Export Sea Freight Forwarder System for MC TRANS (Thailand) Co., Ltd.

by

Ms. Supamas Intarapalit

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

Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science
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Project Title	Export Sea Freight Forwarder System for MC TRANS (Thailand) Co., Ltd.
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Academic Year	November 2003

The Graduate School of Assumption University has approved this final report of the six-credit course, CS 6998 – CS 6999 System Development Project, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer Information Systems.

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ABSTRACT

MC TRANS (Thailand) Co., Ltd. formerly a part of the Logistics Division of Mitsubishi Corporation of Japan is an international logistics service provider. The Export Management System is an important service of an international logistics service provider, especially sea freight forwarder and a lot of customers used this service. The communication uses paper with customers, there is Multi-modal Transport Bill of Lading.

The current existing Export Sea Freight Forwarder System is based on manual and some computerized system for mailing. Most data are stored on paper. It has problems of manual system, which take time to service customer, difficult to find the old information, and have high maintenance cost. Each customer can edit information data in Export Sea Freight Forwarder System before shipping out. The effect is means staff will edit Multi-modal Transport Bill of Lading paper following customers requirements manually. It takes time to find paper. If customer would like to see information after one year, it takes time to find also. Some documents records are not kept.

The new proposed Export Sea Freight Forwarder System (ESFF) will be developed to replace the manually operated system. It will solve the problem of the manual system and decrease the high maintenance cost. The ESFF system will keep all data in the database server. This project provided the application program to support ESFF system such as Multi-modal Transport Bill of Lading, Report data, Search data and print function. The application program runs on Windows 2000 and above. The user interfaces are easy to use

ACKNOWLEDGEMENTS

This project is successfully done with great help and cooperation of many people. First of all the writer must express her gratitude to her advisor Asst.Prof.Dr. Thotsapon Sortrakul for his valuable guidance and suggestions during the period of project.

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Export Sea Freight Forwarder (ESFF) is a service business where the international logistics department of the company as an agent to sell carrier ship space on behalf of carrier ship companies exists. The international logistics department of the company also clears shipment from customers. The main income is from commission of company and service or handling charges from customers. The major concern of this business is to give the best service to its customers. The more services are required, the more resources must be utilized.

The existing system had ESFF for service by manual system everyday. Cause of the manual system is a very large usage time; the existing system is not appropriate and does not support fast service. The ESFF system must deliver data in a timely manner. Data delivered late are useless.

Basically export sea freight forwarder is a service that is involved in the processing and/or movement of goods across international boundaries on behalf of another company. The export sea freight forwarder provides services that are the movement of goods out of a country on behalf of exporters or shippers in which case the forwarder would be termed an export sea freight agent.

The ESFF system is the one important system used as high service of company. The main objective of the project is fast services. The fast service means to produce correct and complete information, easy to search old data, and follow customer commitment, delivering data fast without significant delay. The every time use of the ESFF system to produce management information, it must have zero defect, and minimize cost effective management decision-making.

1.2 Objectives of the Project

The new proposed Export Sea Freight Forwarder System (ESFF) will be developed to solve problems of the existing system, replace the manual system, and decrease the high maintenance cost. It is also appropriate enough for user requirement.

Objectives of this project are as follow:

(1) To analyze and identify problems of the existing system, and users requirement.

(2) To design application program do a computerized ESFF system.

(3) To design a database to support data to cover user's requirement.

(4) To reduce manual system for user.

(5) To collect historical information for analysis.

(6) To centralize data, report, and control.

(7) To reduce time on task for user.

1.3 Scope of the Project

This project concerned application and database system. The proposed system will take care of the following scopes:

(1) Study the problem of existing system in ESFF system and design a new system, which is appropriate for user requirements.

(2) Design application program (user interface), which is easy to use, include design printing and searching functions.

(3) Design database system to support data.

(4) Design report.

1.4 Deliverables

The deliverables of Export Sea Freight Forwarder System for International Logistics Dept. of MC TRANS (Thailand) Co., Ltd. are as follows:

(1) Project Introduction

(a) Background of the project

(b) Objectives of the project

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(a) Conclusions

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(c) Appendix C Structure Chart

(d) Appendix D User Interface

(e) Appendix E Report Design

1.5 Project Plan

The project Plan of the proposed system has provided three main parts. (Figure 1.1 shows project plan of Export Sea Freight Forwarder System.)

(1) Analysis of the Existing System

(a) Define the Objective and Scope

(b) Study the Existing System

(c) Identify the Existing Problems

(d) Develop Context Diagram

(e) Develop Data Flow Diagram

(f) Cost and Benefit Analysis

(2) Analysis and Design of the Proposed System

(a) Interface Design

(b) Report Design

(c) Database Design

(d) Network Design

(e) Program Design

(3) Implementation of the Proposed System

(a) Hardware set up and installation

(b) Software implementation

(c) Data preparation

(d) Testing

(e) Personnel training

(f) Maintenance

(g) Documentation

No.	Task Name
	I. Analysis of the Existing System
1	Define the Objective and Scope
2	Study the Existing System
3	Identify the Existing Problems
4	Develop Context Diagram
5	Develop Data Flow Diagram
6	Cost and Benefit Analysis
	II. Analysis and Design of the Proposed System
7	Interface Design
8	Report Design
9	Database Design
10	Network Design
11	Program Design
	III. Implementation of the Proposed System
12	Coding
13	Testing
14	Hardware Installation
15	Software Installation
16	Conversion

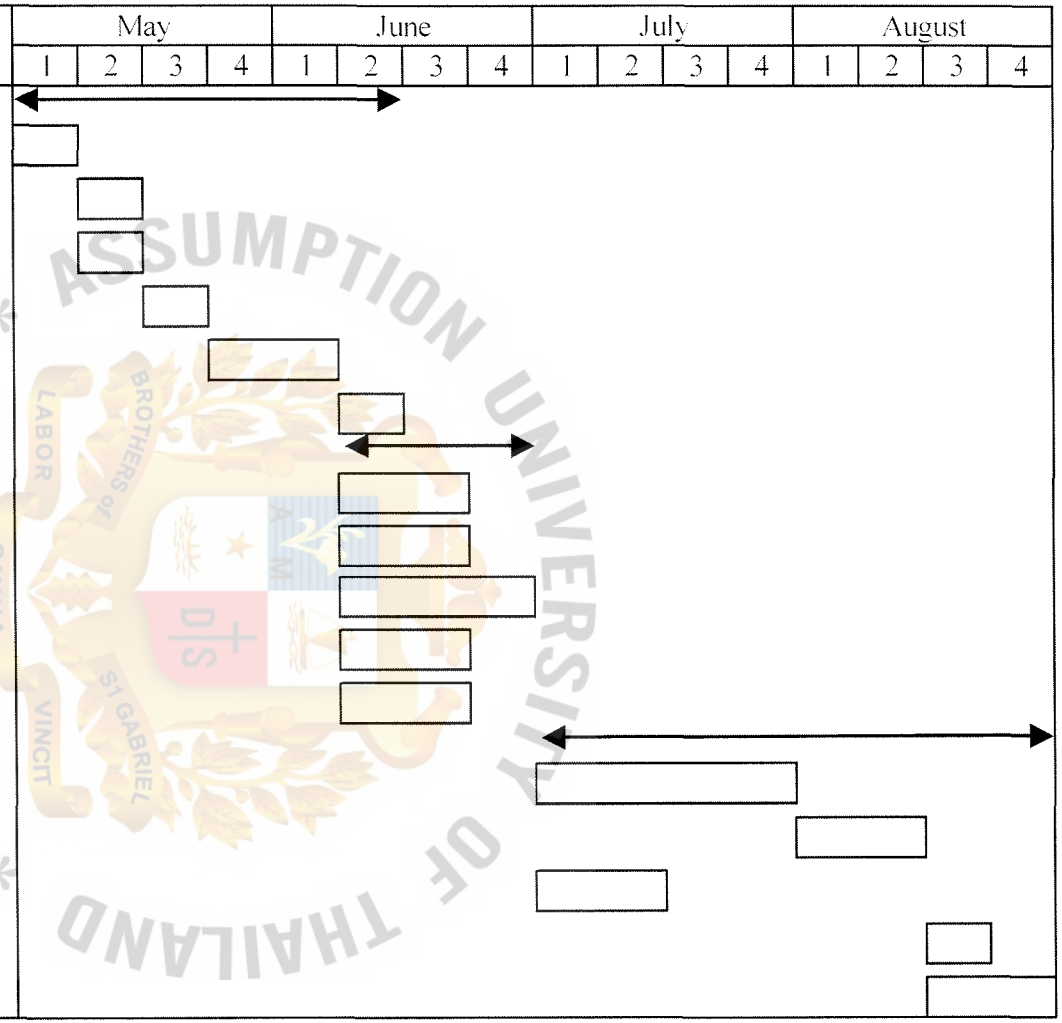

Figure 1.1. Project Plan of Export Sea Freight Forwarder System.

II. THE EXISTING SYSTEM

2.1 Background of the Organization

MC TRANS (Thailand) Co., Ltd. formerly a part of the Logistics Division of Mitsubishi Corporation of Japan is an international logistics service provider. The Export Management System is an important service of an international logistics service provider, especially sea freight forwarder. A lot of customers used this service.

MC TRANS (Thailand) Co., Ltd. is divided into 3 main departments (Accounting Department, Vehicles Transport Department, and International Logistics Department) and 1 support department (IT Department). Each department has clear jobs, as below:

(1) Accounting Department: manage and maintain the financial asset, cash management, accounts payable and accounts receivable.

(2) Vehicles Transport Department: an examination of the options available to the shipper to distribute the goods, involving the booking and dispatch of the goods between the consignor and consignee premises or other specified points.

(3) International Logistics Department: focuses on inter-modal services and endeavors to formulate a cost and time-effective method of transportation for its customers and a single rate for the through transit. The sea freight forwarder concentrates on supply chain management and works towards forming partnerships covering parts of the supply chain with its major customers. Also responsible for arranging sea freight shipment export, customer services, and networking inter-companies information, the sea freight forwarder has four prime activities:

(a) To provide a range of independent services such as packing, warehousing, port agency, customs clearance.

(b) To provide a range of advice on all the areas relative to the international consignment distribution as found in transport distribution analysis.

(c) To act as shipper agent processing transport and/or shipping space on behalf of his/her principal or shipper and executing his/her instruction.

(d) As a principal, usually as a multi-modal transport operator, conveying the goods from A to B, crossing international frontiers and usually involving several carriers.

(4) IT Department: find the interesting new technology knowledge and work with business development to offer the project to management level, design, analyze and control information system in technical terms.

Figure 2.1 shows the organization chart of MC TRANS (Thailand) Co., Ltd. details as above.

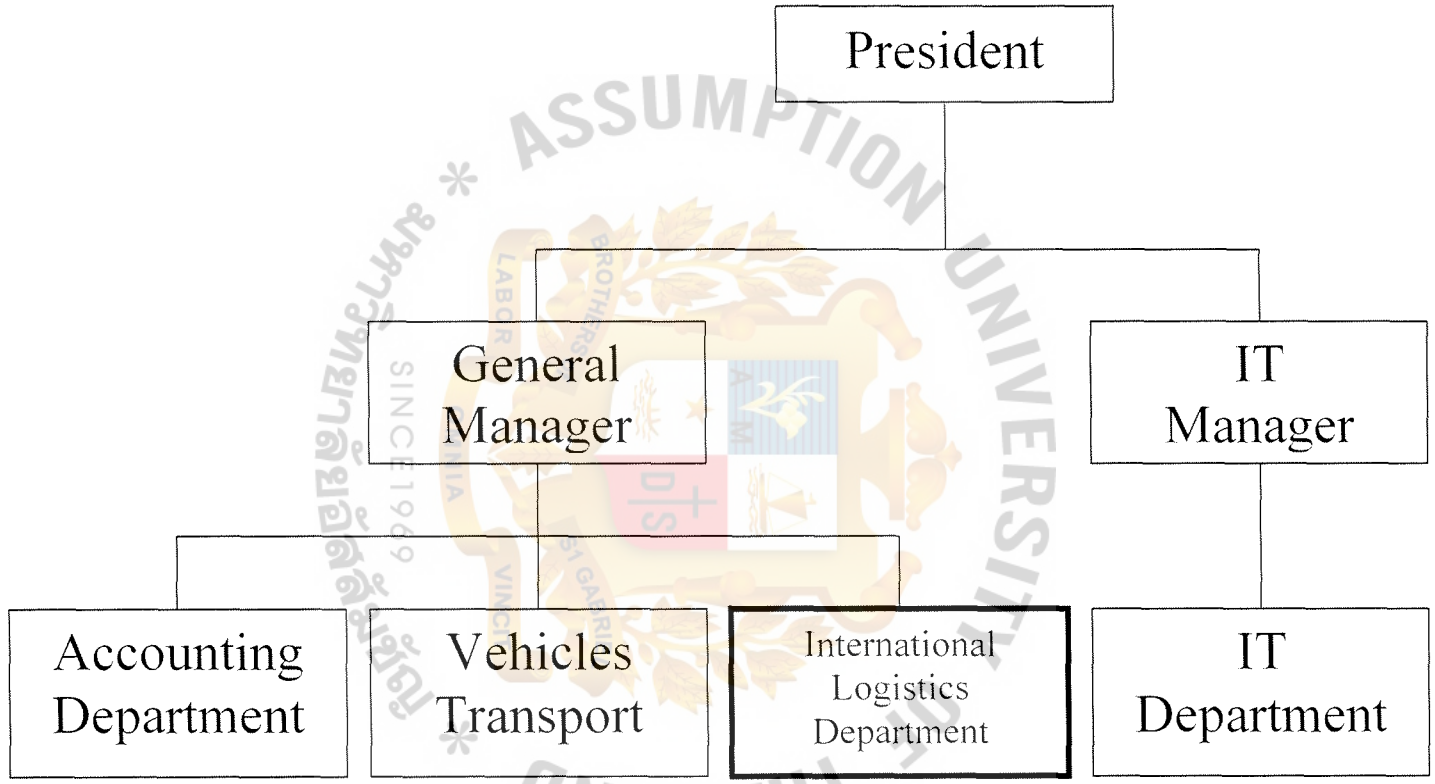

Figure 2.1. Organization Chart of MC TRANS (Thailand) Co., Ltd.

2.2 Process and Data Mapping of Existing System

First, customers contact ESFF system for booking the export product. Then ESFF system will inform booking to agent shipper. Agent shipper will check ship, container, date and time, and location to load product. After that agent shipper will send confirm booking back to ESFF system. So ESFF system will inform confirmed booking to customers for confirmation. Then ESFF will send confirmed booking to shipper to load or pick up, and inform confirmed booking to other countries also. Finally, ESFF will request bill of shipment from account department. Figure 2.2 shows process and data mapping of existing system. Table 2.1 shows the definition of current ESFF system.

Table 2.1. Definition of Current ESFF System.

Name	Definition
Customer	The company that would like to request services from ESFF system.
ESFF System	Export Sea Freight Forwarder System.
Agent Shipper	The agent sea ship or sea line.
Shipping	Work about loading or pick up product follow confirmed booking.
Other Country	Another country that involve with ESFF system.

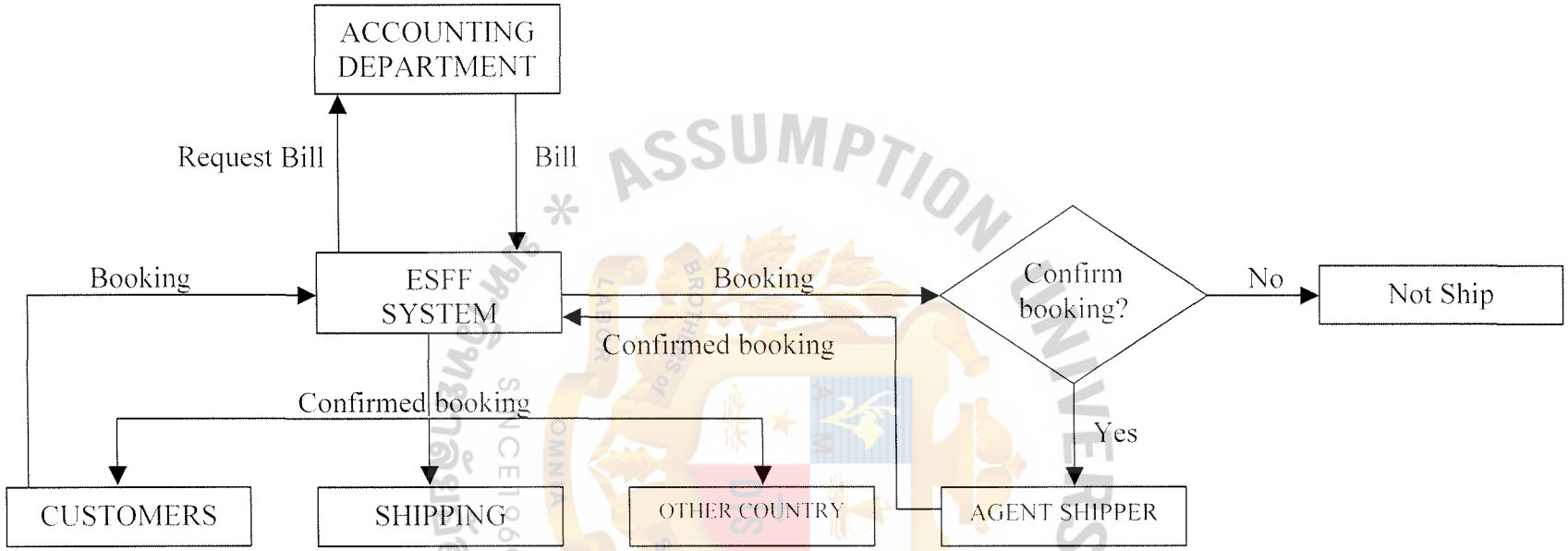

Figure 2.2. Process and Data Mapping of Existing System.

2.3 A Request for Systems Services

Brief Statement of Problem, Opportunity, or Directive

The Export Sea Freight Forwarder (ESFF) strategy planning group has targeted customer services, booking, and reporting for business process redesign and integrated application development. Currently service of ESFF system is not efficient to customers. The existing system is a manual system, it is not fast service booking, and not appropriate. Existing system also has no report for management to make decision. Finally, the computerized system is being developed for fast service, booking, reporting, and data accuracy.

Brief Statement of Expected Solution

The proposed system envisions a completely new and streamlined business process that minimizes the response time to customer booking for information and services. A booking shall not be considered fulfilled until the customer has received it. The new system should provide for customer flexibility and adaptability of basic business services. The proposed system envisions a system that extends to the desktop computers of employees, with appropriate shared services provided across the network, consistent with the database server. This is consistent with strategic plans to retire the manual system and replace with computerize system.

2.4 Current Problems and Areas for Improvement

Currently, users face many problems from manually operating the Export Sea Freight Forwarder (ESFF) for service customers. Cause of the manual system is very large usage time; the existing system is not appropriate and does not support fast service. More problems that can be found in the existing system are listed as follows:

(1) Lack of updating Multi-modal Transport Bill of Lading information: Normally customers will update their booking before shipping out product.

So it is difficult for ESFF system to update manual system (may be data is not accurate) and takes more time to do the Multimodal Transport Bill of Lading information. If we deploy the MTB/L program, ESFF system will be easy to update by computer.

(2) Difficult to find old data: As the existing ESFF system keeps data on paper, it is difficult for ESFF staff to find data. If we use database to store/keep data, ESFF staff will find it easier and faster to find data.

(3) Mistake data historical: Keeping data on paper, data may be lost or wrong data ordering. So the historical data have mistakes. The database is a better way for historical data.

(4) Has no report to analyze business: Currently ESFF system has no report about export. So ESFF system is not fast to know about trend of export. If we create reports, it is useful for them to analyze business or make decisions.

(5) Has no centralized data control: The existing ESFF system dose not keep data at central, so if we use database as a central to keep data it will be very useful.

Figure 2.3 shows Context diagram of existing system.

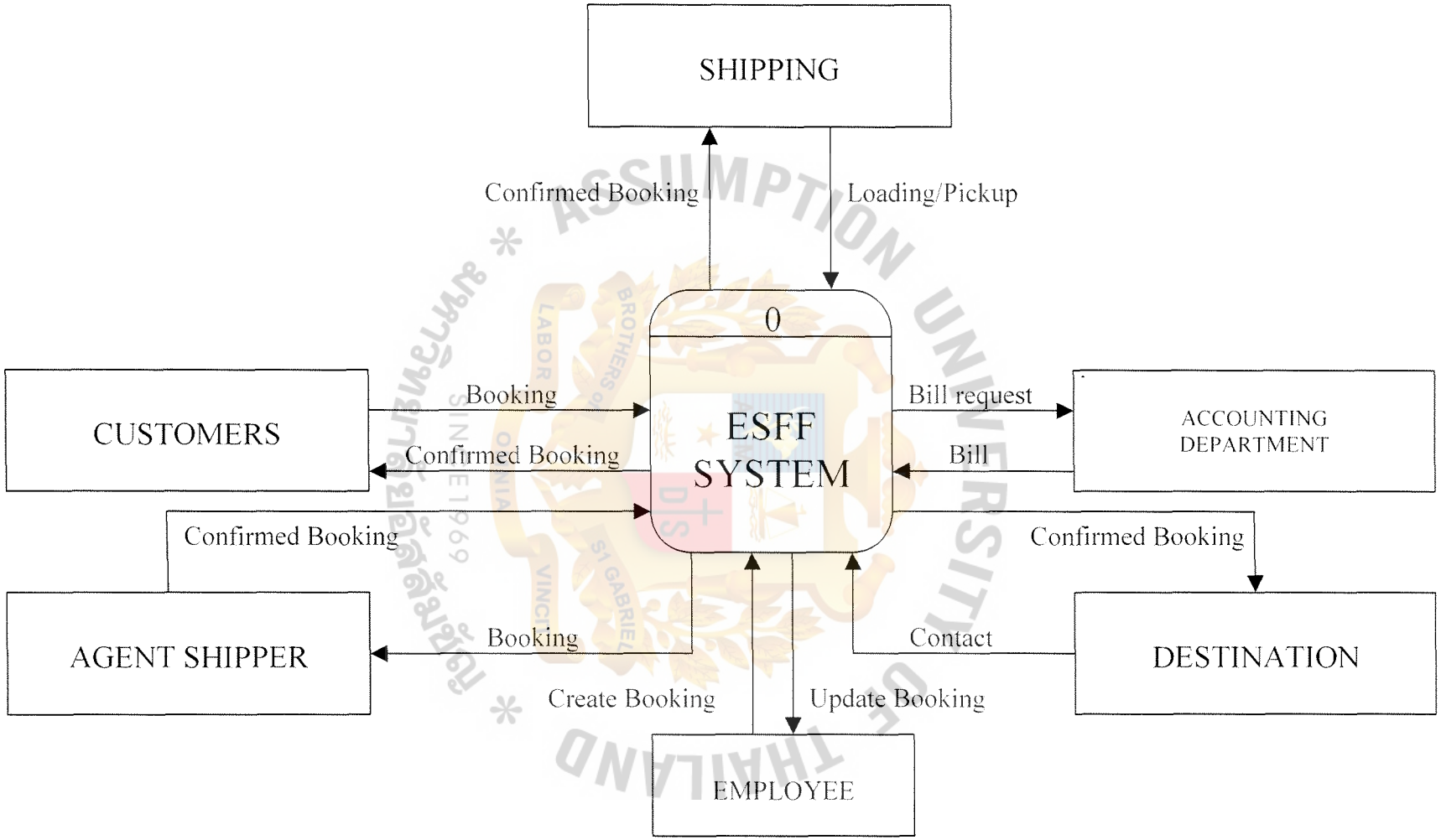

Figure 2.3. Context Diagram of Existing System.

III. THE PROPOSED SYSTEM

3.1 System Specification

According to the previous chapter, there are a lot of problems in the existing Export Sea Freight Forwarder System including human errors. In order to eliminate those problems and provide efficient services, a powerful ESFF system is required. The new ESFF system should solve the problems occurring from the existing manual system. The process to replace the existing ESFF system with the new ESFF system should be done as follows:

(1) First, analyze the equipment or computer used in the system, and how much resources operate this system.

(2) Design database to replace the existing manual system to facilitate the user work, to systematically keep record of data, and solve the problems occurring from the current system.

(3) Design the application program that provides good performance, useful for user and also user-friendly (easy to use).

(4) Develop the application program based on the user requirement. The operating system of application program for the new ESFF system are Windows 2000 and above.

3.2 System Design

After getting the best evaluated alternate solution to fulfill business requirements and specify the computer based solution, the design and integrated requirement is involved to develop technical design specifications.

By constructing the proposed system, the technical design specifications (IS blueprints) are identified into 5 distinct focuses in the system, which are the process to

illustrate a system design by orderly drawing process design, database design, input and output design, user interface, and software design.

(1) Process Design

The process is depicted in a form of data flow diagrams (DFDs) that is the technique for organizing and documenting the structure and flow of data through a system's process. As these pictures define the entire business processes, begin with project scope of ESFF system to look for the information about interface focus that is a document in a context diagram. It is shown in Figure 3.1. After that, the export sea freight forwarder system can be divided into subsystem data flow diagram in a lower level that shows a function decomposition diagram, shown in Figure 3.2 and data flow details to specify deeper information of each subsystem. It is shown in Figures 3.3, 3.4, and 3.5. Then the whole process system (level0) shown in Figure 3.6 is the data flow diagram. Data flow diagram introduced for business requirements can be used to develop a technical design to implement the proposed system. The structure chart of process of ESFF system is shown at Appendix C.

Process Specifications

From the data flow diagram of ESFF system (Figure 3.6), it has 8 processes to support system.

(a) Process create new customer booking: this process concern with customer, agent shipper, and employee. The employee creates new customer booking following customer's request and employee uses information from agent shipper to create a new customer booking.

(b) Process creates new customer MTBL: from this process employee

creates new customer MTBL and uses information from customer booking. After finished creating booking, employee send customer MTBL to customer.

(c) Process create new MCTI MTBL: this process is from employee create new MCTI MTBL and uses information from customer booking. Then employee sends MCTI MTBL to agent shipper.

(d) Process search booking: this process uses information from customer booking and employee send to employee.

(e) Process update booking: employee uses this process to update customer booking.

(f) Process daily Report: employee retrieves report day by day.

(g) Process weekly report: employee retrieves report by week.

(h) Process monthly report: employee retrieves report by month.

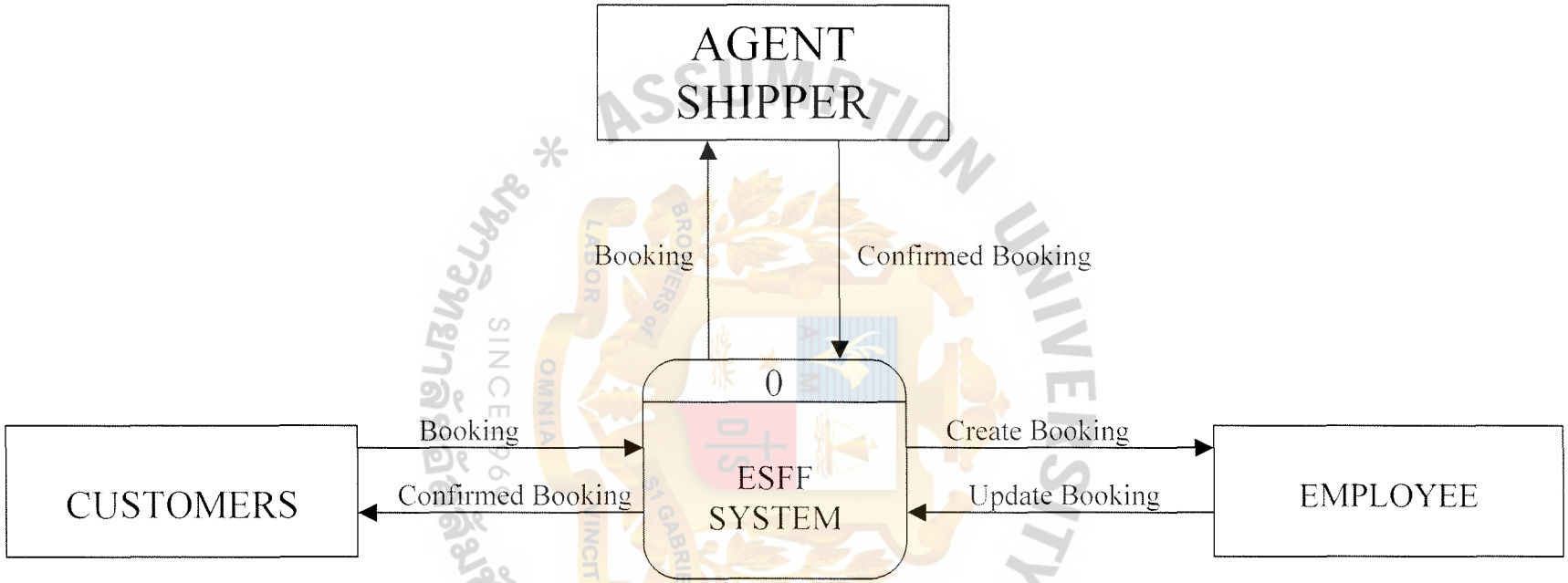

Figure 3.1. Context Diagram for Proposed System.

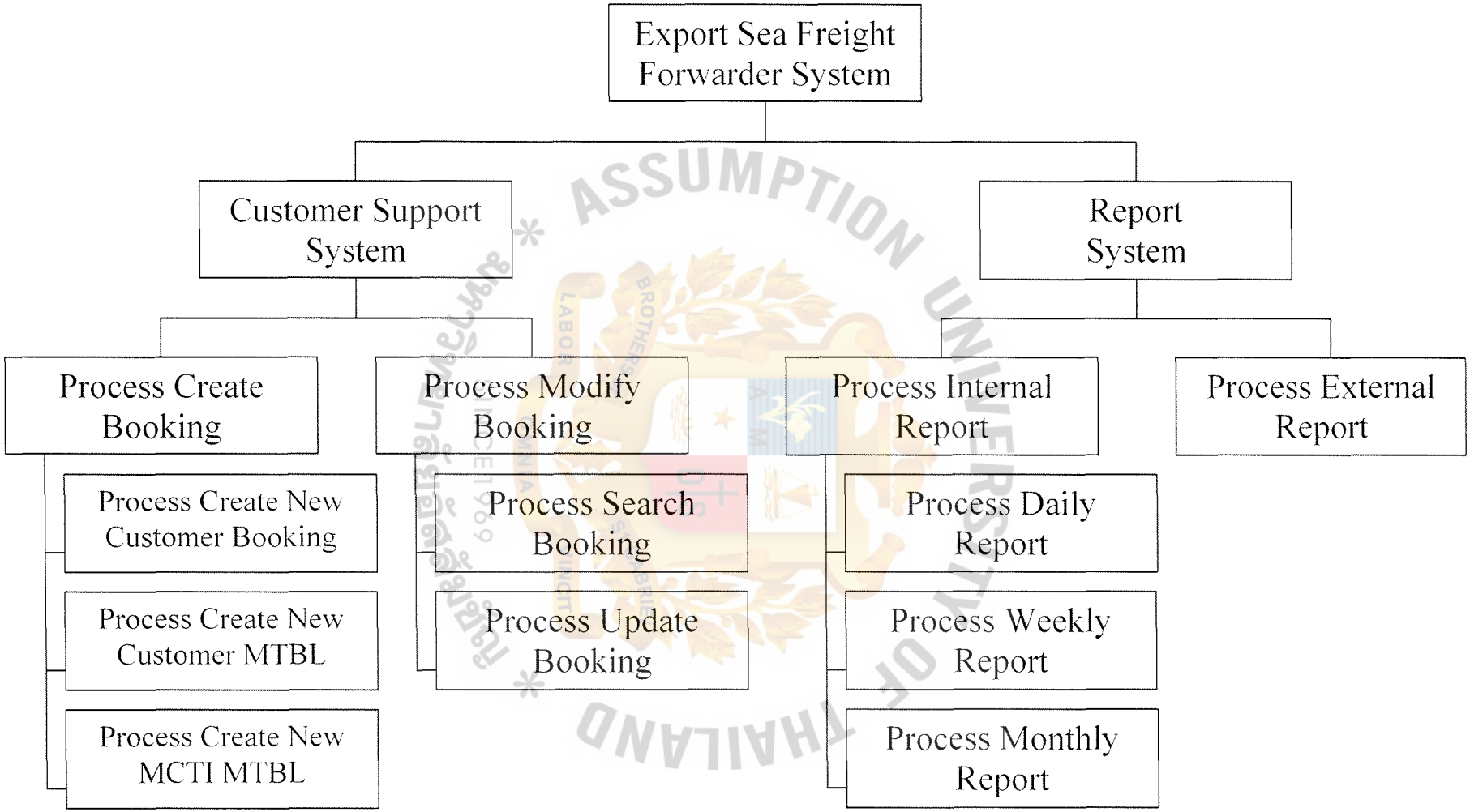

Figure 3.2. A Function Decomposition Diagram – Export Sea Freight Forwarder System.

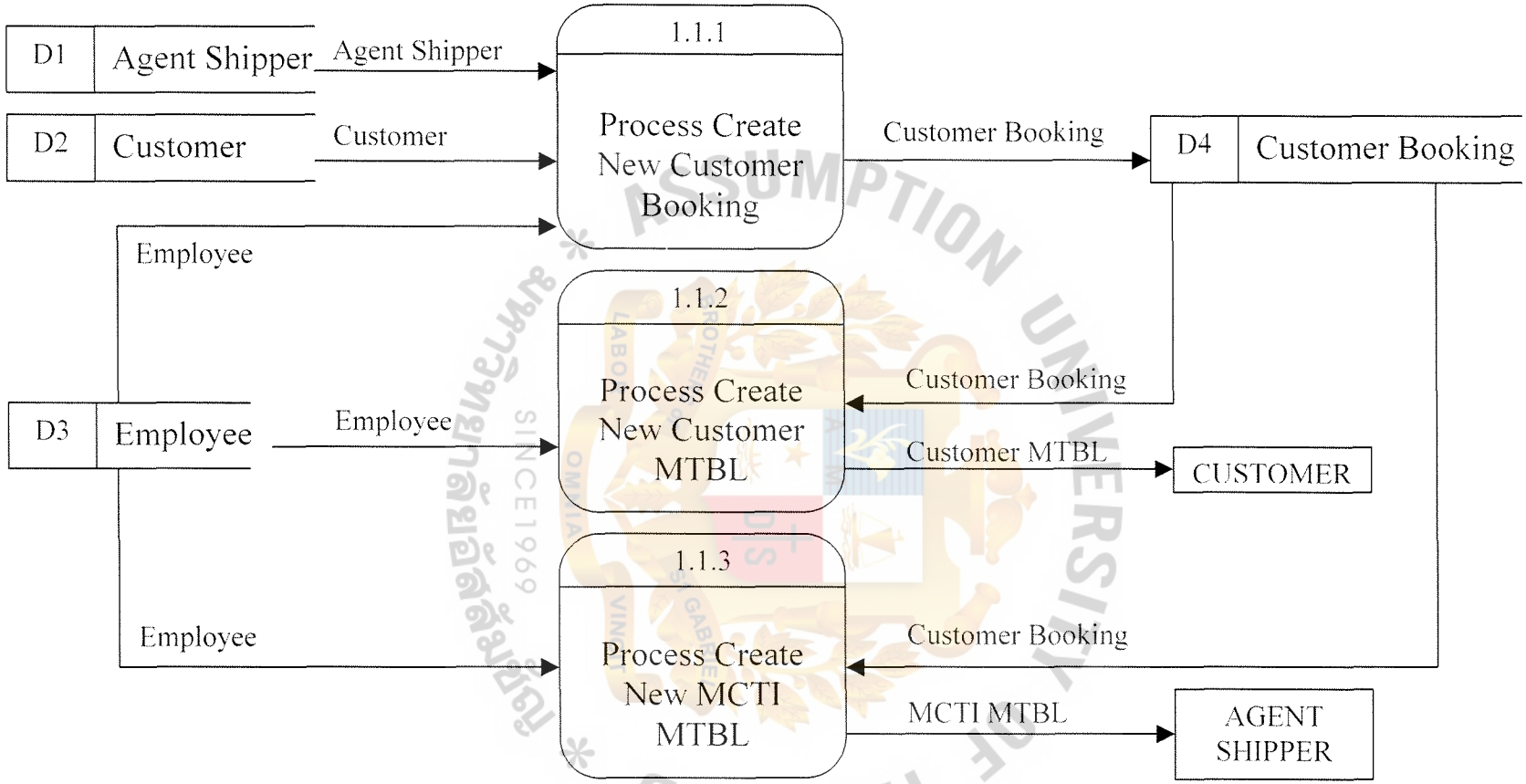

Figure 3.3. Process Create Booking.

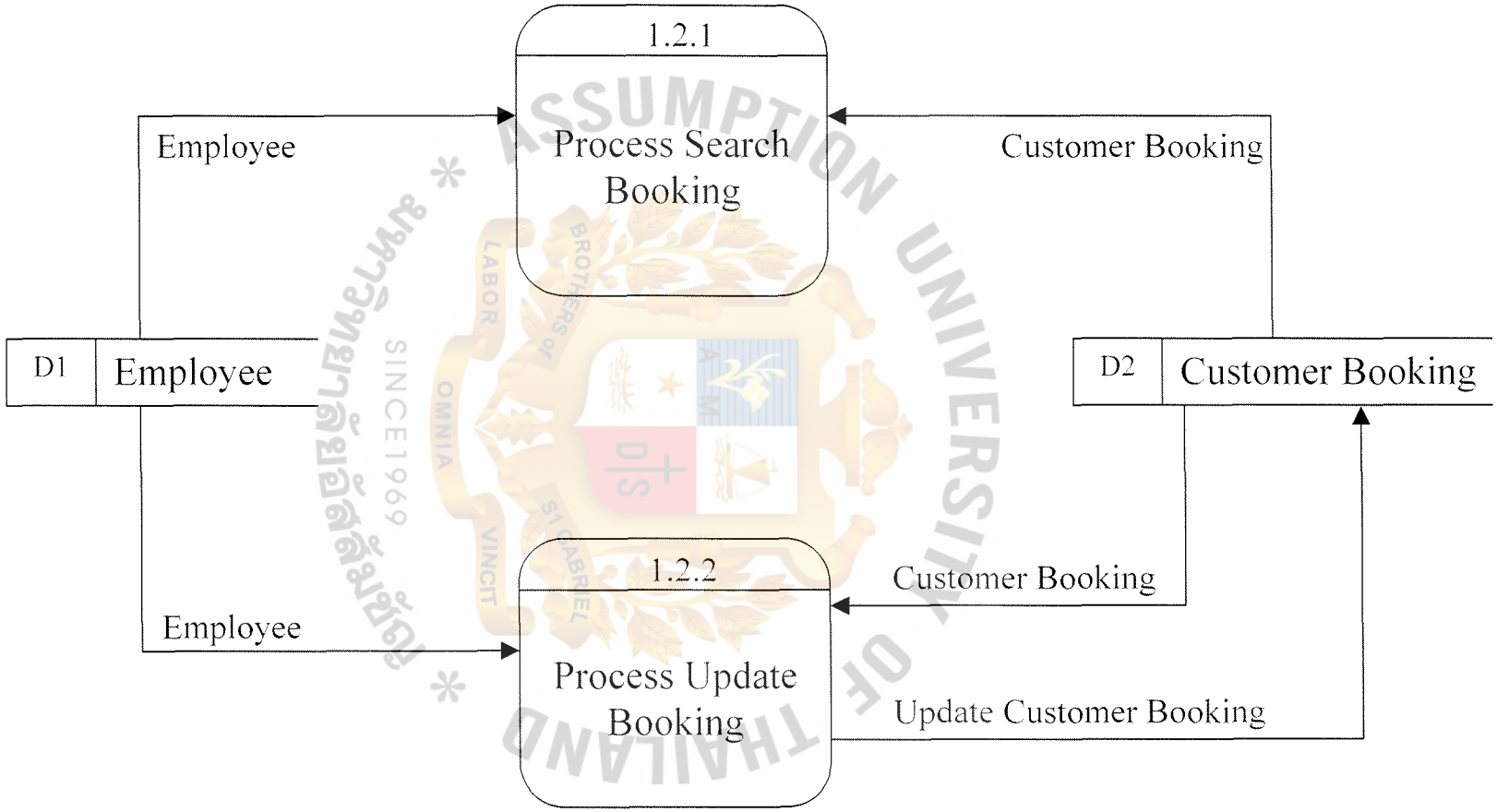

Figure 3.4. Process Modify Booking.

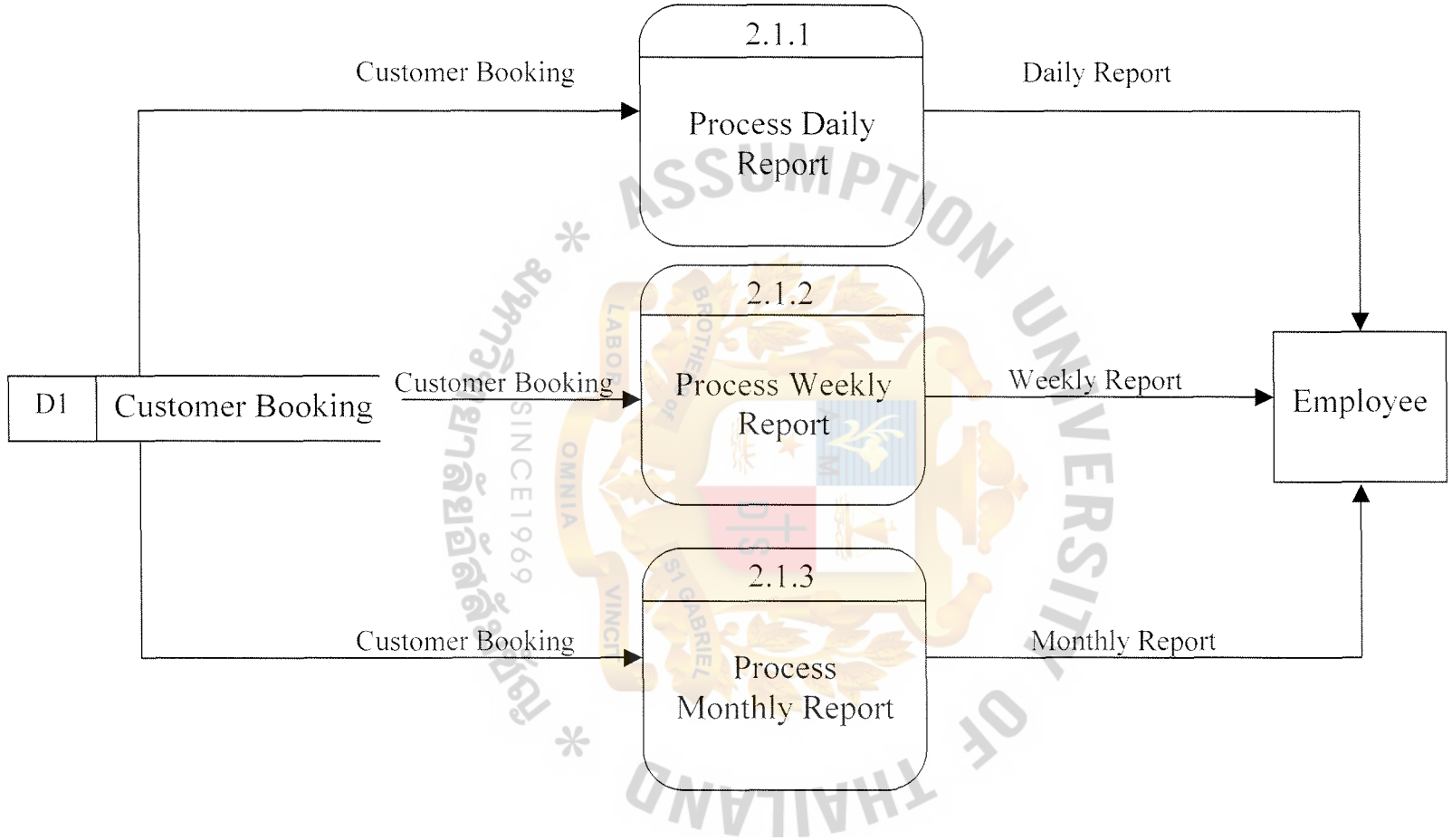

Figure 3.5. Process Internal Report.

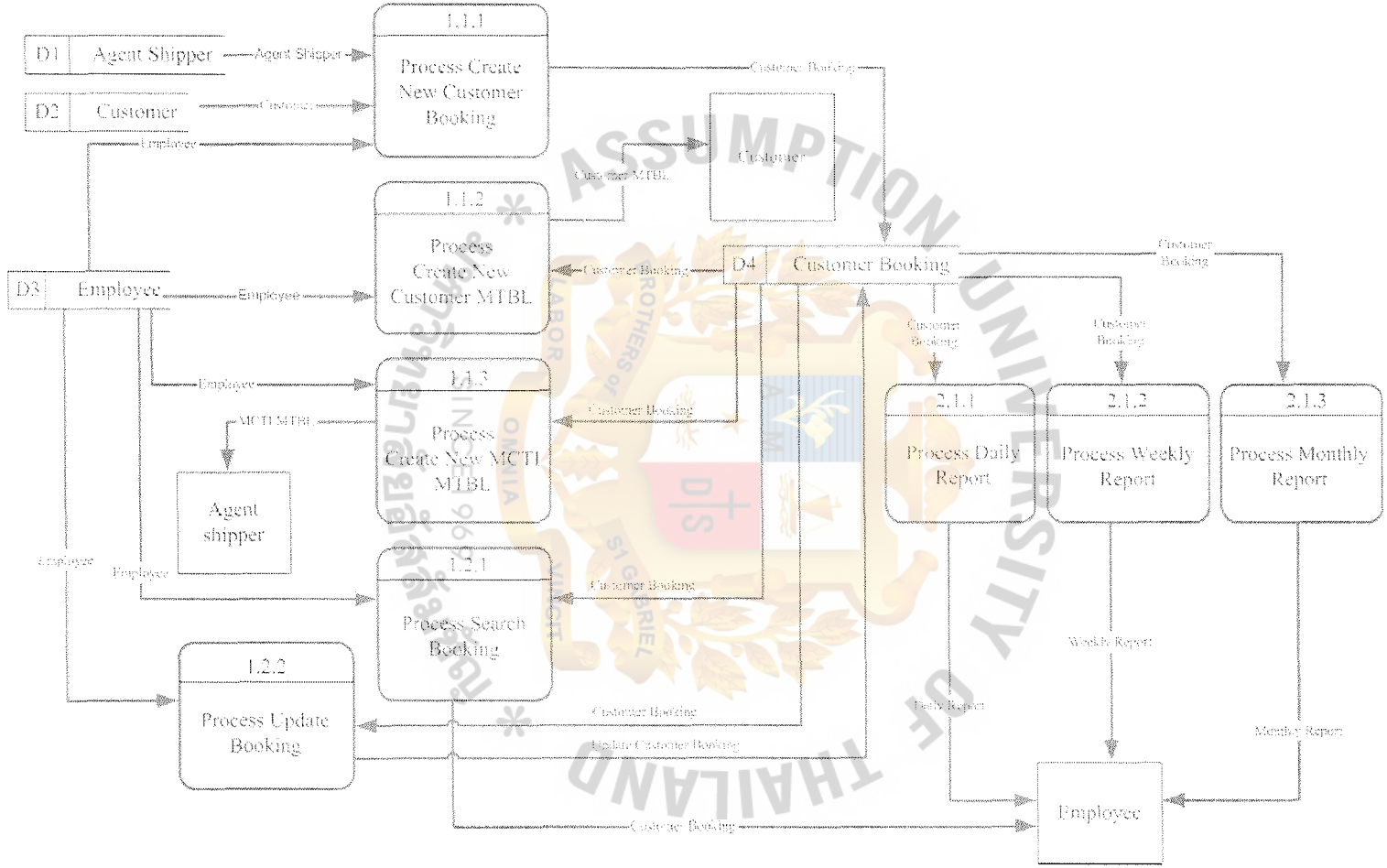

Figure 3.6. Data Flow Diagram of Export Sea Freight Forwarder System.

(2) Database Design

According to business requirements use, useful information is classified into a related data that has been analyzed to be ready for implementation as a simple, not redundant, flexible, and adaptable database. So, the proposed system designed database for organizing and documenting system's data to achieve a target solution the entity relationship diagrams (ER diagrams) is a tool to create database model representing the whole picture of ESFF system's data. These related data will show entities and relationships of proposed system. Appendix A shows the database design of ESFF system. The data dictionary of ESFF system is shown in Appendix B.

(3) Input and Output Design

The input should be simple and designed to reduce the possibility of incorrect data at being entered. The correct data captured will constrain actions of a system to generate most accurate output data that is also used to be collected in database.

The Local area Network (LAN) is the most important foundation in the system. It can display input and output on time from database. Both input and output will be designed easily for users to understand.

(4) User interface

The user interface provides a friendly ease of use by application to process inputs and obtain outputs. User interfaces for this system involved many screens for accomplishment designed system solution. The user interface design is shown in Appendix B.

(5) Software Design

The software design is the last step to complete a system design of a proposed system. After designing the database, input, output, and user interface, then select the appropriate packaged software and computer equipment that should be installed during the system design. The next part presented the specifications programming to implementing the system.

The structured design is used to deal with the size and complexity of selected program. The technique used to design the program is a top-down hierarchy of modules that present the result in an application program, which is easier to implement and maintain.

Typically, structured design requires data flow diagrams to construct the structure chart, tool of this technique to graphically depict a modular design of program. The pictures are illustrated in Figures 3.2 to 3.6. Table 3.1 has been shown Data-To-Process CRUD Matrix.

Table 3.1. Data-To-Process CRUD Matrix.

Entity / Attribute \ Process	Process Create New Cust0mer Booking	Process Create New Customer MTBL	Process Create New MCTI MTBL	Process Search Booking	Process Update Booking	Process Daily Report	Process Weekly Report	Process Monthly Report
AgentShipper								
AgentID	R				R			
CompanyName	R				R			
ContactFName								
ContactLName								
BillingAddress	R				R			
AgentTel								
AgentFax								
AgentEmail								
AgentExt								
Destination	R				R			
ShippingLines	R				R			
Customer								
CusID	R	R	R		R			
CompanyName	R	R	R		R			
ContactFName	R				R			
ContactLName								
BillingAddress	R	R	R		R			
CusTel	R	R	R		R			
CusFax	R	R	R		R			
CusEmail								
CusExt	R							
Employee								
EmpID	R				R			
EmpFName	R				R			
EmpLName								
EmpTitle								
EmpEmail								
EmpExt	R				R			
EmpDept								
CustomerBooking								
BookingNo	C	R	R	R	R	R	R	R
CusID	R	R	R	R	RUD	R	R	R
AgentID	R			R	RUD	R	R	R
EmpID	R			R	RUD			
ShipmentStatus	C			R	RUD			
BookingDate	C			R	R	R	R	R

Table 3.1. Data-To-Process CRUD Matrix (Continued).

Entity / Attribute \ Process	Process Create New Cust0mer Booking	Process Create New Customer MTBL	Process Create New MCTI MTBL	Process Search Booking	Process Update Booking	Process Daily Report	Process Weekly Report	Process Monthly Report
Volume	C			R	RUD	R	R	R
Commodity	C			R	RUD	R	R	R
ShipLoadDate	C			R	RU			
PortDischarge	C	R	R	R	RU	R	R	R
ETDLCB_Date	C			R	R			
ETARUH_Date	C			R	R			
Feeder	C			R	RU			
Vessel	C			R	RU			
Pickup_Date	C			R	R			
Return_Date	C			R	R			
Remark	C				RUD			
ClosingTime	C			R	R			
Before	C			R	R			
Consignee								
ConID		R	R	R	RU			
ConName		R	R	R	RU			
ConTel								
ConFax								
NotifyParty								
NotifyID		R	R	R	RU			
NotifyName		R	R	R	RU			
NotifyTel								
NotifyFax								

3.3 Hardware and Software Requirement

For the new system, the selections of hardware and software specification are the major important points to support system design and implement the proposed system. In addition, the cost of computer hardware and software are not too expensive compared to the past and the performance is either the same or increasing. So, the high quality hard ware software performance with appropriate prices is the best way to reduce cost of implement to get most benefits for business.

The new system requires only one server to provide services needed by any client or workstation. The database must have more efficiency to support business and customer data. It also has a good database management system (DBMS) to manage data extracted or retrieved from different information. The following Tables (3.2 and 3.3) show details of selected hardware and software.

Table 3.2. The Hardware Specification for the Export Sea Freight Forwarder System Server.

Hardware	Specification
CPU	Dual 1000 MHz, Pentium IV, or higher
Cache	512 MB, or higher
Memory	256 MB or higher
Hard Disk	20 GB or higher
CD-ROM Drive	40X or higher
Floppy Drive	1.44 MB
Network Adapter	Ethernet 100-BaseT, HUB&LAN Card UTP
Display Adapter	SVGA Card
Monitor	15" monitor
Printer	Hewlett Packard Laser Jet
Hub	10/100mbps 24 ports
UPS	UPS, Leonics Accura 1050 VA.

Table 3.3. The Software Specification for the Export Sea Freight Forwarder System Server.

Software	Specification
Operating System	Microsoft Windows 2000 Server
Database Server	Microsoft Access
Virus Scan	McAfee Virus Scan 5.15

The client of the proposed system has 5 computers in the International Logistics department because the main reason to implement a new system is to reduce the cost of office staff and the server should be more efficient to support any complicated data by on-line communication. The current/selected hardware and software are shown in Tables 3.4 and 3.5 below.

Table 3.4. The Hardware Specification for Client.

Hardware	Specification
CPU	1000 MHz, Intel Pentium IV, or higher
Memory	128 MB or higher
Hard Disk	4 GB or higher
CD-ROM Drive	40X or higher
Floppy Drive	1.44 MB
Network Adapter	Ethernet 100-BaseT, HUB&LAN Card UTP
Display Adapter	SVGA Card
Display	15" monitor
UPS	UPS, Leonics PC Mate 500VA

Table 3.5. The Software Specification for Client.

Software	Specification
Operating System	Microsoft Windows 200 (or higher)
Application Software	Microsoft Office 2000 Profession Edition
Virus Scan	McAfee Virus Scan

3.4 Security Control

The security of the proposed system is significant to control the mistakes that happened from starting the process through the end as business concerns the corrective communication. The proceeding data entry must be accurate. The security control of processes occurring in the system that are following:

(1) Add, update, or search booking: As mentioned, since this system concerns directly the ESFF staff who contacts directly to many customers, the requirements of each customer are extremely different. The first step security control is to prevent any ESFF staffs that operate the missing data while gaining entry to the system.

(2) Backup data: ESFF system has modified data that will be kept to create backup copies every time in database and generate update data.

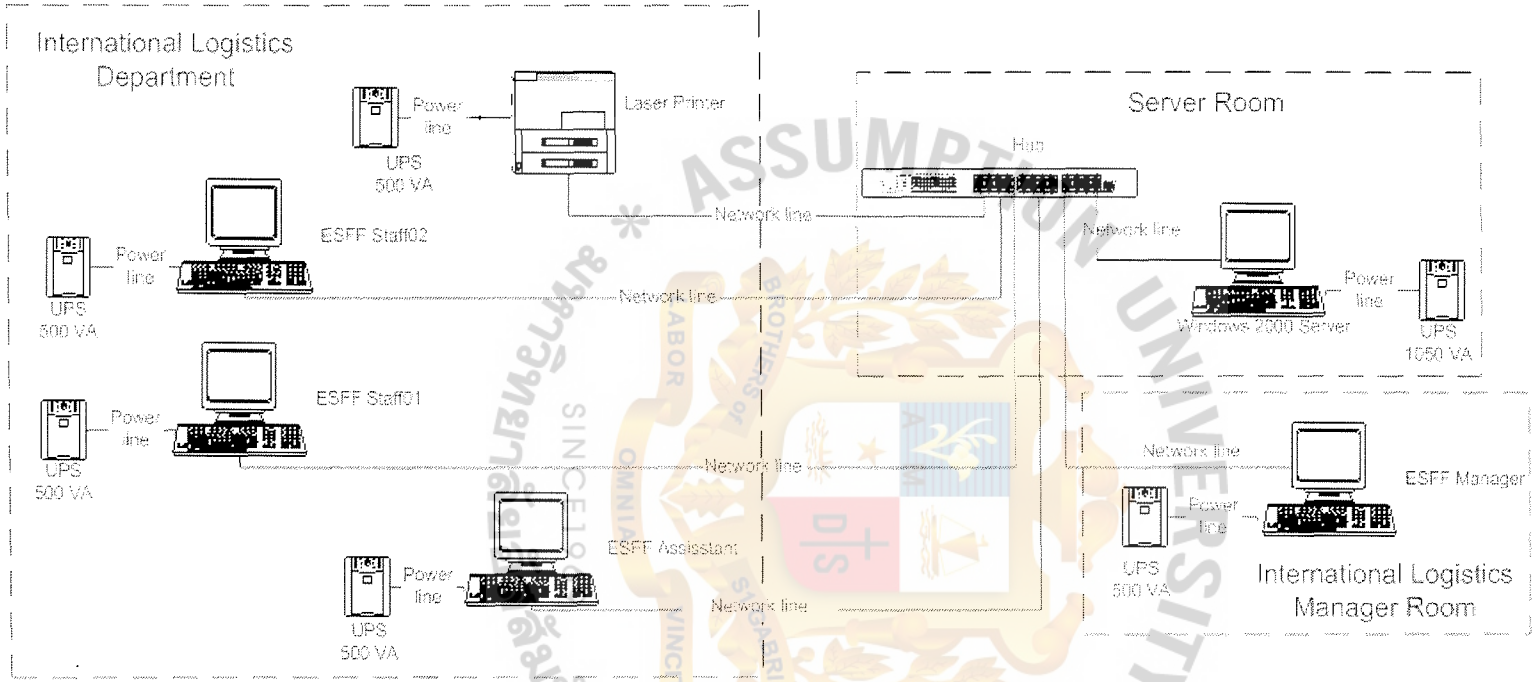

Figure 3.7. The Network Configuration Export Sea Freight Forwarder System.

3.5 System Cost and Benefit Analysis

(1) Feasibility Analysis

Table 3.6. 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.	International Logistics in relation to support one or more business function and information system.	COTs package would be purchased and customized to satisfy International Logistics required functionality.	Same as candidate 1.
Benefits: Brief description of the business benefits what would be realized for this candidate.	Easy to develop, and users are familiar with the application software.	This solution can be implemented rapidly so we have more time to develop another areas.	Fully and systematically supports users required International Logistics function for one company.
Server and Workstations: A description of the server and workstation needed to support this candidate.	MS Windows 2000 for server and MS Windows 98 or above for workstation.	Technically architecture dictates Pentium III or above, MS Windows 2000 advance servers and workstation.	Same as candidate 2.

Table 3.6. 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., database management system, operating systems, languages, etc.). Not generally applicable if applications software packages are to be purchased.	MS Access for customization of package or data to provide application software, report writing and integration.	MS Visual Basic 6.0.	Same as Candidate 2.
Application Software: A description of the software to be purchased, built, accessed, or some combination of these techniques.	Package or data solution.	Customized solution.	Same as candidate 2.
Method of Data Processing: Generally some combination of: on-line, batch, deferred batch, remote batch, and real-time.	Client/Server	Same as candidate 1.	Same as candidate 1.
Output Devices and Implications: A description of output devices that would be used, special output requirement (e.g., network, etc.), and output considerations (e.g., timing constraints)	1. Hewlett Packard Laser Jet. All internal screen will be designed for SVGA resolution.	Same as candidate 1.	Same as candidate 1.

Table 3.6. 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.), and input considerations (e.g., timing of actual inputs).	Keyboard and mouse.	Same as candidate 1.	Same as candidate 1.
Storage Devices and Implications: Brief description of what data would be stored, what data would be accessed from existing stores, what storage media would be used, how much storage capacity would be needed, and how data would be organized.	HD Seagate 15 GB arrayed capability	Same as candidate 1.	Same as candidate 1.

Table 3.7. Feasibility Analysis Matrix.

Feasibility	Wt.	Candidate 1	Candidate 2	Candidate 3
Operational Feasibility Functionality: A description of to what degree the candidate would be benefit the organization and how well the system would work. Political: A description of how well received this solution would be from user management, user, and organization perspective.	35%	Easy to develop but not support all functions of International Logistics Management. Score: 65	Fully supports user required functionality. Score: 80	Fully and efficiently support user by using own developed system. Score: 100
Technical Feasibility Technology: An assessment of the maturity, availability (or ability to acquire), and desirability of the computer technology needed to support this candidate. Expertise: An assessment of the technical expertise needed to develop, operate, and maintain the candidate system.	35%	Require MS Office 2000 No need additional training. Score: 65	Purchased COTs software package. Maturity of product is a risk. Required to train expertise to perform COTs. Score: 80	Require VB version 6.0 and MS Access. Required to train and hire expertise to perform a developing program. Score: 100
Economic Feasibility: Cost to develop: Net present value: Detailed calculations:	20%	See table 3.8 Score: 80	Score: 85	Score: 95

Table 3.7. Feasibility Analysis Matrix (Continued).

Feasibility	Wt.	Candidate 1	Candidate 2	Candidate 3
Schedule Feasibility: An assessment of how long the solution will take to design and implement.	10%	At least 3 months.	Less than 2 months.	4 months.
Ranking	100%	77%	87.25%	90%

(2) Costs of Existing System

Table 3.8. Existing System Cost Analysis, Baht.

Cost items		Years				
		1	2	3	4	5
Fixed Cost						
Personal computer	5 units @20,770	103,850.00	-	-	-	-
Calculator	6 units @200	1,200.00	-	-	-	-
Printer	1 unit @10,150	10,150.00	-	-	-	-
Total Fixed Cost		115,200.00	-	-	-	-
Operating Cost						
Salary Cost:						
International Logistics Manager 1 person @27,000		27,000.00	29,700.00	32,670.00	35,937.00	39,530.70
Staff:						
Assistant	1 person @12,000	12,000.00	13,200.00	14,520.00	15,972.00	17,566.20
Staff	4 persons @10,000	40,000.00	44,000.00	48,400.00	53,240.00	58,564.00
Total Monthly Salary Cost		79,000.00	86,900.00	95,590.00	105,149.00	115,660.90
Total Annual Salary Cost		948,000.00	1,042,800.00	1,147,080.00	1,261,788.00	1,387,930.80
Office Supplies & Miscellaneous Cost:						
Stationary	Per Annual	3,000.00	3,300.00	3,630.00	3,993.00	4,392.30
Paper	Per Annual	7,000.00	7,700.00	8,470.00	9,317.00	10,248.70
Utility	Per Annual	5,000.00	5,500.00	6,050.00	6,655.00	7,320.50
Miscellaneous	Per Annual	2,000.00	2,200.00	2,420.00	2,662.00	2,928.20
Total Annual Office Supplies & Miscellaneous Cost		17,000.00	18,700.00	20,570.00	22,627.00	24,889.70
Total Annual Operating Cost		965,000.00	1,061,500.00	1,167,650.00	1,284,415.00	1,412,820.50
Total Existing System Cost		1,080,200.00	1,188,220.00	1,307,042.00	1,437,746.20	1,581,520.80

Table 3.9. Five Years Accumulated Existing System Cost, Baht.

Year	Total Existing System Cost	Accumulated Cost
1	1,080,200.00	1,080,200.00
2	1,188,220.00	2,268,420.00
3	1,307,042.00	3,575,462.00
4	1,437,746.20	5,013,208.20
5	1,581,520.80	6,594,729.00
Total	6,594,729.00	-

(3) Costs of Proposed System

Table 3.10. Proposed System Cost Analysis, Baht.

Cost items		Years				
		1	2	3	4	5
Fixed Cost						
Hardware Cost:						
Computer Server Cost	1 unit @185,500	186,500.00	186,500.00	186,500.00	186,500.00	186,500.00
UPS 1050VA Cost	1 unit @8,550	8,550.00	8,550.00	8,550.00	8,550.00	8,550.00
UPS 500AV Cost	5 units @2,400	12,000.00	12,000.00	12,000.00	12,000.00	12,000.00
Hub Cost	1 unit @30,500	30,500.00	30,500.00	30,500.00	30,500.00	30,500.00
Total Hardware Cost		237,550.00	237,550.00	237,550.00	237,550.00	237,550.00
Maintenance Cost:						
Maintenance Cost		-	-	-	15,000.00	14,000.00
Total Maintenance Cost		-	-	-	15,000.00	14,000.00
Software Cost:						
Network & software Cost		12,000.00	12,000.00	12,000.00	12,000.00	12,000.00
Total Software Cost		12,000.00	12,000.00	12,000.00	12,000.00	12,000.00
Implementation Cost:						
Advanced Training Cost		25,000.00	-	-	-	-
Basic Training Cost		30,000.00	-	-	-	-

Table 3.10. Proposed System Cost Analysis, Baht (Continued).

Cost items	Years				
	1	2	3	4	5
Set up Cost	17,500.00	-	-	-	-
Total Implementation Cost	72,500.00	-	-	-	-
Office Equipment Cost:					
Calculator 6 units @200	1,200.00	-	-	-	-
Total Office Equipment Cost	1,200.00	-	-	-	-
Total Fixed Cost	323,250.00	249,550.00	249,550.00	264,550.00	263,550.00
Operating Cost					
People-Ware Cost:					
International Logistics Manager 1 person @27,000	27,000.00	29,700.00	32,670.00	35,937.00	39530.70
Staff:					
Assistant 1 person @12,000	12,000.00	13,200.00	14,520.00	15,972.00	17,566.20
Staff 2 persons @ 10,000	20,000.00	22,000.00	24,200.00	26,620.00	29,282.00
Total Monthly Salary Cost	59,000.00	64,900.00	71,390.00	78,529.00	86,378.70
Total Annual Salary Cost	708,000.00	778,800.00	856,680.00	942,348.00	1,036,544.40
Office Supplies & Miscellaneous Cost:					
Stationary 2,000 per month	24,000.00	26,400.00	29,040.00	31,944.00	35,138.40
Paper 900 per month	10,800.00	11,880.00	13,068.00	14,374.80	15,812.28
Utility 1,900 per month	22,800.00	25,080.00	27,588.00	30,346.80	33,381.48
Miscellaneous 700 per month	8,400.00	9,240.00	10,164.00	11,180.40	12,298.44
Annual Office Supplies & Miscellaneous Cost	66,000.00	72,600.00	79,860.00	87,846.00	96,630.60
Total Operating Cost	774,000.00	851,400.00	936,540.00	1,030,194.00	1,133,177.40
Total Proposed System Cost	1,097,250.00	1,100,950.00	1,186,090.00	1,295,344.00	1,396,727.40

Table 3.11. Five Years Accumulated Proposed System Cost, Baht.

Year	Total Proposed System Cost	Accumulated Cost
1	1,097,250.00	1,097,250.00
2	1,100,950.00	2,198,200.00
3	1,186,090.00	3,384,290.00
4	1,295,344.00	4,679,634.00
5	1,396,727.40	6,076,361.40
Total	6,076,361.40	-

(4) The Comparison of the System Costs between Proposed System and Old System

Table 3.12. The Comparison of the System Costs, Baht.

Year	Accumulated Existing Cost	Accumulated Proposed Cost
1	1,080,200.00	1,097,250.00
2	2,268,420.00	2,198,200.00
3	3,575,462.00	3,384,290.00
4	5,013,208.20	4,679,634.00
5	6,594,729.00	6,076,361.40

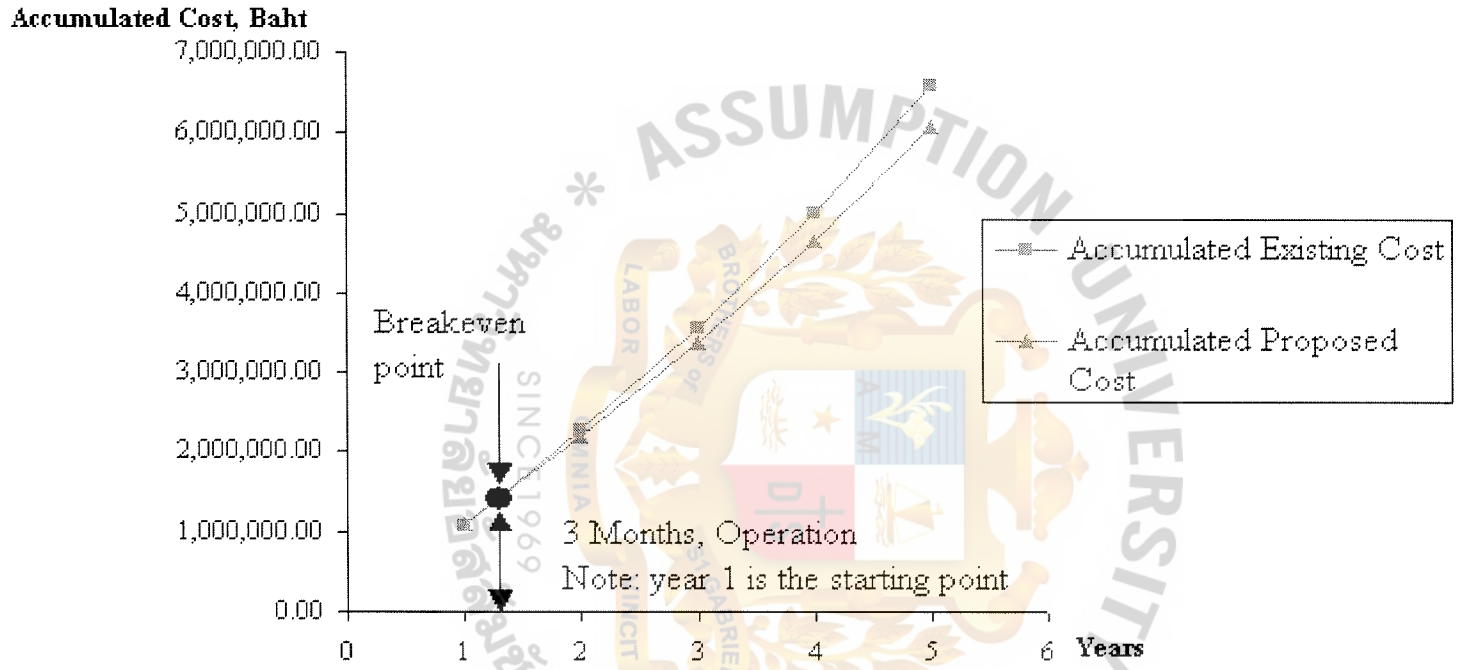

Figure 3.8. Cost Comparison between Old and Proposed System.

(5) Payback Analysis

The following cost items are required, and are shown in Table 3.10.

Investment Cost:

Hardware cost	237,550 Baht
Software cost	12,000 Baht
Advanced Training cost	25,000 Baht
Basic Training cost	30,000 Baht
Set up cost	17,500 Baht
Office Equipment cost	1,200 Baht
Total Investment cost	323,250 Baht

Annual Operating Cost:

People-ware cost	708,000 Baht
Office Supplies & Miscellaneous cost	66,000 Baht
Total Annual Operating Cost	774,000 Baht

Annual Cost:

The formula of annual cost of the proposed system is

Annual cost = (Investment Cost/Estimated System Life) + Annual Operation Cost

= (323,250 / 5) + 774,000

= 838,650 Baht

Saving:

Staff	240,000 Baht
Office Supplies & Miscellaneous	899,000 Baht
Total Saving	1,139,000 Baht

Table 3.13. Payback Analysis for the Proposed ESFF System, Baht.

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Development Cost:	323,250.00						
Operation & Maintenance cost:		774,000.00	851,400.00	936,540.00	1,030,194.00	1,133,213.40	1,246,534.74
Discount factor for 10 %	1.000	0.909	0.826	0.751	0.683	0.621	0.564
Time adjusted costs (adjusted to present value):	323,250.00	703,566.00	703,256.40	703,341.54	703,622.50	703,725.52	703,045.59
Cumulative time-adjusted costs over life time	323,250.00	1,026,816.00	1,730,072.40	2,433,413.94	3,137,036.44	3,840,761.96	4,543,807.55
Benefits derived from operation of proposed system:	-	1,139,000.00	1,252,900.00	1,378,190.00	1,516,009.00	1,667,609.90	1,834,370.89
Discount factor for 10 %	1.000	0.909	0.826	0.751	0.683	0.621	0.564
Time adjusted benefits (adjusted to present value):	-	1,035,351.00	1,034,895.40	1,035,020.69	1,035,434.14	1,035,585.74	1,034,585.18
Cumulative time-adjusted benefits over life time:	-	1,035,351.00	2,070,246.40	3,105,267.09	4,140,701.23	5,176,286.97	6,210,872.15
Cumulative benefit – cost over life time:	-323,250.00	8,535.00	340,174.00	671,853.15	1,003,664.79	1,335,525.01	1,697,064.60

Payback period is the commonly used technique to assess the value of an investment. Generally, payback period is the period that investment takes to recover the initial investment. To reflect the real value of money, the time value of money concept is also applied in this analysis. A discount rate is also required to calculate discounted value or the present value of all costs and benefits. Then the Payback period is calculated to judge the profitability of the system. (See: Table 3.13. and Figure 3.9).

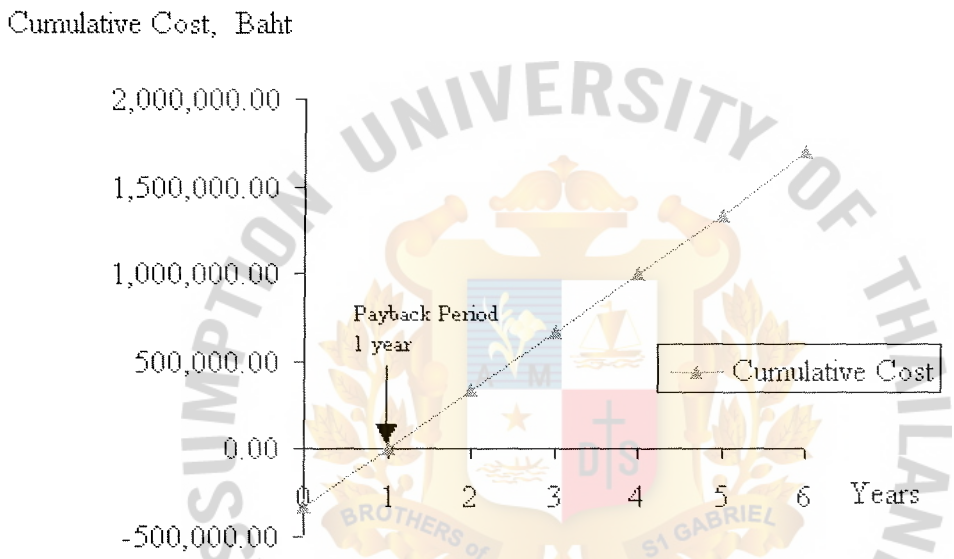

Figure 3.9. Payback Period of ESFF System.

As shown in Figure 3.10 the graph of cumulative cost of proposed system crosses the x-axis at 1 year, which means the payback period of the proposed system is 1 year.

Moreover, the payback period can be calculated by the formula as follows:

$$P = \text{Last year of negative Cash flow difference} + \frac{\text{Cumulative different last negative year}}{\text{Absolute value of cumulate difference (last negative plus first year positive year)}}$$

Where P = Payback Period

$P = 1 + \{(323{,}250.00 / (323{,}250.00 + 8{,}535.00)\}$

$= 1.97$ years or around 2 years

(6) Return-on-Investment Analysis (ROI)

Return-on-Investment Analysis technique compares the lifetime profitability of alternative solutions or projects. The ROI for a project is a percentage rate that measures the relationship between the amounts the business gets back from an investment and the amount invested. The ROI for the proposed project is calculated by using the data from Table 3.11 as follows:

ROI = (Estimated lifetime benefits – Estimated lifetime costs) / Estimated lifetime costs

ROI = ((6,210,872.15 – 4,543,807.55)/4,543,807.55) x 100

= 0.37 x 100

= 37%

Therefore, the lifetime ROI is 37 percent. Simple division by the lifetime of the system yields an average ROI of 6.16 percent per year.

IV. PROJECT IMPLEMENTATION

4.1 Overview of Implementation

System Implementation is the planned and orderly conversion from a current existing system to the newly proposed information system. The final design should be evaluated first to make sure that the newly proposed system can meet the desired goals and objectives, and then the other remaining processes will be performed. The typical processes of the System Implementation are:

(1) Hardware setup and installation

(2) Software implementation

(3) Data preparation

(4) Testing

(5) Personnel training

(6) Maintenance

(7) Documentation

Moreover, it also involves fine-tuning system elements, in order to maximize the system efficiency and productivity.

4.2 Hardware Setup and Installation

(a) Design location to install computer system in MC TRANS (Thailand) Co., Ltd.

(b) Installation hardware part such as computer server, ups, and hub.

(c) Setup hardware configuration

4.3 Software Implementation

(a) Install operating system

(b) Setup software configuration

(c) Running the program

(d) Testing whether it can work or not

4.4 Data Preparation

Data in proposed system should be added via application program.

4.5 Testing

Tested to run application program and check the results. If it is correct, the proposed system is running fine. If there are some problems, checking the concerning problems, then correct the problems. Test the application program again since there are no more errors.

4.6 Personnel Training

Personnel Training is the process to prepare people for the proposed system. Some people do not know how to operate the proposed system. We should have training courses to help users understand how the proposed systems work and how to create reports. Distribute overview of the designed application program, so users can use this information to analyze in the future.

4.7 Maintenance

After implementation of the new system, we still need to maintain the system and advise the users, if they have problems concerning the application of the program.

4.8 Documentation

Documentation is the essential element in helping solve the problems that might happen in the future. Corrected and completed documentations are essential. Therefore, we should make the official document for hardware and software configuration also include how to use the application program.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The manual system of the company is a time consuming process. It takes much time to get response after the customers send their request or order. The slowness of these processes, especially when a job request is from a lot of customers, can make the company lack business opportunities.

This ESFF system is proposed to increase the efficiency of the manual system. It can provide faster transaction time and is also intended to facilitate the employee's tasks and help the company to utilize the people and resources effectively.

The proposed system consists of one server connected to the company LAN and implemented on the Microsoft Access and Visual Basic 6 application program. The cost analysis of the proposed system is determined by using payback method and break-even point between existing system and proposed system. At the beginning, the proposed system costs higher than the existing system but in 1 year and 3 months, both systems will cost the same and then the accumulating cost of proposed system will be lower. The payback period of the proposed system is 1 year and the ROI is 37 percent in 5 years (system lifetime). The new system can also increase the security and control of the information in the system. It uses passwords to ensure that only authorized users can enter the system, access the information. The proposed system has several benefits. After system development and implementation; it was found that the system meets all the project objectives. The time required to finish a booking request is shorter and the number of staff in the department is also reduced. The new system is also considered user friendly and can provide many useful information that the existing system cannot generate such as management report. Many processes of the proposed system can also be finished in less time than the existing system.

Table 5.1 is the table of achievements that show the time performance on each process of the proposed system compared to the existing system.

Table 5.1. The Degree of Achievement of the Proposed System.

Process	Existing System	Proposed System
Create Booking	10 minutes	5 minutes
Modify Booking	15 minutes	5 minutes
Internal Report	Non	1 minute

From the table, the time required to finish each process of the computerized system is a lot less than the existing system. In the existing system, most processes are done manually, the time taken to operate all work steps takes quite a long time.

Summary of this project

(1) This project improved the sequence of the workflow for:

(a) Input Process: this project provided application program for users. It can easily input data from application program.

(b) Data Processing Process: application program keeps data in database and is more convenient for data processing.

(c) Output Process: this project provides friendly user interface for application program and report.

(2) The project implementation included:

(a) Hardware setup and installation

(b) Software implementation

(c) Data preparation

(d) Testing

(e) Personnel training

(f) Maintenance

(g) Documentation

5.2 Recommendations

There are some recommendations that the company has to consider in order to expand this project.

(1) After the ESFF system is implemented, the company should continuously monitor the working procedure and look at the feedback of the system.

(2) Users should be involved in all processes to spell out their requirements and provide feedback to system analyst and programmer. Consequently, the company can ensure that the new system will meet all user requirements and that program will not change much in the future.

(3) Company should emphasize the security and control technology. New techniques or methods should be added more in the system to increase the security and to reduce errors in the system.

APPENDIX A

DATABASE DESIGN

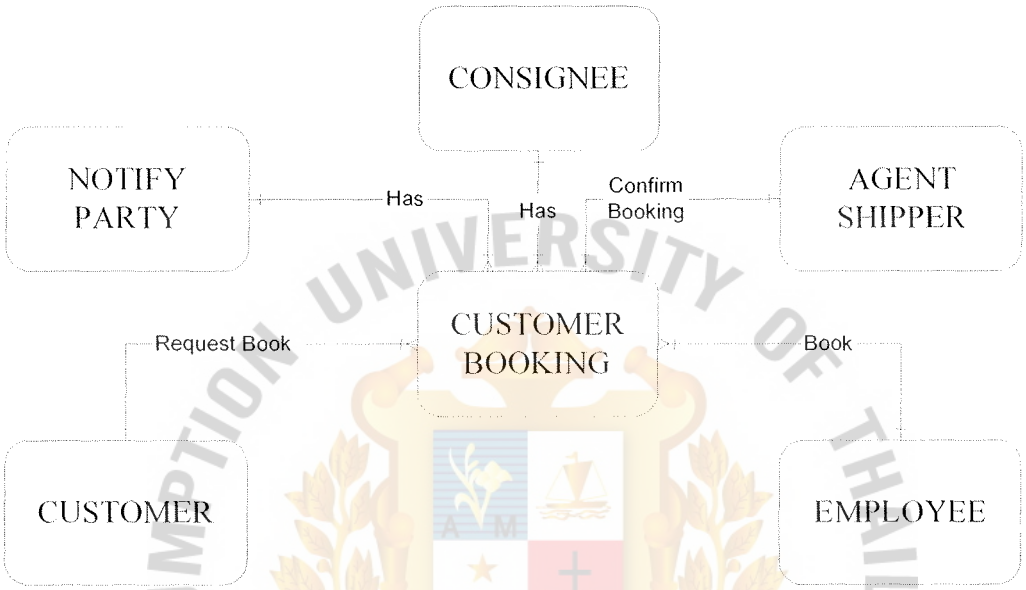

Figure A.1. Context Level Entity Relationship Diagram of ESFF System.

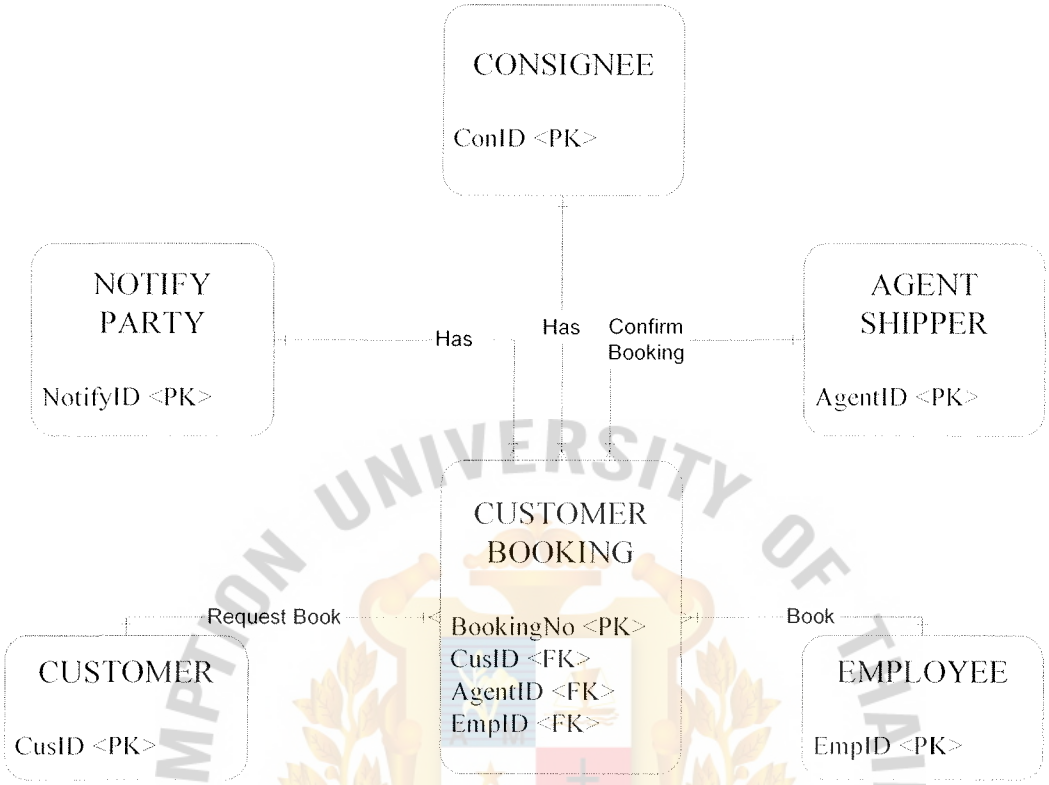

Figure A.2. Key-Based Attributed Entity Relationship Diagram of ESFF System.

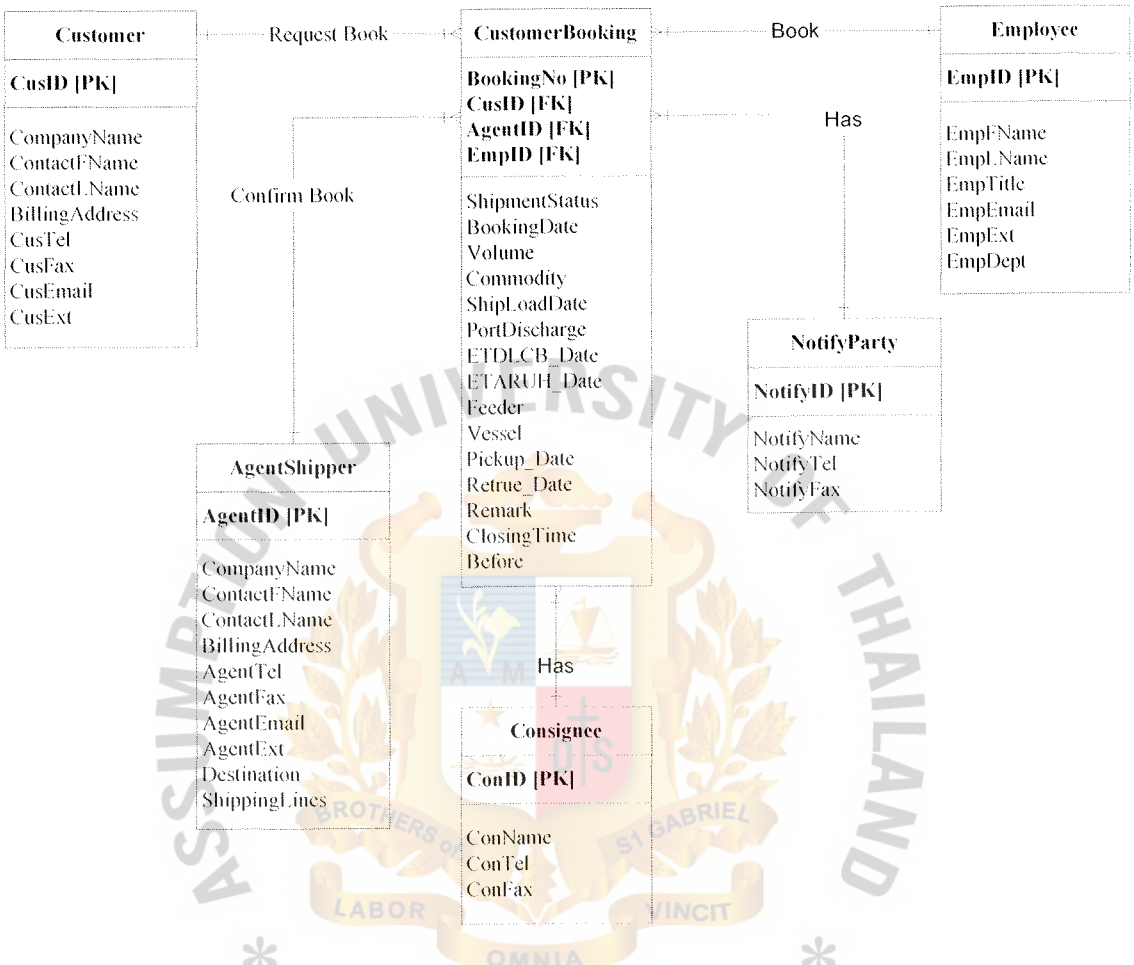

Figure A.3. Fully Attributed Entity Relationship Diagram of ESFF System.

APPENDIX B

DATA DICTIONARY

DATA DICTIONARY

Table B.1. Name: AgentShipper.

Field Name	Type	Length	Domain	Key Constraint	Description
AgentID	Integer	5		PK	Identification number of agent shipper
CompanyName	Text	50			Company name of agent shipper
ContactFName	Text	50			Agent shipper contact first name
ContactLName	Text	50			Agent shipper contact last name
BillingAddress	Text	255			Agent shipper address
AgentTel	Text	30			Agent shipper telephone number
AgentFax	Text	30			Agent shipper fax number
AgentEmail	Text	50			Agent shipper email address
AgentExt	Text	30			Agent shipper extension
Destination	Text	50			Destination
ShippingLines	Text	50			Shipping Lines

Table B.2. Name: Customer.

Field Name	Type	Length	Domain	Key Constraint	Description
CusID	Integer	5		PK	Identification number of customer
CompanyName	Text	50			Company name of customer
ContactFName	Text	50			Customer contact first name
ContactLName	Text	50			Customer contact last name
BillingAddress	Text	255			Customer address
CusTel	Text	30			Customer telephone number
CusFax	Text	30			Customer fax number
CusEmail	Text	50			Customer email address
CusExt	Text	30			Customer extension

Table B.3. Name: Employee.

Field Name	Type	Length	Domain	Key Constraint	Description
EmpID	Integer	5		PK	Identification number of employee
EmpFName	Text	50			First name of employee
EmpLName	Text	50			Last name of employee
EmpTitle	Text	50			Employee title
EmpEmail	Text	50			Employee email address
EmpExt	Text	30			Employee extension
EmpDept	Text	50			Employee department name

Table B.4. Name: CustomerBooking.

Field Name	Type	Length	Domain	Key Constraint	Description
BookingNo	Text	20		PK	Number of customer booking
CusID	Integer	5		FK	Identification number of customer
AgentID	Integer	5		FK	Identification number of agent shipper
EmpID	Integer	5		FK	Identification number of employee
ShipmentStatus	Text	50			Status of shipment
BookingDate	Date	10	DD/MM/YYYY		Created date of customer booking
Volume	Text	50			Volume of commodity
Commodity	Text	50			Commodity
ShipLoadDate	Date	10	DD/MM/YYYY		Shipping loading date
PortDischarge	Text	50			Port of discharge
ETDLCB_Date	Date	10	DD/MM/YYYY		Date of ETD LCB
ETARUH_Date	Date	10	DD/MM/YYYY		Date of ETA RUH
Feeder	Text	50			Feeder
Vessel	Text	50			Vessel
Pickup_Date	Date	10	DD/MM/YYYY		Pick up date
Return_Date	Date	10	DD/MM/YYYY		Return date
Remark	Text	255			Remark
ClosingTime	Date	10	DD/MM/YYYY		Closing Time
Before	Text	50			Before ship

Table B.5. Name: Consignee.

Field Name	Type	Length	Domain	Key Constraint	Description
ConID	Integer	5		PK	Identification number of consignee
ConName	Text	255			Consignee name
ConTel	Text	30			Consignee telephone number
ConFax	Text	30			Consignee fax number

Table B.6. Name: NotifyParty.

Field Name	Type	Length	Domain	Key Constraint	Description
NotifyID	Integer	5		PK	Identify number of notify
NotifyName	Text	255			Notify name
NotifyTel	Text	30			Notify telephone number
NotifyFax	Text	30			Notify

APPENDIX C

STRUCTURE CHART

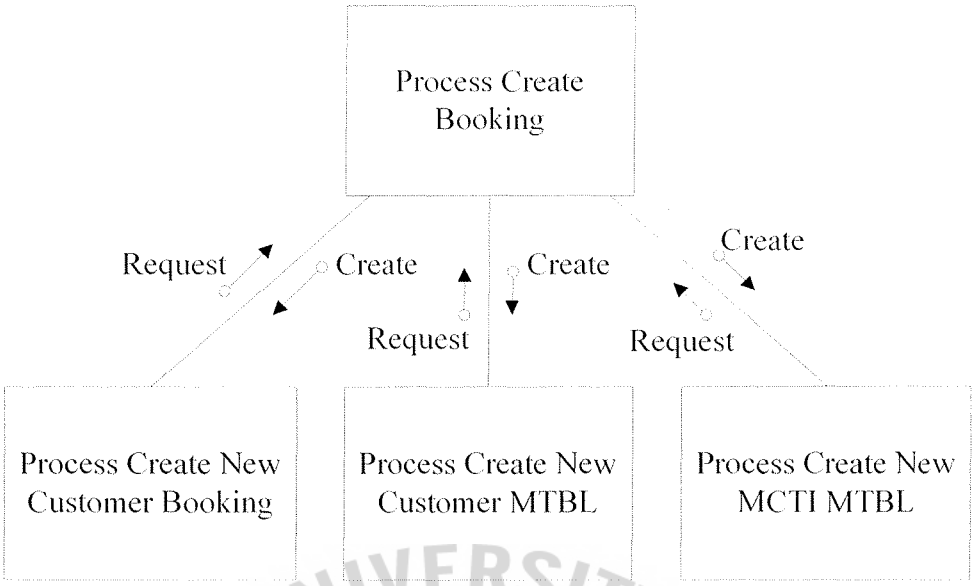

Figure C.1. Structure Chart of Process Create Booking.

Figure C.2. Structure Chart of Process Modify Booking.

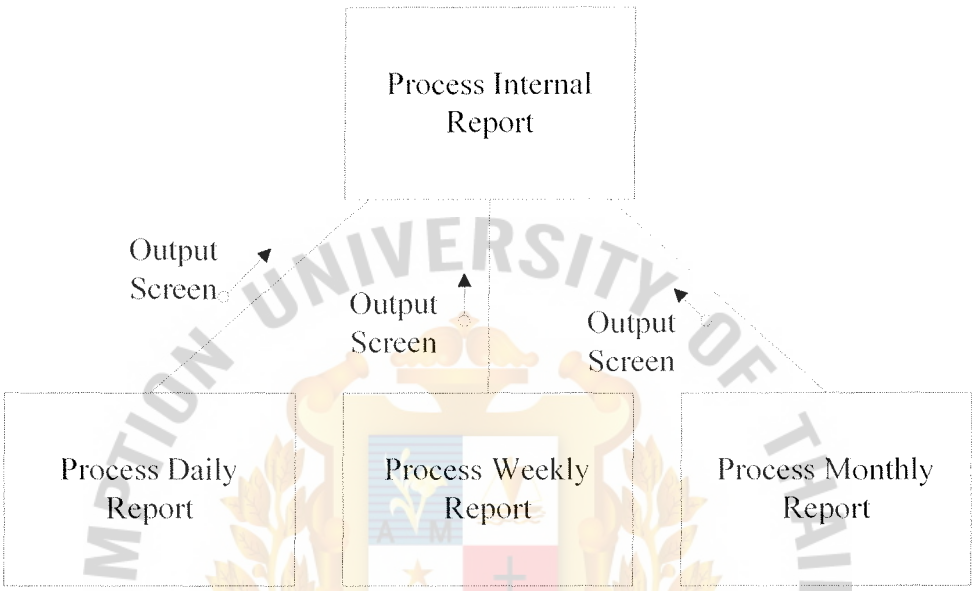

Figure C.3. Structure Chart of Process Internal Report.

APPENDIX D

USER INTERFACE

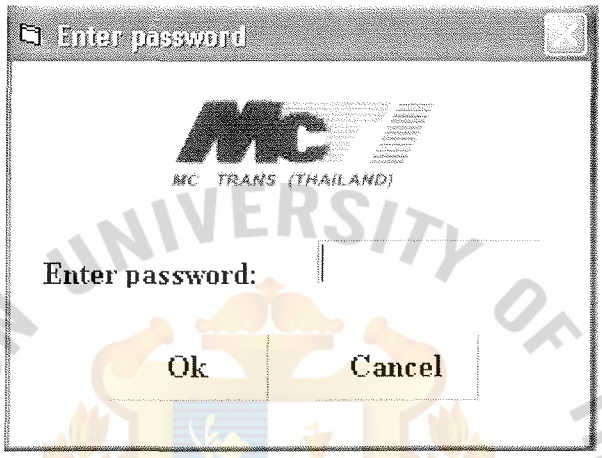

Figure D.1. Enter Password Form.

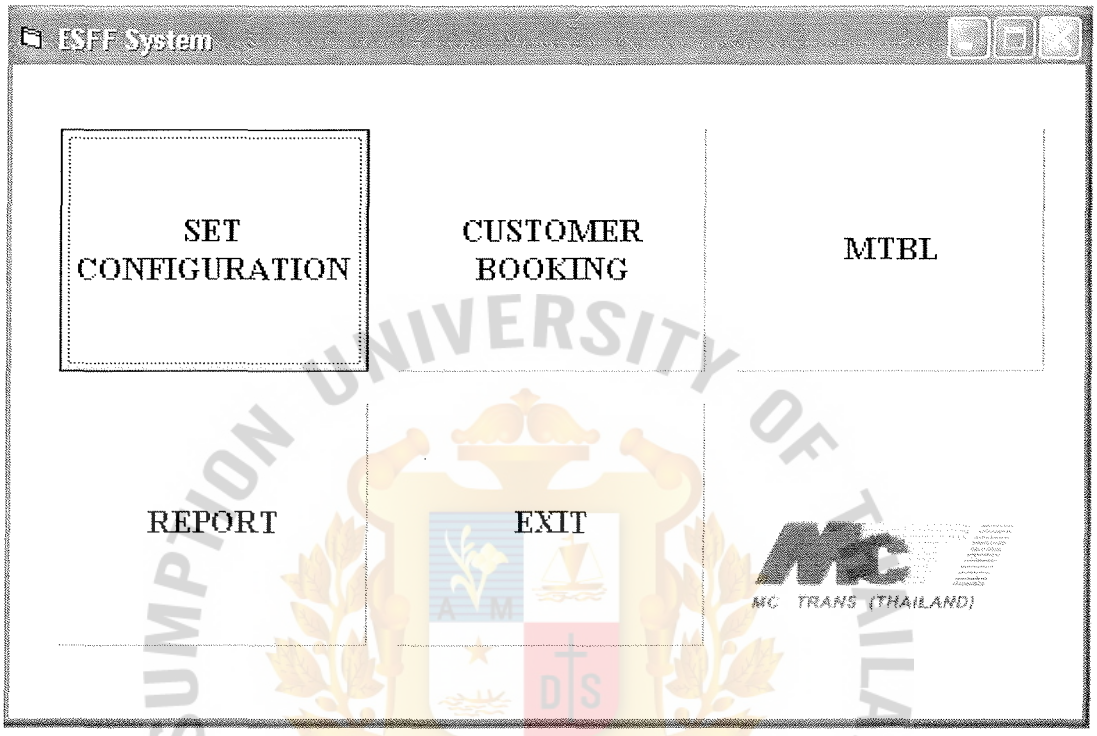

Figure D.2. ESFF System Main Form.

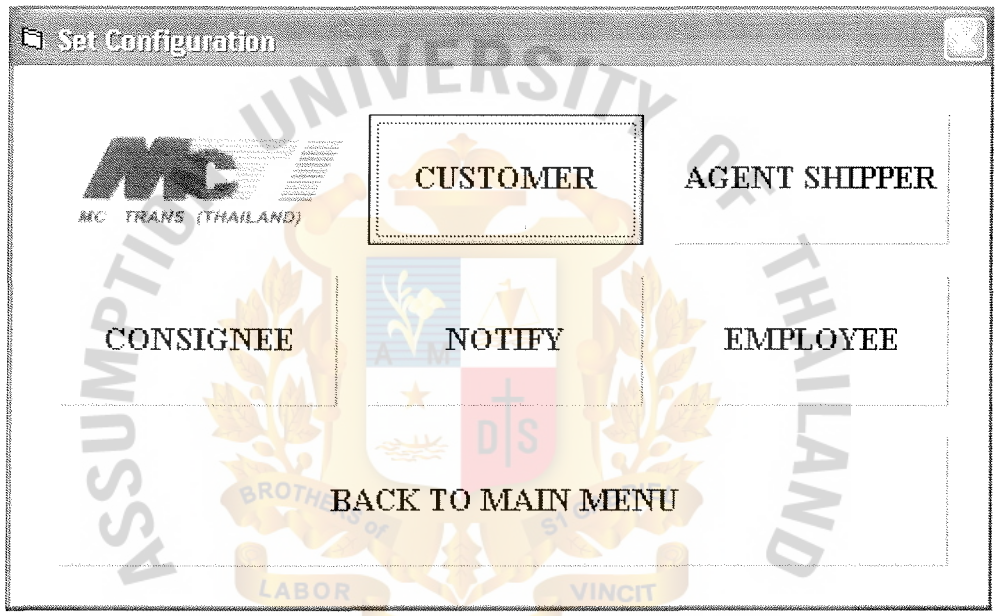

Figure D.3. Set Configuration Form.

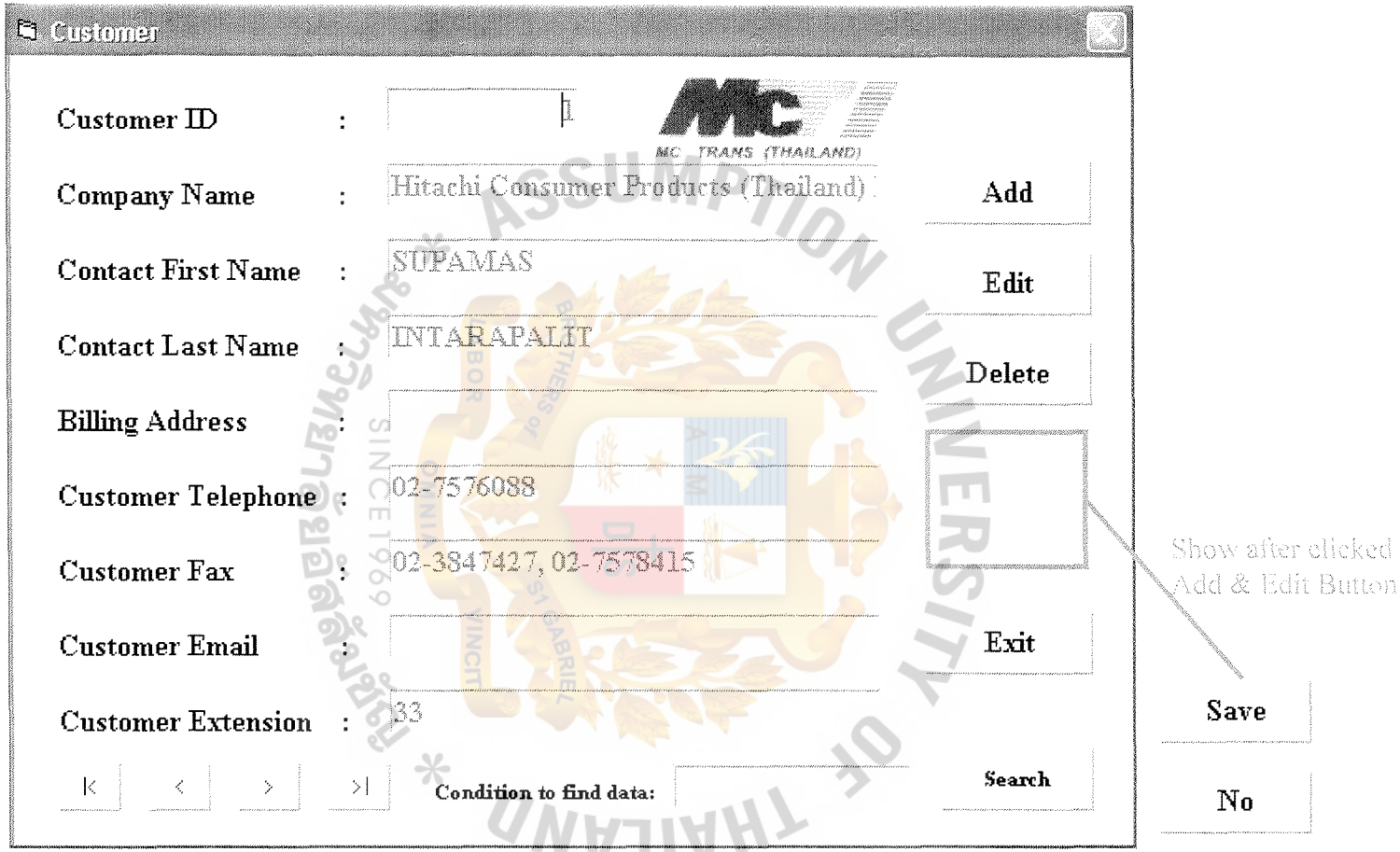

Figure D.4. Customer Configuration Form.

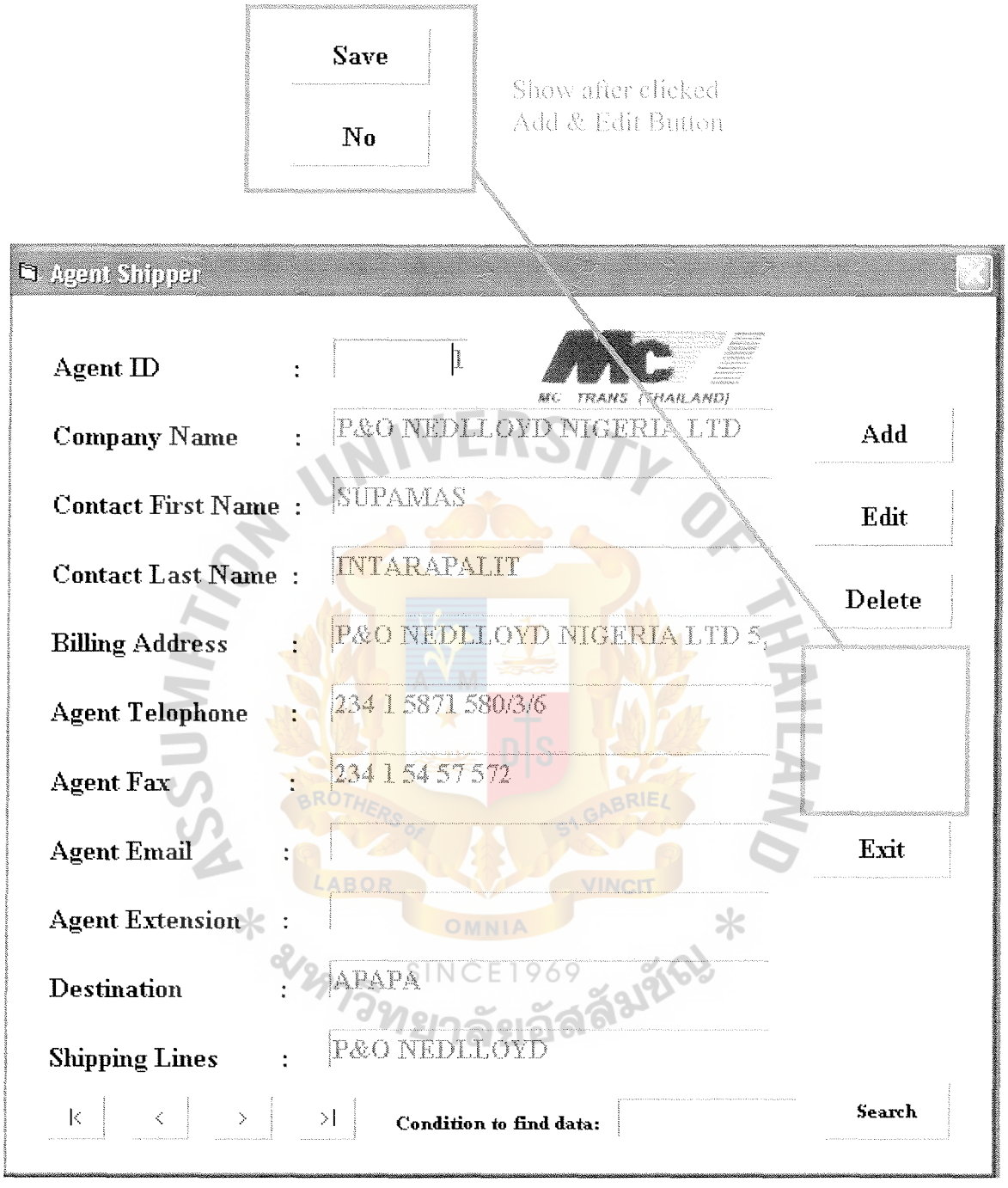

Figure D.5. Agent Shipper Configuration Form.

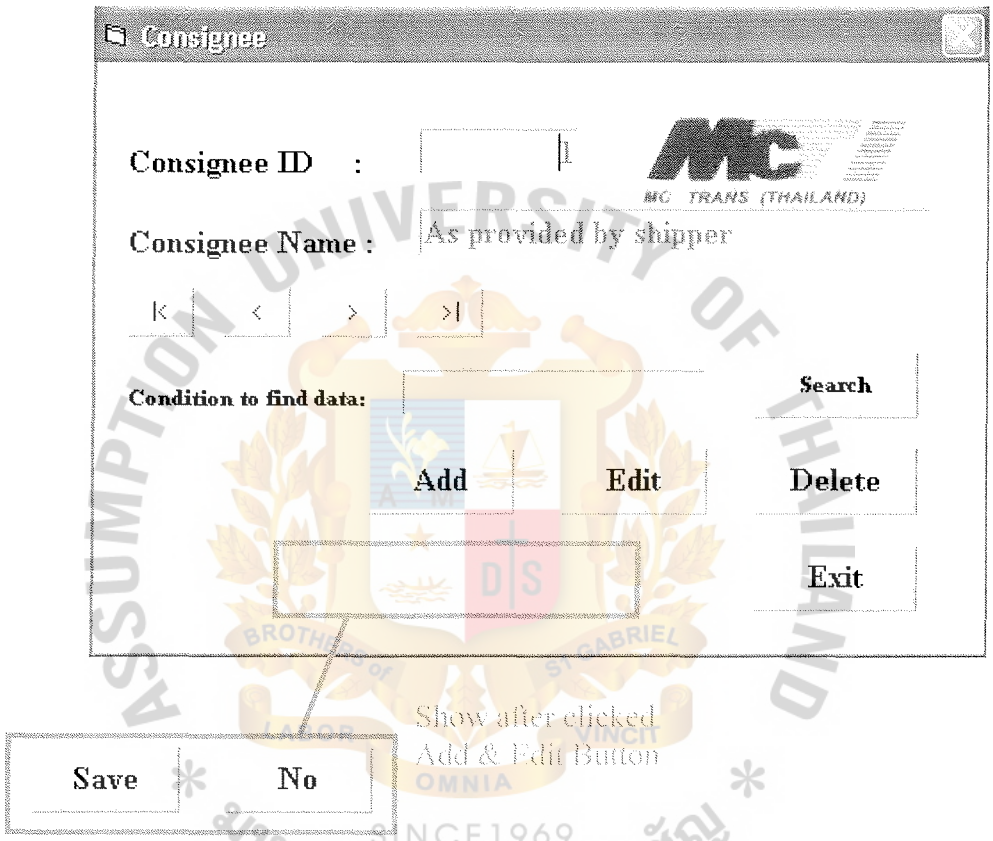

Figure D.6. Consignee Configuration Form.

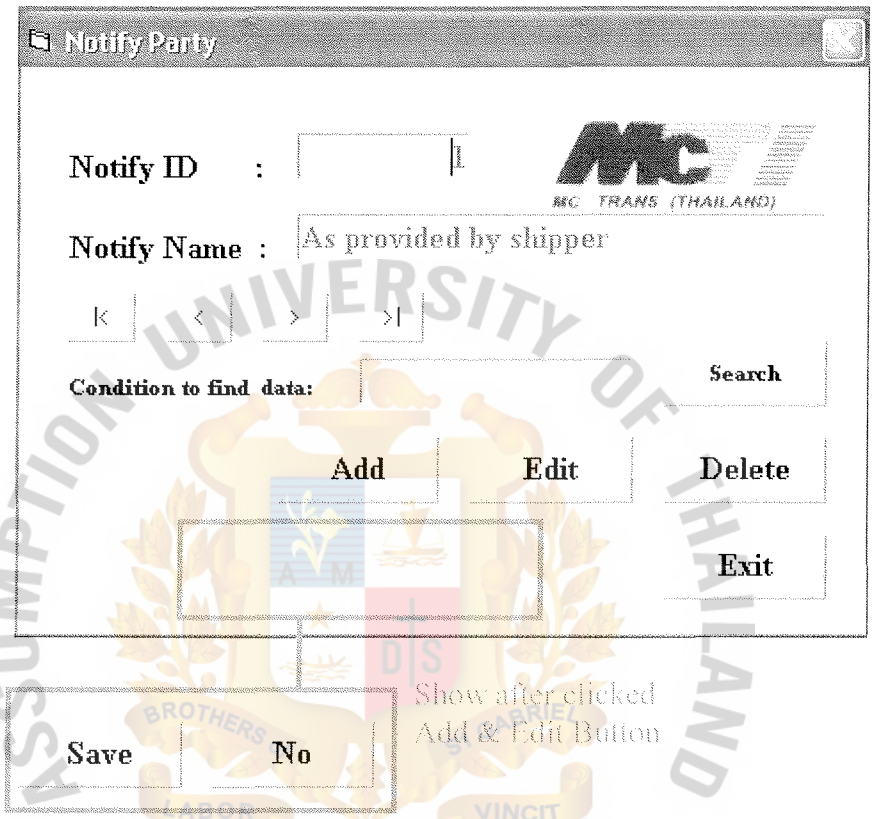

Figure D.7. Notify Party Configuration Form.

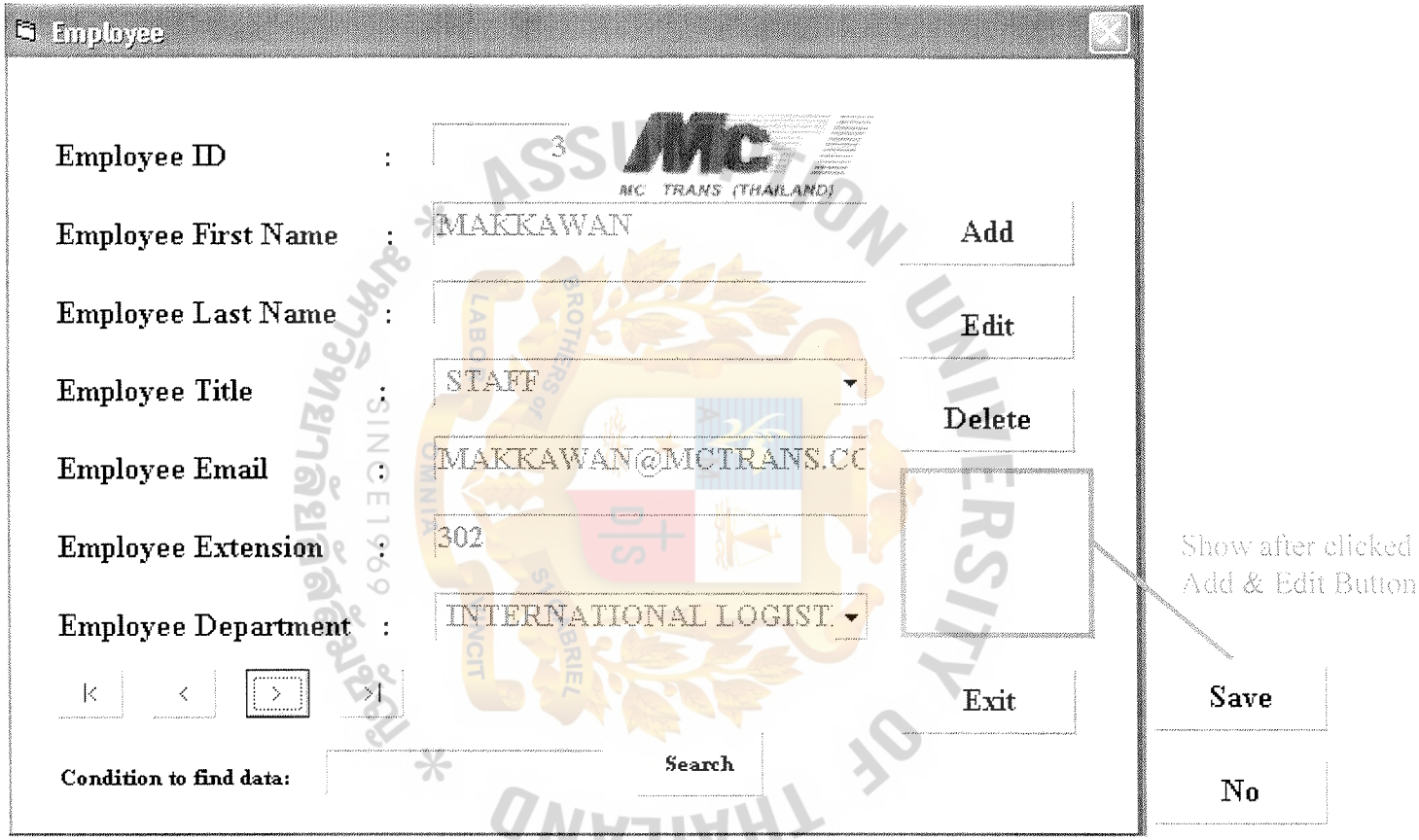

Figure D.8. Employee Configuration Form.

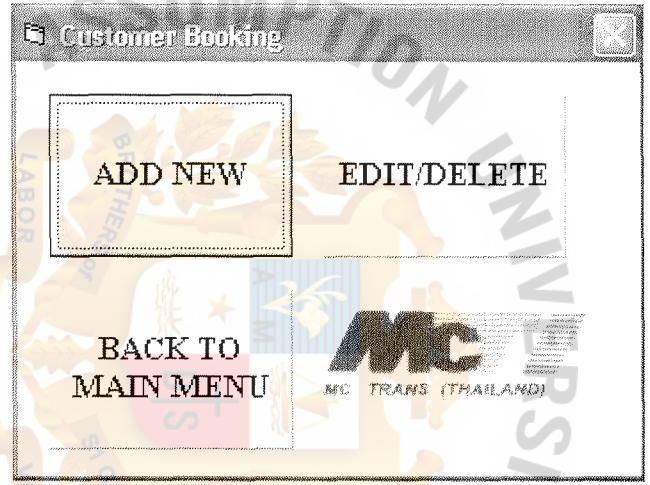

Figure D.9. Customer Booking Menu Form.

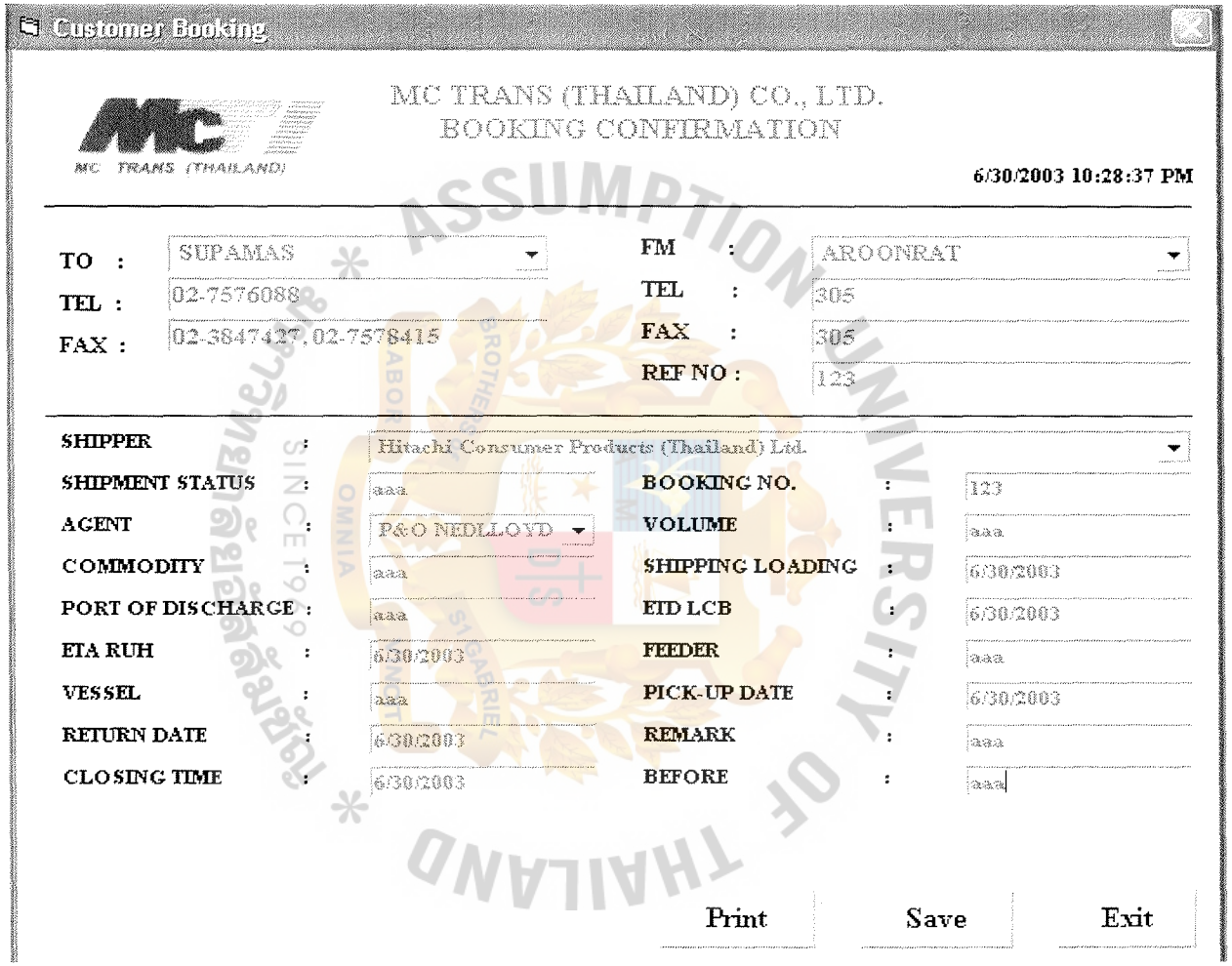

Figure D.10. Add New Customer Booking Form.

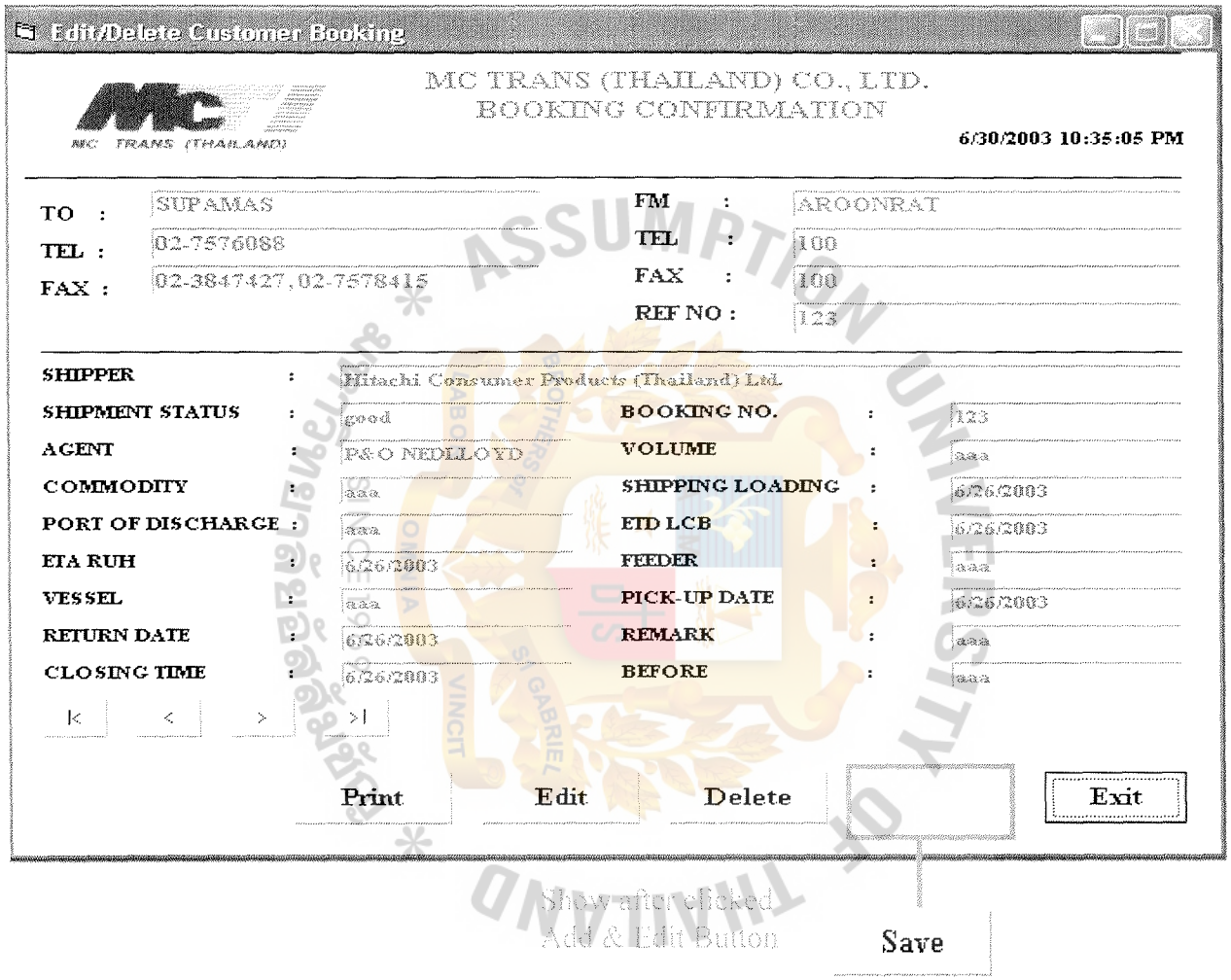

Figure D.11. Edit/Delete Customer Booking Form.

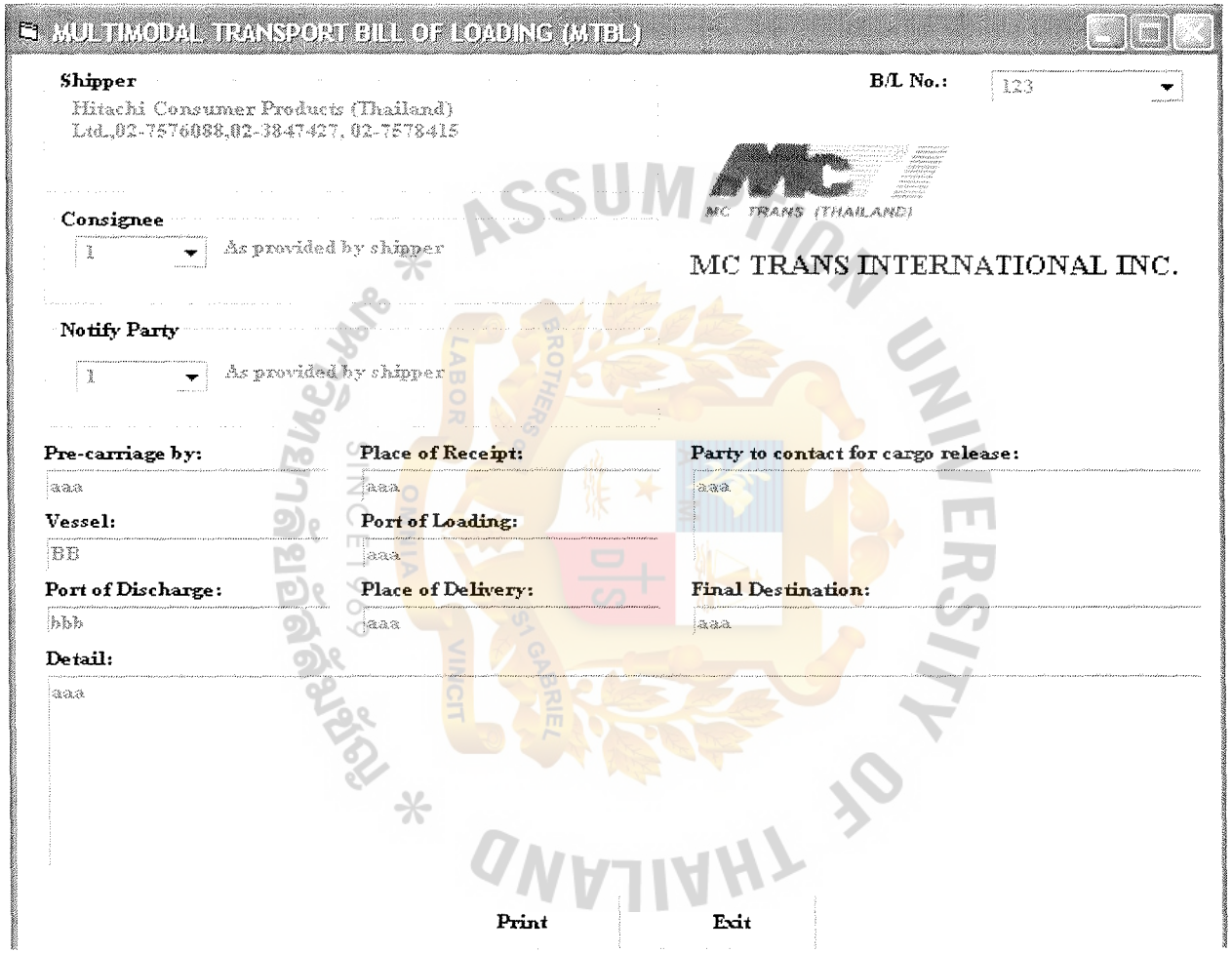

Figure D.12. MTBL Form.

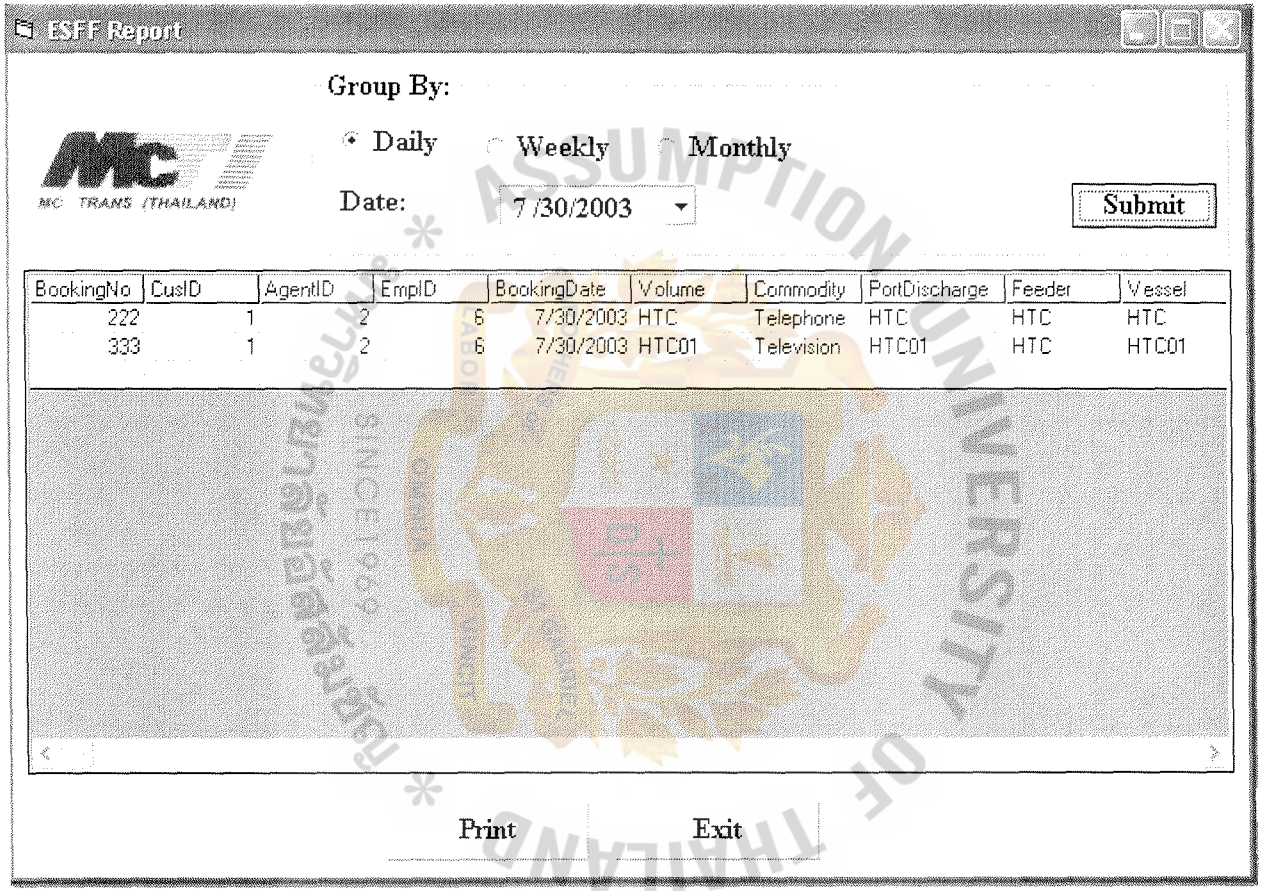

Figure D.13. ESFF Daily Report.

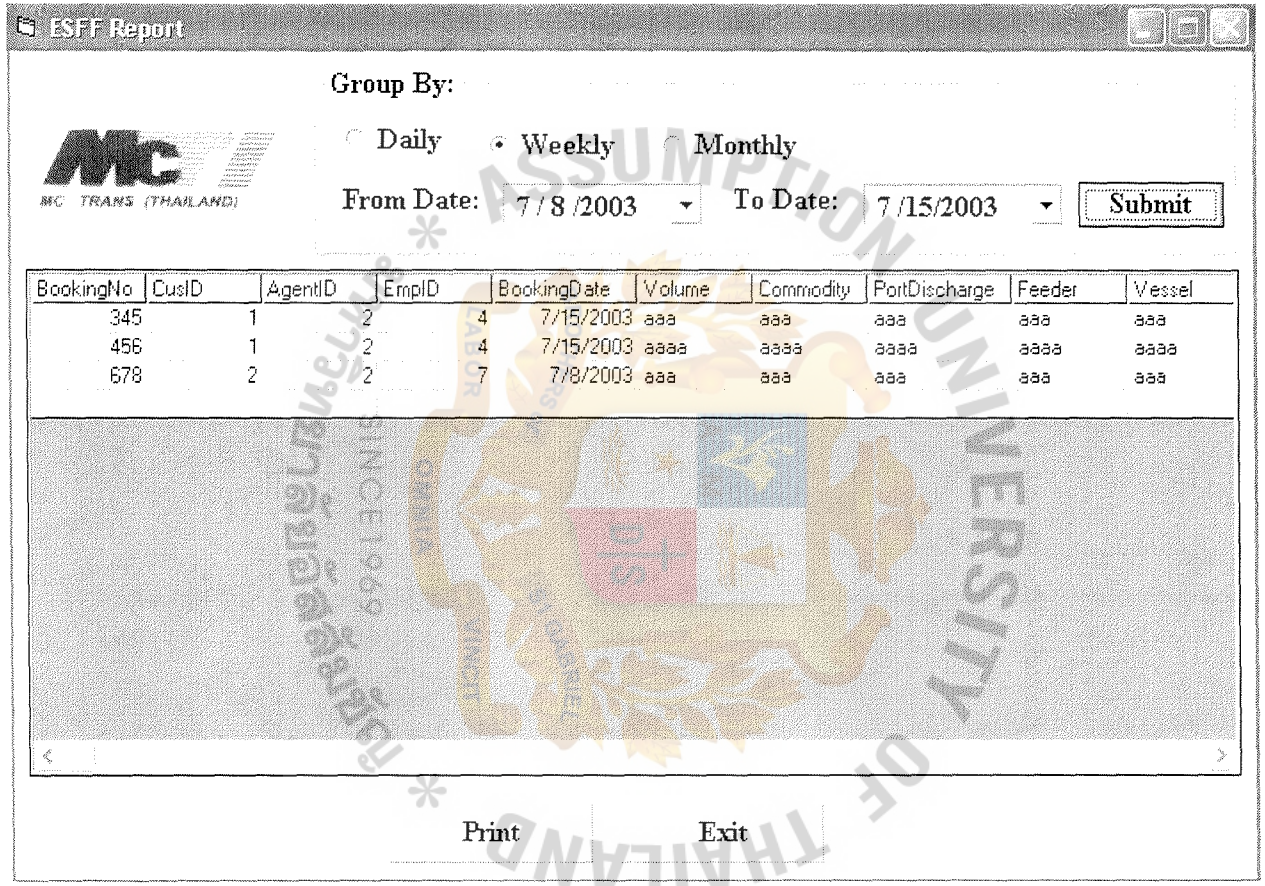

Figure D.14. ESFF Weekly & Monthly Report.

APPENDIX E

REPORT DESIGN

MC TRANS (THAILAND)

Date : 10/30/2003

Booking No	Customer ID	Agent ID	Employee ID	Booking Date	Volume	Commodity	Port Discharge	Feeder	Vessel
200310300830	1	1	1	10/30/2003	HC01	Note Book	APAPA	HC01	HC01
200310300900	2	1	1	10/30/2003	HC02	Telephone	APAPA	HC02	HC02
200310301011	2	2	1	10/30/2003	HC03	Telephone	AQABA	HC03	HC03

Figure E.1. Report on Paper.

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