Benefits

In this section, we will find the benefits after the proposed system is implemented. The value of benefits has been specified in Tables 3.4-3.6, Payback Analysis for Client-Server System. The benefit can be measured in two difference approaches:

(1) Tangible benefit

- Reduce personal cost
- Fewer processing errors
- Eliminate job steps
- Increase sales
- Reduce paper work and document cost
- Reduce response time to customer's inquiry

(2) Intangible benefit

- Increase job satisfaction
- Improve operations
- Increase customer satisfaction
- Collect more accurate information
- Collect more timely information
- Improve decision making

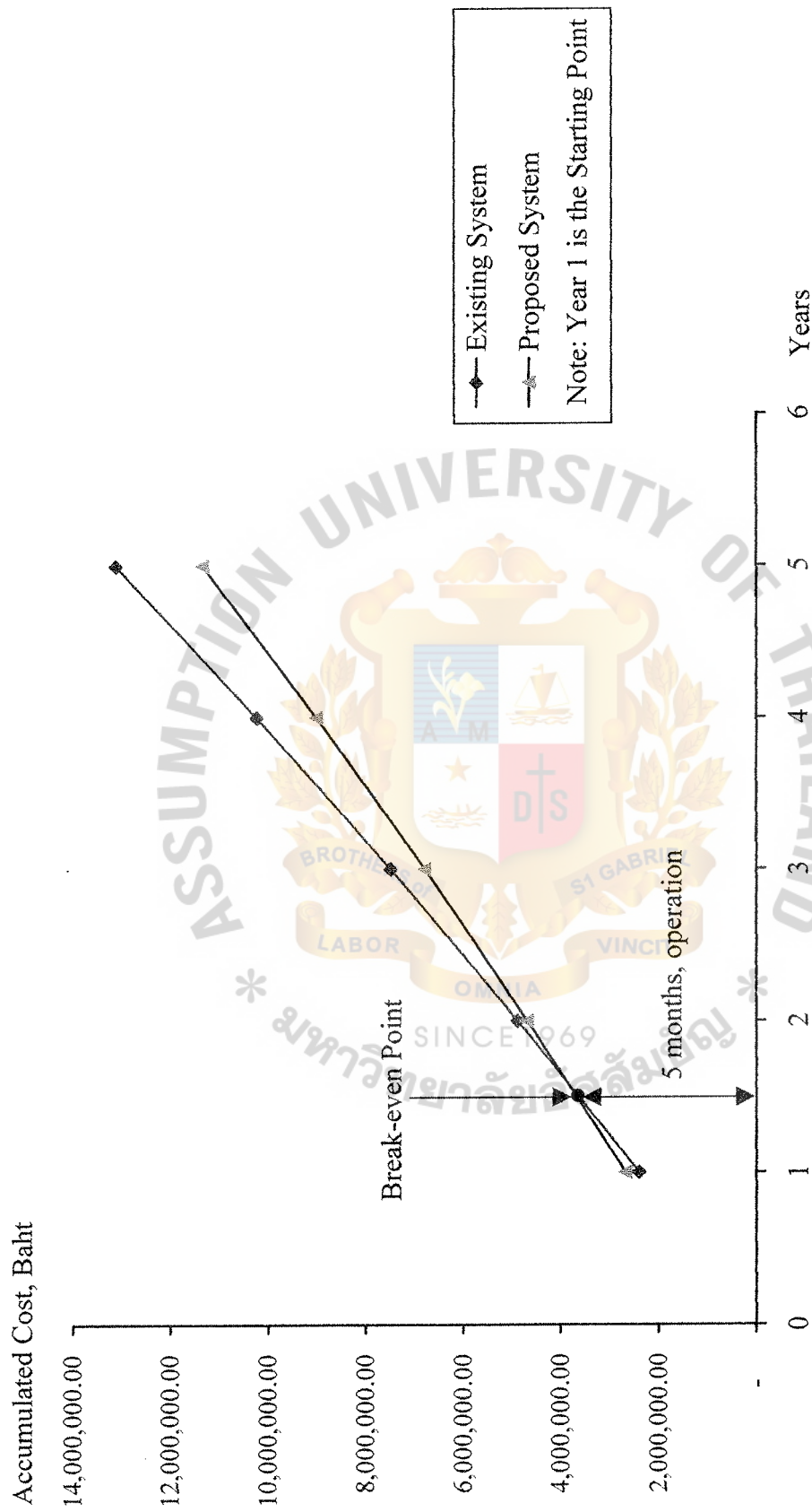


Figure 3.24. Break-even Point between Existing System and Proposed System.

IV. PROJECT IMPLEMENTATION

4.1 Overview of Project Implementation

Once our needs and goals are established, it is time to implement a solution. The most important issue facing a process improvement effort is the implementation of the proposed system. It should keep management and end-users focused on the correct priorities to drive the implementation effort to a successful completion.

Up to this stem, the analysis team has finished the design in all system outputs and inputs as well as the database design. The implementation schedule begins with setting up the developer team the code the program by following the guideline of module specification.

The prototype used in this phrase is subject to demonstrations and feedback from the system users. It begins with the first module, which requests the hardware service, and end up with the last module, which analyze the data. While the team is developing the prototype, the analysts and users often play a less visible role. The analyst serves as a general contractor for work done by technical specialists. System users' responsibilities are usually limited to reacting to the functional system's ease of learning and ease of use.

Once the developer team finished coding the whole system, the analysis team and the users will join together to test the overall system. The test plan and results will be mentioned in the next section.

After be thoroughly tested and free from any error, the system will be prepared for the system conversion. The computer staff and the technical analyst will closely work together in order to install necessary software and initial a new database on the server. Then, the application software on every client PC is installed.

One of the most important elements for implementation is user training. The user will be aware of how to operate the proposed system. They will be trained by using the on-the-job training methods because there is not enough people to operate the system. Moreover, training about technical issues should be organized because the users need to support of the whole system. The technical analyst will guide him how to monitor and manage the hardware, operating software and database management. This activity requires communication skills to the successful completion of the project.

Developing documentation must be produced to aid the system users such as user manual, process specification, sort codes of the program, etc. The user will be able to consult them while facing problems about the system after training ended.

Periodically, the computer staff requires to backing up all the data on the database server. This is to prevent the lost of data damage or any unexpected events. And if necessary, the computer staff should keep in touch with software and hardware vendors for support.

The original application software must be kept in safe place and taken care by the system administrator. However, it should be duplicated more than one copy. In case of emergency, the computer staff can re-copy from the original version.

4.2 Test Plan

Development team and all users must conduct test plan to ensure whether the proposed system produces the right results. Test data must be carefully prepared, results reviewed, and corrections made in the system. Testing for this project will consist of three types of activities as follows:

- (1) Unit Testing tests each program separately in the system to ensure that it works properly. However, it really impossibly guarantees that the programs are error free. Testing should be viewed instead as a means of locating

errors in programs, focusing on finding all the ways to make a program fail. Once pinpointed, problems can be corrected.

- (2) System Testing tests the functioning of the new system as a whole. It tries to determine whether the distinct modules will perform together. Among the areas examined are performance time, capacity for file storage, and handling peak loads, recovery and restart capabilities, and manual procedures.
- (3) Acceptance Test provides the final guarantee that the system is ready to be used in a production setting. Systems tests are evaluated by users and reviewed by management. When they are satisfied that the proposed system meets their standards, the system is formally accepted for installation.

In the testing process, we consider that users play a critical role because they understand every single data and processing conditions that may occur in their system. The programmers learn only of the conditions treated in their programs; test data they think out are too limited. Therefore, input from users will help ensure that the range of conditions included in the test data is complete.

4.3 Conversion

Conversion is the process of changing from the old system to the new system. Conversion plan must be determined to provide a schedule of all the activities required installing the new system. Conversion plan can solve the most time-consuming problem in terms of excessive overtime work, avoid disrupting the day-to-day business activities. Data from the old system must also be transferred to the new system. The converted data must be carefully verified for accuracy and completeness.

Although there are many conversion strategies to be used, this proposed system will be installed by parallel strategy. This approach works best when a computer system replaces a manual one because we can compare the outputs between the manual and the

St. Gabriel Library, Au

new system. This method provides the most security one. The process could be accomplished if errors occur with the new system. Though we have performed a test and trained the staffs to ensure that there was no problem with the new system, it does not guarantee that the errors may not occur in this situation.

Both systems are run simultaneously for about 3 days, and the reliability of the results is examined. If the same results are obviously gained, the new system is put into use, and the operation of existing system is discontinued.



V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The Sales Information System is designed for sales department of Wine Gallery Co., Ltd. As the existing system is inefficient, and the major problems are inaccurate, unshared and no link information among several department. Besides, it sometimes leads to the delay response, because of insufficient information and load of paper work. Therefore, the proposed system has hopefully solved the mentioned problems and is expected to provide other advantages, for examples faster response to customers' and management's inquiry, reduce work load of sales staff, better making decision for management, increase customer's satisfaction, gain company's image, etc. However, the problems occurred by the existing system need two months to four months to be solved after the proposed system has been implemented.

This system mostly gives several intangible benefits than the tangible benefits in terms of money. The intangible benefits cannot be measured in terms of money but can be evaluated by the user. The user can realize the weak point and improve them by the accurate way for better results. This way of work is the most idea by management team of the company.

The users must go through a learning process in which they have to learn how to operate it efficiently. At the same time, the system must be accepted by not only the routine user who operates daily but also by the management team who relies on the system's information for decision making. Documents must be developed to aid system users by the system development team.

The proposed system must be tested by unit test, system test and acceptance test before being installed to ensure that it will be free of any error in the programs. Then, the system is conversed by using parallel strategy, which provides the most security.

5.2 Recommendations

The proposed system stores data of sales department in the Sales Information System database which is able to share to other involved departments such as inventory systems, and accounting systems. In the future, if the company's business has good progress, the company may set new departments such as customer service department, marketing department, etc. The Sales Information System will also be able to be linked to the other new departments in the future. Sharing information will reduce more time for operation and transferring the data through the database systems. Moreover, the proposed system can connect to the Internet. It offers the company to contact the customers and the suppliers via Internet. Also, the customers can place the order and search information from the company's website.

Information is the essential asset for the company. Therefore, the system users must be very careful in entering input data for accurate output. If the input data is keyed in the database mistakenly, it will decrease the efficiency and effectiveness of the proposed system. Moreover, all data must be saved periodically to be the back-up data. In case, there is an unexpected event occurs, the system will have back-up data to be installed.

The users have their own significant password in order to access the system. The authorized users can access not only to view and print out the report. The system administrator has his/her own password separately. Besides the activities that end-user can operate the system, the system administrator can also log into the completed the

system file to solve problems of some basic programs. The end-users and the system administrator must change their own password periodically.

The system administrator should monitor the end-users' activities toward the system whether they can lead to any harm for the system. He/she should set the policy for the users. It describes the regulations and the practices of the system and the programs that the users have to follow.

Table 5.1 shows the time spent on each process of the proposed system compared with the existing system. It shows that each process of the proposed system spends less time than each process of the existing one which has to pass many manual work steps.

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

Process	Existing System	Proposed System
Maintain Customer Process	10 mins.	2 mins.
Response to Customer's Inquiry Process	15 mins.	3 mins.
Verify Order Process	10 mins.	3 mins.
Verify Return Order Process	20 mins.	4 mins.
Prepare Delivery Process	15 mins.	3 mins.
Produce Report Process	1 hour	15 mins.
Total	2 hrs.10 mins.	30 mins.

Maintain Customer Process: For the existing system, the data entry officer has to search and check the former customer data kept in the documents manually for 5 minutes, then correct the records carefully for 5 minutes. In the proposed system, she needs only to check the customer record stored in the database. The system searches the record rapidly. Then, the officer can change or input the new data into the system right

away and, after that, save the data. The data is updated automatically. It consumes totally 2 minutes.

Response to Customer's Inquiry Process: For the existing system, the sales officer has to consult or search information concerning the customer's inquiry in many documents. If the customer's inquiry is about wine which is not sold by our company. We need longer time to find the information in many wine books to answer the customer's query. The customer has to wait for a few minutes and his dissatisfaction occurs. In the proposed system, there are wine profiles and other information concerning each customer in the database which sales officer can retrieve immediately. It helps the officer can response the customer's question promptly.

Verify Order Process: For manual system, the sales officer have to check whether products that customer wants are available in our stock by calling to warehouse department. She also has to check whether the customer's account is over credit limit or not by calling to accounting department. If the products needed are unavailable, the officer has to call the customer back to inform. There are many steps for this process. For the computerized system, as soon as the sales officer receives an order from the customer, she can check the stock as well as the customer's credit limit status by her computer rapidly. It is because there is data sharing between the involved departments.

Verify Return Order Process: When a customer wants to return the product due to a particular reason, for the existing system, sales officer has to check the history of the customer's purchase in the sales order forms manually. As soon as she finds the required sales order, she needs to verify whether the products in the sales order had been returned to the company or not as well as needs to check the price of the products. It is very complicated activity. If the mistake happens, the company may loss revenue. The proposed system reduces time and steps of complicated activities by searching the date

and sales order number of the products that the customer wants to return in the computer. The system will search the sales record within a few minutes. It also offers us accurate information.

Prepare Delivery Process: In the existing system, sales officer must check the correctness of the content in the invoice and sales order. Then, she fills in the picking slip manually before sending the copy to the warehouse for product delivery. If there is some mistakes in sales order or in invoice or in picking slip, the sales officer needs to spend times in order to find the document to correct or issue the new one. The proposed system helps her to produce or correct the mistake within a few minutes. The document also looks clean and tidy.

Produce Report Process: The existing system cannot produce report automatically, but this has to be done manually by looking in the past document. The proposed system can generate the report in many formats automatically from the database periodically.

This can be explained as that the proposed system is more efficient and effective than the existing system.



APPENDIX A
SCREEN DESIGN

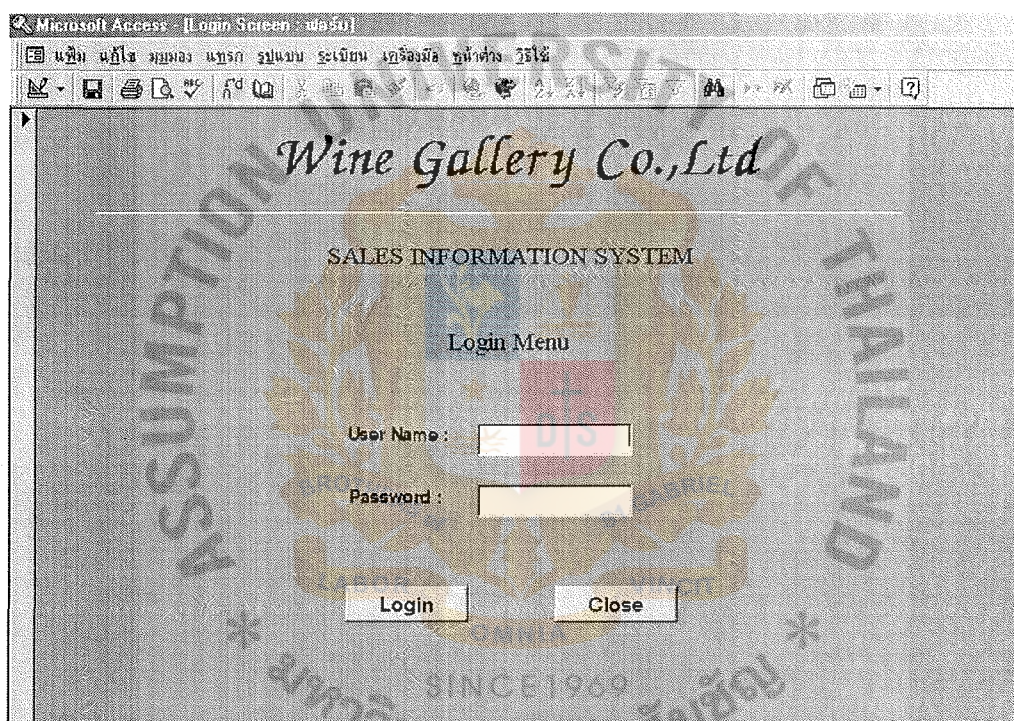


Figure A.1. Screen Display of First Screen of Sales Information System.

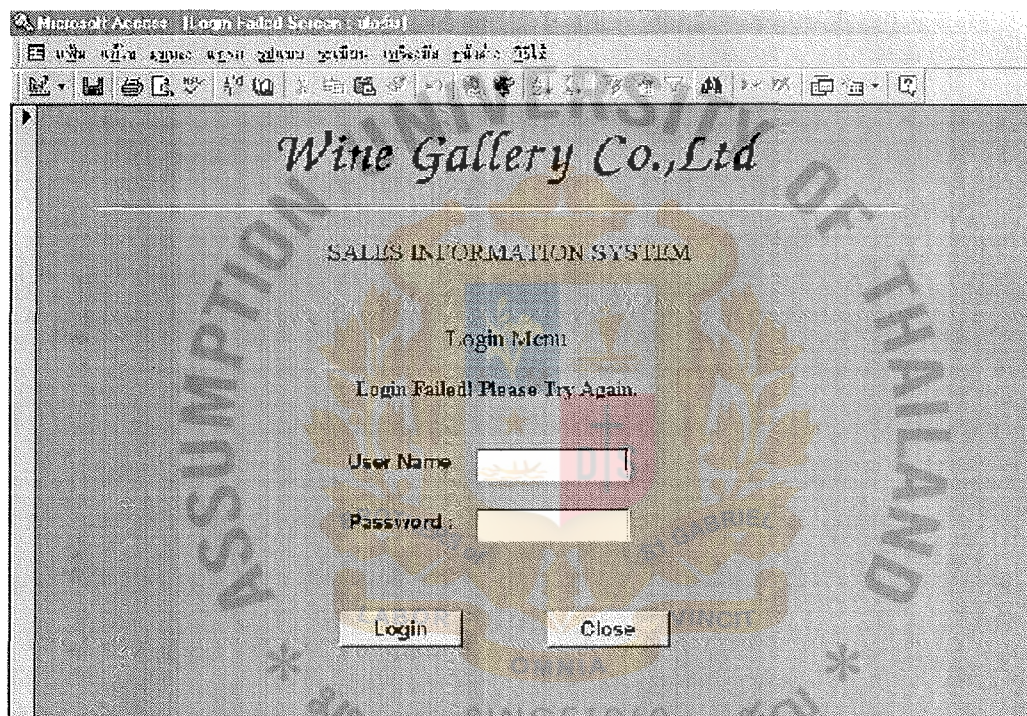


Figure A.2. Screen Display of Login Failed Screen.

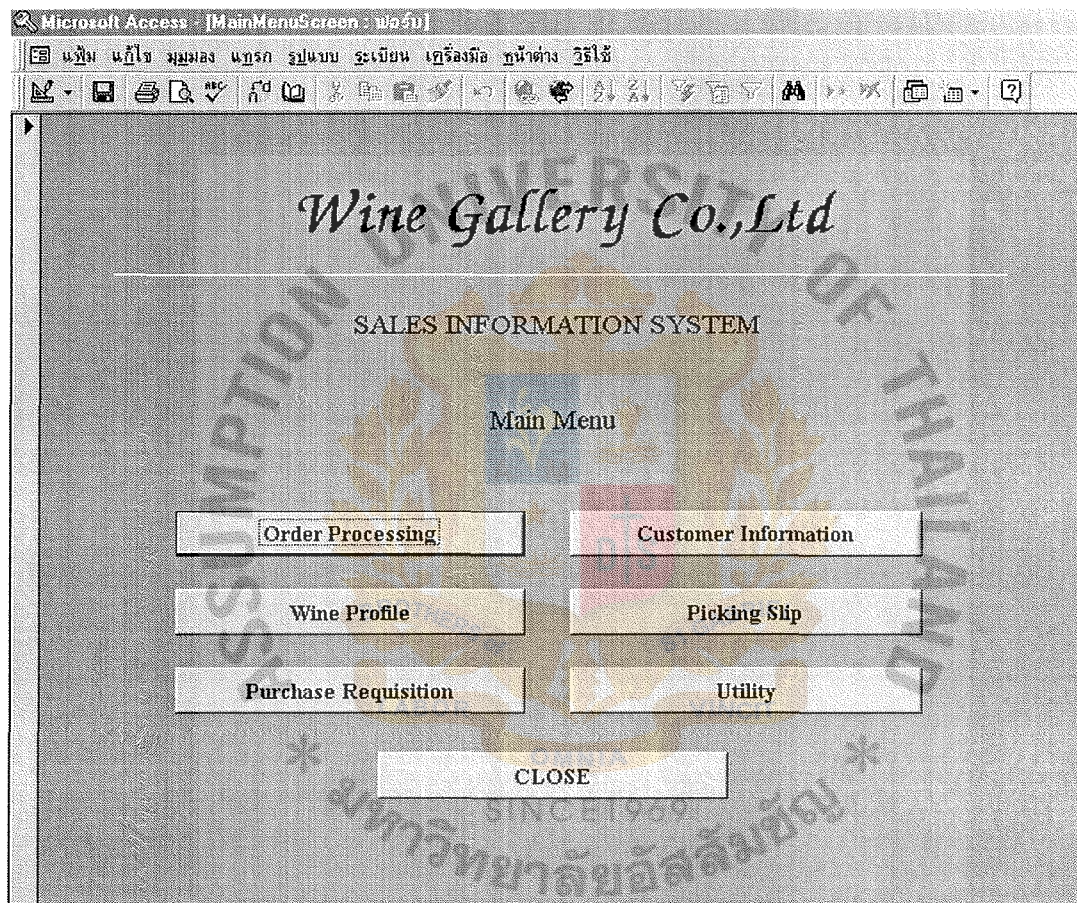


Figure A.3. Screen Display of Main Menu of Sales Information System.



Figure A.4. Screen Display Design for Order Processing Main Menu.

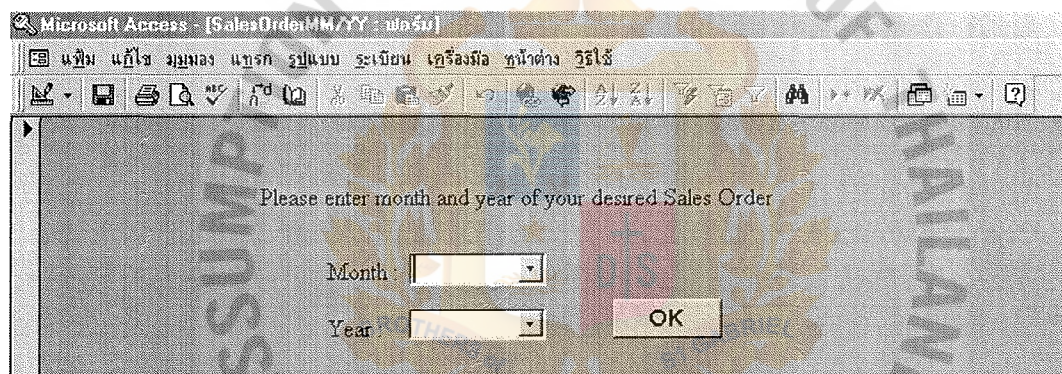


Figure A.5. Screen Display for First Screen of Sales Order.

Microsoft Access - [Sales Order List : ฟอร์ม]

เพิ่ม แก้ไข มายอง แทรก รูปแบบ ระบาย เครื่องมือ หน้าต่าง ฐานข้อมูล

SALES INFORMATION SYSTEM

Order Processing

Sales Order List

05/2001

SalesOrderList.rubform1

Sales Order #	Date	Customer	Amount
SO0544/0001	2 May 2001	บ. กรองสีครุส จำกัด	36,428.36
SO0544/0002	2 May 2001	BANGKOK FINE WINE CO.,LTD.	563,548.32
SO0544/0003	2 May 2001	VIPAVADEE AVENUE CO.,LTD.	63,859.32
SO0544/0004	2 May 2001	บ. แกรมมี เอ็นเตอร์เทนเมนท์ จำกัด (มหาชน)	2,563.44
SO0544/0005	2 May 2001	การปิโตรเลียมแห่งประเทศไทย	6,584.00
SO0544/0006	2 May 2001	บ. ชินวัตรใหม่ไทย จำกัด	4,683.12
SO0544/0007	2 May 2001	บ. สารพาร์ค จำกัด	54,965.00
SO0544/0008	2 May 2001	บ. เพลีนจิต เรียดเอสเตท จำกัด	23,695.22
SO0544/0009	2 May 2001	INTERNATIONAL FRENCH FOOD CO.,LTD.	25,974.52
SO0544/0010	2 May 2001	บงค. จัดการกองทุนรวม จำกัด	8,545.37
SO0544/0011	2 May 2001	บ. กัดตาตารแกรนด์เซียงการีล่า จำกัด	9,658.11
SO0544/0012	2 May 2001	บ. สารพัดดี จำกัด	8,742.51
SO0544/0013	3 May 2001	บ. โทโมโรได จำกัด	15,243.88
SO0544/0014	3 May 2001	บ. จัสทไวน์ (1996) จำกัด	258,744.69

ระเบียบ: 14/1/1 1 > < > * จาก 20

New Edit Delete CLOSE

Figure A.6. Screen Display for the List of Sales Order in May 2001.

Microsoft Access [SalesOrderEntry - 000000]

Sales Order Entry

Sales Order No. : Date :

Customer No. : Contact Name :

Customer Name / Address : Ship to :

Purchase Order Number : Term of Payment : Due Date : Sales Person :

Customer Order Information -> Form

Item	Product #	Description	Quantity	Unit Price	Discount %	Amount (Baht)
1			0	0	0	0
2			0	0	0	0
3			0	0	0	0
4			0	0	0	0
5			0	0	0	0
6			0	0	0	0
7			0	0	0	0
8			0	0	0	0
9			0	0	0	0
10			0	0	0	0

Order Total Amount Information

Credit Limit : Order Amount : Total :

Discounts : V.A.T. : Gross Total :

Remarks :

Previous Retrieve

Save As Pending Order Close

Print Save/Next

Figure A.7. Screen Display for Sales Order Entry.



Figure A.8. Screen Display for First Screen of Return Order.

Microsoft Access - [Return Order List : ฟอร์ม]

เพิ่ม แก้ไข มุมมอง แทรก รูปแบบ ระเบียบงาน เครื่องมือ หน้าต่าง วิเคราะห์

SALES INFORMATION SYSTEM

Order Processing

Return Order List

05/2001

Return Order subform1

Return #	Date	Sales Order #	Customer	Amount
RE0544/0001	1 May 2001	SO0144/0025	INTERNATIONAL FRENCH FOOD CO.,LTD.	1,260.00
RE0544/0002	10 May 2001	SO0244/0013	บ. สารรพารต์ จำกัด	1,539.00
RE0544/0003	19 May 2001	SO0244/0014	บ. สารรพารต์ จำกัด	1,360.50
RE0544/0004	19 May 2001	SO0244/0014	บ. สารรพารต์ จำกัด	235.36
				0.00

ระเบียบงาน: 1 5 จาก 5

New Edit Delete CLOSE

Figure A.9. Screen Display Design for The List of Return Order in May 2001.

Microsoft Access - [Return Order Entry : ๗๕๕๗]

Return Order Entry

SALES INFORMATION SYSTEM

Return Order Entry

Return Order No. : Date :

Sales Order No. : Sales Person :

Customer No. : Customer Name :

Address :

Return Order Information

Item	Product #	Description	QTY	Unit Price	Disc %	Total
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Remarks :

Order Total Amount Information

Credit Limit : Order Amount : Total :

Discounts : V.A.T. : Gross Total :

Previous Retrieve Print Save/Next Close

Figure A.10. Screen Display Design for Return-Order Entry.



Figure A.11. Screen Display Design for Sales Report Menu.

Microsoft Access - [Sales Report By Customer - ปรัง]

เมนูใหม่ แก้ไข มุมมอง แทรก รูปแบบ ระเบียบ เครื่องมือ หน้าต่าง วิดีโอ

SALES INFORMATION SYSTEM

Sales Report by Customer

Customer Name : Any Press Ctrl + Click for selecting more than one alternatives

ธนาคารกรุงเทพ จำกัด (มหาชน)

ธนาคารกรุงไทย

Period of time to be printed

From : dd/mm/yyyy 01/01/2000

To : dd/mm/yyyy 31/05/2001

Process Cancel

Figure A.12. Screen Display Design for Query of Sales Report by Customer.

Microsoft Access - [Sales Report by Salesperson - มอ.รณ]

เพิ่ม แก้ไข มุมมอง แทรก รูปแบบ ระเบียบ เครื่องมือ หน้าต่าง ฐานข้อมูล

SALES INFORMATION SYSTEM

Sales Report by Salesperson

Salesperson : Any Any

F0001 Patcharee M.

F—1 Patcharee M.

Press Ctrl + Click for selecting more than one alternatives

Period of time to be printed

From : dd/mm/yyyy 01/01/2001

To : dd/mm/yyyy 31/07/2001

Process Cancel

Figure A.13. Screen Display Design for Query of Sales Report by Salesperson.

Microsoft Access - [Sales Report By Commission : มอว.]

เมนู แอปพลิเคชัน มุมมอง แทรก รูปแบบ ระเบียบแถว เครื่องมือ หน้าตามาตรฐาน วิจัยใช้

SALES INFORMATION SYSTEM

Sales Report by Commission

Salesperson : Any Any

F0001 Patcharee M.

F—1 Patcharee M.

Press Ctrl + Click for selecting more than one alternatives

Period of time to be printed

From : dd/mm/yyyy

To : dd/mm/yyyy

Process Cancel

Figure A.14. Screen Display Design for Query of Sales Report by Commission.

Microsoft Access - [Sales Report by Products - ฟอรัม]

เมนู หน้าแรก มุมมอง แปรภพ รูปแบบ ระเบียบงาน เครื่องมือ หน้าต่าง วิสัทัศน์

SALES INFORMATION SYSTEM

Sales Report by Products

Product : FR000101185 Ch. Cos d' Estoune1 1985
FR000101195 Ch. Cos d' Estoune1 1995
FR000202182 Ch. Mouton Rothschild 1982

Press Ctrl + Click for selecting more than one alternatives

Period of time to be printed

From : dd/mm/yyyy

To : dd/mm/yyyy

Process Cancel

Figure A.15. Screen Display Design for Query of Sales Report by Product.

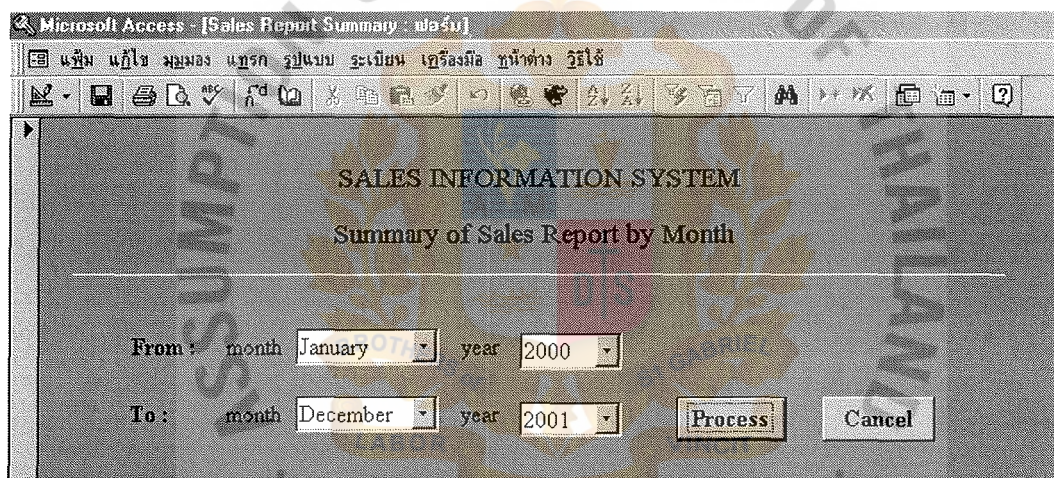


Figure A.16. Screen Display Design for Query of Summary of Sales Report by Month.

Microsoft Access - [Return Order Report - ฟอร์ม]

แฟ้ม แก้ไข มุมมอง แกรก รูปแบบ ระเบียบ เครื่องมือ หน้าต่าง วิจัย

SALES INFORMATION SYSTEM

Returned Product Report

Customer Name :

Any
ขนาดรถสูงเทพ จำกัด (มหาชน)
ขนาดรถสูงไทย

Product :

FR000101185 Ch. Cos d'Estoune1 1985
FR000101195 Ch. Cos d'Estoune1 1995
FR000202182 Ch. Mouton Rothschild 1982

Press Ctrl + Click for selecting more than one alternatives

Press Ctrl + Click for selecting more than one alternatives

Period of time to be printed

From : dd/mm/yyyy 01/05/2001

To : dd/mm/yyyy 31/05/2001

Process Cancel

Figure A.17. Screen Display Design for Query of Returned Order Report.

Microsoft Access - [Inventory Status Report : ผลิต]

เพิ่ม แก้ไข มุมมอง แปรปรู รูปแบบ ความเป็น เครื่องมือ หน้าต่าง วัตถุ

SALES INFORMATION SYSTEM

Inventory Status Report

Product : FR000101186 Ch. Cos d' Estoune1 1986
FR000101195 Ch. Cos d' Estoune1 1995
FR000202182 Ch. Mouton Rothschild 1982

Press Ctrl + Click for selecting more than one alternatives

Period of time to be printed

From : dd/mm/yyyy 01/01/1999

To : dd/mm/yyyy 31/05/2001

Process Cancel

Figure A.18. Screen Display Design for Query of Inventory Status Report.

Microsoft Access - [Outstanding Debtors Report - ฟอร์ม]

แฟ้ม แก้ไข ขยายมอง แทรก รูปแบบ ระเบียบ เครื่องมือ หน้าต่าง วัตถุใช้

SALES INFORMATION SYSTEM

Outstanding Debtors Report

Customer Name :

Any
ธนาคารกรุงเทพ จำกัด (มหาชน)
ธนาคารกรุงไทย

Press Ctrl + Click for selecting more than one alternatives

Salesperson :

Any Any
F0001 Patcharee M.
F—1 Patcharee M.

Press Ctrl + Click for selecting more than one alternatives

Period of time to be printed

From : dd/mm/yyyy 01/05/2001

To : dd/mm/yyyy 31/05/2001

Process Cancel

Figure A.19. Screen Display Design for Query of Outstanding Debtors Report.

Microsoft Access - [Customer List - ฟิล์ม]

ปุ่ม แก้ไข มุมมอง แทรก รูปแบบ ระบุเงื่อนไข เครื่องมือ หน้าต่าง วิดีโอ

SALES INFORMATION SYSTEM
Customer Information

Customer List

Customer Information ribbon

Customer #	Customer Name	Address	Telephone	Fax
1BB0001	ธนาคารกรุงเทพ จำกัด (มหาชน)	25th Floor, 333 Silom Road, Bangkok	6857851-5	6857700
1BK0001	ธนาคารกรุงไทย	35 Sukhumvit Road, Klong Toey Nu	255-2222	255-939
1CA0001	บ. ชันดาวินมาเค็ดติ้ง จำกัด	25 ถ.พัฒนาการ สวนหลวง กทม.	321-1423	231-144
1CA0002	บ. อะโรเมติก จำกัด	555 พหลโยธิน กทม.	501-7458	
1CA0003	บ. แอนเดอร์เซ็น คอนสัลติ้ง จำกัด	อาคารอับดุลรอฮิมเพลส ถ.พระราม4	636-1616	
1CD0001	บ. ดีทเอสส์ จำกัด	1696 ถ.เพชรบุรีตัดใหม่ กทม.	254-4900-12	253-556
1CJ0001	บ. เจริญพัฒนานาบรรจภัณฑ์ จำกัด	31/2 หมู่1 ถ.พระรามที่2 ถ.สมเด็จพระนาง	451-5880-2	51-5883
1CL0001	บ. ล็อกซเลย์ อินฟอร์เมชั่น เซอร์วิส จำกัด	304 ถ.เสือป่า แขวงป้อมปราบ เขตป้อม	622-5678	622-567
1CN0001	บ. นำแสงจักรวาล จำกัด	33/25 ถ.เพชรเกษม นนทบุรี	809-7020	809-703
1CT0001	บ. พีซีพี อินดัสทรี จำกัด	502/5 ถ.ประชาอุทิศ69 เขตทุ่งครุ กทม.	426-1567-70	426-157
1CTH0001	บ. ไทยฟิวเจอร์ส จำกัด	175 สีลมใต้ กทม.	679-6050-68	679-604
1RF0001	บ. ฟิชเชอร์แมน ซิปส์ เรสเสิร์ช จำกัด	ชั้น1 เกลียวท่า 999 ถ.เพลินจิต ปทุม	656-1013-4	656-101
1RI0001	INTERNATIONAL FRENCH FOOD CO.	14 SUKHUMVIT SOI8, SUKHUMVIT	258-5678	258-566
1RN0001	บ. นีลส์ เทเวรีน จำกัด	58/4 ซ.ร่วมฤดี วิทยุ กทม.	256-6874-6	650-974

* ระบุเงื่อนไข: 14 1 14 จาก 14

New Edit Delete CLOSE

Figure A.20. Screen Display Design for Customer List.

Microsoft Access - [Customer Info Entry : ฟอร์ม]

เมนู: แก้ไข, มุมมอง, แถวกร, รูปแบบ, ควบคุม, เครื่องมือ, ข้ามต่าง, วัตถุ

SALES INFORMATION SYSTEM

Customer Information Entry

Customer No. : Type : Agent

General Information :

Customer Name : Beginning Date :

Address

Tel. :

Fax :

Contact Person :

Status Information :

Credit Limit (Baht)

Credit Term (Day)

Discount %

Sales Person

Previous

Print

Close

Save/Next

Figure A.21. Screen Display Design for Customer Information Entry.

Microsoft Access - [Customer Report Query - ฟอร์ม]

SALES INFORMATION SYSTEM

Customer Report Query

Customer : 00000 Any

1BB0001 ธนาคารกรุงเทพ จำกัด (มหาชน)

1BK0001 ธนาคารกรุงไทย

Sales Person : Any

Product Name : Any

Ch. Cos d'Estoune 1986

Ch. Cos d'Estoune 1995

Press Ctrl + Click for selecting more than one alternatives

Show customer address : ☒ Yes ☐ No

Show credit limit : ☒ Yes ☐ No

Show outstanding payment : ☒ Yes ☐ No

Show outstanding invoice : ☒ Yes ☐ No

OK / List

Close

Figure A.22. Screen Display Design for Customer Report Query.

Microsoft Access - [Wine_Profile_List : ฟอร์ม]

เมนู แก้ไข มุมมอง ตาราง รูปแบบ ระเบียบงาน เครื่องมือ หน้าต่าง วิดีโอ

SALES INFORMATION SYSTEM

Wine Profile

Wine Profile List

Wine_Profile.rdbform

PROFILE #	WINE NAME	RETAIL PRICE	PRIVATE PRICE	QTY IN STOCK
ESTRC8200004	Ch. Calon Segur 1982	6000	6500	0
ESTRC8500001	Ch. Cos d' Estournel 1985	8000	8500	5
ESTRC89H00002	Ch Cos d' Estournel 1989 Half	2000	2100	16
ESTRC9500003	Ch. Cos d' Estournel 1995	3800	4000	12
ESTRC9500005	Ch. Calon Segur 1995			0
ESTRF9600011	Ch. Frank Phelan 1996	1200	1300	512
ESTRL9400006	Ch. Lafon Rochet 1994	2300	2400	30
ESTRL9600007	Ch. Lafon Rochet 1996	2500	2600	24
ESTRM9000008	Ch. Montrose 1990			0
ESTRM9500009	Ch. Montrose 1995	5200	5600	10
ESTRP9600010	Ch. Phelan Segur 1996	2400	2600	120
PAURL5500001	Ch. Latour 1955	26500	28400	3
PAURL7000002	Ch. Latour 1970	29700	31700	10
PAURL8200003	Ch. Latour 1982	28000	30000	80

ระเบียบ: 14 4 5 17

New Edit Delete CLOSE

Figure A.23. Screen Display for Wine Profile List.

Microsoft Access - [Wine Profile Entry : พร้อม]

หน้าแรก ข้อมูล ฟอร์ม ฐานข้อมูล เครื่องมือ หน้าต่าง วิดีโอ

SALES INFORMATION SYSTEM

Wine Profile Entry

Profile No. : Date : Last Update. :

General Information :

Producer Name : Country of Origin :

Wine Name : Domaine / State :

Grape Variety : Vol. of Acl. (%) :

Type :


Characteristic Information :

Characteristic :

Wine Taste :

Food :

Picture : [\[Click to Attach Picture \]](#)



Rating : points

Private Price : Baht

Retail Price : Baht

Previous Print Save/Next Close

Figure A.24. Screen Display for Wine Profile Entry.



Figure A.25. Screen Display Design for Picking Slip Menu.

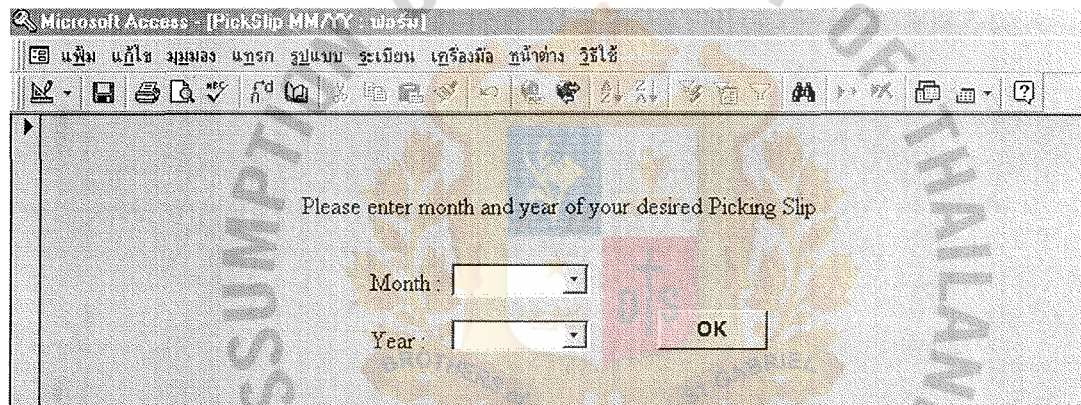


Figure A.26. Screen Display for First Screen of Picking Slip.

Microsoft Access - [Pick_Slip_List : ฟอร์ม]

เพิ่ม แก้ไข มุมมอง แทรก รูปแบบ ระเบียบ เครื่องมือ หน้าต่าง วิจัย

SALES INFORMATION SYSTEM

Picking Slip

Picking Slip List

05/2001

PickSlipList:Form

Picking #	Sales Order #	Delivery Date	Customer	Pla
PC0544/0001	SO0544/0013	1 May 2001	บ. ชานอติ จำกัด	SAME
PC0544/0002	SO0544/0006	1 May 1958	บ. เค.พี.ซี อินเตอร์เนชั่นแนล จำกัด	คอนโด มาดาม ซี
PS0544/0003	SO0544/0020	1 May 2001	บ. แกรมี่ อินเตอร์เทนเมนท์ จำกัด (มหาชน)	โรงแรม แกรมี่ไฮ
PS0544/0004	SO0444/0109	1 May 2001	INTERNATIONAL FRENCH FOOD CO.,LTD.	เลอบันยัน สุทธิวิท
PS0544/0005	SO0544/0025	1 May 2001	บ. สราพัฒน์ จำกัด	ห้องอาหารยามี่บัว
PS0544/0006	SO0544/0026	1 May 2001	คุณมณฑิรา นาจะหมื่น	เวก้าคาเฟ่
PS0544/0007	SO0544/0027	1 May 2001	บ. ไทย เอ็ม-ซี จำกัด	บ้านพักพานประส
PS0544/0008	SO0544/0006	1 May 2001	บ. เค.พี.ซี อินเตอร์เนชั่นแนล จำกัด	คอนโด มาดาม ซี
PS0544/0009	SO0444/0021	2 May 2001	บ. เกรพบริษัทรักษ์ กับ จำกัด	บามีเก้น สีสม
PS0544/0010	SO0444/0022	2 May 2001	พจก. ดีโฮล์ดไวน์	โรงแรมกรุงศรี ริเว
PS0544/0011	SO0544/0036	2 May 2001	บ. ภาพมรดก เอฟเอเนตบี อินเตอร์โพล จำกัด	เออเบก ดับ

ระเบียบ: 1 จาก 14

[New] [Edit] [Delete] [CLOSE]

Figure A.27. Screen Display for Picking Slip List in May 2001.

Microsoft Access - [Picking Slip Entry : ใหม่]

SALES INFORMATION SYSTEM

Picking Slip Entry

Picking Slip No. : Ship Date :

Customer No. : Arrival Time : A.M. P.M.

Customer Name / Address : Ship to :

Contact Name :

Picking Slip Information

Item	To be Shipped	Ordered	Sales Order #	Invoice #	Product
1					
2					
3					
4					
5					
6					
7					
8					
9					

ระเบียน: 14 1 1 1 จาก 15

Previous Retrieve Save/Next Print Close

Figure A.28. Screen Display for Picking Slip Entry.

Microsoft Access - [Picking Slip Report : ฟอร์ม]

เมนูใหม่ แก้ไข มุมมอง แปรปรู รูปแบบ ระเบียบแถว เครื่องมือ ฐานข้อมูล วิดีโอ

SALES INFORMATION SYSTEM

Picking Slip

Picking Slip Report

Customer Name : Any
 ธนาคารกรุงเทพ จำกัด (มหาชน)
 ธนาคารกรุงไทย

Product : FR000101185 Ch. Cos d'Estounef 1985
 FR000101195 Ch. Cos d'Estounef 1985
 FR000202182 Ch. Mouton Rothschild 1982

Press Ctrl + Click for selecting more than one alternatives

Press Ctrl + Click for selecting more than one alternatives

Period of time to be printed

From : dd/mm/yyyy 01/01/2001

To : dd/mm/yyyy 31/05/2001

Process Cancel

Figure A.29. Screen Display Design for Query of Picking Slip Report.

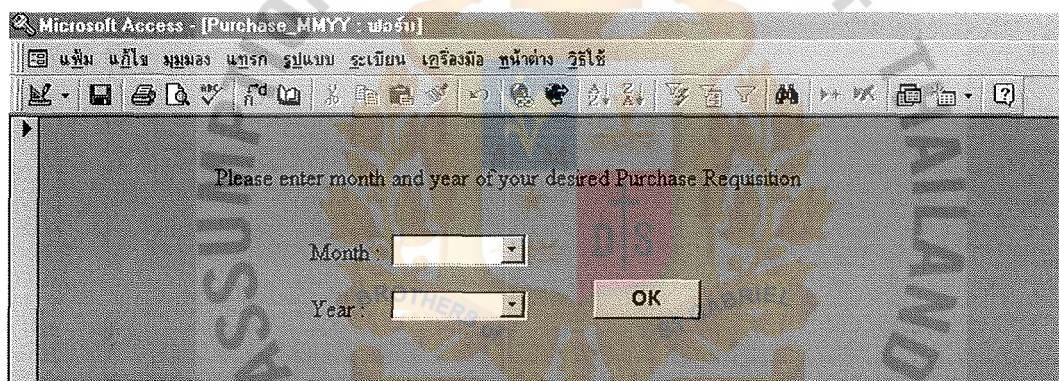


Figure A.30. Screen Display for First Screen of Purchase Requisition.

Microsoft Access - [Purchase_List : ฟอร์ม]

เพิ่ม แก้ไข มุมมอง แทรก รูปแบบ ระเบียบ เครื่องมือ ค้นหา ใช้

SALES INFORMATION SYSTEM

Purchase Requisition

Purchase Requisition List

05/2001

Purchase_Request_List.rptform

Request #	Date	Product	Amount of Unit
PR0544/0001	1 May 2001	Screw Pull	24
PR0544/0002	3 May 2001	Ch. Frank Phelan 1996	120
PR0544/0003	12 May 2001	Ch. Cheval Blanc 1982	60
PR0544/0004	19 May 2001	Ch. Michel de Montane 1998	1200
PR0544/0005	23 May 2001	M-G Cab-Sau. 2000	2400

ระเบียบ: 14 6 จาก 6

New Edit Delete CLOSE

Figure A.31. Screen Display for Purchase Requisition List of May 2001.

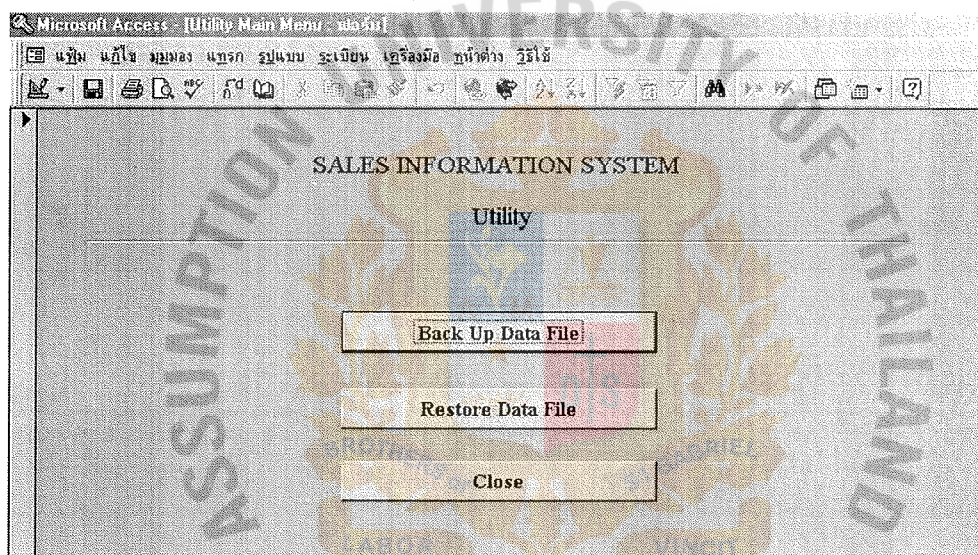


Figure A.32. Screen Display Design for Main Menu of Utility.

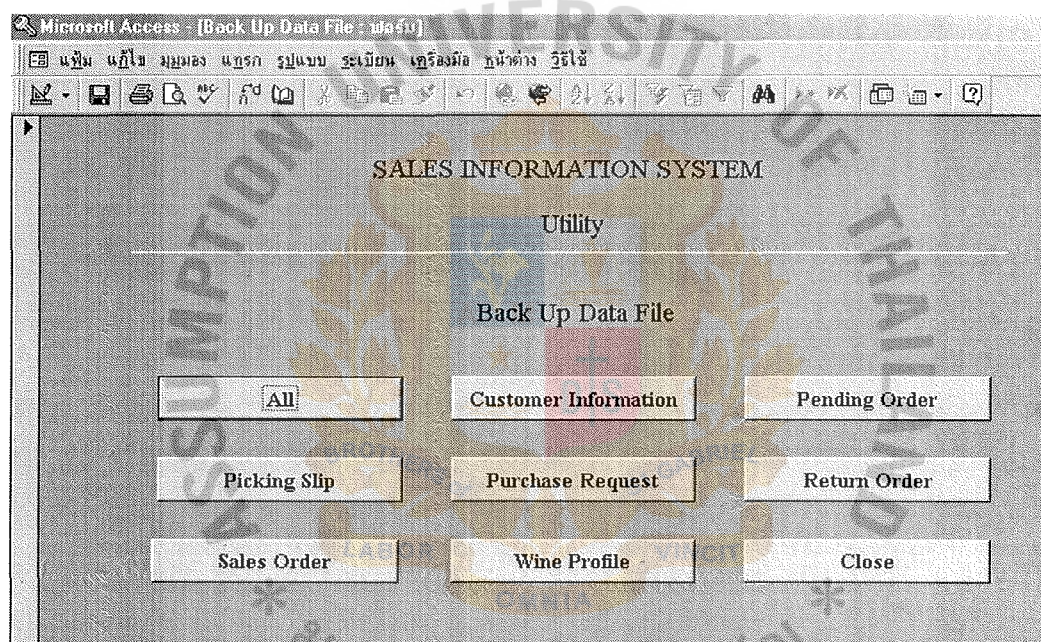


Figure A.33. Screen Display Design for Back Up Data File.

Microsoft Access - [Back Up Query : ๗๐๕๖]

แฟ้ม แก้ไข มุมมอง แทรก รูปแบบ เครื่องมือ หน้าต่าง ช่วยเหลือ

SALES INFORMATION SYSTEM

Utility

Back Up Data File

Enter source drive of data back up : A:

Time range of data to be saved :

From : month January year 2001

To : month May year 2001

OK Cancel

Figure A.34. Screen Display Design for Back Up Data File Query.

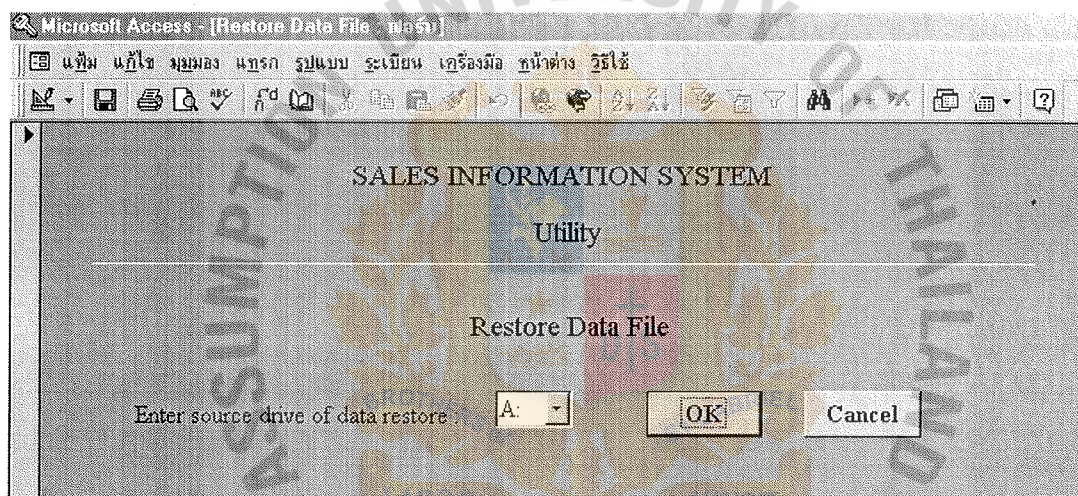


Figure A.35. Screen Display Design for Restore Data.

Microsoft Access - [Credit Limit Permission : ฟอร์ม]

เพิ่ม แก้ไข มุมมอง แปรปรู รูปแบบ กระบวนกร เครื่องมือ หน้าต่าง ช่วยเหลือ

SALES INFORMATION SYSTEM

Credit Limit Permission

Customer No. :

Beginning Date :

Customer Name :

Type :

Contact Person :

Sales Person :

Current Credit Limit : Baht

Requested Credit Limit : Baht

Credit Term day(s)

Discount %

Reasons :

Retrieve New

Close Print

Figure A.36. Screen Display Design for Customer's New Credit Limit Permission.



APPENDIX B
FORM AND REPORT DESIGN

St. Gabriel Library, Au

WINE GALLERY CO.,LTD.

9/8 Soi Deangudom (Soi 33), Sukhumvit Rd., Klongton-nua, Wattana, Bangkok 10110

Tel : 261 4602, 662 1345-6 Fax : 261 4536

SALES ORDER

Customer No. : _____

Date : _____

Customer Name : _____

Delivery to : _____

Address :

.....

Sold by :

P.O. No. :

Credit :

Contact :

Item	Description	Size	QTY.	Unit Price	Discount	Total
<div style="display: flex; justify-content: space-between;"> <div> <p>Remarks :</p> <p>_____</p> <p>_____</p> </div> <div> <p>Total</p> <p>V.A.T.</p> <p>Total Amount</p> </div> </div>						

Keep to pending order (Y/N) _____

Prepare by :	Approved by :
Date :	Date :

1st copy (White) for Sales Department

3rd copy (Pink) for Warehouse Department

2nd copy (Yellow) for Accounting Department

Figure B.1. Form Design for Sales Order Form.

Sales Report By Customer : Wine Gallery Co.,Ltd.

Tax ID No. : 3181010813

Period from dd/mm/yyyy to dd/mm/yyyy

printed date : dd/mm/yyyy

page : 1 [1]

Customer No.	Customer Name	Sales Order No.	Sales Date	Amount	VAT	Total	% of Sales
xxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxx	xxxxxx	xxxxxxxxxxxx	xxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxx	xxxxxx	xxxxxxxxxxxx	xxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxx	xxxxxx	xxxxxxxxxxxx	xxxxxx
		Total sales by customer				xxxxxxxxxxxx	xx %
xxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxx	xxxxxx	xxxxxxxxxxxx	xxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxx	xxxxxx	xxxxxxxxxxxx	xxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxx	xxxxxx	xxxxxxxxxxxx	xxxxxx
		Total sales by customer				xxxxxxxxxxxx	xx %
xxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxx	xxxxxx	xxxxxxxxxxxx	xxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxx	xxxxxx	xxxxxxxxxxxx	xxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxx	xxxxxx	xxxxxxxxxxxx	xxxxxx
		Total sales by customer				xxxxxxxxxxxx	xx %
		Total Sales				xxxxxxxxxxxx	100%

Figure B.2. Report Design for Sales Report by Customer.

Sales Report By Salesperson : Wine Gallery Co.,Ltd.

Tax ID No. : 3181010813

Period from dd/mm/yyyy to dd/mm/yyyy

printed date : dd/mm/yyyy

page : 1 [1]

Salesperson Code	Salesperson Name	Sales Order No.	Sales Date	Customer Name	Amount Before VAT.	Total After VAT	% of Sales
xxxxxx	xxxxxxxxxxxxxxxxxxxxxxxx	SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxx	xxxxxxxxxxxx	xxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxx	xxxxxxxxxxxx	xxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxx	xxxxxxxxxxxx	xxxxxx
		Total sales by the salesperson				xxxxxxxxxxxx	xx %
xxxxxx	xxxxxxxxxxxxxxxxxxxxxxxx	SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxx	xxxxxxxxxxxx	xxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxx	xxxxxxxxxxxx	xxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxx	xxxxxxxxxxxx	xxxxxx
		Total sales by the salesperson				xxxxxxxxxxxx	xx %
xxxxxx	xxxxxxxxxxxxxxxxxxxxxxxx	SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxx	xxxxxxxxxxxx	xxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxx	xxxxxxxxxxxx	xxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxx	xxxxxxxxxxxx	xxxxxx
		Total sales by the salesperson				xxxxxxxxxxxx	xx %
		Total Sales				xxxxxxxxxxxx	100%

Figure B.4. Report Design for Sales Report by Salesperson.

Sales Report By Salesperson Commission : Wine Gallery Co.,Ltd.

Tax ID No. : 3181010813

Period from dd/mm/yyyy to dd/mm/yyyy

printed date : dd/mm/yyyy

page : 1 [1]

Salesperson Code	Salesperson Name	Sales Order No.	Sales Date	Customer Name	Amount Before VAT.	% of Commission	Total Commission
xxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxx	x.xx %	xxxxxxxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxx	x.xx %	xxxxxxxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxx	x.xx %	xxxxxxxxxxx
		Total sales by commission			xxxxxxxxxxxxx		xxxxxxxxxxx
xxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxx	x.xx %	xxxxxxxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxx	x.xx %	xxxxxxxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxx	x.xx %	xxxxxxxxxxx
		Total sales by commission			xxxxxxxxxxxxx		xxxxxxxxxxx
xxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxx	x.xx %	xxxxxxxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxx	x.xx %	xxxxxxxxxxx
		Total sales by commission			xxxxxxxxxxxxx		xxxxxxxxxxx
		Total Sales			xxxxxxxxxxxxx		xxxxxxxxxxx

Figure B.5. Report Design for Salesperson Commission Earned Report.

Sales Report By Product : Wine Gallery Co.,Ltd.

Tax ID No. : 3181010813

Period from dd/mm/yyyy to dd/mm/yyyy

printed date : dd/mm/yyyy

page : 1 [1]

Product Code	Product Name	Sales Order No.	Sales Date	Sold Unit	Customer Name	Unit Price	Amount Before VAT.	Total After VAT.	% of Sales
xxxxxx	xxxxxxxxxxxxxx	SOxxxx/xxxx	dd/mm/yyyy	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxx	xxxxxxxxxxxx	xxxxxxxxxx	xxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxx	xxxxxxxxxxxx	xxxxxxxxxx	xxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxx	xxxxxxxxxxxx	xxxxxxxxxx	xxxxxx
					Total sales by product			xxxxxxxxxx	xx %
xxxxxx	xxxxxxxxxxxxxx	SOxxxx/xxxx	dd/mm/yyyy	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxx	xxxxxxxxxxxx	xxxxxxxxxx	xxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxx	xxxxxxxxxxxx	xxxxxxxxxx	xxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxx	xxxxxxxxxxxx	xxxxxxxxxx	xxxxxx
					Total sales by product			xxxxxxxxxx	xx %
xxxxxx	xxxxxxxxxxxxxx	SOxxxx/xxxx	dd/mm/yyyy	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxx	xxxxxxxxxxxx	xxxxxxxxxx	xxxxxx
		SOxxxx/xxxx	dd/mm/yyyy	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxx	xxxxxxxxxxxx	xxxxxxxxxx	xxxxxx
					Total sales by product			xxxxxxxxxx	xx %
					Total Sales			xxxxxxxxxx	100%

Figure B.7. Report Design for Sales Report by Product.

Sales Report By Month (summary) : Wine Gallery Co.,Ltd.

Tax ID No. : 3181010813

Period from mm/yyyy to mm/yyyy

page : 1 [1]

printed date : dd/mm/yyyy

Year	Jan.	Feb.	Mar	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total Sales
1996	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx
1997	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx
1998	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx
1999	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx
2000	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx
2001	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx

Figure B.8. Report Design for Sales Report by Month.

St. Gabriel Library, Au

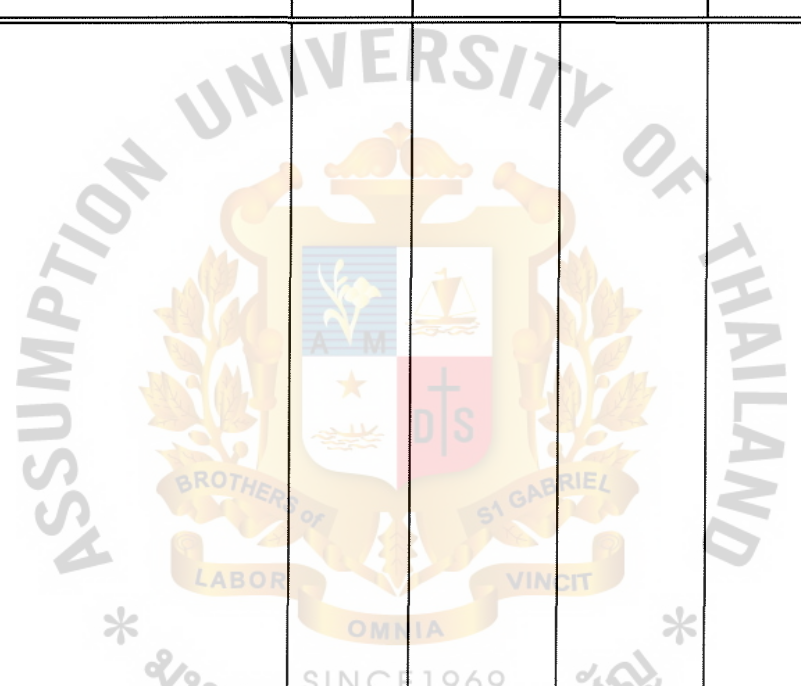
WINE GALLERY CO.,LTD.

9/8 Soi Deangudom (Soi 33), Sukhumvit Rd., Klongton-nua, Wattana, Bangkok 10110

Tel : 261 4602, 662 1345-6 Fax : 261 4536

RETURNED ORDER

Customer No. : _____ Date : _____
 Customer Name : _____ Return Order No. : _____
 _____ Sales Order No. : _____
 _____ Salesperson : _____

Item	Description	QTY.	Unit Price	Discount	Total
					
Remarks : _____					Total
_____					V.A.T.
_____					Total Amount

Prepared By : _____	Approved By : _____
Date : _____	Date : _____

1st copy (White) for Sales Department

2nd copy (Blue) for Accounting Department

Figure B.9. Form Design for Return Order.

Returned Product Report : Wine Gallery Co.,Ltd.

Tax ID No. : 3181010813

Period from dd/mm/yyyy to dd/mm/yyyy

printed date : dd/mm/yyyy

page : 1 [xx]

Returned Order No.	Date	Sales Order No.	Customer Name	Product	QTY	Amount	V.A.T.	Total After VAT.
ROxxxx/xxxx	dd/mm/yyyy	SOxxxx/xxxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xxx	xxxxxxxxxx	xxxx	xxxxxxxx
			xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xxx	xxxxxxxxxx	xxxx	xxxxxxxx
			xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xxx	xxxxxxxxxx	xxxx	xxxxxxxx
			Total Returned Product					xxxxxxxx
ROxxxx/xxxx	dd/mm/yyyy	SOxxxx/xxxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xxx	xxxxxxxxxx	xxxx	xxxxxxxx
			xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xxx	xxxxxxxxxx	xxxx	xxxxxxxx
			xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xxx	xxxxxxxxxx	xxxx	xxxxxxxx
			Total Returned Product					xxxxxxxx
ROxxxx/xxxx	dd/mm/yyyy	SOxxxx/xxxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xxx	xxxxxxxxxx	xxxx	xxxxxxxx
			xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xxx	xxxxxxxxxx	xxxx	xxxxxxxx
			xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xxx	xxxxxxxxxx	xxxx	xxxxxxxx
			Total Returned Product					xxxxxxxx

Figure B.10. Report Design for Returned Product Report.

Tax ID No.: 3181010813

Period from dd/mm/yyyy to dd/mm/yyyy

page: 1 [xx]

printed date : dd/mm/yyyy

[illegible]

Figure B.11. Report Design for Inventory Status Report (summary).

Outstanding Debtors Report : Wine Gallery Co.,Ltd.

Tax ID No. : 3181010813

Period from dd/mm/yyyy to dd/mm/yyyy

printed date : dd/mm/yyyy

page : 1 [xx]

Customer Code	Customer name		Credit Limit		Salesperson	Aging (days)				
	Sales Order No.	Date	Due Date	Amount	Current	0-30	31-60	61-90	Over 90	
XXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXX	XXXXXXXXXX	XXXXXX						
	SOxxxx/xxxxx	dd/mm/yyyy	dd/mm/yyyy	XXXXXXXX.XX	XXXXXXXX.XX		XXXXXXXX.XX			
	SOxxxx/xxxxx	dd/mm/yyyy	dd/mm/yyyy	XXXXXXXX.XX						
	SOxxxx/xxxxx	dd/mm/yyyy	dd/mm/yyyy	XXXXXXXX.XX	XXXXXXXX.XX					
	Total Amount			XXXXXXXX.XX	XXXXXXXX.XX		XXXXXXXX.XX			
XXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXX	XXXXXXXXXX	XXXXXX						
	SOxxxx/xxxxx	dd/mm/yyyy	dd/mm/yyyy	XXXXXXXX.XX					XXXXXXXX.XX	
	SOxxxx/xxxxx	dd/mm/yyyy	dd/mm/yyyy	XXXXXXXX.XX	XXXXXXXX.XX					
	SOxxxx/xxxxx	dd/mm/yyyy	dd/mm/yyyy	XXXXXXXX.XX	XXXXXXXX.XX					
	Total Amount			XXXXXXXX.XX	XXXXXXXX.XX		XXXXXXXX.XX		XXXXXXXX.XX	
XXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXX	XXXXXXXXXX	XXXXXX						
	SOxxxx/xxxxx	dd/mm/yyyy	dd/mm/yyyy	XXXXXXXX.XX						
	SOxxxx/xxxxx	dd/mm/yyyy	dd/mm/yyyy	XXXXXXXX.XX	XXXXXXXX.XX					
	Total Amount			XXXXXXXX.XX	XXXXXXXX.XX		XXXXXXXX.XX			

Figure B.12. Report Design for Outstanding Debtors Report.

WINE GALLERY CO.,LTD.

9/8 Soi Deangudom (Soi 33), Sukhumvit Rd., Klongton-nua, Wattana, Bangkok 10110

Tel : 261 4602, 662 1345-6 Fax : 261 4536

PICKING SLIP

Picking Slip No. : _____

Ship Date : _____

Customer No. : _____

Arrival Time : _____

Customer Name : _____

Delivery to : _____

Address : _____

Contact : _____

Item	QTY. Shipped	QTY. Ordered	Sales Order No.	Invoice No.	Product

Remarks : _____

Prepared By : _____	Approved By : _____
Date : _____	Date : _____

1st copy (White) for Warehouse Department

2nd copy (Blue) for Sales Department

Figure B.13. Form Design for Picking Slip.

Picking Slip Report : Wine Gallery Co.,Ltd.

Tax ID No. : 3181010813

Period from dd/mm/yyyy to dd/mm/yyyy

page : 1 [1]

printed date : dd/mm/yyyy

Picking Slip No.	Shipped Date	Sales Order No.	Sales Order Date	Customer Name	Product	QTY. Shipped	QTY. Ordered	Remaining
PSxxxx/xxxx	dd/mm/yyyy	SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xxxx	xxxx	xxxx
		SOxxxx/xxxx	dd/mm/yyyy		xxxxxxxxxxxxxxxxxxxx	xxxx	xxxx	xxxx
		SOxxxx/xxxx	dd/mm/yyyy		xxxxxxxxxxxxxxxxxxxx	xxxx	xxxx	xxxx
PSxxxx/xxxx	dd/mm/yyyy	SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xxxx	xxxx	xxxx
		SOxxxx/xxxx	dd/mm/yyyy		xxxxxxxxxxxxxxxxxxxx	xxxx	xxxx	xxxx
		SOxxxx/xxxx	dd/mm/yyyy		xxxxxxxxxxxxxxxxxxxx	xxxx	xxxx	xxxx
PSxxxx/xxxx	dd/mm/yyyy	SOxxxx/xxxx	dd/mm/yyyy	xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xxxx	xxxx	xxxx
		SOxxxx/xxxx	dd/mm/yyyy		xxxxxxxxxxxxxxxxxxxx	xxxx	xxxx	xxxx
		SOxxxx/xxxx	dd/mm/yyyy		xxxxxxxxxxxxxxxxxxxx	xxxx	xxxx	xxxx

Figure B.14. Report Design for Picking Slip Report.



APPENDIX C
DATABASE DESIGN

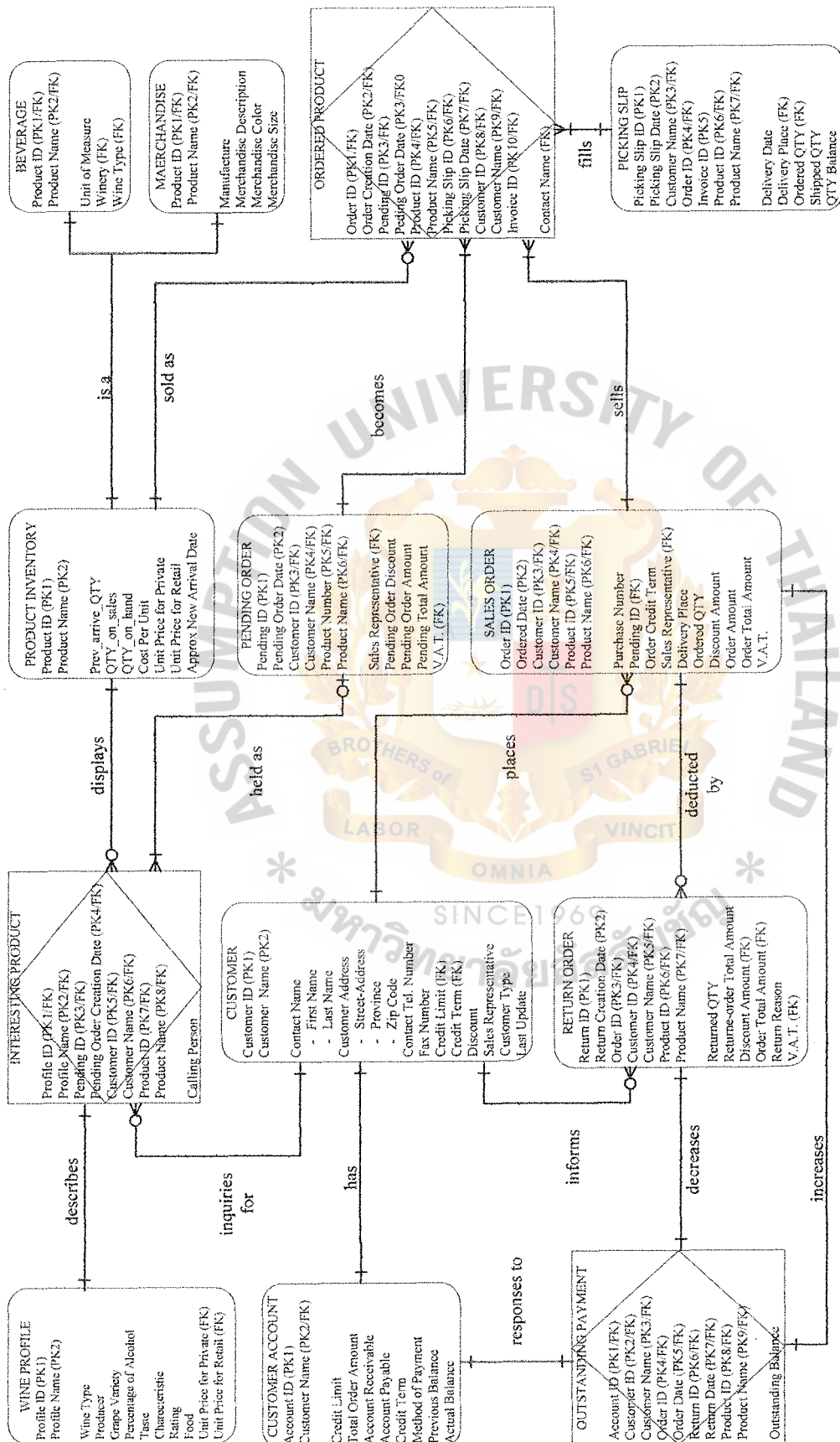


Figure C.1. Fully Attributed Data Model of Sales Information System.

Table C.1. Structure of Customer Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Customer ID	Char(10)	Y	Y				Primary Key
2	Customer Name	Char(50)	Y					Primary Key
3	Contact Name							Attribute
	- First Name	Varchar(20)			Y			
	- Last Name	Varchar(30)			Y			
4	Address							Attribute
	- Street-Address	Varchar(40)						
	- Province	VarChar(30)						
	- Zip Code	Char(5)						
5	Contact Tel.Number	Char(15)			Y			Attribute
6	Fax Number	Char(15)			Y			Attribute
7	Credit Limit	Smallmoney						Attribute
8	Credit Term	Int					from 0 to 120 days	Attribute
9	Discount	Int					from 0 to 50 %	Attribute
10	Sales Representative	Char(40)			Y			Attribute
11	Customer Type	Char(15)						Attribute
12	Last Update	Date					dd/mm/yyyy	Attribute

Table C.2. Structure of Product Inventory Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Product ID	Char(20)	Y	Y				Primary Key
2	Product Name	VarChar(35)	Y	Y				Primary Key
3	Previous_Arrive_QTY	Int						Attribute
4	QTY_on_sales	Int						Attribute
5	QTY_on_hand	Int						Attribute
6	Cost Per Unit	Smallmoney						Attribute
7	Unit Price for Private	Smallmoney						Attribute
8	Unit Price for Retail	Smallmoney						Attribute
9	Approx New Arrival Date	Date			Y		dd/mm/yyyy	Attribute
10	Universal Product Code	Char(15)			Y			Attribute

Table C.3. Structure of Beverage Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Product ID	Char(20)	Y	Y		Product Inventory		Primary Key
2	Product Name	VarChar(35)	Y	Y		Product Inventory		Primary Key
3	Unit of Measure	Char(3)						Attribute
4	Winery	VarChar(35)				Wine Profile		Attribute
5	Wine Type	Char(15)				Wine Profile		Attribute

Table C.4. Structure of Merchandise Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Product ID	Char(20)	Y	Y		Product Inventory		Primary Key
2	Product Name	VarChar(35)	Y	Y		Product Inventory		Primary Key
3	Manufacture	VarChar(30)						Attribute
4	Merchandise Description	Text						Attribute
5	Merchandise Color	Char(15)						Attribute
6	Merchandise Size	Int			Y			Attribute

Table C.5. Structure of Wine Profile Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Profile ID	Char(20)	Y	Y		Product Inventory		Primary Key
2	Profile Name	VarChar(35)	Y	Y		Product Inventory		Primary Key
3	Wine Type	Char(15)						Attribute
4	Winery	VarChar(35)						Attribute
5	Grape Variety	Char(25)						Attribute
6	Percentage of Alcohol	Int					from 10 to 16	Attribute
7	Taste	Text						Attribute
8	Characteristic	Text						Attribute
9	Rating	Int			Y		from 0 to 100	Attribute
10	Food	Text			Y			Attribute
11	Unit Price for Private	Smallmoney			Y	Product Inventory		Attribute
12	Unit Price for Retail	Smallmoney			Y	Product Inventory		Attribute

Table C.6. Structure of Customer Account Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Account ID	Char(20)	Y	Y				Primary Key
2	Customer Name	VarChar(50)	Y	Y		Customer		Primary Key
3	Credit Limit	Smallmoney					>0	Attribute
4	Total Order Amount	Smallmoney					>0	Attribute
5	Account Receivable	Smallmoney						Attribute
6	Account Payable	Smallmoney						Attribute
7	Credit Term	Int					from 0 to 120 days	Attribute
8	Method of Payment	Char(10)						Attribute
9	Previous Balance	Smallmoney						Attribute
10	Actual Balance	Smallmoney						Attribute

Table C.7. Structure of Return OrderTable.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Return ID	Char(11)	Y	Y				Primary Key
2	Return Creation Date	Date	Y				dd/mm/yyyy	Primary Key
3	Order ID	Char(11)	Y			Sales Order		Primary Key
4	Customer ID	Char(10)	Y			Customer		Primary Key
5	Customer Name	Char(50)	Y			Customer		Primary Key
6	Product ID	Char(20)	Y			Product Inventory		Primary Key
7	Product Name	VarChar(35)	Y			Product Inventory		Primary Key
8	Returned QTY	Int					<= Ordered QTY	Attribute
9	Return-order Total Amount	Smallmoney					<= Ordered Total Amount	Attribute
10	Discount Amount	Smallmoney						Attribute
11	Return Reason	Char						Attribute
12	V.A.T.	Smallmoney						Attribute

Table C.8. Structure of Pending Order Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Pending ID	Char(11)	Y	Y				Primary Key
2	Pending Order Date	Date	Y				dd/mm/yyyy	Primary Key
3	Customer ID	Char(10)	Y			Customer		Primary Key
4	Customer Name	Char(10)	Y			Customer		Primary Key
5	Product Number	Char(50)	Y			Product Inventory		Primary Key
6	Product Name	Char(20)	Y			Product Inventory		Primary Key
7	Sales Representative	VarChar(35)	Y			Customer		Attribute
8	Pending Order Discount	Smallmoney						Attribute
9	Pending Order Amount	Smallmoney						Attribute
10	Pending Total Amount	Smallmoney						Attribute
11	V.A.T.	Smallmoney						Attribute

Table C.9. Structure of Sales Order Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Order ID	Char(11)	Y	Y				Primary Key
2	Order Date	Date	Y				dd/mm/yyyy	Primary Key
3	Customer ID	Char(10)	Y			Customer		Primary Key
4	Customer Name	Char(10)	Y			Customer		Primary Key
5	Product ID	Char(50)	Y			Product Inventory		Primary Key
6	Product Name	Char(20)	Y			Product Inventory		Primary Key
7	Purchase Number	VarChar(35)	Y					Attribute
8	Pending ID	Smallmoney				Pending Order		Attribute
9	Order Credit Term	Smallmoney					from 0 to 120 days	Attribute
10	Sales Representative	Smallmoney						Attribute
11	Delivery Place	VarChar(70)						Attribute
12	Ordered QTY	Int						Attribute
13	Discount Amount	Smallmoney						Attribute
14	Order Amount	Smallmoney						Attribute
15	Order Total Amount	Smallmoney						Attribute
16	V.A.T.	Smallmoney	*					Attribute

Table C.10. Structure of Picking Slip Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Picking Slip ID	Char(11)	Y	Y				Primary Key
2	Picking Slip Date	Date	Y				dd/mm/yyyy	Primary Key
3	Customer Name	Char(50)	Y			Customer		Primary Key
4	Order ID	Char(11)	Y			Sales Order		Primary Key
5	Invoice ID	Char(11)	Y					Primary Key
6	Product ID	Char(20)	Y			Product Inventory		Primary Key
7	Product Name	VarChar(20)	Y			Product Inventory		Primary Key
8	Delivery Date	Date	Y				dd/mm/yyyy	Attribute
9	Delivery Place	VarChar(70)				Sales Order		Attribute
10	Ordered QTY	Int				Sales Order		Attribute
11	Shipped QTY	Int					<= Ordered QTY	Attribute
12	QTY Balance	Int					Ordered QTY-Shipped QTY	Attribute

Table C.11. Structure of Interesting Product Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Profile ID	Char(11)	Y			Wine Profile		Primary Key
2	Profile Name	VarChar(35)	Y			Wine Profile		Primary Key
3	Pending ID	Char(11)	Y			Pending Order		Primary Key
4	Pending Order Creation Date	Date	Y			Pending Order	dd/mm/yyyy	Primary Key
5	Customer ID	Char(11)	Y			Customer		Primary Key
6	Customer Name	VarChar(50)	Y			Customer		Primary Key
7	Product ID	Char(20)	Y			Product Inventory		Primary Key
8	Product Name	VarChar(35)	Y			Product Inventory		Primary Key
9	Calling Person	VarChar(40)						Attribute

Table C.12. Structure of Outstanding Payment Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Account ID	Char(20)	Y			Customer Account		Primary Key
2	Customer ID	Char(10)	Y			Customer		Primary Key
3	Customer Name	VarChar(50)	Y			Customer		Primary Key
4	Order ID	Char(11)				Sales Order		Primary Key
5	Order Date	Date				Sales Order		Primary Key
6	Return ID	Char(11)				Return Order		Primary Key
7	Return Date	Date				Return Order	dd/mm/yyyy	Primary Key
8	Product ID	Char(20)				Product Inventory		Primary Key
9	Product Name	VarChar(35)				Product Inventory		Primary Key
10	Outstanding Balance	Smallmoney						Attribute

Table C.13. Structure of Ordered Product Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Order ID	Char(11)	Y			Sales Order		Primary Key
2	Order Creation Date	Date	Y			Sales Order	dd/mm/yyyy	Primary Key
3	Pending ID	Char(11)	Y			Pending Order		Primary Key
4	Pending Order Date	Date				Pending Order	dd/mm/yyyy	Primary Key
5	Product ID	Char(20)				Product Inventory		Primary Key
6	Product Name	VarChar(35)				Product Inventory		Primary Key
7	Picking Slip ID	Char(11)				Picking Slip		Primary Key
8	Picking Slip Date	Date				Picking Slip	dd/mm/yyyy	Primary Key
9	Customer ID	Char(10)	Y			Customer		Primary Key
10	Customer Name	VarChar(50)	Y			Customer		Primary Key
11	Invoice ID	Char(11)						Primary Key
12	Contact Name	VarChar(40)				Customer		Attribute



Table D.1. Process Description of Level 1 for Process 1.0 - Maintain Customer.

No.	Process Name	Description	Input(s)	Description of Process	Output(s)
1.1	Get Customer Information	To review customer information	- Customer Information	To receive customer information into the system	- Customer's name - Customer's address
1.2	Verify Customer Information	To check customer's information	- Customer's name - Customer's address	To check all details about new and current customer's data for accurate inputs	- New customer's name - New customer's address - Change of current customer's name - Change of current customer's address
1.3	Update Current Customer Information	To update customer record	- Change of current customer's name - Change of current customer's address	To edit and update customer's information from the customer master file	- Customer's name change confirmation - Customer's address change confirmation - Updated name - Updated address

Table D.1. Process Description of Level 1 for Process 1.0 - Maintain Customer (Continued).

No.	Process Name	Description	Input(s)	Description of Process	Output(s)
1.4	Add New Customer Information	To add new customer record	<ul style="list-style-type: none"> - New customer's name - New customer's address 	To add new customer record in the customer master file	<ul style="list-style-type: none"> - New customer



Table D.2. Process Description of Level 1 for Process 2.0 - Response to Customer's Inquiry.

No.	Process Name	Description	Input(s)	Description of Process	Output(s)
2.1	Collect Data	To collect data of customer's inquiries and customer's orders	<ul style="list-style-type: none"> - Customer inquiry - Customer order 	To gather necessary data of customer's order information and customer's inquiries	<ul style="list-style-type: none"> - Inquiry detail - Order detail
2.2	Edit and Route	To edit the data and transfer them to other process	<ul style="list-style-type: none"> - Inquiry detail - Order detail 	To edit data of customer's inquiry in appropriate form, and transfer the correct data to other processes	<ul style="list-style-type: none"> - Edited inquiry - Edited order
2.3	Prepare Information for Reply	To prepare information in order to reply to customer	<ul style="list-style-type: none"> - Edited inquiry - Inventory status - Wine information - Pending order information - Approved order information 	To prepare information for customer's inquiries so that the sales officers can give accurate answers to customers	<ul style="list-style-type: none"> - Reply for customer

Table D.3. Process Description of Level 2 for Process 2.2 - Edit and Route.

No.	Process Name	Description	Input(s)	Description of Process	Output(s)
2.2.1	Check Detail	To check details of inquiry and order	- Inquiry detail - Order detail	- To check the detail whether it is in appropriate form	- Checked detail
2.2.2	Edit Detail	To edit the detail into the appropriate form	- Checked detail	- To edit the details of inquiry and order into the correct form	- Edited detail
2.2.3	Separate Detail	To separate and route the details to their own direction	- Edited detail	- To separate the details to their own section, and to route them to their own section of the process	- Edited order - Edited inquiry

Table D.4. Process Description of Level 2 for Process 2.3 - Prepare Information for Reply.

No.	Process Name	Description	Input(s)	Description of Process	Output(s)
2.3.1	Determine Inquiry Topic	To determine customer's inquiry topics	- Edited inquiry	To determine and separate into topics of customers' inquiries for searching information easily	- A particular inquiry topic
2.3.2	Find Information	To find information for customer's query in a particular topic	- A particular inquiry topic	To search information from suitable file in order to answer customer's query	- Pending order information - Wine information - Approved order information - Inventory status
2.3.3	Collect Information	To collect the information we have just found	- Information	To collect all information found from the files for reply	- Required Information

Table D.4. Process Description of Level 2 for Process 2.3 - Prepare Information for Reply (Continued).

No.	Process Name	Description	Input(s)	Description of Process	Output(s)
2.3.4	Prepare To Reply	To prepare information for answering the customers	- Required information	To prepare information in the suitable form and to give customer answer	- Reply for customer

Table D.5. Process Description of Level 1 for Process 3.0 - Verify Order.

No.	Process Name	Description	Input(s)	Description of Process	Output(s)
3.1	Receive Customer Order	To get customer's order	<ul style="list-style-type: none"> - Edited order - Pending order information 	To receive orders from customers	<ul style="list-style-type: none"> - Price of product - Required quantity - Name of product
3.2	Check Inventory Status	To check inventory status of products in the warehouse	<ul style="list-style-type: none"> - Price of product - Required quantity - Name of product - Inventory status 	To check whether the required product(s) in customer's order is available in the stock or not.	<ul style="list-style-type: none"> - Recorded new pending order - purchase requisition - Price and quantity for available products - Out of stock notification
3.3	Calculate Order Amount	To calculate total price of the order	<ul style="list-style-type: none"> - Price and quality for available wines - Product record 	To calculate order amount and retrieve product details for verifying	<ul style="list-style-type: none"> - Total order amount

Table D.5. Process Description of Level 1 for Process 3.0 - Verify Order (Continued).

No.	Process Name	Description	Input(s)	Description of Process	Output(s)
3.4	Check Credit Limit	To check credit limit for each customer	<ul style="list-style-type: none"> - Total order amount - Outstanding payment 	To compare the amount sold with the credit limit from customer account file	<ul style="list-style-type: none"> - Accepted order - Rejected order
3.5	Complete Sales Order	To complete information into the sales order form	<ul style="list-style-type: none"> - Accepted order - Accurate customer information 	To fill the order information into the sales order form	<ul style="list-style-type: none"> - Update sales order data - Sold wine - Approved sales order - Sales order copy - Customer acknowledgement

Table D.6. Process Description of Level 2 for Process 3.2 - Check Inventory Status.

No.	Process Name	Description	Input(s)	Description of Process	Output(s)
3.2.1	Check Inventory Status	To check inventory status of ordered products	<ul style="list-style-type: none"> - Name of product - Price per unit - Required quantity 	To check inventory status of required product from the product inventory file	<ul style="list-style-type: none"> - Unavailable product - Available product for an order
3.2.2	Inform Customer	To inform the customer about unavailable product	<ul style="list-style-type: none"> - Unavailable product 	To inform the customer about the unavailable product if he wants to cancel, change, or keep the order for pending order	<ul style="list-style-type: none"> - Invalid order acknowledgement
3.2.3	Prepare Purchase Requisition	To prepare purchase requisition form	<ul style="list-style-type: none"> - Unavailable product 	To prepare the purchase requisition form for unavailable product and send to Purchasing Department	<ul style="list-style-type: none"> - Purchase requisition

Table D.6. Process Description of Level 2 for Process 3.2 - Check Inventory Status (Continued).

No.	Process Name	Description	Input(s)	Description of Process	Output(s)
3.2.4	Keep Order to Pending Order	To keep the unavailable product to the pending order	- Order	If the customer does not want to cancel the order of unavailable product, the officer will keep it as a pending order	- Record

Table D.7. Process Description of Level 2 for Process 3.3 - Calculate Order Amount.

No.	Process Name	Description	Input(s)	Description of Process	Output(s)
3.3.1	Adjust Unit Price, Qty.	To adjust unit price and quantity of product	<ul style="list-style-type: none"> - Unit price - Required quantity 	To adjust unit price and quantity for each product sold	<ul style="list-style-type: none"> - Amount per item
3.3.2	Adjust product	To retrieve product information for each product item sold	<ul style="list-style-type: none"> - Amount per item - Product description 	To retrieve product information, to match the product information in for each product sold	<ul style="list-style-type: none"> - Product information
3.3.3	Calculate Total Amount	To calculate the total amount sold for each sales order	<ul style="list-style-type: none"> - Product information 	To calculate an accumulated amount per item sold into the grand total amount sold for each sales order slip	<ul style="list-style-type: none"> - Total order amount

Table D.8. Process Description of Level 2 for Process 3.4 - Check Credit Limit.

No.	Process Name	Description	Input(s)	Description of Process	Output(s)
3.4.1	Get Order Amount	To get total amount of an order	- Total order amount	To retrieve total amount of sales order	- Total amount information
3.4.2	Compare Credit Limit	To check customer's current credit limit with his total amount of his order	- Total amount information - Outstanding payment	To check and compare the customer's total purchasing amount with his current credit limit status from the customer account file	- Over credit limit - Under credit limit
3.4.3	Approve Credit	To approve the customer's credit limit in case of having over credit limit	- Over credit limit	In case of having over credit limit, the officer will consider it whether the credit should be accepted and approved, or rejected.	- Rejected order - Approved over-credit limit - Update

Table D.8. Process Description of Level 2 for Process 3.4 - Check Credit Limit (Continued).

No.	Process Name	Description	Input(s)	Description of Process	Output(s)
3.4.4	Approve Order	To approve the customer's purchase order	- Approved over-credit limit	To approve and accept the customer's purchase order	- Accepted order

Table D.9. Process Description of Level 1 for Process 4.0 - Verify Return Order.

No.	Process Name	Description	Input(s)	Description of Process	Output(s)
4.1	Receive Return Order	To get return-order information	- Return-order requisition	To get return-order information for verify	- Return-product information
4.2	Check Return Requisition	To check the accuracy of return-order requisition	- Return-product information - Sales order information - Return order information	To verify the return-order requisition with information in sales order file and return-order file for accuracy	- Accurate information
4.3	Create Return Order	To produce return-order form	- Accurate information - Accurate customer information	To produce return-order form and send it to Accounting Department for issuing credit note	- Approve return-order - Return-order information - Update to return-order file - Update to sales order

Table D.10. Process Description of Level 2 for Process 4.1 - Check Inquiry Information.

No.	Process Name	Description	Input(s)	Description of Process	Output(s)
4.1.1	Check Time Period	To verify production time period for the report	- Internal inquiry	To check the proper time to product the final report for the management	- Valid time
4.1.2	Put Inquiry Detail	To fill in the data of inquiry for processing the information	- Valid time	To fill data of the inquiry in the system in order to retrieve the required information from the database	- Valid inquiry

Table D.11. Process Description of Level 2 for Process 4.2 - Check Return Product.

No.	Process Name	Description	Input(s)	Description of Process	Output(s)
4.2.1	Match with Sales Order	To match data of return order requisition with sales order data	<ul style="list-style-type: none"> - Return product information - Sales information 	<p>To match data of the return-order requisition with sales order database. To check the goods required to return are in what sales order number</p>	<ul style="list-style-type: none"> - Sales query - Sales order information
4.2.2	Check Return-Order History	To check the history of return-order record	<ul style="list-style-type: none"> - Sales order information - Return-order information 	<p>To check whether the goods required to return had been issued the return-order form</p>	<ul style="list-style-type: none"> - Return-order query - Accurate information

Table D.12. Process Description of Level 1 for Process 5.0 - Prepare Delivery.

No.	Process Name	Description	Input(s)	Description of Process	Output(s)
5.1	Verify Sales Order	To verify sales order copy	- Sales order copy	To check the information in the sales order copy	- Approved sales order copy
5.2	Check Against Invoice	To check the content in sales order copy with the content in the invoice	- Approved sales order copy - Invoice	To check the contents in the sales order copy against the contents in the invoice in order to eliminate any mistake	- Correct information
5.3	Prepare Picking Slip	To issue picking slip	- Correct information	To prepare picking slip, and send to Warehouse Department to arrange the goods for delivery to customers	- Up-date picking slip to the file - Picking slip

Table D.13. Process Description of Level 1 for Process 6.0 - Produce Report.

No.	Process Name	Description	Input(s)	Description of Process	Output(s)
6.1	Check Inquiry Information	To verify the internal inquiry	- Internal Inquiry	To verify the internal inquiry for reports from the management and match it with appropriate files	- Valid inquiry
6.2	Display Information	To retrieve information from the data stores	<ul style="list-style-type: none"> - Inventory status - Payment information - Picking slip information - Sales transaction - Return-order information 	To retrieve data from the files and display them according to management's request	- Requested information
6.3	Process Report	To produce reports for management	- Requested information	To print the requested information in form of hard copy	- Printed report



APPENDIX E
DATA DICTIONARY

Table E.1. Data Dictionary of Entity Relationship for Attribute Fields for Sales Information System.

Field Name Object Type: Attribute	Meaning
Account Payable	Customer's debt which has not been settled
Account Receivable	Customer's debt which has been settled
Actual Balance	The difference between the amount of account payable and the amount of account receivable
Address	Customer's address used for producing invoices
Approx New Arrival Date	Expected date of a product which is going to arrive the warehouse
Calling Person	Person who inquiries about the product, and service.
Characteristic	Features of wine
Contact Name	Name of a person whom we can contact or who is responsible for purchasing our products.
Contact Tel. Number	Telephone number which we can keep in touch with a customer
Cost Per Unit	Price for each item of a product
Credit Limit	Maximum amount of money that a customer can be allowed to buy goods on credit
Credit Term	Permission to delay payment for products until after they have been received
Customer Type	"Agent", "Hotel", "Private", "Retailer", "Wholesaler".
Delivery Date	Date for ordered product should be received by a customer
Delivery Place	Location to which purchased product should be dispatched.
Discount	Percentage of amount of money taken off the cost of something
Discount Amount	Amount of money taken off the cost of something
Fax Number	Number which can be used to communicate with a customer by fax machine
Food	Food and dessert which well match with a wine
Grape Variety	Grapes which is used to produce wine
Last Update	Latest date which data has been changed
Manufacture	Company that produces goods

Table E.1. Data Dictionary of Entity Relationship for Attribute Fields for Sales Information System (Continued).

Field Name Object Type: Attribute	Meaning
Merchandise Description	Features and characteristic of product
Merchandise Size	Measurement or amount of product
Method of Payment	Way of customer to settle his/her debt
Order Amount	Amount of goods which customer purchases
Order Total Amount	Total amount of money which customer has to pay for an order
Ordered QTY	Quantity of purchased product
Outstanding Balance	Total amount of debt which has not been paid
Pending Order Discount	Percentage of amount of money taken off the cost of goods in pending order
Pending Order Amount	Amount of money of pending order before discounts and value added tax
Pending Total Amount	Gross total amount of money of pending order
Percentage of Alcohol	Percentage of alcohol volume contains in wine
Previous Balance	Last balance of customer's debt
Previous_Arrive_QTY	Quantities of goods which arrived in warehouse last time.
Purchase Number	Number of customer's purchase order form
QTY Balance	Balance of customer's stock of purchased goods kept in our company
QTY_on_hand	Quantities of goods available in warehouse
QTY_on_sales	Quantities of goods which have been sold
Rating	Wine score based on Robert Parker book
Return Reason	Reason of customer to return good to our company
Returned QTY	Quantity of goods which customer desires to return to our company
Return-order Total Amount	Total amount of money of returned goods
Sales Representative	Person who is responsible for selling goods
Shipped QTY	Quantities of goods which customer has taken
Taste	Sense by which flavor is known
Total Order Amount	Total amount of money of current customer's order
Unit of Measure	Volume amount of wine contains in a bottle

Table E.1. Data Dictionary of Entity Relationship for Attribute Fields for Sales Information System (Continued).

Field Name Object Type: Attribute	Meaning
Unit Price for Private	Price per item of goods sold to private customer
Unit Price for Retail	Price per item of goods sold to retailer, wholesaler, hotel, and agent.
V.A.T.	Value Added Tax of sales amount
Wine Type	Kind of wines
Winery	Wine producer

Table E.2. Data Dictionary of Entity Relationship for Entity Fields for Sales Information System.

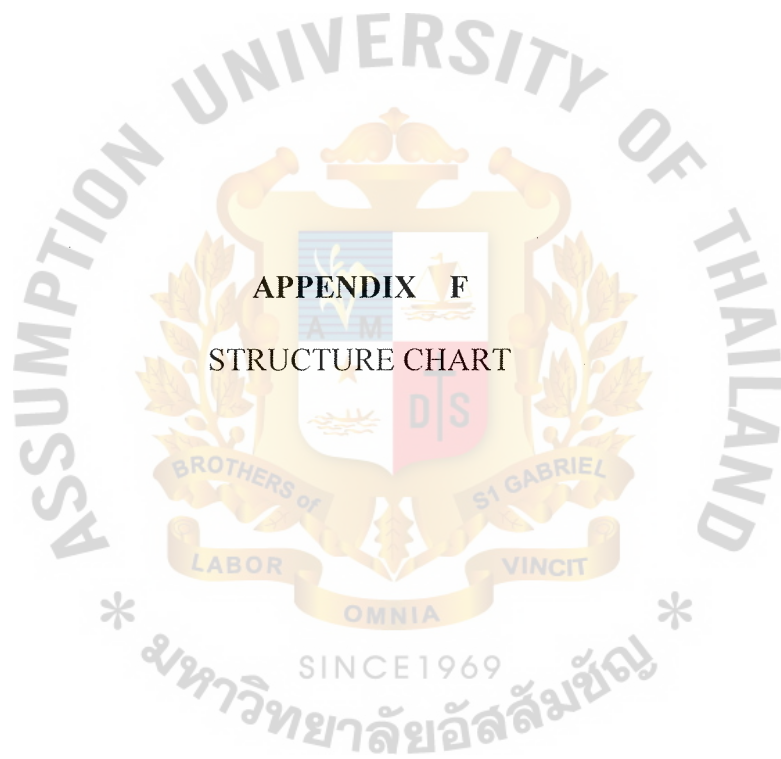
Field Name Object Type: Entity	Meaning
Wine Profile	Brief description of wine
Customer Account	Customer's statement of money paid or owed for goods
Outstanding Payment	Gross total of customer's debt which is not yet paid
Interesting Product	Product which is interesting by customer
Customer	Person who buys goods
Return Order	Order that customer to return product to company
Product Inventory	Detailed list of products
Pending Order	Order which is waiting to be decided
Sales Order	Customer's order
Beverage	Wine, champagne, sparkling wine, etc.
Merchandise	Goods for sales
Ordered Product	Product which is purchased
Picking Slip	Detailed list of product quantity dispatched to customer

Table E.3. Data Dictionary of Entity Relationship for ERC Connection for Sales Information System.

Field Name Object Type: ERD Connection	Meaning
Becomes	Comes to be
Deducted by	Be subtracted by
Decreases	Reduces
Describes	Explains
Displays	Shows
Fills	Occupies all of the space in picking slip
Has	Possess
Held as	Be supported to be
Increases	Makes greater in number
Informs	Gives somebody information of something
Inquiries for	Asks for information
Is a	Be as
Places	Puts in a particular place
Responds to	Gives an answer
Sells	Gives goods to someone who becomes their owner after paying one money
Sold as	Be sold as

Table E.4. Data Dictionary of Entity Relationship for Primary Key Fields for Sales Information System.

Field Name Object Type: Primary Key	Meaning
Account ID	Account identification number
Customer ID	Customer identification number
Customer Name	Buyer's name or company's name which buy goods
Invoice ID	Invoice identification number
Order Date	Date of order made
Order ID	Order identification number
Pending ID	Pending order identification number
Pending Order Date	Date of pending order made
Picking Slip Date	Date of picking slip made
Picking Slip ID	Picking slip identification number
Product ID	Product identification number
Product Name	Name of product
Profile ID	Wine profile identification number
Profile Name	Wine profile name
Return Creation Date	Date of returned order made
Return ID	Returned order identification number



APPENDIX F
STRUCTURE CHART

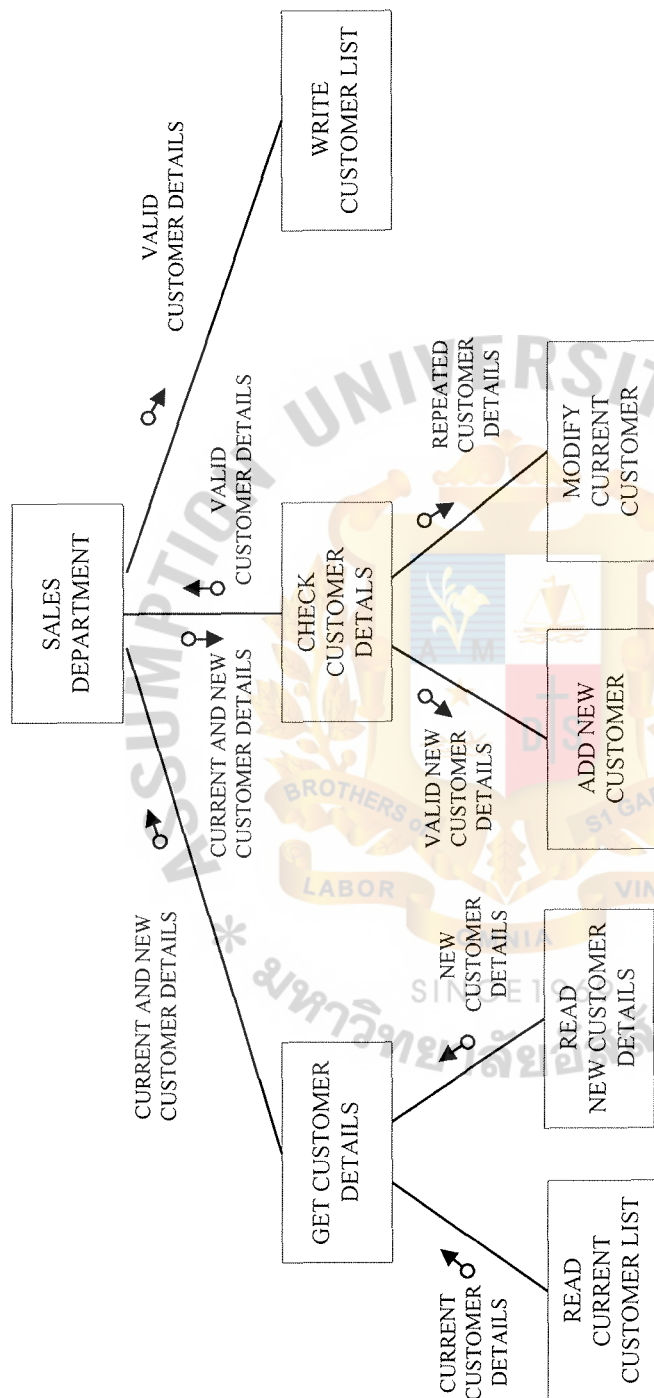


Figure F.1. * Structure Chart of Maintain Customer Module.

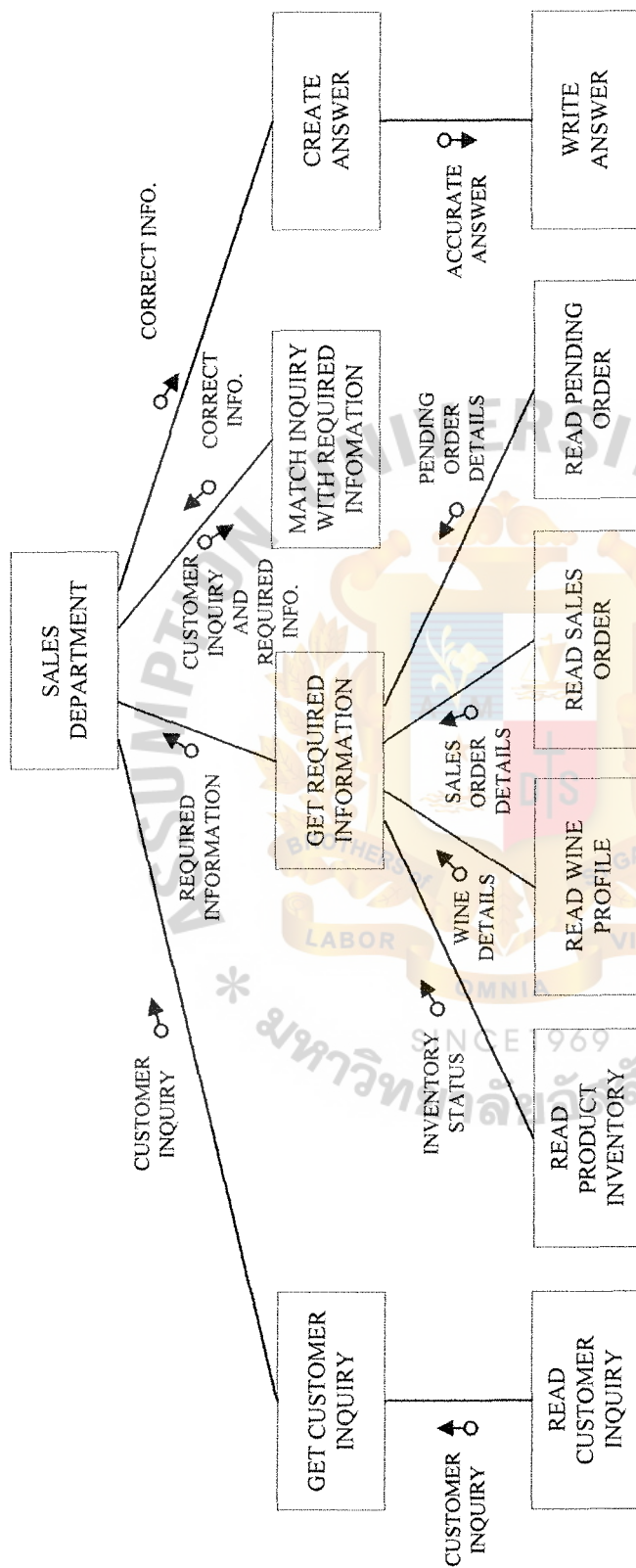


Figure F.2. Structure Chart of Response to Customer Inquiry Module.

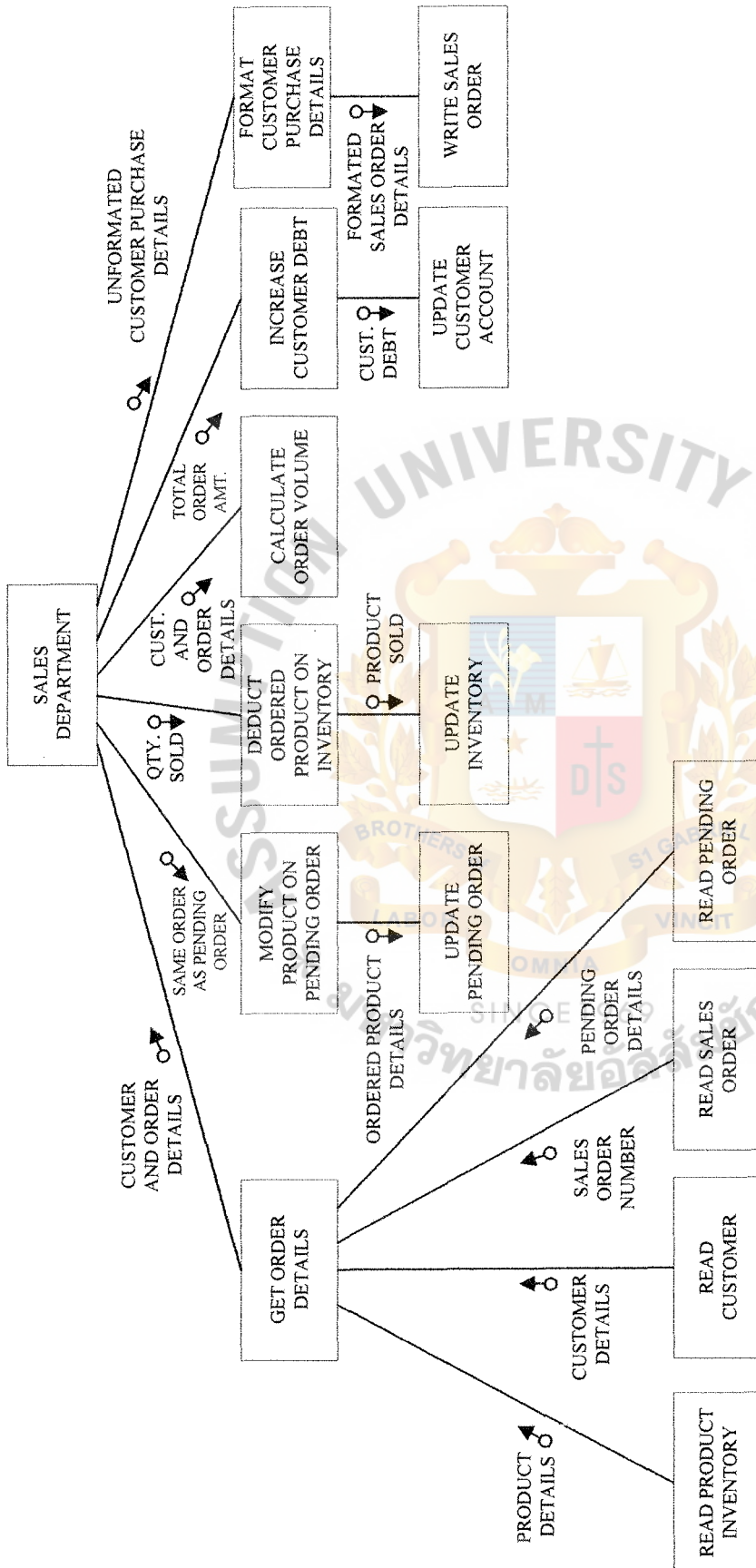


Figure F.3. Structure Chart of Response to Verify Order Module.

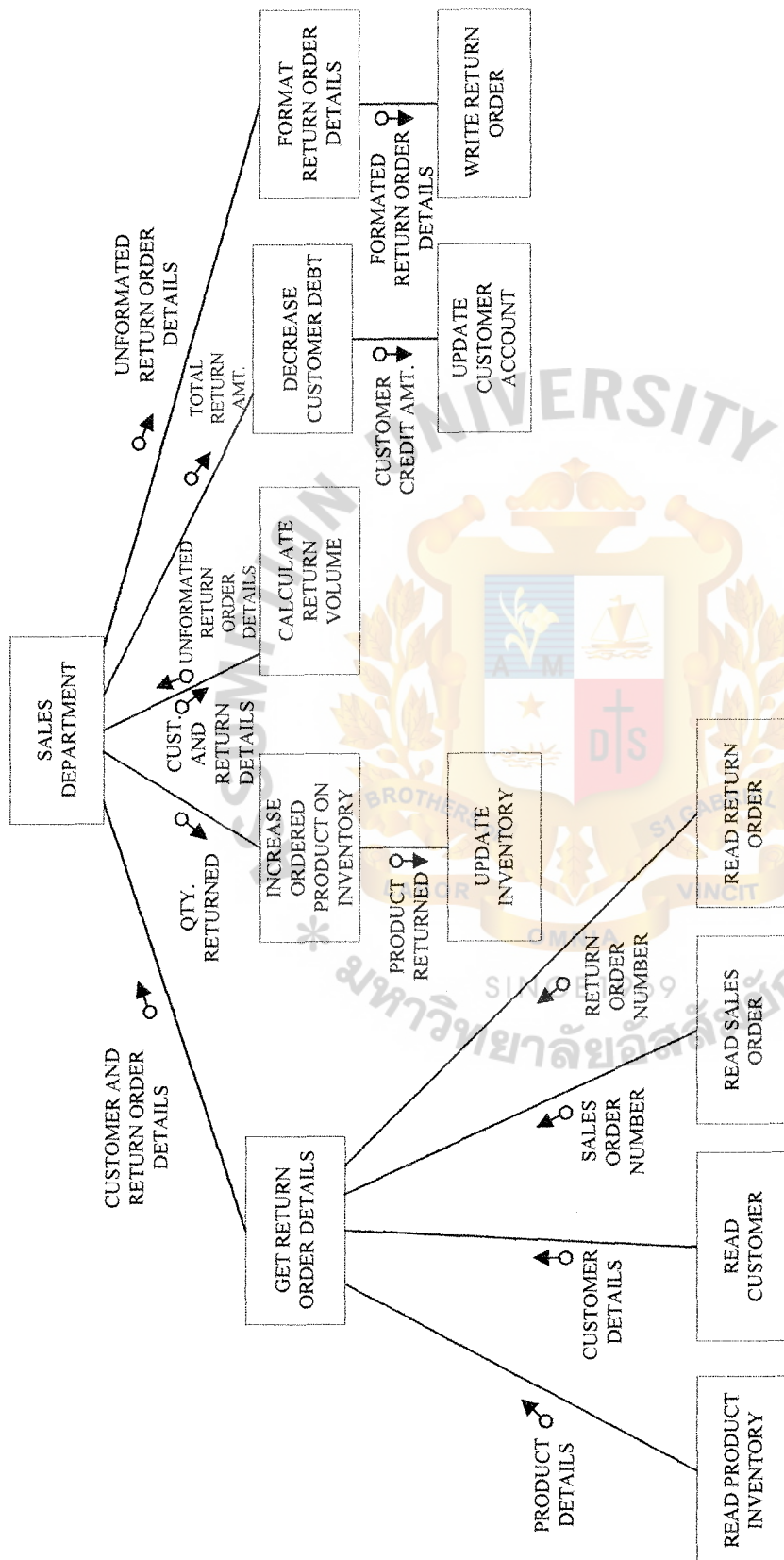


Figure F.4. Structure Chart of Return Order Module.

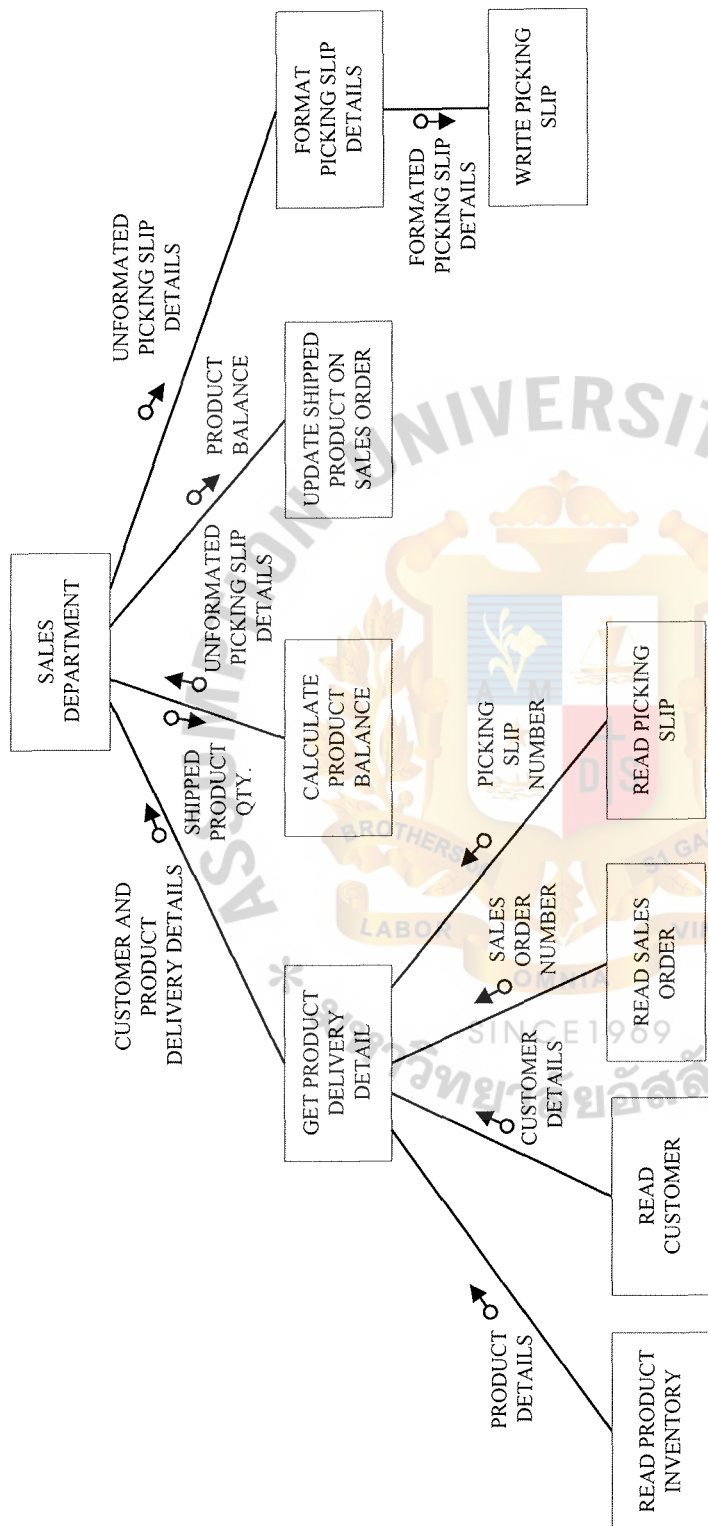


Figure F.5. Structure Chart of Prepare Delivery Module.

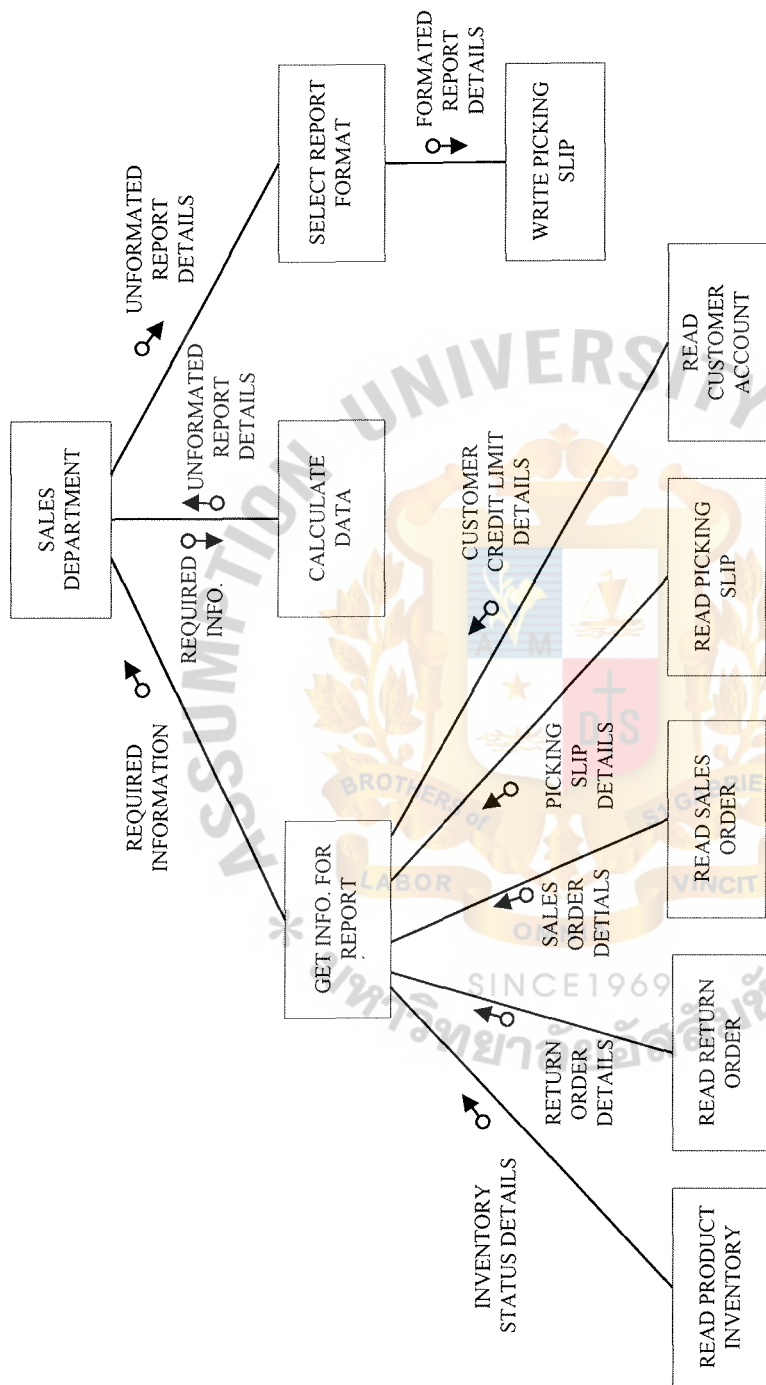


Figure F.6. Structure Chart of Produce Report Module.

BIBLIOGRAPHY

1. Adams, Dennis A. and James R. Mensching. Managing an Information Systems. New Jersey: Prentice Hall International Company, 1990.
2. Batini, Carlo, Shamkant B. Navathe, and Carol Batini. Conception Database Design: An Entity-Relationship Approach. California: Addison-Wesley Pub Co., 1991.
3. Burg, Bob and Bob Berg. Endless Referrals: Network Your Everyday Contacts into Sales. New York: McGraw-Hill International, 1998.
4. Date, C. J. An Introduction to Database Systems. California: Addison-Wesley Publishing Company, 1998.
5. Halpin, Terry. Information Modeling and Relational Databases: From Conceptual Analysis to Logical Design. California: Morgan Kaufmann Publishers, 1998.
6. Laudon, Kenneth C. and Jane P. Laudon. Management Information System, 5th Edition. New Jersey: Prentice Hall International Company, 1998.
7. Long, Larry. Management Information System. New Jersey: Prentice Hall International Company, 1989.
8. Mensching, James R. and Dennis A. Adams. Managing and Information System. New Jersey: Prentice Hall International Company, 1998.
9. Page-Jones, Meilir. The Practical Guide to Structured System Design. New Jersey: Prentice Hall International Company, 1988.
10. Whitten, Jeffrey L. and Lonnie D. Bentley. System Analysis and Design Methods, 4th Edition. New York: McGraw-Hill International, 1998.
11. Yourdon, Edward. Modern Structure Analysis. New Jersey: Prentice Hall International Company, 2000.