Product Ordering Information System for Hana Electric Company Limited

by

Mr. Teera Akanalin

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

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

November 2002

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Project Title	Product Ordering Information System for Hana Electric Company Limited
Name	Mr. Teera Akanalin
Project Advisor	Air Marshal Dr. Chulit Meesajjee
Academic Year	November 17, 2002

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.

Approval Committee:

(Air Marshal Dr. Chulit Meesajjee)
Dean and Advisor

(Prof.Dr. Srisakdi Charmonman)
Chairman

(Asst.Prof.Dr. Vichit Avatchanakorn)
Member

(Assoc.Prof. Somchai Thayarnyong)
MUA Representative

November 17, 2002

ABSTRACT

Hana Electric Co., Ltd. is an Electric Home Appliance Trading Company located in Bangkok since 1986. It has provided many categories of Electric Home Appliance Products for retail distribution, wholesale distribution and modern trade stores. In order to provide the ordering service, a lot of processes are required, and has to deal with several departments; therefore, this project is to develop the effective information system to facilitate the process of ordering service.

The current existing Ordering Information System is based on the manual system. Most of data are stored on paper in the file. It requires many administrative staffs to maintain the system, and has to face the general problems of manual system, which are error-prone and having a high maintenance cost.

The new proposed Ordering Information System will be developed to replace the manual system with Internet System. All data are kept in the database server, Microsoft SQL Server 7.0, and are accessed through the web server, Microsoft Internet Information Server 5.0 on Microsoft Windows 2000 Server. The user interfaces, moreover, are implemented on web browser, Microsoft Internet Explorer 5.0. It will reduce the number of administrative staffs, solve the problem of manual system and decrease the high maintenance cost.

ACKNOWLEDGEMENTS

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He would like to thank Air Marshal Dr. Chulit Meesajjee, his project advisor, for his valuable suggestions and advice given in preparation of this project.

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I. INTRODUCTION

1.1 Background of the Project

Internet currently is the largest computer network in the world. It is the network of networks. The interconnection of many billion computers, ranging from a very large supercomputer host to a small individual desktop or notebook.

Internet is also the largest human society, the world without human nationality or race, no matter in which country you are living, you can communicate with the others around the world. Internet is comprised of both profit and non-profit organizations; therefore, it exactly is also the world of business. In the near future, a commercial organization, however, cannot directly connect to the Internet, but it has to access Internet through Internet Services Provider, or ISP.

Currently, the business is intensely competitive because of a lot of competitors. Using the Internet technology is a kind of solution to help increase the selling process effectively and meet more new customers as well. Moreover, using the computer-based new information system will help the cost reduction and increase the performance of ordering service for the company.

The major problems of the existing system are summarized as follows:

(1) To cause the high cost because of the redundant jobs.

(2) To be intensely competitive because of a lot of competitors.

(3) To serve customers ineffectively because of a lot of customers.

(4) To summarize the reports ineffectively to the top management because of the lack of management knowledge.

(5) To keep track of the customers ineffectively because of the lack of accurate information.

For those reasons, we need to develop the Internet system in the marketing / sales department. We expect to summarize the special information to the top management in order to support the decision making process and promote the technology to the marketing / sales workers.

1.2 Objectives of the Project

The objectives of the project on the product ordering information system are as follows:

(1) To provide the accuracy of the information in the form of online information system.

(2) To support all levels of management.

(3) To be competitive with the other competitors in the market place.

(4) To serve the customer satisfaction.

(5) To reduce the cost of existing operation.

(6) To reduce the time and resources including paperwork.

(7) To reduce the manual system and error.

(8) To definitely divide the specific job as the job description.

(9) To support the decision making of the top management.

1.3 Scope of the Project

The project will cover the major parts of the product ordering information system as follows:

(1) To analyze the existing information system.

(2) To design the proposed online ordering information system.

(3) To add new customer information.

(4) To identify the frequency of the ordered items.

(5) To enter the customer orders.

(6) To look up the customer credit balance.

(7) To maintain the adequate inventory.

(8) To look up the customer's location.

(9) To update the product price list.

(10) To propose the company's information.

(11) To receive each customer's inquiry.

(12) To propose new product's information.

(13) To support the customer's questions interactively.

1.4 Deliverables

The deliverables of the project on Hana Electic Co.,Ltd.'s Product Ordering Information System are as follows:

(a) Application Software is written by HTML, JavaScript, VB Script, and Active Server Pages, using database with Microsoft SQL Server 7.0, and Web Application with Internet Information System 5.0 with Microsoft Windows 2000 Server.

(b) Web Interfaces Containing

(1) Main Page

(2) Product Category 1 Information Page

(3) Product Category 2 Information Page

(4) Product Category 3 Information Page

(5) Product Category 4 Information Page

(6) Product Category 5 Information Page

(7) Advanced Search Page

(8) Customer Register Page

(9) Customer Login Page

(10) Forgot Password Page

(11) Shopping Card Page

(12) Customer Information Page

(13) Bank List Page

(14) Order Summary Information Page

(15) Order Confirmation Page

(16) Customer's Billing Information Page

(17) Sales Order Page

(18) Administration Login Page

(19) Administration Section Page

(20) Product Administration Page

(21) Product Category Administration Page

(22) Add Product Administration Page

(23) Product Change Administration Page

(24) Shipping Charge Administration Page

(25) Address Change Administration Page

(26) Customer Information Administration Page

(27) Customer's Order Information Administration Page

(28) Add Customer's Order Description Administration Page

(29) Change Customer's Order Description Administration Page

(30) Change Password Administration Page

(31) User List Administration Page

(32) Main Page Administration Page

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(c) Reports Containing

(1) Order Billing Statement / Receipt

(2) Order Picking List

(3) All Account Receivable Report

(4) Monthly Account Receivable Report

(5) All Sales Orders Report

(6) Daily Sales Orders Report

(7) Monthly Sales Orders Report

(8) Quarterly Sales Orders Report

(9) Yearly Sales Orders Report

(10) Monthly New Customer Report

(11) Quarterly New Customer Report

(12) Yearly New Customer Report

(13) All Customers Report

(14) Product Best Selling Report

1.5 Project Plan

This project plan representing its activities and duration of each activity is in Figure 1.1

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	Study the Existing Computer System
5	Develop Context Diagram
6	Develop Data Flow Diagram
7	Cost and Benefit Analysis
	II. Analysis and Design of the Proposed System
8	Web Interface Design
9	Report Design
10	Database Design
11	Network Design
12	Program Design
	III. Implementation of the Proposed System
13	Coding
14	Testing
15	Hardware Installation
16	Software Installation
17	Conversion

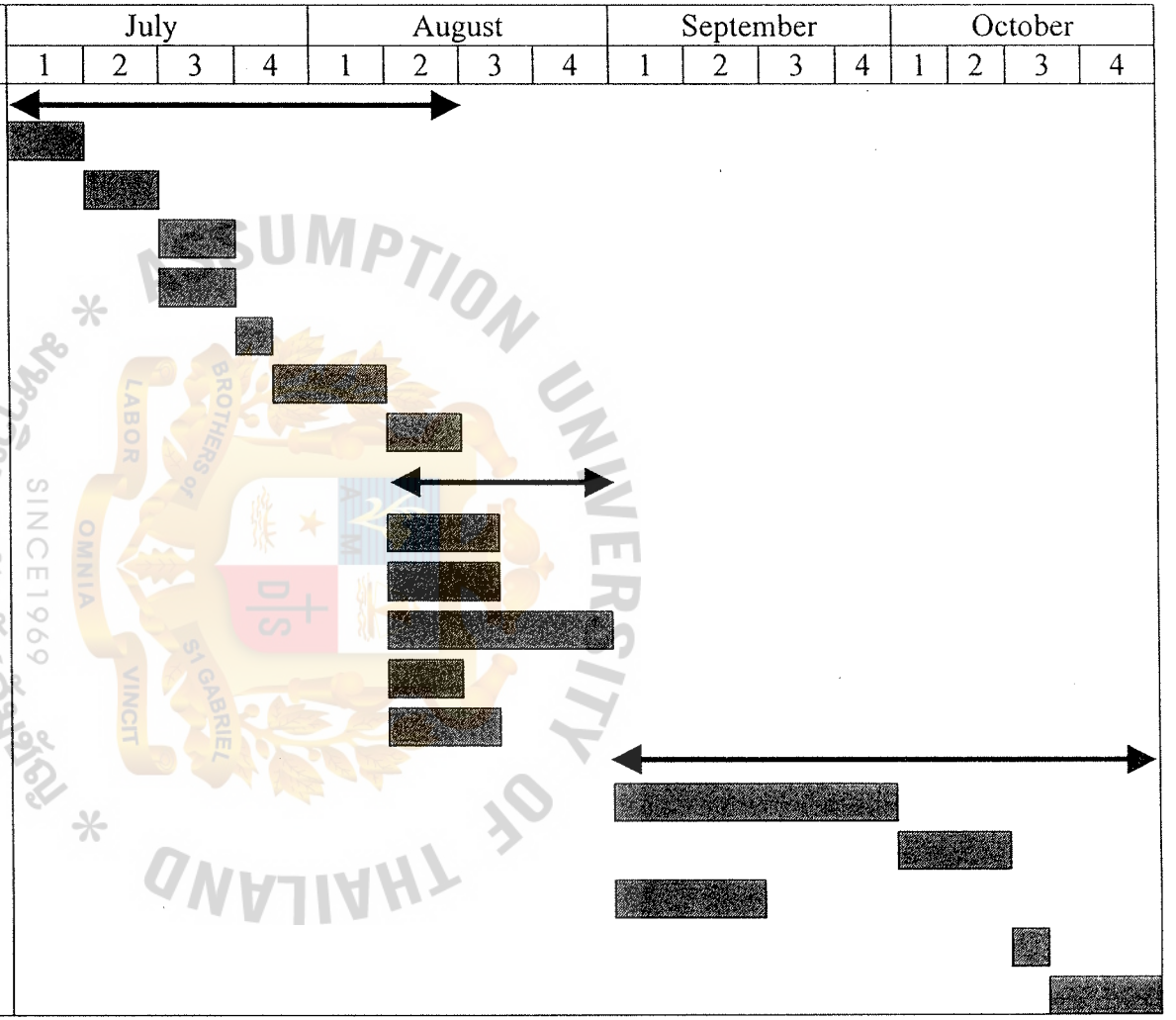

Figure 1.1. Project Plan of Product Ordering Information System.

II. THE EXISTING SYSTEM

2.1 Background of the Organization

Hana Elecric Co., Ltd. has been established since 1986. The company has operated in three main channels as follows:

(1) Retail Distribution

The company has sold electric home appliance products through retail distribution. It provides many types of electric home appliance products such as Electric pan, Rice cooker, Sukiyaki pot, Slow cooker, Electric pot, Electric iron, Electric stove, Electric shower-bath, and so on that are locally distributed.

(2) Wholesale Distribution

The company has sold electric home appliance products through wholesale distribution. It also provides many types of products like the retail distribution and distributes them locally as well.

(3) Modern Trade Store Distribution

The company has sold electric home appliance products through modern trade store distribution, which comprises of Department store, Super stores and Discount stores. It provides all type of products for end-user customers.

The organization chart of Hana Electric Co.,Ltd. and Marketing / Sales Department will be given in Figures 2.1 and 2.2.

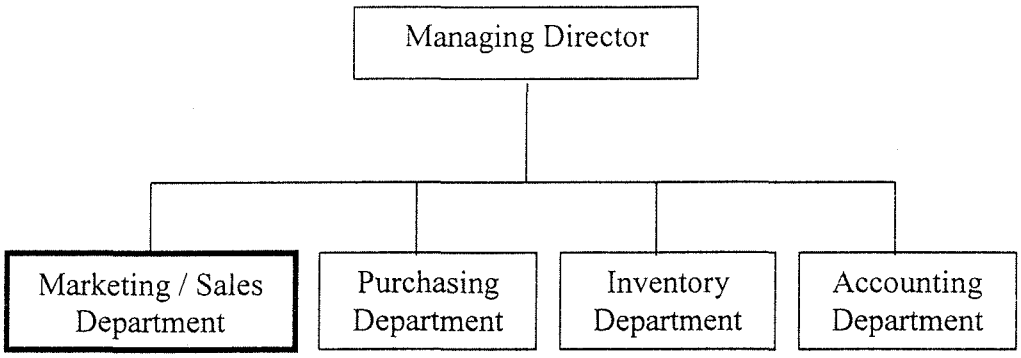

Figure 2.1. Organization Chart of Hana Electric Co., Ltd.

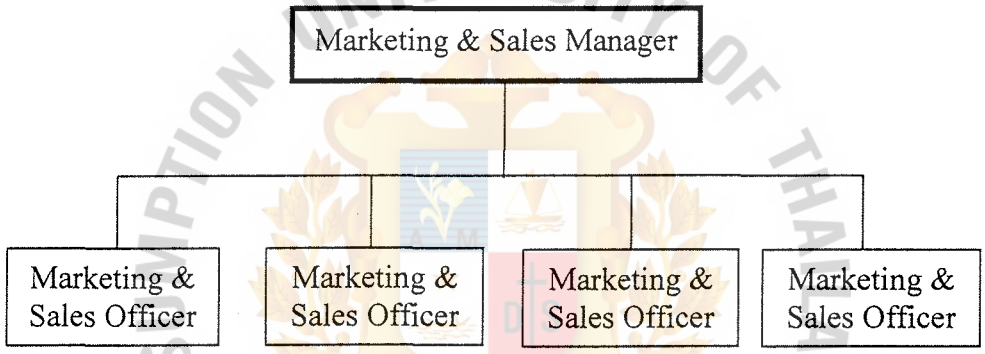

Figure 2.2. Organization Chart of Marketing / Sales Department.

2.2 Current Problems and Areas for Improvement

The current problems and areas for improvement of the Marketing / Sales department will be focused as follows:

(1) Keeping track of the customers' information ineffectively such as order information, credit balance information, contact information, and so on.

(2) Being intensely competitive from the competitors such as the product's price reduction, and so on.

(3) Unable to serve some of customers' satisfaction because of the inefficiency of product delivery.

(4) Providing late reports to the top management.

(5) Providing the high cost of the existing operation because of many employees in the department.

(6) Providing a lot of redundant jobs.

(7) Indefinitely providing the job description to the department's employees.

(8) Ineffectively maintaining the adequate inventory.

2.3 Existing Computer System

Currently, Hana Electric Co., Ltd. does not have adequate for the computer equipment. The ordering process of the Marketing / Sales department is with the manual system. It causes the problem of maintaining the customers' ordering information because of the inefficiency of information storage.

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III. THE PROPOSED SYSTEM

3.1 System Specification

According to the previous chapter, Hana Electric Co., Ltd. now requires an effective Product Ordering Information System, which can facilitate the various processes of Product Ordering Service, and solve the problems occurring from the existing manual system.

In order to achieve the target, the new proposed Product Ordering Information System should consist of the related database as follows:

(1) Customer Database Design developed to the high performance database server, available for marketing & sales officers to online, manage the data and make a query.

(2) Order Database converted from unstructured paper-sheet file to effective database format design and develop on database server, and having integrated with Customer Database to be the same information system.

(3) Product Database developed to help sales officers design a practical possible solution with present products information, and having integrated with Customer Database to be the same information system.

(4) Customer Status Database replacing the existing manual system to facilitate the marketing & sales officers' work, to systematically keep track of customer contact, and solve the problems occurring from the current system, and having integrated with Customer Database to be the same information system.

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3.2 System Design

The system design can be categorized into the following parts:

(1) Design of input and output screens.

The concept of design is concerned on the screen of computer to be used for data input and data output. The screens will display the data and generate the reports. The input screen will be designed based on the information design. The output screen will be based on the specific layout, characteristics or format of the used information.

(2) Design of database.

The database design is extremely important to the system and the interaction with database. The design database is a major concern on how to appropriately design the database interaction to ensure that there are no problems occurred after implementation. The good database will cover the requirements and reduce problems.

(3) Design of procedure.

The procedure design will specify the tasks that must be prepared in using the system. The important procedure is as follows:

(a) Data entry procedure.

(b) Run time procedure.

(c) Error handling procedure.

(d) Security procedure.

(4) Design of program specification.

The program specification describes the design process of input data, retrieve data, and update data through web browser. In designing the computer software, it is important to ensure that:

(a) The actual program must perform all tasks and in the manner intended for the application.

(b) The structure of software is divided into modules for testing and validation to ensure that it is followed with the procedure.

3.3 Hardware and Software Requirement

This system is designed for the web-based application. So it needs the web server to serve the online transactions expected to serve more than 100 transactions per day. We have decided to use the web hosting service of Internet Service Provider (ISP) that will reduce the cost of hardware and software for the web server extremely. For the client's hardware and software, we have decided to use 2 sets PC workstations for our Marketing / Sales officers that will be enough to operate the online sales functions. The hardware configuration of Marketing / Sales Department is shown in Figure 3.1.

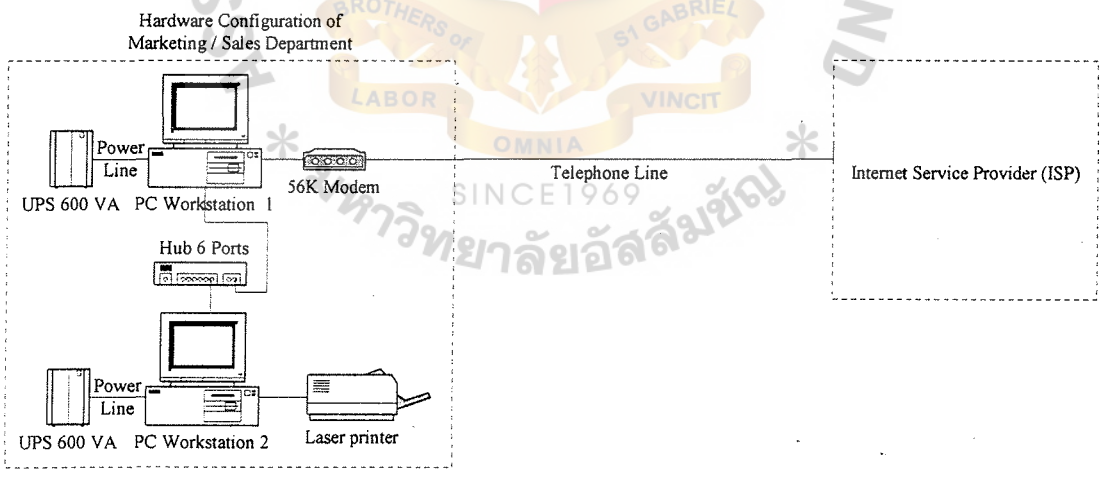

Figure 3.1. The Hardware Configuration of Marketing / Sales Department.

In the Internet System, the client machines will have capacity only high enough to run a Web Browser, such as Microsoft Internet Explorer, Netscape Navigator, etc. It,

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however should have specification higher than that, because it is sometimes used to run any other office automation software, such as word processing, for example. Therefore, in general standard, it should have hardware specification high enough to run Microsoft windows 98 and Microsoft Office 97. The hardware & software specifications for each client machine are shown in the Tables 3.1 and 3.2 respectively.

Table 3.1. The Hardware Specification for the Client Machine.

Hardware	Specification
CPU	Pentium IV 2.0GHz, or higher
Cache	256 KB or higher
Memory	256 MB or higher
Hard Disk	40 GB or higher
CD-Rom Drive	52X or higher
Floppy Drive	1.44 MB
Network Adapter	Ethernet 10/100-Base T
Display Adapter	SVGA card
Display	17" SVGA monitor
Printer	Laser Printer
Modem	56K V.90 Modem
UPS	600 VA or higher

Table 3.2. The Software Specification for the Client Machine.

Software	Specification
Operating System	Microsoft Windows 98 or higher
Web Browser	Microsoft Internet Explorer 5.0 or higher
Application Software	Microsoft Office 97 Professional Edition

3.4 Security and Control

The security is very important for the Internet system, so the major security concerns are as follows:

(1) System Security and Control

The web services will run on Windows 2000 Server environment. When a client has an access to the web server, remote user is given an access to local hard disk resource by creating shared directories. So the client must be set for user right access on which permission control required a particular directory basis. Windows 2000 Server security system is as follows:

(a) Directory and File Resource Security

Any directory and files system must be set as Windows 2000 File System (NTFS), which protects its resources including files, printer, and applications, by controlling their access.

(b) Directory and File Resource Control

For each resource to be protected or secured, the resource must be accessible to authorized users and inaccessible to unauthorized users. Windows 2000 Server protects its resources by:

(1) Access Control Lists.

(2) Access Control Entries.

(c) Full back up both of database and system.

(2) Data Security and Control

The database was designed to run on MS SQL Server 2000. The user has to be assigned User ID and corresponding Password to have the right to access database.

(a) Data Control

Database Management System must be backed up everyday. So it could be recovered if there is any problem occurring such as indexing damage.

(3) Application Security and Control

In the web development, all users could manage their account information by using their login and password. The permission will be granted or denied for each user. The administration page must enable authorized users and disable unauthorized users.

(a) Application Control

All web pages that are concerned about security issues need to pass the identification internally. After all, users may buy or do the activities only to enter their user account and password.

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3.5 Cost and Benefit Analysis

(1) Costs of Manual System

Table 3.3. Manual System Cost Analysis, Baht.

Cost items	Years				
	1	2	3	4	5
Fixed Cost					
Typewriter 1 unit @ 8,000	8,000.00	–	–	–	–
Calculator 4 units @ 1,500	6,000.00	–	–	–	–
Total Fixed Cost	14,000.00	–	–	–	–
Operating Cost					
Salary Cost:					
Marketing / Sales Manager 1 person @ 30,000	30,000.00	33,000.00	36,300.00	39,930.00	43,923.00
Staff:					
Marketing / Sales officer s 4 persons @ 10,000	40,000.00	44,000.00	48,400.00	53,240.00	58,564.00
Total monthly salary Cost	70,000.00	77,000.00	84,700.00	93,170.00	102,487.00
Total Annual Salary Cost	840,000.00	924,000.00	1,016,400.00	1,118,040.00	1,229,844.00
Office Supplies & Miscellaneous Cost:					
Stationary Per Annual	5,000.00	5,500.00	6,050.00	6,655.00	7,320.50
Paper Per Annual	7,000.00	7,700.00	8,470.00	9,317.00	10,248.70
Utility Per Annual	6,000.00	6,600.00	7,260.00	7,986.00	8,784.60
Miscellaneous Per Annual	2,000.00	2,200.00	2,420.00	2,662.00	2,928.20
Total Annual Office Supplies & Miscellaneous Cost	20,000.00	22,000.00	24,200.00	26,620.00	29,282.00
Total Annual Operating Cost	874,000.00	946,000.00	1,040,600.00	1,144,660.00	1,259,126.00
Total Manual System Cost	874,000.00	946,000.00	1,040,600.00	1,144,660.00	1,259,126.00

Table 3.4. Five Years Accumulated Manual System Cost, Baht.

Year	Total Manual Cost	Accumulated Cost
1	874,000.00	874,000.00
2	946,000.00	1,820,000.00
3	1,040,600.00	2,860,600.00
4	1,144,660.00	4,005,260.00
5	1,259,126.00	5,264,386.00
Total	5,264,386.00	–

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(2) Costs of Computerized System

Table 3.5. Computerized System Cost Analysis, Baht.

Cost items	Years				
	1	2	3	4	5
Fixed Cost					
Hardware Cost:					
Web Hosting Cost	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00
PC Workstation Cost	12,000.00	12,000.00	12,000.00	12,000.00	12,000.00
Printer Cost	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00
Modem Cost	2,000.00	2,000.00	2,000.00	2,000.00	2,000.00
UPS Cost	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00
Total Hardware Cost	30,000.00	30,000.00	30,000.00	30,000.00	30,000.00
Maintenance Cost:					
Maintenance Cost	–	–	–	10,000.00	9,000.00
Total Maintenance Cost	–	–	–	10,000.00	9,000.00
Software Cost:					
Client Operating System Cost	50,000.00	10,000.00	10,000.00	10,000.00	10,000.00
Application Cost	90,000.00	20,000.00	20,000.00	20,000.00	20,000.00
Total Software Cost	140,000.00	30,000.00	30,000.00	30,000.00	30,000.00
Implementation Cost:					
Training Cost	30,000.00	–	–	–	–
Total Implementation Cost	90,000.00	–	–	–	–
Total Fixed Cost	290,000.00	60,000.00	60,000.00	70,000.00	69,000.00
Operating Cost					
Peopleware Cost:					
Marketing / Sales Manager 1 person @ 30,000	30,000.00	33,000.00	36,300.00	39,930.00	43,923.00
Staff:					
Marketing / Sales Officers 2 persons @ 10,000	20,000.00	22,000.00	24,200.00	26,260.00	29,282.00
Total Monthly Salary Cost	50,000.00	55,000.00	60,500.00	66,550.00	73,205.00
Total Annual Salary Cost	600,000.00	660,000.00	726,000.00	798,600.00	878,460.00
Office Supplies & Miscellaneous Cost:					
Stationary	5,000.00	5,500.00	6,050.00	6,655.00	7,320.00
Paper	10,000.00	11,000.00	12,100.00	13,310.00	14,641.00
Utility	10,000.00	11,000.00	12,100.00	13,310.00	14,641.00
Miscellaneous	5,000.00	5,500.00	6,050.00	6,655.00	7,320.50
Annual Office Supplies & Miscellaneous Cost	30,000.00	33,000.00	36,300.00	39,930.00	43,923.00
Total Operating Cost	630,000.00	693,000.00	762,300.00	838,530.00	922,383.00
Total Computerized System Cost	920,000.00	753,000.00	822,300.00	908;530.00	991,383.00

Table 3.6. Five Years Accumulated Computerized Cost, Baht.

Year	Total Computerized Cost	Accumulated Cost
1	920,000.00	920,000.00
2	753,000.00	1,673,000.00
3	822,300.00	2,495,300.00
4	908,530.00	3,403,830.00
5	991,383.00	4,395,213.00
Total	4,395,213.00	–

(3) The Comparison of the System Costs between Computerized System and Manual System

Table 3.7. The Comparison of the System Costs, Baht.

Year	Accumulated Manual Cost	Accumulated Computerized Cost
1	874,000.00	920,000.00
2	1,820,000.00	1,673,000.00
3	2,860,600.00	2,495,300.00
4	4,005,260.00	3,403,830.00
5	5,264,386.00	4,395,213.00

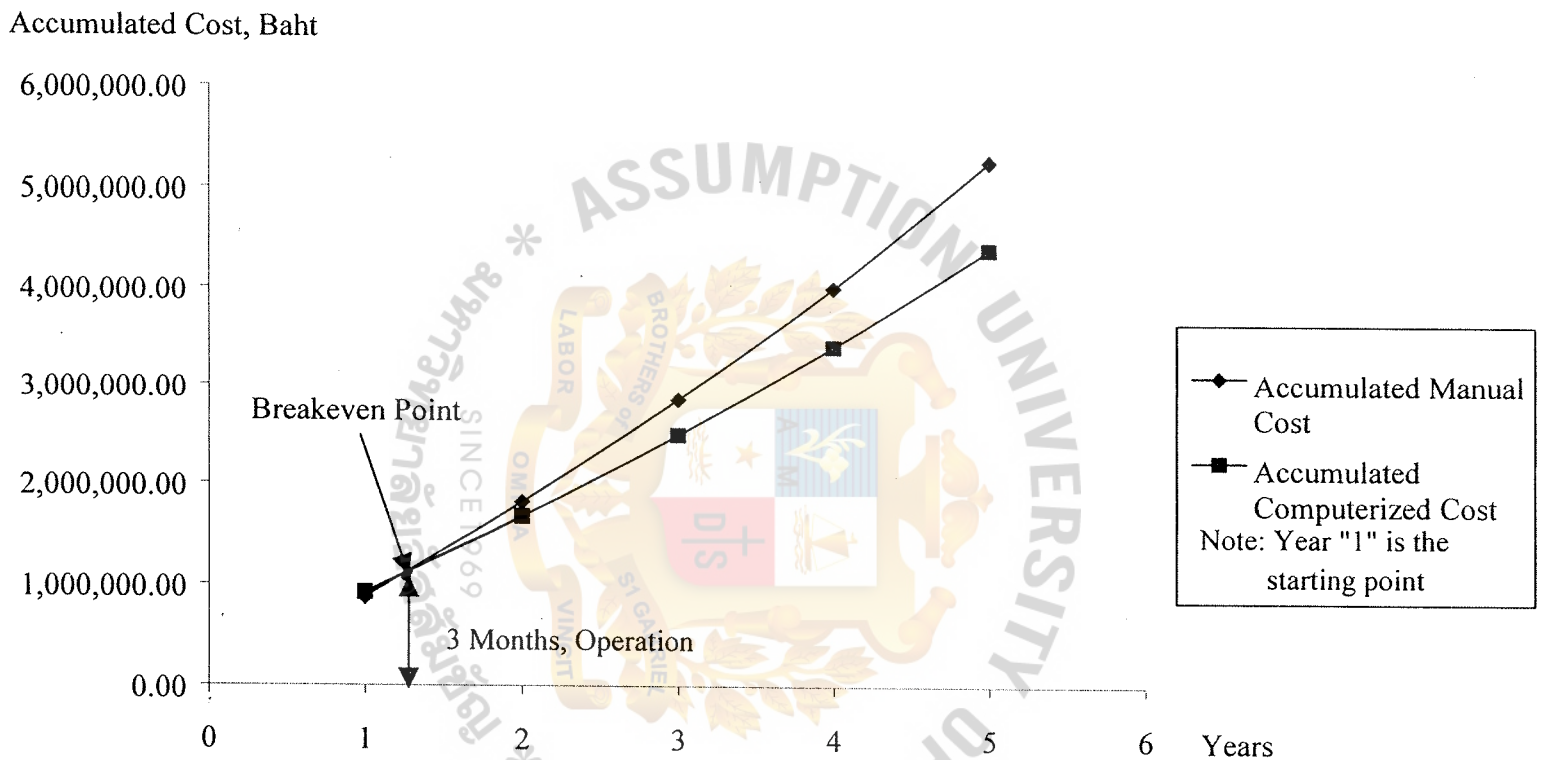

Figure 3.2. Cost Comparison between Manual and Computerized System.

Table 3.8. Payback Analysis for the Proposed System, Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development cost	-300,000.00	-	-	-	-	-
Operation cost	-	-630,000.00	-693,000.00	-762,300.00	-838,530.00	-922,383.00
Maintenance cost	-	-	-	-	-10,000	-9,000.00
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted costs (adjusted to present value)	-300,000.00	-562,590.00	-552,321.00	-542,757.60	-539,665.08	-528,094.16
Cumulative time-adjusted costs over lifetime	-300,000.00	-862,590.00	-1,414,911.00	-1,957,668.60	-2,497,333.68	-3,025,427.84
Benefits derived from operation of new system	0	700,000.00	840,000.00	1,008,000.00	1,209,600.00	1,451,520.00
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted costs (adjusted to present value)	0	625,100.00	669,480.00	717,696.00	769,305.60	823,011.84
Cumulative time-adjusted benefits over lifttime	0	625,100.00	1,294,580.00	2,012,276.00	2,781,581.60	3,604,593.44
Cumulative lifttime time-adjusted cost + benefit	-300,000.00	-237,490.00	-120,331.00	54,607.40	284,247.92	579,165.60

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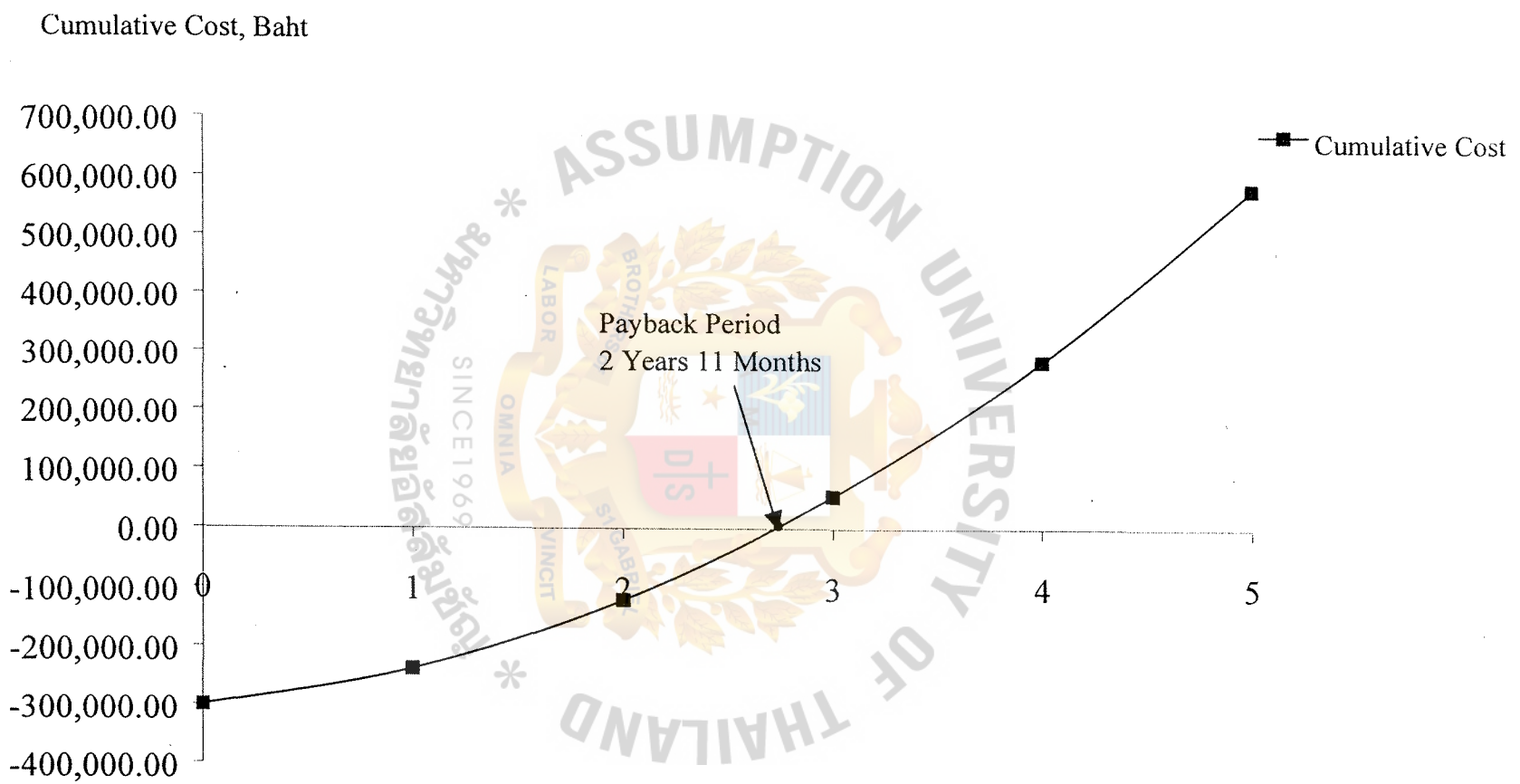
Cumulative Cost, Baht
700,000.00
600,000.00
500,000.00
400,000.00
300,000.00
200,000.00
100,000.00
0.00
-100,000.00
-200,000.00
-300,000.00
-400,000.00
0
1
2
3
4
5
Payback Period
2 Years 11 Months
Cumulative Cost

(4) Intangible Benefits

Some benefits that are given by the organization from the use of information system are difficult to measure but it is important. This benefit is known as intangible benefit. Intangible benefits can be authorized to:

(a) Imposing discipline for all of the staffs and management throughout the system.

(b) Forecasting or improving the strategic planning activities.

(c) Getting more current and accurate information for the management and planning for the future.

(1) Improving service.

(2) Reducing the confusion problems in the operation.

(d) Information given by the system could contribute value-added data to the company in the future.

(5) Tangible Benefit

The tangible benefit can be summarized as follows:

(a) The breakeven point analysis can be defined that the cost of proposed system is higher than the cost of manual system at the beginning, but in the near future there is the opportunity to have more profits to cover all investment of developing the proposed system.

(b) The employees can highly operate their effective and efficiently assigned tasks.

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IV. PROJECT IMPLEMENTATION

4.1 Overview of Project Implementation

The implementation plan for the Internet system of Marketing / Sales department begins after the top management agrees with the outline of proposal of the new system and analyze the cost and benefit. The steps of implementation are as follows:

(1) Requirement Specification

(2) System Analysis

(3) Conceptual Design

(4) Implementation and Installation

The implementation and installation are the most difficult part that concerns the problems occurred in design and software development. The adjustment occurs during the development in the real situation. The testing software is very important, because it provides the reliable software.

(1) Software Project Implementation Recommendation.

(a) Designing the software to satisfy the user requirement.

(b) Designing the software to become user friendly.

(c) Software should be modular corresponding to sub-functions.

(d) Testing phase from the sub-functions to the integrated functions. (Using bottom up approach).

(e) Testing sending the parameters to sub-functions.

(f) Conversion will be parallel to ensure that the staff can adapt to the new system.

(g) Providing the training course.

(2) The Implementation Steps

(a) Studying all documents to concern with the Internet processing.

(b) Verifying all processes.

(c) Verifying the ordering process from input, process, and output.

(d) The statistics for reporting functions will be implemented into the process to test.

(e) Verifying the accuracy of storage and display the results.

(f) Verifying the reliable and stable system.

(g) Reviewing all steps.

(h) The periodic system review is necessary so that it may find some problems in the future.

4.2 Testing Plan and Results

(1) Coding

Microsoft SQL Server 2000 and Microsoft Excel are used to build up the import data's function for the Internet system. They completely provide the functions necessary to develop the system. Microsoft SQL Server 2000 is used to be the database storage. For the processing data through web, Microsoft Active Server Pages to process all results on the web browser. The programming language is visual basic scripting. The program structure is not complicated to develop. The line of code used in the program is less than the other programming languages. The screen design provides user friendly and interactive online help. According to the system code, the retrieval program provides fast speed and easy searching for the information. All users can use the program without the knowledge of visual basic scripting language.

(2) Testing

(a) Testing the software program to satisfy the user requirement.

(b) Testing all subprograms

(c) Testing all parameters to send among subprograms

(d) Testing integrated all subprograms.

(e) Testing the accuracy of results.

(f) Verifying the sufficient file size and speed of processing.

(g) Testing the reliable and stable of the system.

4.3 Conversion

Conversion includes the creation of all required master files, transaction files, backup files and converting the tested program to the operation status. The data conversion must be carefully planned and accurately done. We let the staffs to be familiar with the Internet system and train them.

We use the parallel system that the new system is operated side by side with the old one to ensure that the system does not lose. We can test the conversion or completeness of the results, and we compare the report of the new system with the report of the old one.

The parallel system is safe and ensures that work will not be failure. It uses more time and resources and it provides the duplicate jobs, the redundant report during conversion phase.

4.4 Training

The training section will introduce to the staffs and managers for use of the Internet system and introduces about the web server and web browser's function. We provide the seminar room to show how to use the web browser. The training can be divided into two sections for the system operators and end users.

(1) System Operator Training

Training involves the staffs who are responsible for keeping the equipment running, provides the necessary support service, or introduce the application to end users. Training covers the handling of all routine operations about the Internet system. Training includes how to run the system, backup files, and import files. System Operators know the general function of the system. They solve or prevent the malfunction problems, before system is down.

(2) End User Training

Training involves the general concept of the web server and web browser, Internet concept. We provide the steps on how to use the web browser and how to use the Internet system. We explain the first page to enter the Internet system, the hyperlink of pages and how to use all menus.

It is necessary for the project developer to gain feedback from the trainees of the system. The project developer should make sure that they could work the system completely by themselves. The project developer evaluates the effectiveness of the training, and provides some testing to users for the important tasks to make sure that users understand all steps.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The Internet of Product Ordering Information System is a computerized system, which is developed to replace the existing non-system. The Internet is developed based on structured methodology and prototype approach. The Internet is developed based on client / server application. In the side of client, the users send the command to the server side. After the server has already processed, the server sends the results to client. The Internet provides the online information and the users can inquire, or manipulate information. The Internet provides the graphic user interface and interactive command and use the structured query language (SQL) manipulate the data into the relational database. We analyze results and the achievement of the Internet project as follows:

(1) Providing the accuracy of reports.

(2) Being able to support decision making in time.

(3) Supporting all users to pay attention the new technology.

(4) Reducing the redundancy jobs.

(5) Reducing overhead costs and time.

(6) Being easy to manipulate the data and not to provide redundant update.

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

Process	Existing System	Proposed System
Add Customer Record Process	1 hr.	15 mins.
Search Item Process	15 mins.	5 mins.
Add Customer Order Process	30 mins.	10 mins.
Prepare Picking Slips Process	10 mins.	3 mins.

Table 5.1. The Degree of Achievement of the Proposed System (Continued).

Process	Existing System	Proposed System
Ship Customer Order Process	10 mins.	5 mins.
Create Customer Billing Process	15 mins.	5 mins.
Produce Sales Report Process	1 hr.	10 mins.
Produce Accounts Receivable Report Process	1 hr.	10 mins.

As a result, each process of the proposed system can use less time than that of the existing system. Each process can be explained in details as follows:

Add Customer Record Process

The proposed system can use this process efficiently and effectively, because the customer data can be stored in the computerized system by the marketing / sales staffs or customers instead of the manual system, in which the customer data was stored in the notebook by the marketing / sales staffs. It can reduce the duplicated processes and human errors efficiently and effectively.

Search Item Process

The proposed system can use this process efficiently and effectively. Customers can search any kind of paper as their requirements by themselves via the company's website instead of the manual system, in which the marketing / sales staffs have to search the product as customers' requirements at the storefront or by phone.

Add Customer Order Process

The proposed system can use this process efficiently and effectively, in which are customers can send an order by themselves via the company's website. Moreover the marketing / sales staffs can receive customers' order by phone or at the storefront, after that they make the order records via the company's website, too. Not only can it save

much more time for marketing / sales staffs to operate their sales tasks, but also save much more time for customers to travel to the company's storefront to select the products they want.

Prepare Picking Slips Process

The proposed system can use this process efficiently and effectively, which not only can retrieve faster the customer order information than the existing system, but also reduce the duplicated operations of recording customers and customer orders information.

Ship Customer Order Process

The proposed system can use this process efficiently and effectively, which is getting the complete and correct customer orders from the company's computerized database system. So we can ship the products to customers place according to their orders faster than the existing manual system.

Create Customer Billing Process

The proposed system can use this process efficiently and effectively, because customer information and order information are stored in the company's computerized database system. So it's much easier to query and retrieve customer information and order information to create customer billing than the existing manual system, which uses the notebook to store and retrieve the customer and order information. The existing system can cause human errors easily and takes a long time to create this task compared with the proposed system.

Produce Sales Report Process

The proposed system can use this process efficiently and effectively, because it takes less time and is more correct to create a sales report to manager. The correct information about customer and order are stored in the computerized database system.

When a manager wants to view the sales volumes, weekly, monthly, or yearly, he can query and retrieve the database from the company's website to do that task in a few minutes, comparing with the existing manual system, where customer information and order information are stored in the notebook. So it is so complicated and takes a long time to create the sales report for a manager. It may also lead to data errors by staffs.

Produce Accounts Receivable Report Process

The proposed system can use this process efficiently and effectively, because its result is similar to the Sales Report Production process compared with the existing manual system.

5.2 Recommendations

(1) The proposed Internet system should be developed further to a larger scale and the best efficient way to connect to the remote access.

(2) The related systems or functions should be convert or adapted to the Internet system.

(3) We can expand the Internet to all departments.

(4) We can improve the technical knowledge more and more.

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APPENDIX A

PROPOSED DATA FLOW DIAGRAM

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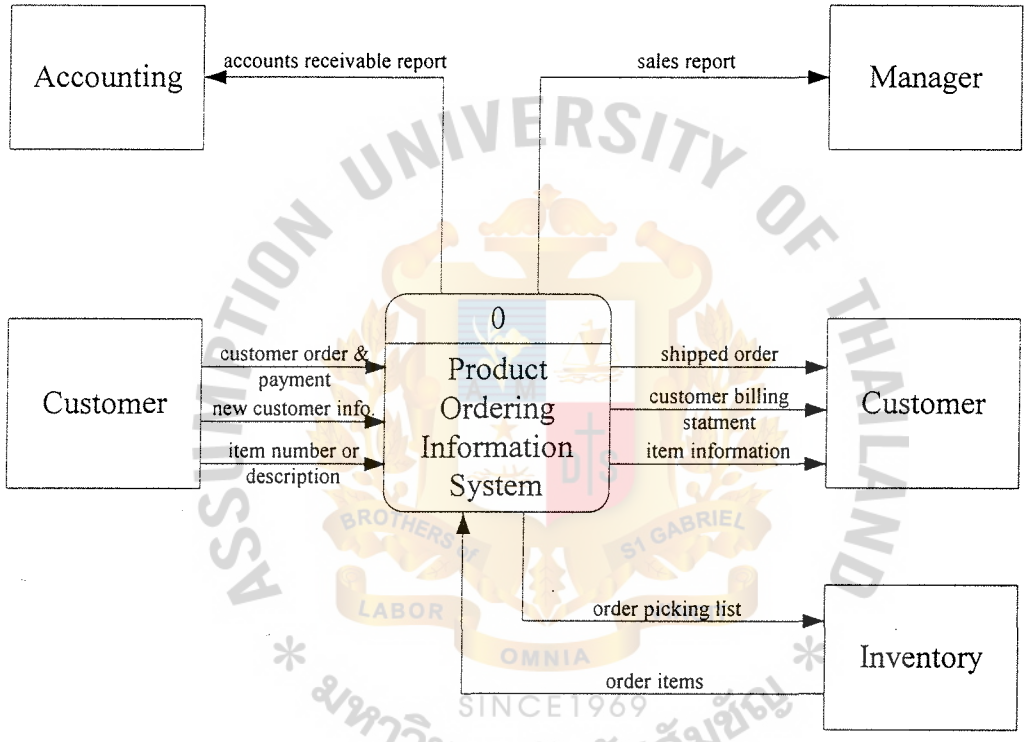

Figure A.1. Context Level Data Flow Diagram of Product Ordering Information System.

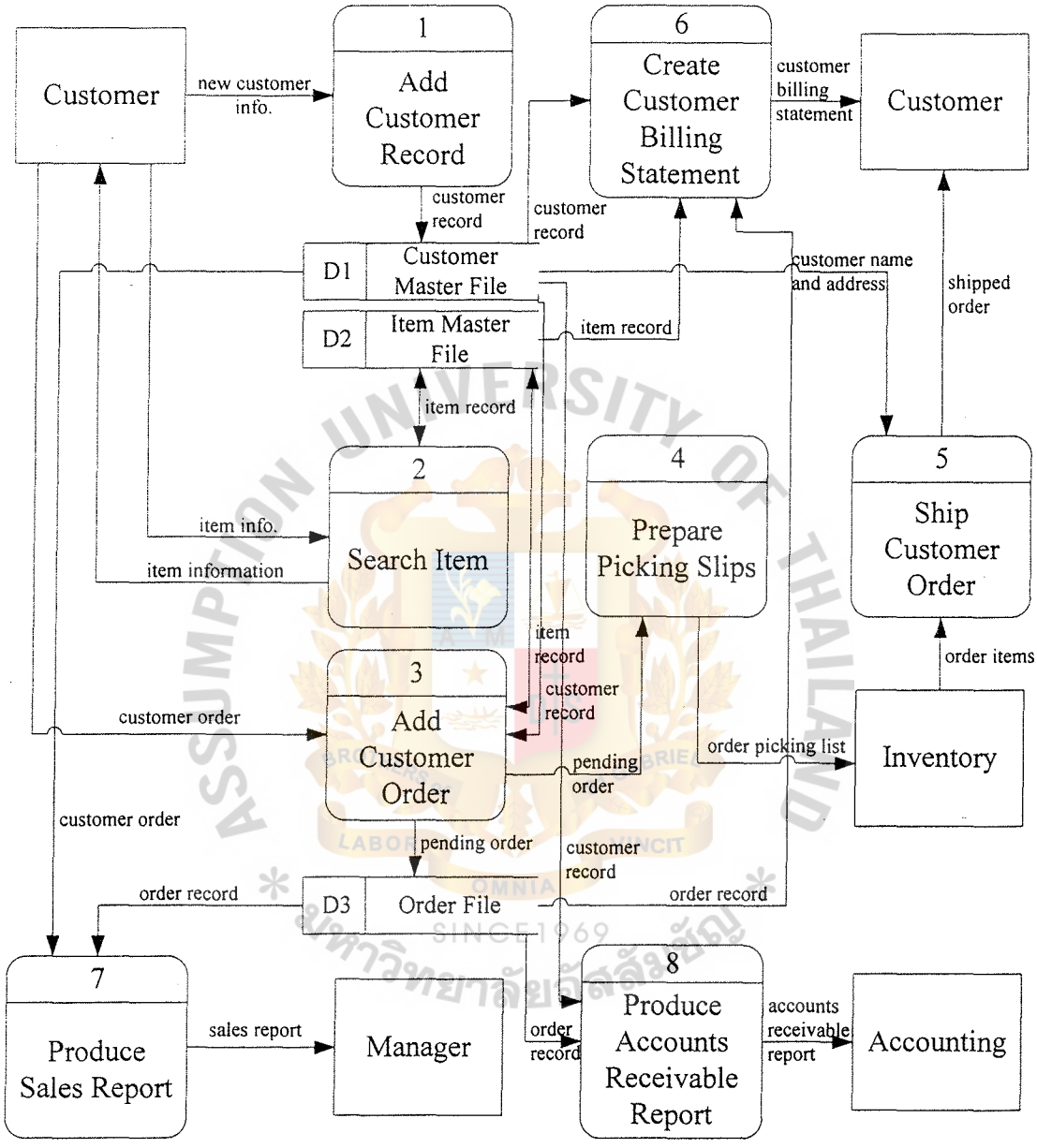

Figure A.2. Level 0 Data Flow Diagram of Product Ordering Information System.

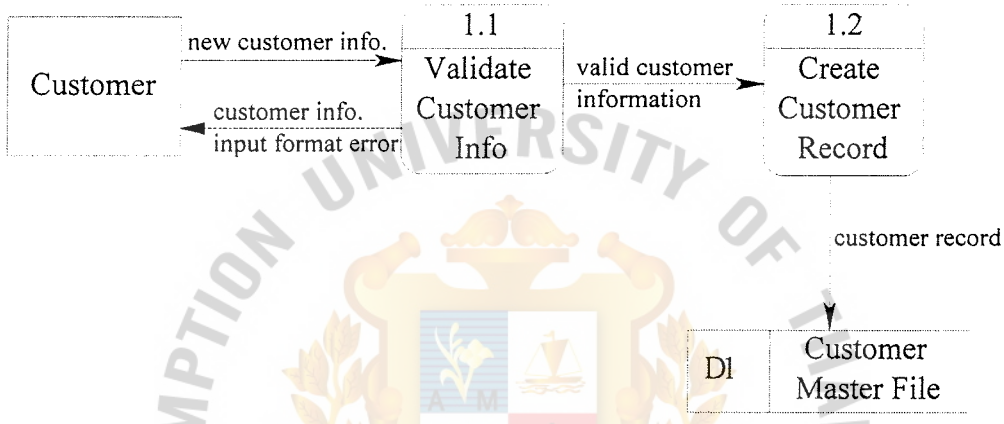

Figure A.3. Level 1 Data Flow Diagram of Add Customer Record Process of Product Ordering Information System.

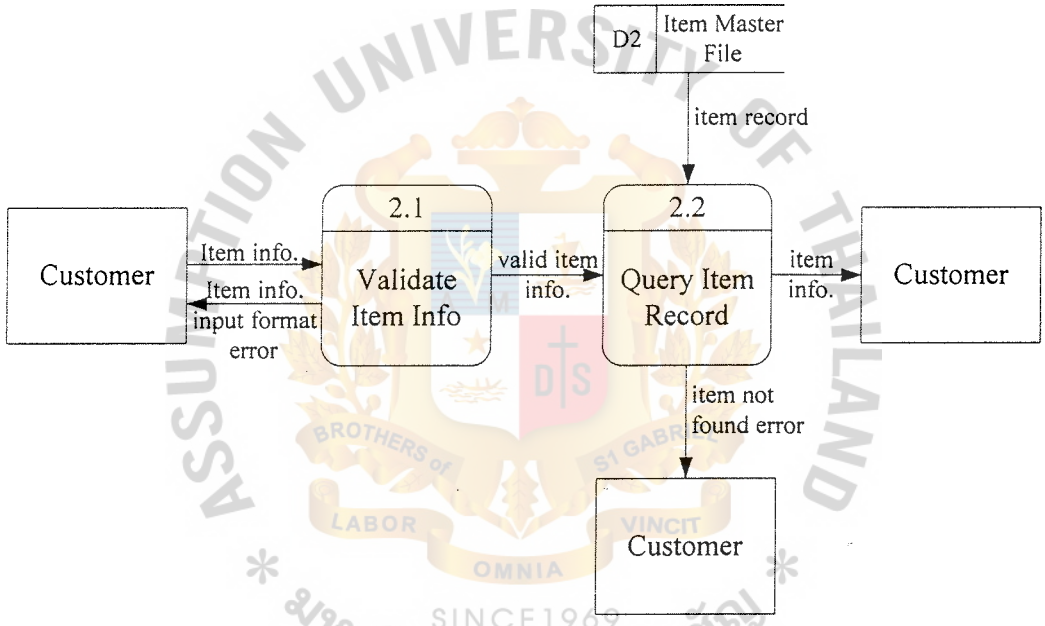

Figure A.4. Level 1 Data Flow Diagram of Search Item Process of Product Ordering Information System.

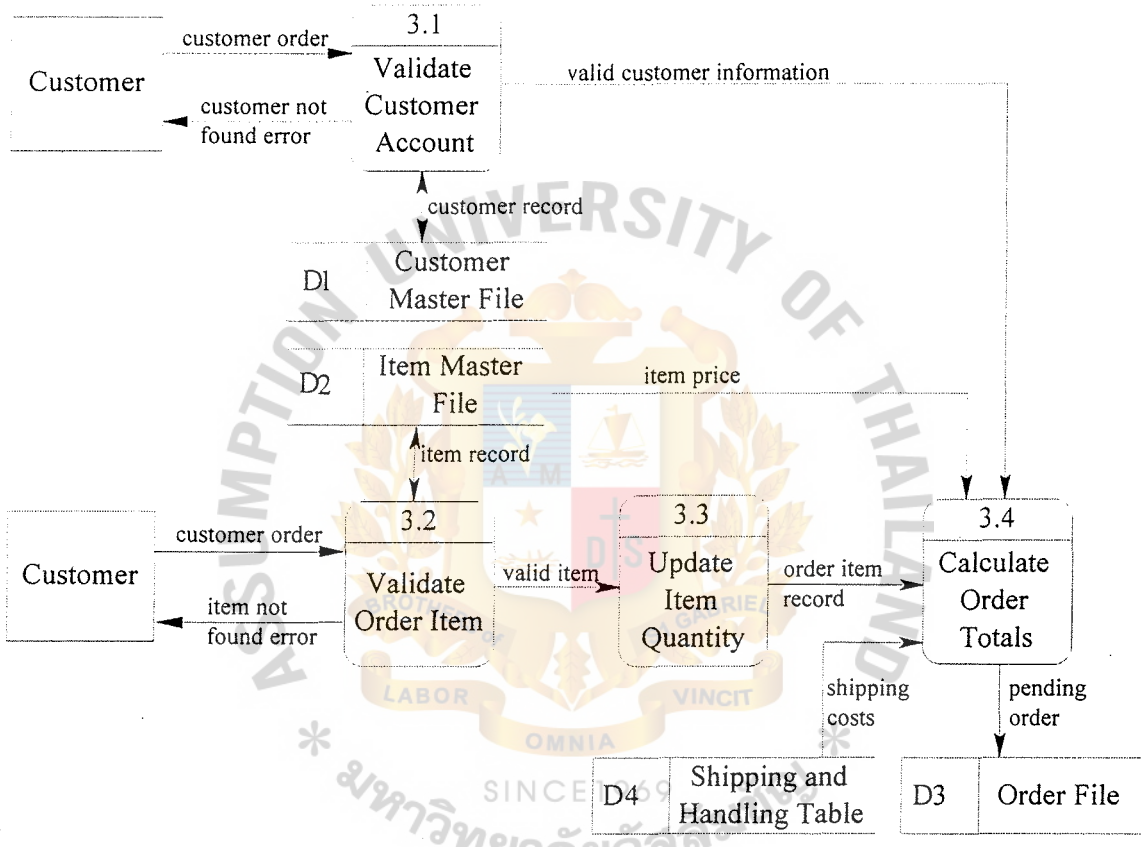

Figure A.5. Level 1 Data Flow Diagram of Add Customer Order Process of Product Ordering Information System.

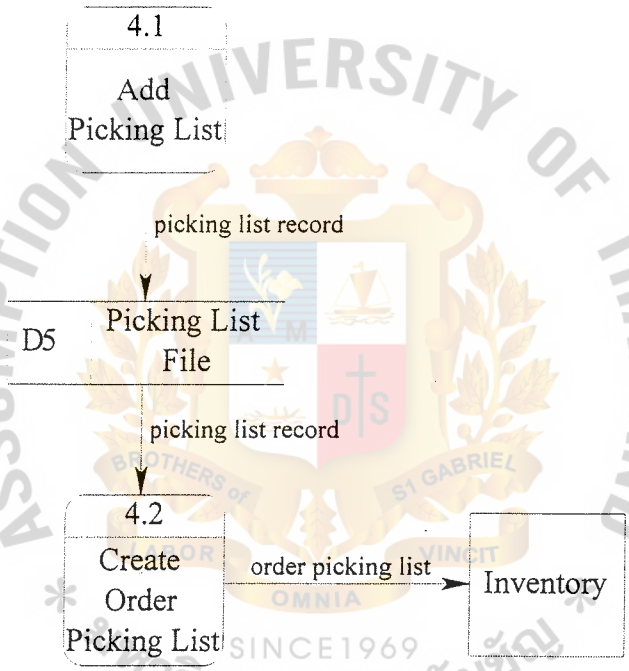

Figure A.6. Level 1 Data Flow Diagram of Prepare Picking Slips Process of Product Ordering Information System.

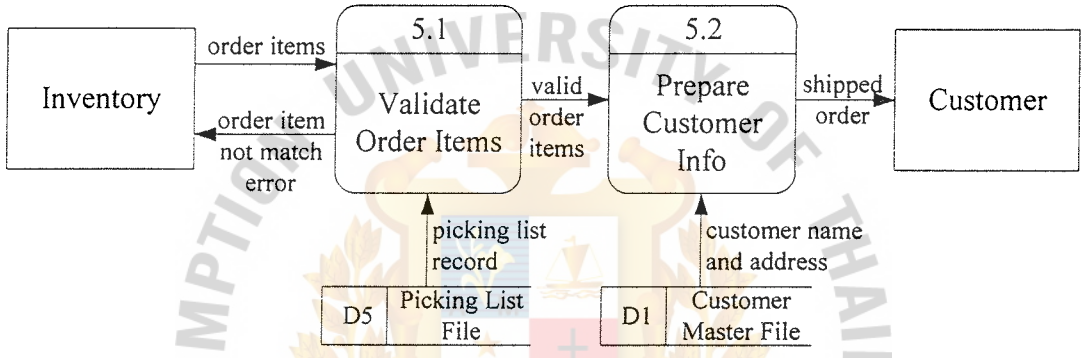

Figure A.7. Level 1 Data Flow Diagram of Ship Customer Order Process of Product Ordering Information System.

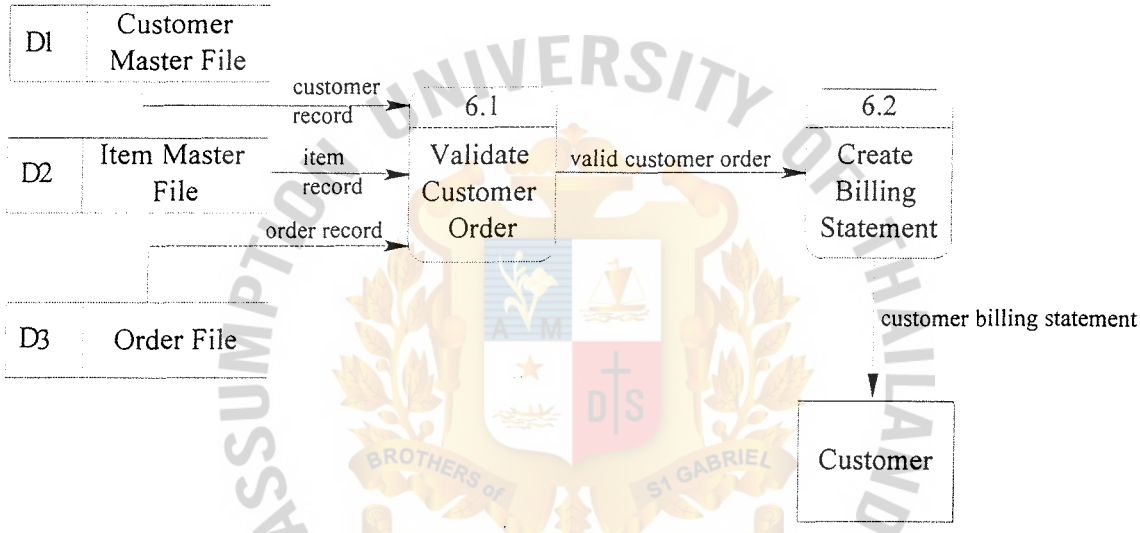

Figure A.8. Level1 Data Flow Diagram of Create Customer Billing Statement Process of Product Ordering Information System.

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Figure A.9. Level 1 Data Flow Diagram of Produce Sales Report Process of Product Ordering Information System.

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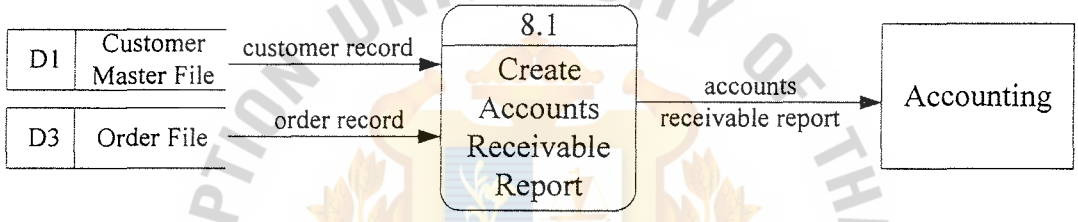

Figure A.10. Level 1 Data Flow Diagram of Produce Account Receivable Report Process of Product Ordering Information System.

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APPENDIX B

WEB INTERFACE DESIGN

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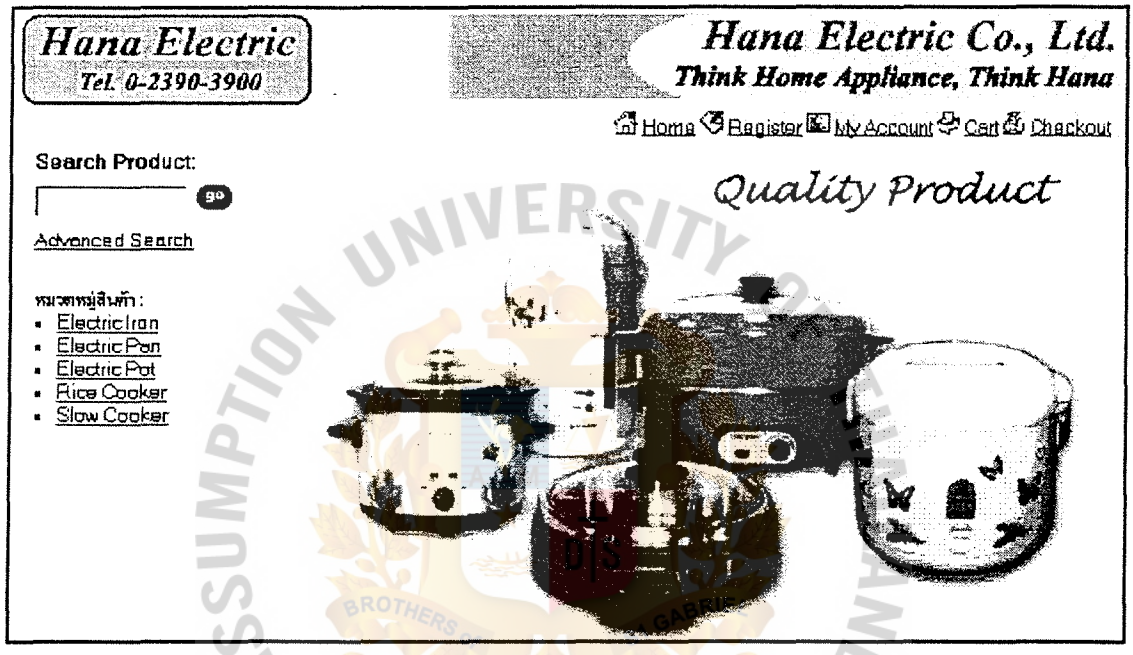

Figure B.1. Main Page.

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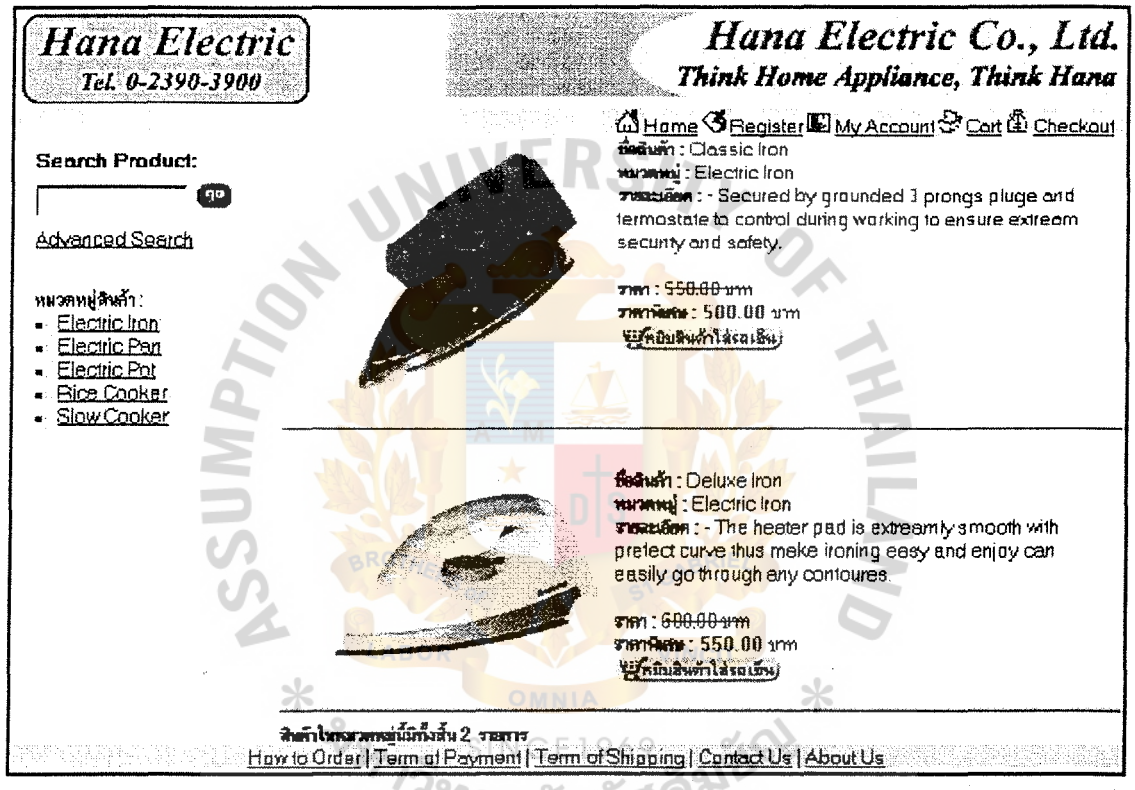

Figure B.2. Product Information Page.

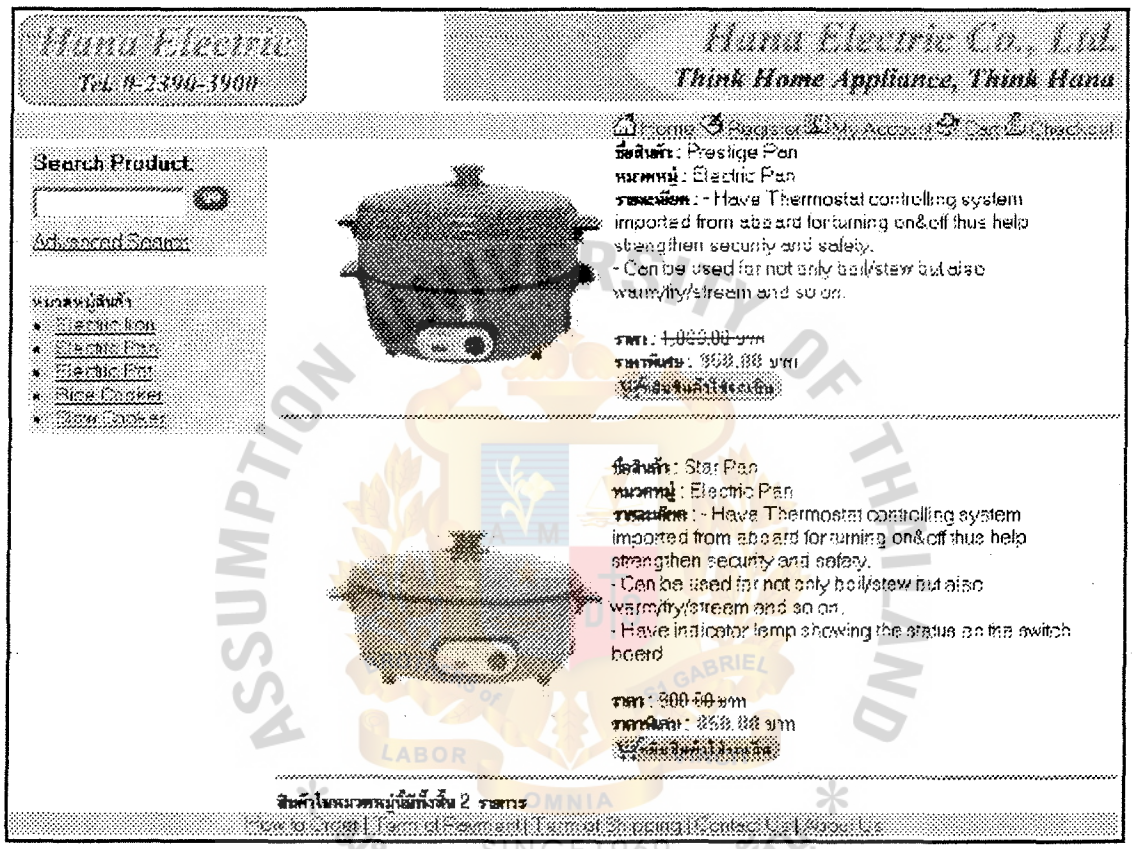

Figure B.3. Product Information Page.

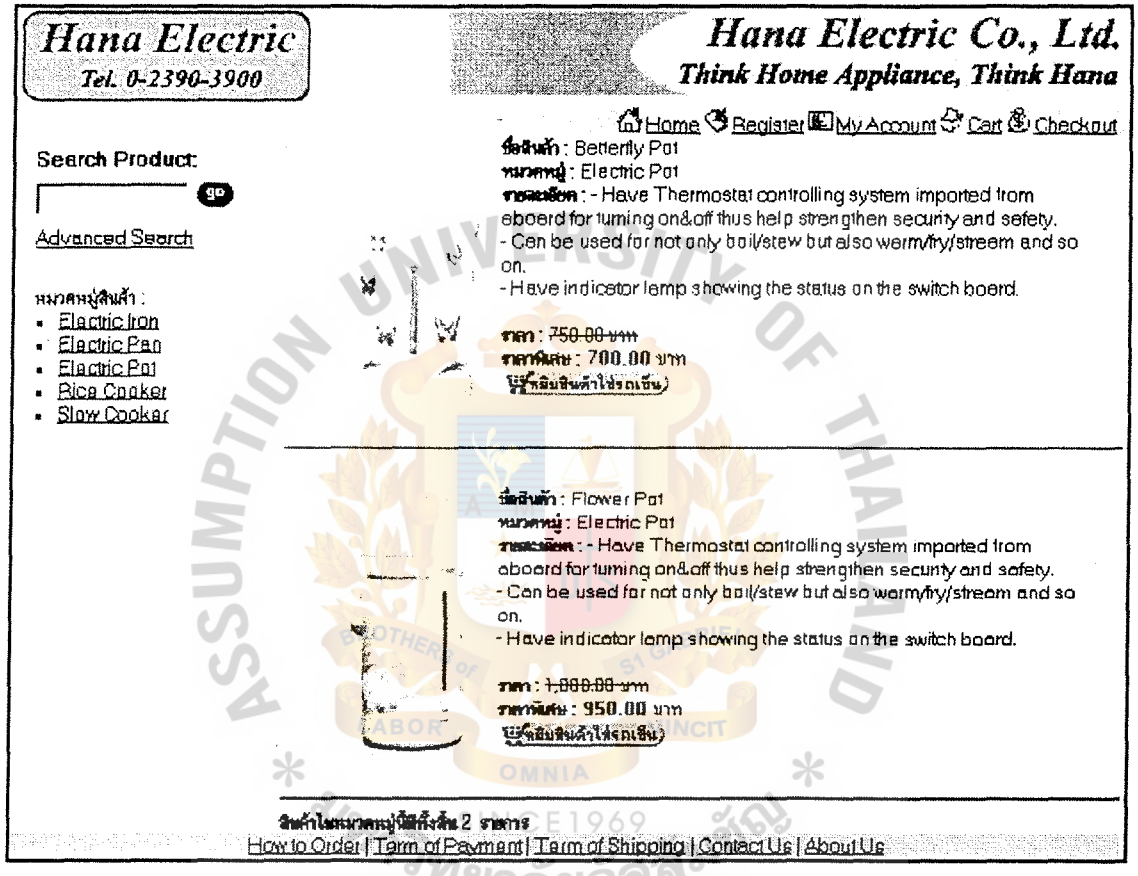

Figure B.4. Product Information Page.

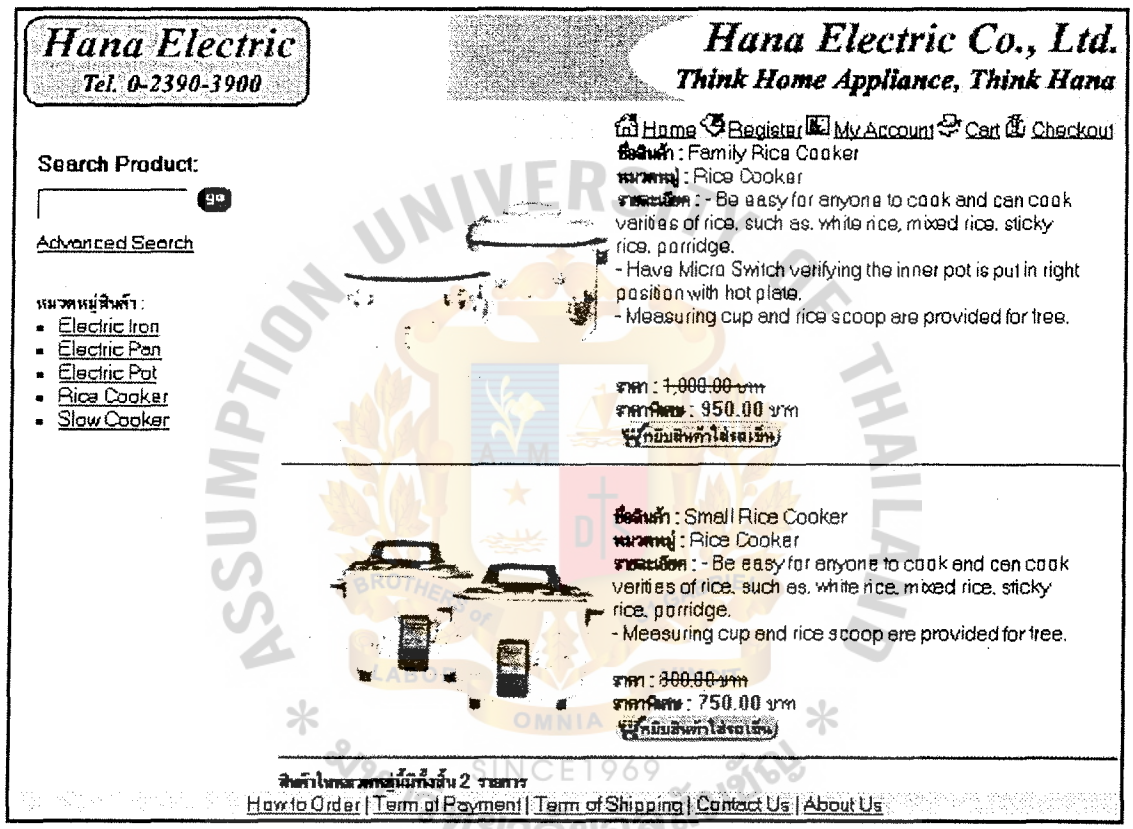

Figure B.5. Product Information Page.

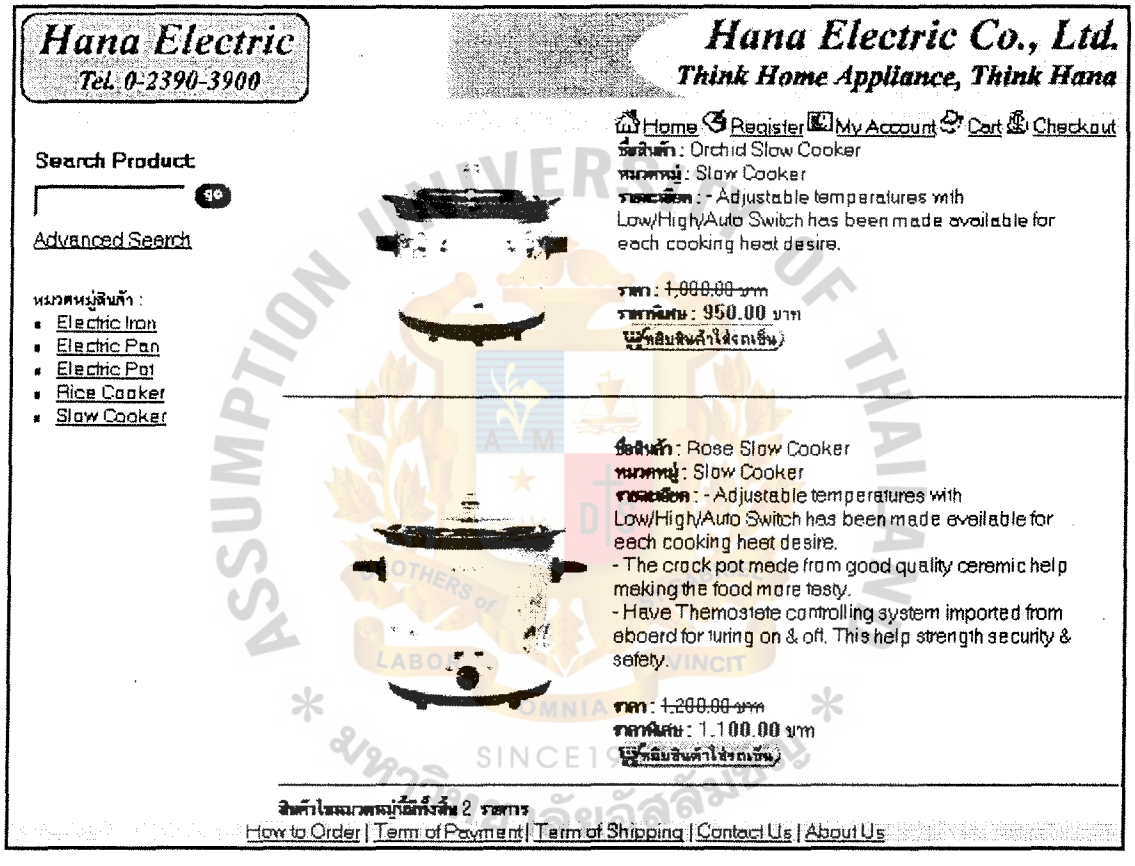

Figure B.6. Product Information Page.

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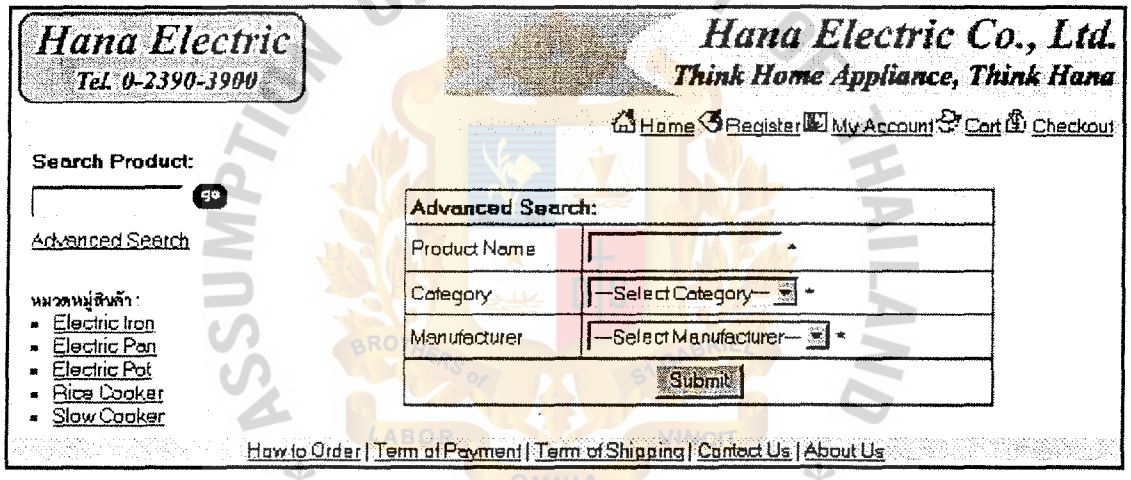

Figure B.7. Advanced Search Page.

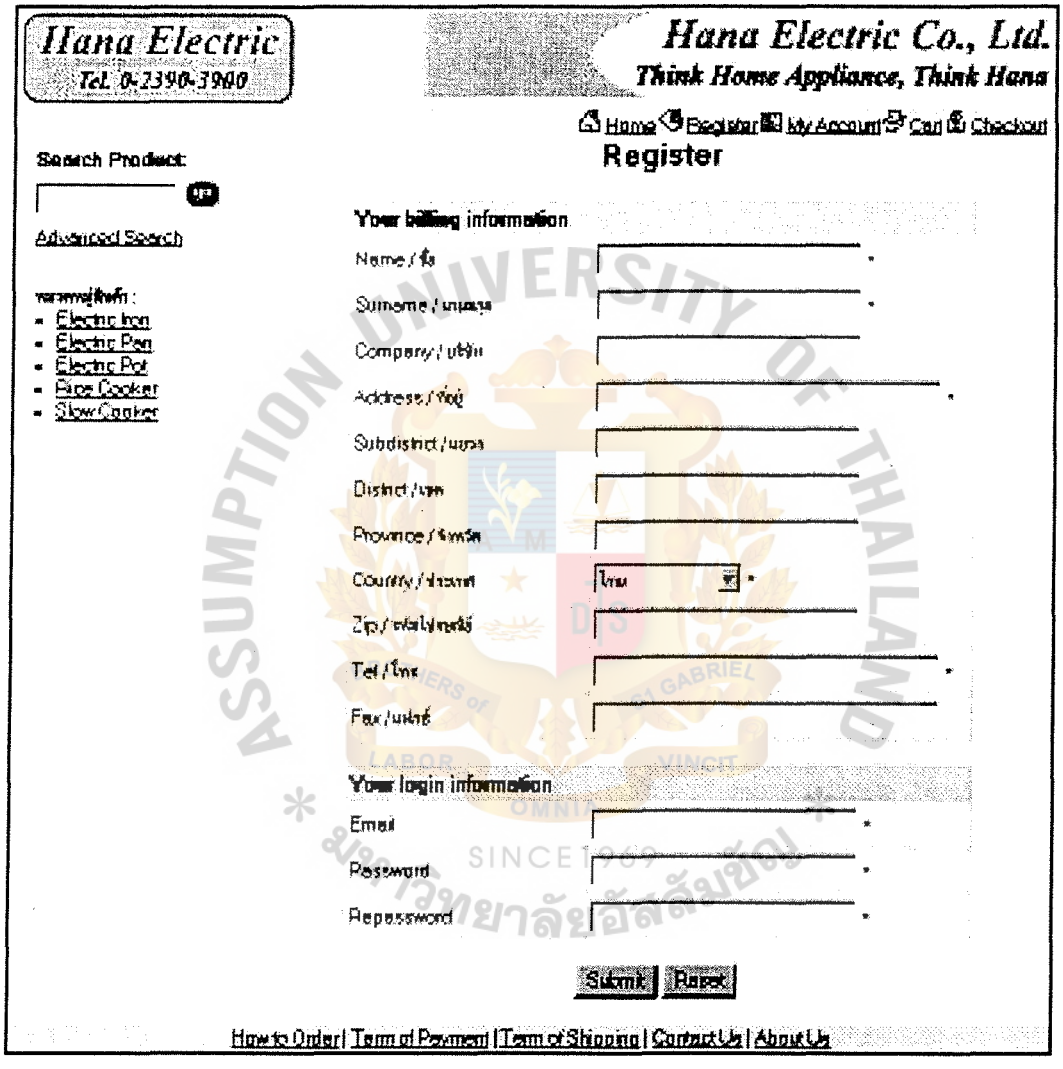

Figure B.8. Customer Register Page.

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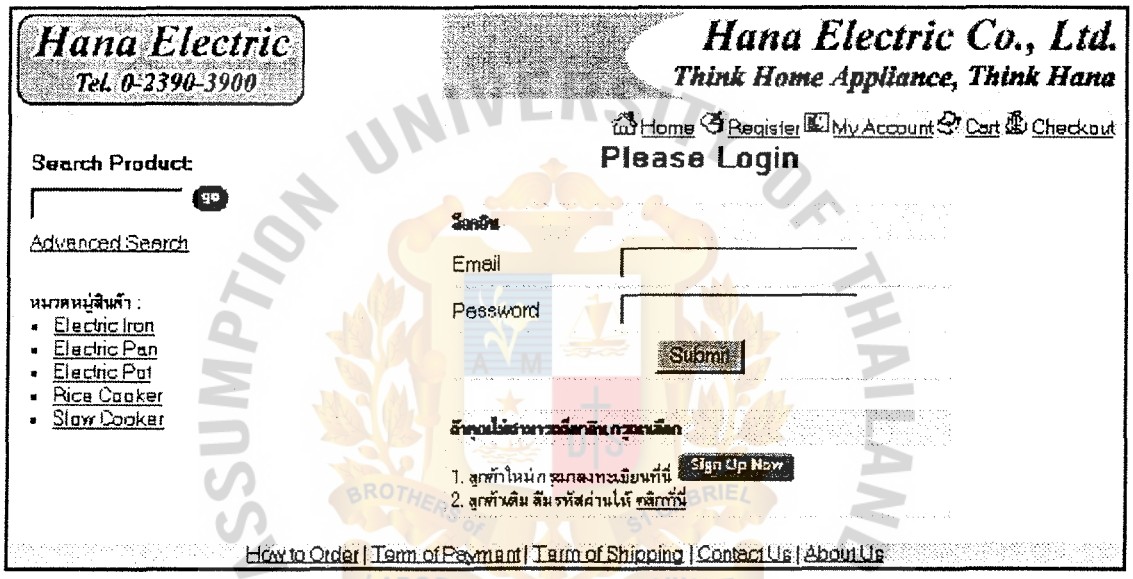

Figure B.9. Customer Login Page.

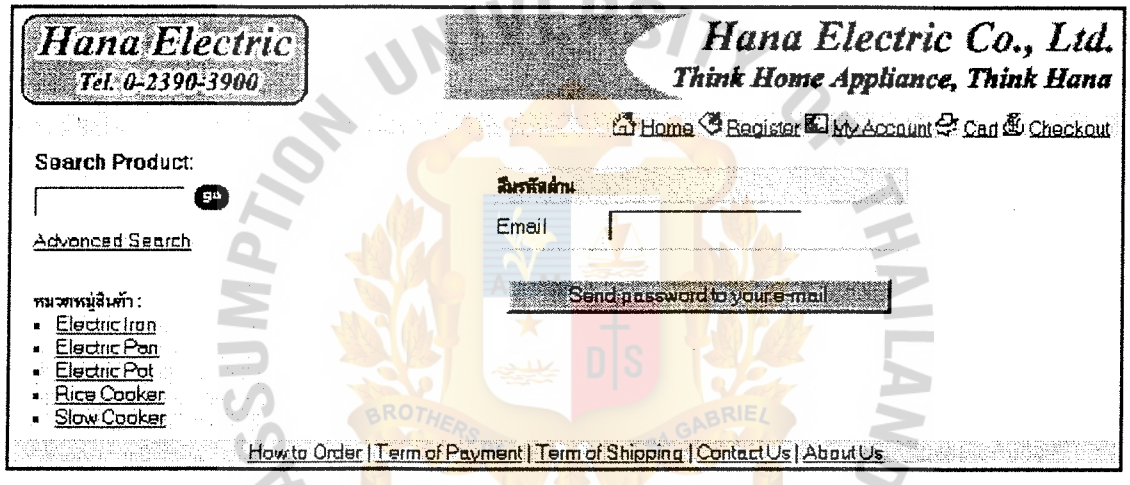

Figure B.10. Forgot Password Page.

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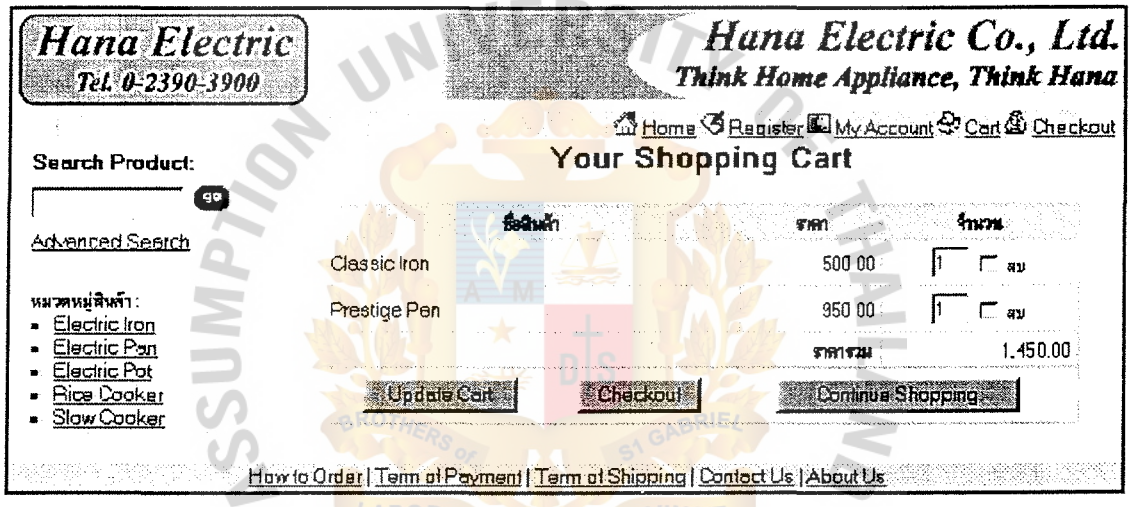

Figure B.11. Shopping Card Page.

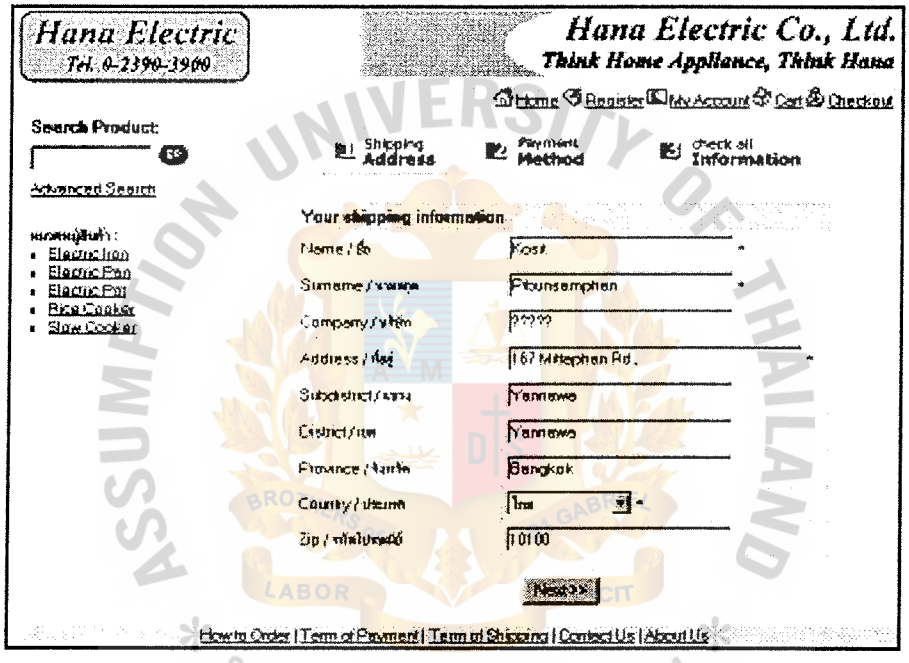

Figure B.12. Customer's Information Page.

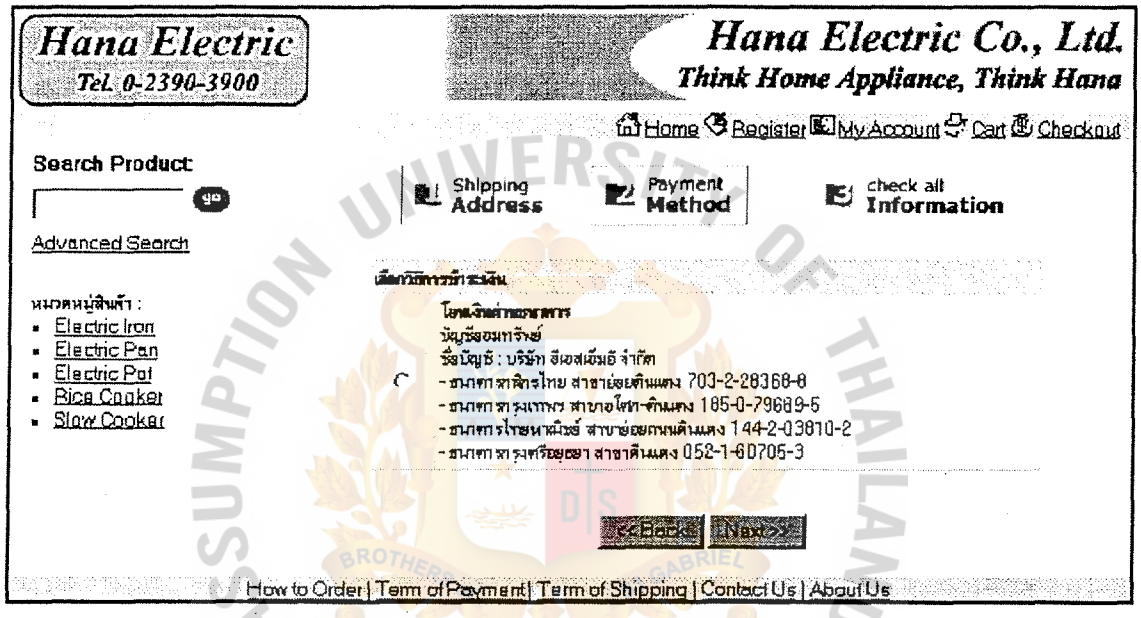

Figure B.13. Bank List Page.

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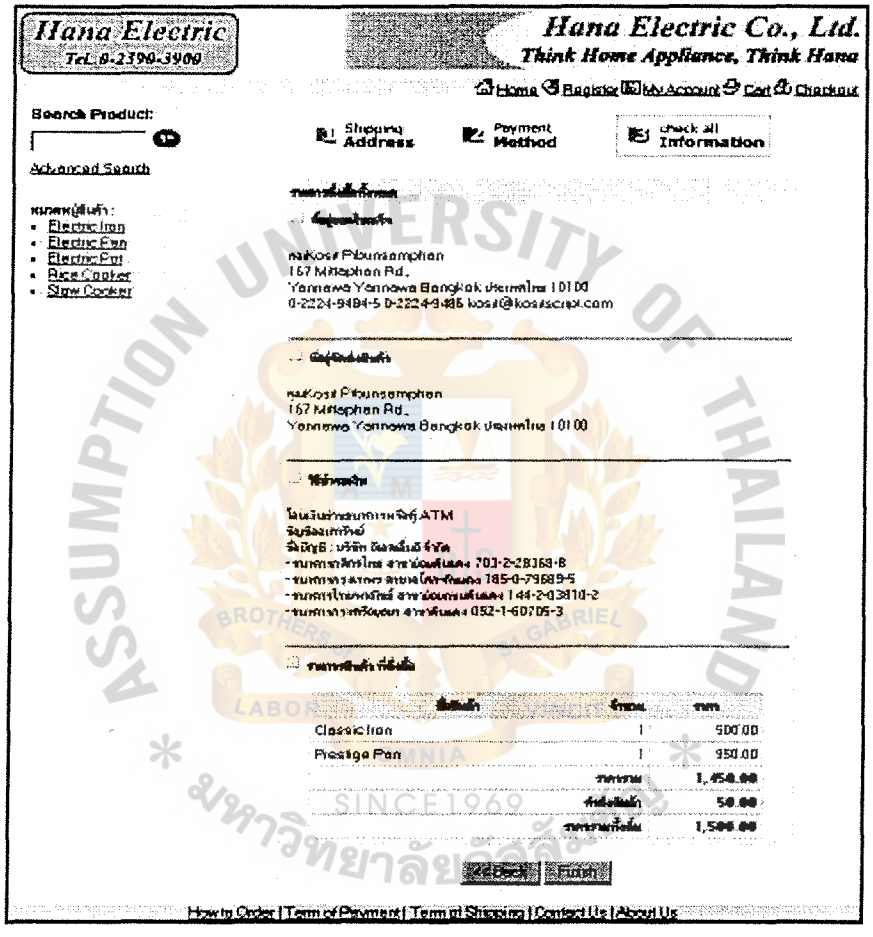

Figure B.14. Order Summary Information Page.

Figure B.15. Order Confirmation Page.

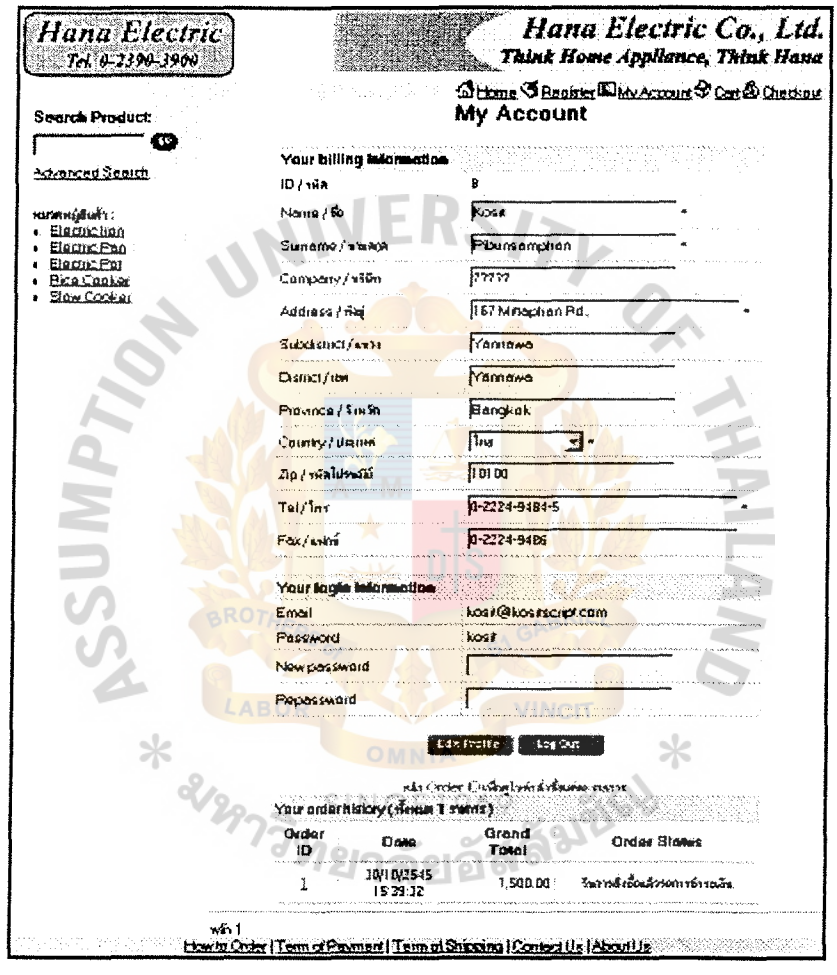

Figure B.16. Customer's Billing Information Page.

Sales Order

Customer : คุณKosit Pibunsemphan
167 Mittaphan Rd.
Yannawa Yannawa Bangkok
ไทย 10100

Shipping at : คุณKosit Pibunsemphan
167 Mittaphan Rd.
Yannawa Yannawa Bangkok
ไทย 10100

Date : 30/10/2545 15:39:32
Order ID : 1

No.	Description	Unit Price (Baht)	Qty	Total (Baht)
1	Classic Iron	500.00	1	500.00
2	Prestige Pan	950.00	1	950.00
			Subtotal	1,450.00
			Shipping Fee	50.00
			Grand Total	**1,500.00**

ขอขอบคุณที่ใช้สินค้าและบริการของเรา
กรุณาพิมพ์เอกสารชุดนี้เพื่อเก็บไว้เป็นหลักฐาน
หมายเหตุ : คุณสามารถตรวจสอบประวัติการสั่งซื้อของคุณได้ตลอด 24 ชม.ที่เมนู "My Account" บนเว็บไซต์เราครับ

Thank you for using our products/services.
Please print this document in order to confirm with us.
Remember, you can check your order history at our website on menu "My Account" all the time.

Figure B.17. Sales Order Page.

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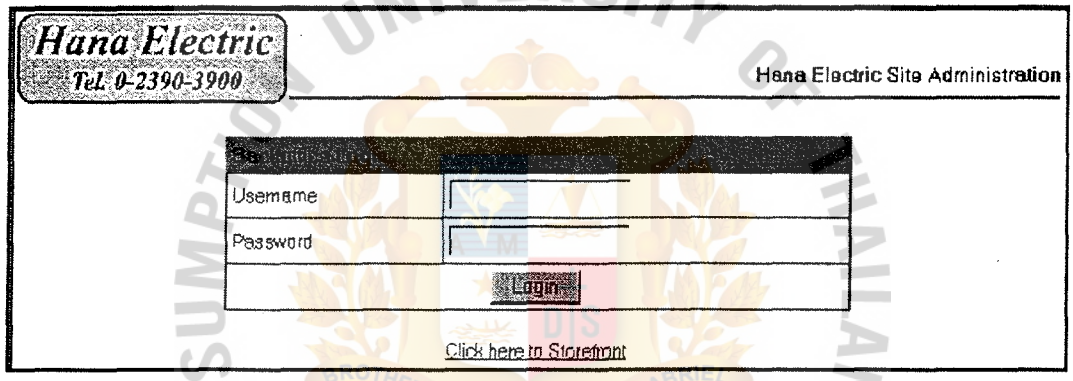

Figure B.18. Administration Login Page.

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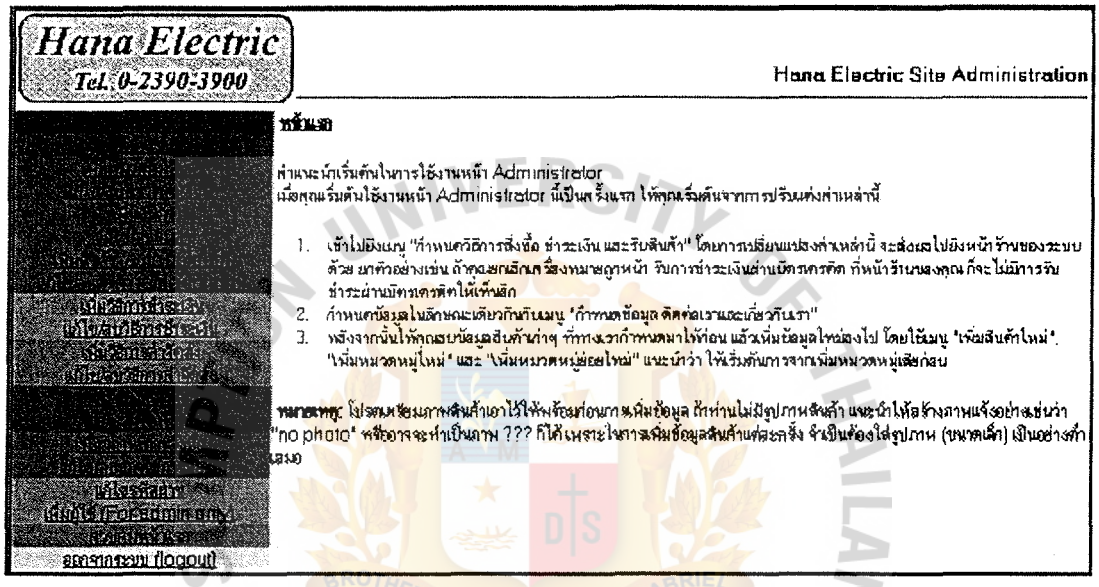

Figure B.19. Administration Section Page.

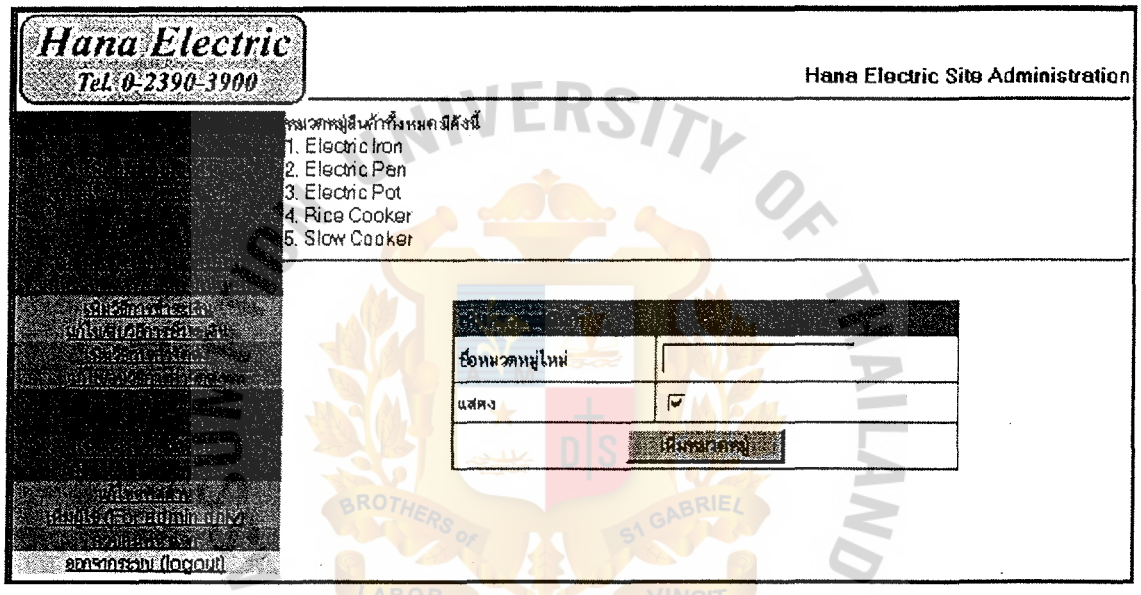

Figure B.20. Product Administration Page.

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BROTHERS OF ST GABRIEL
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มหาวิทยาลัยอัสสัมชัญ

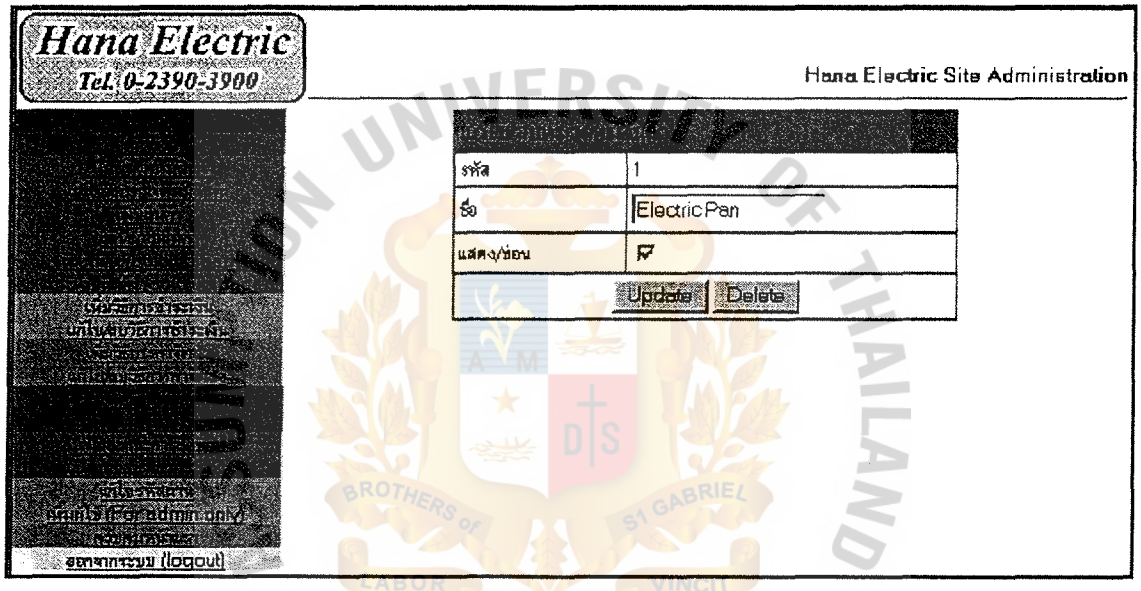

Figure B.21. Product Category Administration Page.

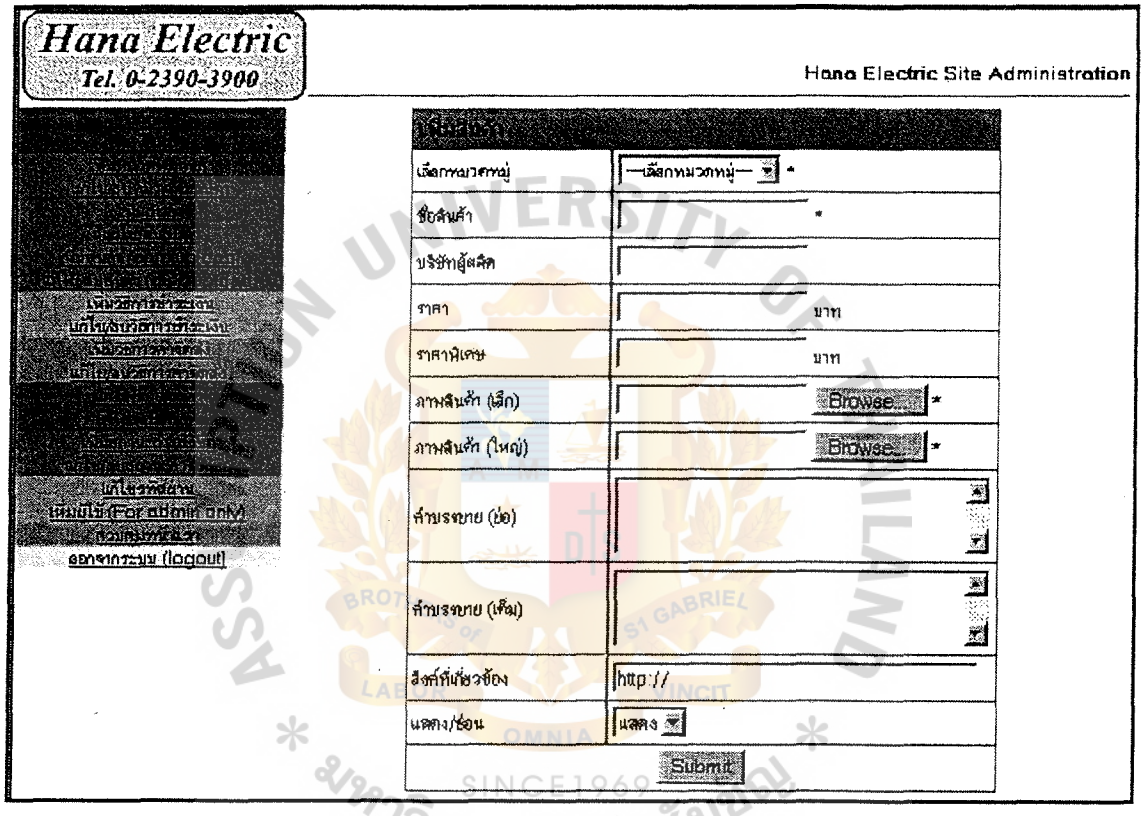

Figure B.22. Add Product Administration Page.

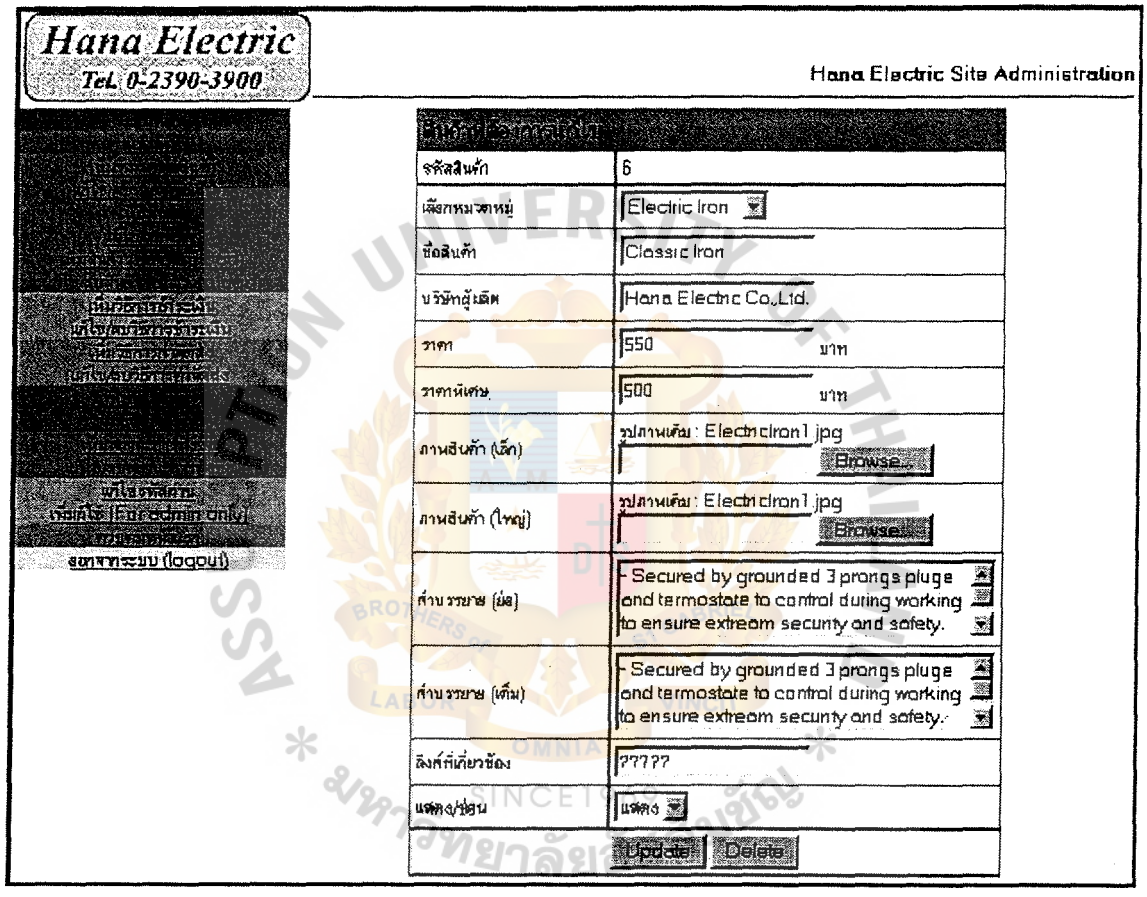

Figure B.23. Product Change Administration Page.

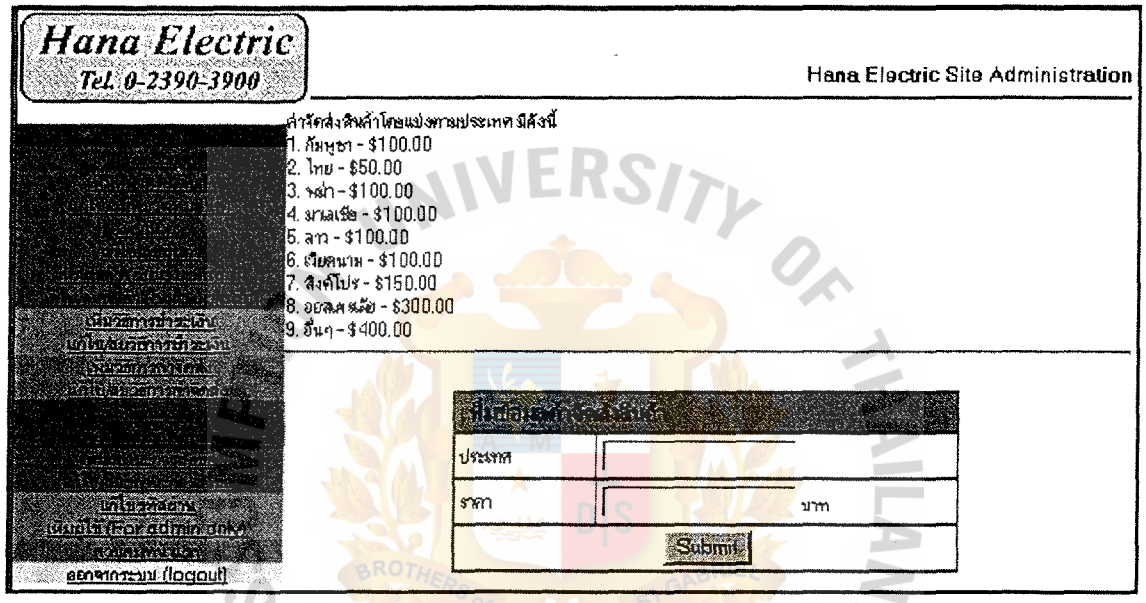

Figure B.24. Shipping Charge Administration Page.

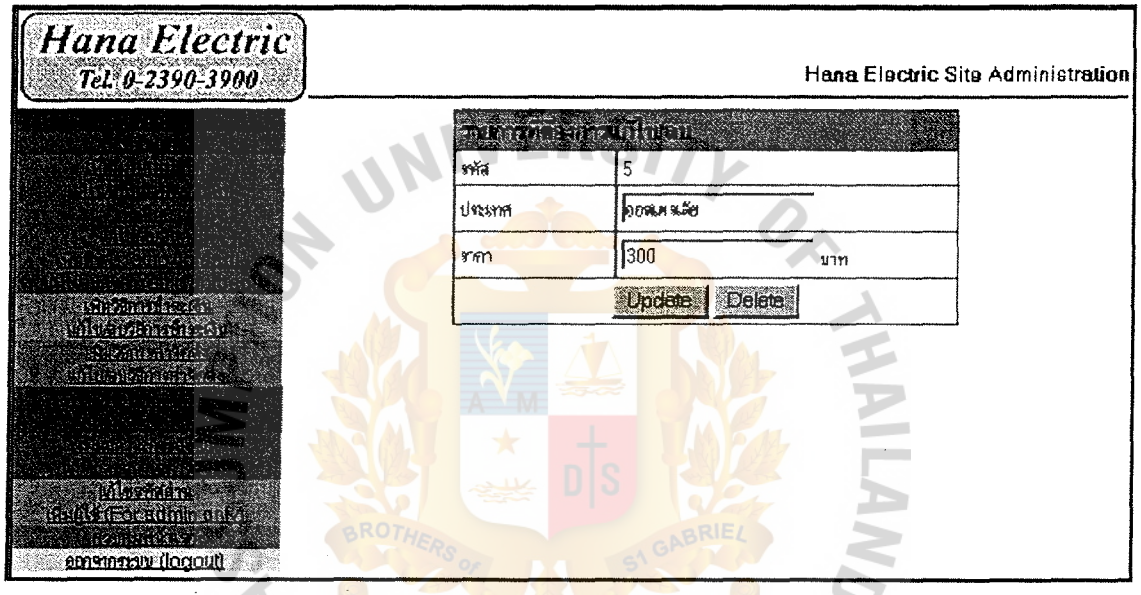

Figure B.25. Address Change Administration Page.

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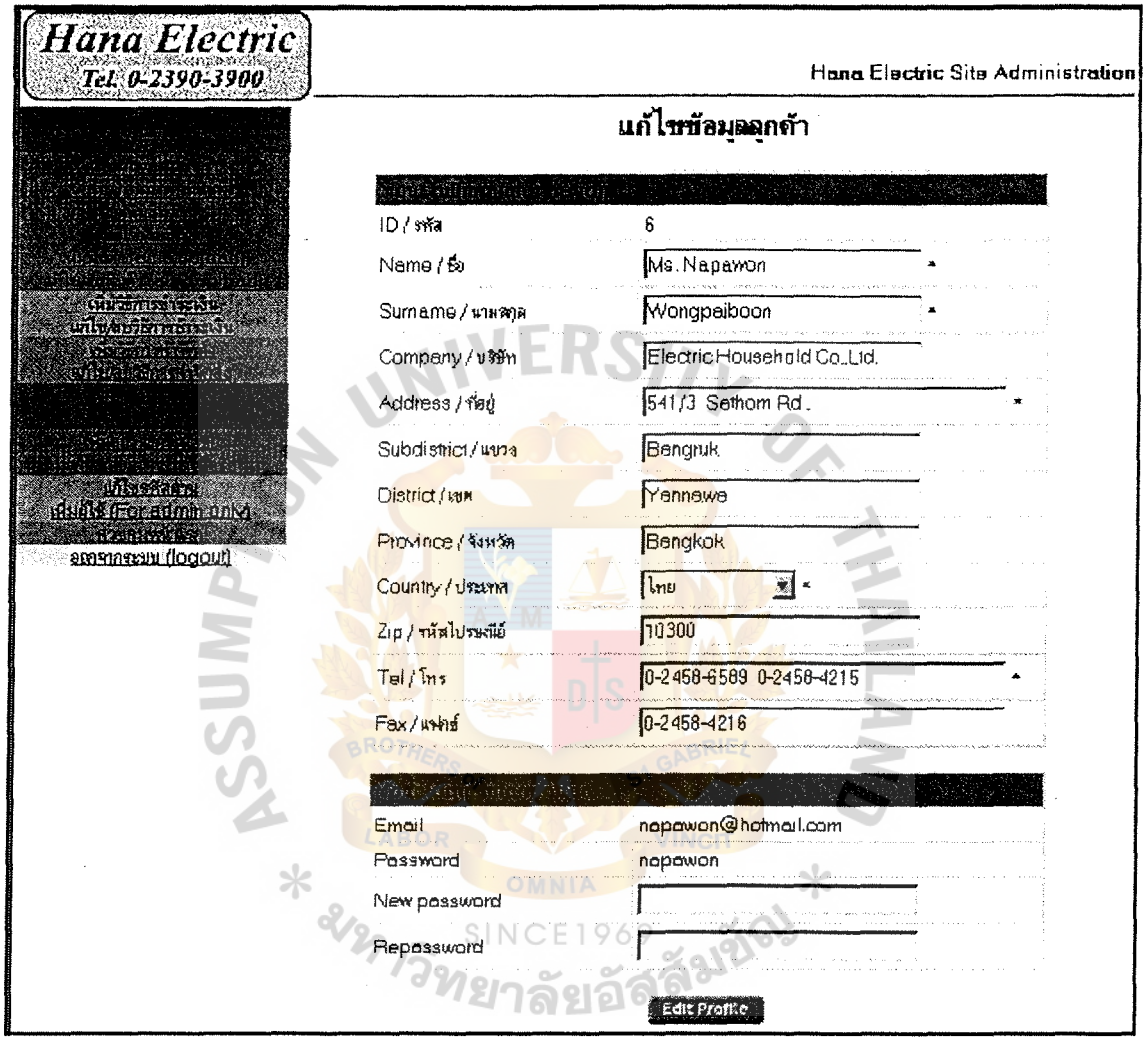

Figure B.26. Customer Information Administration Page.

Figure B.27. Customer's Order Information Administration Page.

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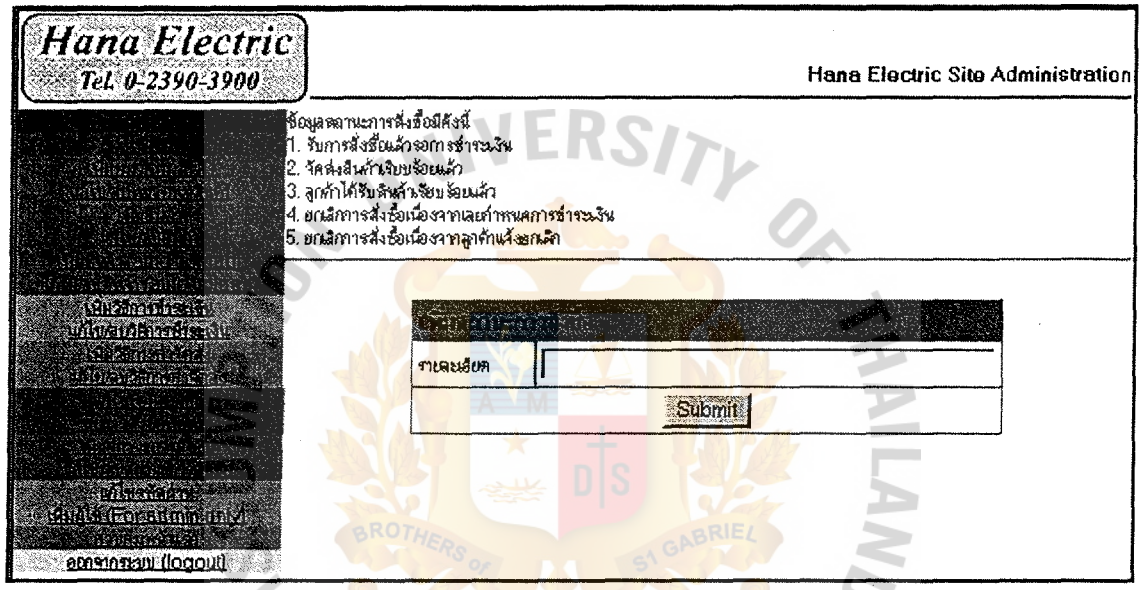

Figure B.28. Add Customer's Order Description Administration Page.

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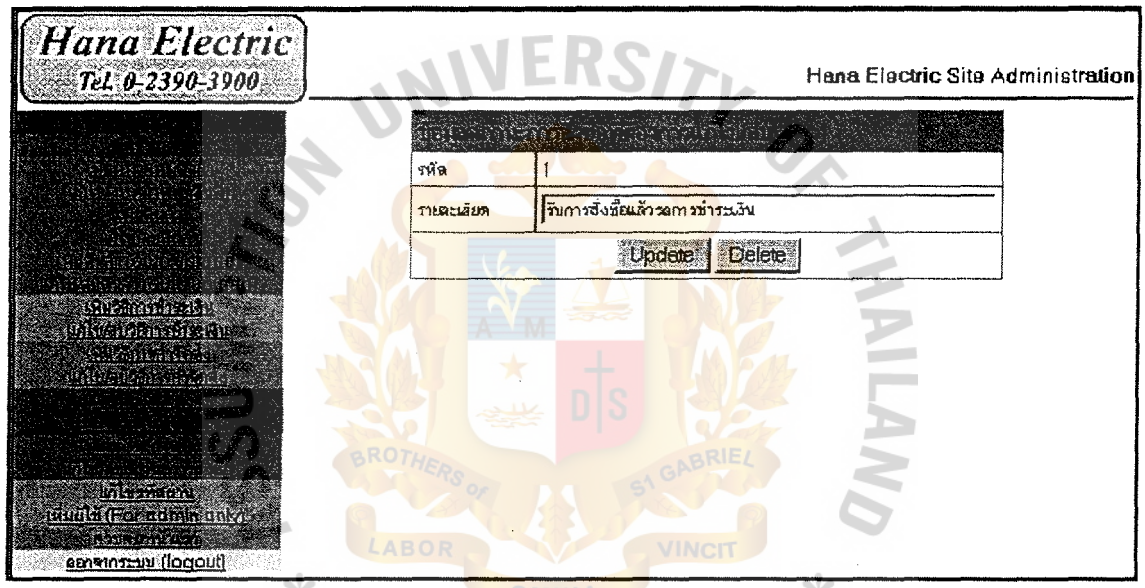

Figure B.29. Change Customer's Order Description Administration Page.

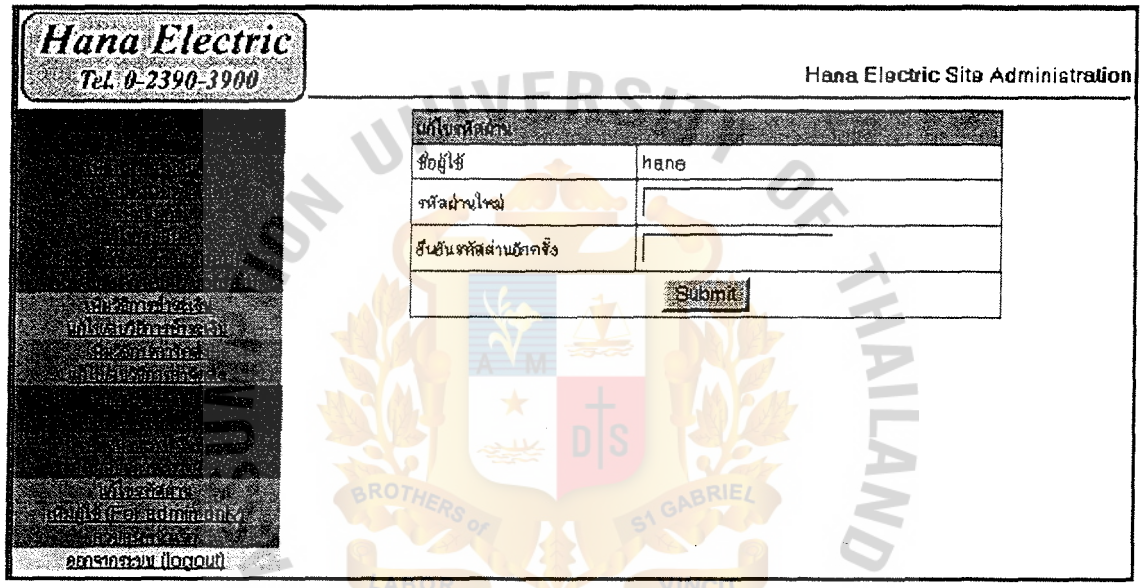

Figure B.30. Change Password Administration Page.

มหาวิทยาลัยอัสสัมชัญ

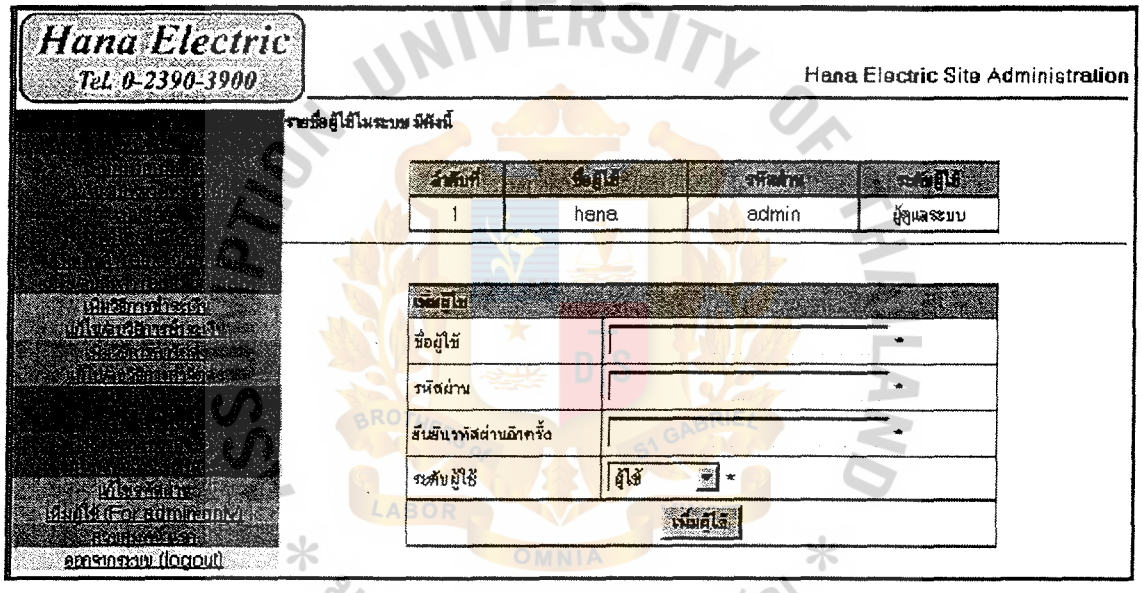

Figure B.31. User List Administration Page.

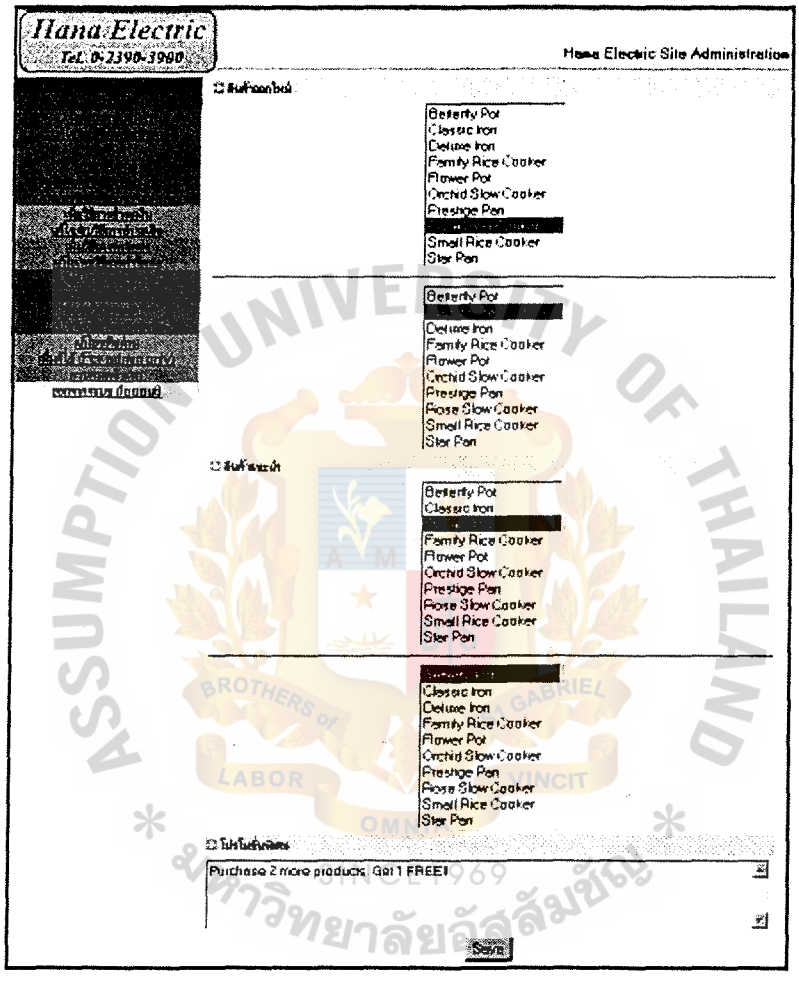

Figure B.32. Main Page Administration Page.

APPENDIX C

REPORT DESIGN

ASSUMPTION UNIVERSITY OF THAILAND
BROTHERS OF ST GABRIEL
LABOR OMNIA VINCIT
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Table C.1. Sales Orders Report.

No.	Order Date	Order Number	Customer ID	Customer Name	Amount (Baht)
1	22/06/45	SC0199/02	00001	Mr.Kosit Pibunsamphan	35,838.00
2	30/06/45	SC0200/02	00002	Mr.Kitti Jaidee	21,400.00
3	15/07/45	SC0201/02	00003	Mr.Suphasit Luksana	535.00
4	15/07/45	SC0202/02	00002	Mr.Kitti Jaidee	12,840.00
5	17/07/45	SC0203/02	00004	Ms.Piyamas Rangsri	642.00
				Grand Total	71,255.00

Table C.2. Daily Sales Orders Report (From 01/06/45 To 30/06/45).

No.	Order Date	Order Number	Customer ID	Customer Name	Amount (Baht)
1	22/06/45	SC0199/02	00001	Mr.Kosit Pibunsamphan	35,838.00
2	30/06/45	SC0200/02	00002	Mr.Kitti Jaidee	21,400.00
				Grand Total	57,238.00

Table C.3. Monthly Sales Orders Report (From 06/45 To 07/45).

No.	Order Date	Order Number	Customer ID	Customer Name	Amount (Baht)
1	22/06/45	SC0199/02	00001	Mr.Kosit Pibunsamphan	35,838.00
2	30/06/45	SC0200/02	00002	Mr.Kitti Jaidee	21,400.00
3	15/07/45	SC0201/02	00003	Mr.Suphasit Luksana	535.00
4	15/07/45	SC0202/02	00002	Mr.Kitti Jaidee	12,840.00
5	17/07/45	SC0203/02	00004	Ms.Piyamas Rangsri	642.00
				Grand Total	71,255.00

Table C.4. Quarterly Sales Orders Report (From 01/45 To 03/45).

No.	Order Date	Order Number	Customer ID	Customer Name	Amount (Baht)
1	22/06/45	SC0199/02	00001	Mr.Kosit Pibunsamphan	35,838.00
2	30/06/45	SC0200/02	00002	Mr.Kitti Jaidee	21,400.00
3	15/07/45	SC0201/02	00003	Mr.Suphasit Luksana	535.00
4	15/07/45	SC0202/02	00002	Mr.Kitti Jaidee	12,840.00
5	17/07/45	SC0203/02	00004	Ms.Piyamas Rangsri	642.00
				Grand Total	71,255.00

Table C.5. Yearly Sales Orders Report (From 45 To 45).

No.	Order Date	Order Number	Customer ID	Customer Name	Amount (Baht)
1	22/06/45	SC0199/02	00001	Mr.Kosit Pibunsamphan	35,838.00
2	30/06/45	SC0200/02	00002	Mr.Kitti Jaidee	21,400.00
3	15/07/45	SC0201/02	00003	Mr.Suphasit Luksana	535.00
4	15/07/45	SC0202/02	00002	Mr.Kitti Jaidee	12,840.00
5	17/07/45	SC0203/02	00004	Ms.Piyamas Rangsri	642.00
				Grand Total	71,255.00

Table C.6. Customers Report.

No.	Date	Customer ID	Name	Tel	Fax	E-mail	Province
1	22/06/45	00001	Mr.Kosit Pibunsamphan	289-5555-9	289-5560	kosit@itopm.com	Bangkok
2	30/06/45	00002	Mr.Kitti Jaidee	389-9989	389-9990	kitti@hotmail.com	Bangkok
3	15/07/45	00003	Mr.Suphasit Luksana	585-8990	585-8991	suphasit@yahoo.com	Bangkok
4	17/07/45	00004	Ms.Piyamas Rangsri	385-5536	385-5537	piyamas@yahoo.com	Samutprakarn

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Table C.7. Monthly Customers Report (From 07/45 to 07/45).

No.	Date	Customer ID	Name	Tel	Fax	E-mail	Province
1	15/07/45	00003	Mr.Suphasit Luksana	585-8990	585-8991	suphasit@yahoo.com	Bangkok
2	17/07/45	00004	Ms.Piyamas Rangsri	385-5536	385-5537	piyamas@yahoo.com	Samutprakarn

Table C.8. Quarterly Customers Report (From 03/45 to 03/45).

No.	Date	Customer ID	Name	Tel	Fax	E-mail	Province
1	15/07/45	00003	Mr.Suphasit Luksana	585-8990	585-8991	suphasit@yahoo.com	Bangkok
2	17/07/45	00004	Ms.Piyamas Rangsri	385-5536	385-5537	piyamas@yahoo.com	Samutprakarn

Table C.9. Yearly Customers Report (From 45 To 45).

No.	Date	Customer ID	Name	Tel	Fax	E-mail	Province
1	22/06/45	00001	Mr.Kosit Pibunsamphan	289-5555-9	289-5560	kosit@itopm.com	Bangkok
2	30/06/45	00002	Mr.Kitti Jaidee	389-9989	389-9990	kitti@hotmail.com	Bangkok
3	15/07/45	00003	Mr.Suphasit Luksana	585-8990	585-8991	suphasit@yahoo.com	Bangkok
4	17/07/45	00004	Ms.Piyamas Rangsri	385-5536	385-5537	piyamas@yahoo.com	Samutprakarn

Table C.10. Product Best Selling Report.

No.	Product Code	Product Name	Color	Size	Unit Price
1	001	Slow Cooker	Red	1 Litre	950.00
2	031	Electric Pan	Green	12 Inches	900.00
3	005	Slow Cooker	Pink	1.5 Litres	1,000.00
4	010	Electric Pot	White	2.5 Litres	750.00
5	015	Electric Pot	White	3.0 Litres	950.00
6	020	Electric Iron	Red	2.0 Pounds	550.00
7	029	Rice Cooker	Grey	1.8 Litres	750.00

Table C.11. Account Receivable Report.

No.	Customer ID	Customer Name	Order Date	Order Number	Amount (Baht)
1	00001	Mr.Kosit Pibunsamphan	22/06/45	SC0199/02	35,838.00
2	00002	Mr.Kitti Jaidee	30/06/45	SC0200/02	21,400.00
3	00003	Mr.Suphasit Luksana	15/07/45	SC0201/02	535.00
4	00002	Mr.Kitti Jaidee	15/07/45	SC0202/02	12,840.00
5	00004	Ms.Piyamas Rangsri	17/07/45	SC0203/02	642.00
				Grand Total	71,255.00

Table C.12. Monthly Account Receivable Report (From 07/45 To 07/45).

No.	Customer ID	Customer Name	Order Date	Order Number	Amount (Baht)
1	00003	Mr.Suphasit Luksana	15/07/45	SC0201/02	535.00
2	00002	Mr.Kitti Jaidee	15/07/45	SC0202/02	12,840.00
3	00004	Ms.Piyamas Rangsri	17/07/45	SC0203/02	642.00
				Grand Total	14,017.00

Table C.13. Order Picking List.

Order Picking List
Picking List ID : PL0001/45 Picking List Date : 23/04/45 Customer : Mr.Kosit Pibunsamphan (#00001)

Product Details				
Code	Name	Color	Size	Qty.
001	Slow Cooker	Red	1 Litre	24
031	Electric Pan	Green	12 Inches	12

Sender Signature _____
Sender Name _____
Date _____

Receiver Signature _____
Receiver Name _____
Date _____

Table C.14. Order Billing Statement/Receipt.

Order Billing Statement/Receipt	
Order Number : SC0199/02 Order Date : 22/06/45 Customer : Mr.Kosit Pibunsamphan (#00001/kosit@itopm.com)	
Shipping Address	Billing Address
To : Mr.Kosit Pibunsamphan 232-234 Chan Rd., Yannawa Yannawa Bangkok Thailand 10300 Tel : 289-5555-9 Fax : 289-5560	To : Mr.Kosit Pibunsamphan 555 Silom Rd., Yannawa Yannawa Bangkok Thailand 10300 Tel : 291-0001 Fax : 291-0002
Payment	
Bangkok Bank Thong Rung Rueng Paper Co., Ltd. Saving, #567-8-33333-1, Pomprab	

Table C.15. Order Billing Statement/Receipt (Continued).

Code	Description	Qty.	Unit Price (Baht)	Total (Baht)
001	Slow Cooker (Red)	24	950.00	22,800.00
031	Electric Pan (Green)	12	900.00	10,800.00
			Sub Total	33,600.00
			VAT 7%	2,352.00
			Shipping and Handling	100.00
			Grand Total	36,052.00

Buyer Signature _____
Buyer Name _____
Date _____

Seller Signature _____
Seller Name _____
Date _____

APPENDIX D

ENTITY RELATIONSHIP DIAGRAM

ASSUMPTION UNIVERSITY OF THAILAND
BROTHERS OF ST GABRIEL
LABOR OMNIA VINCIT
SINCE1969
มหาวิทยาลัยอัสสัมชัญ

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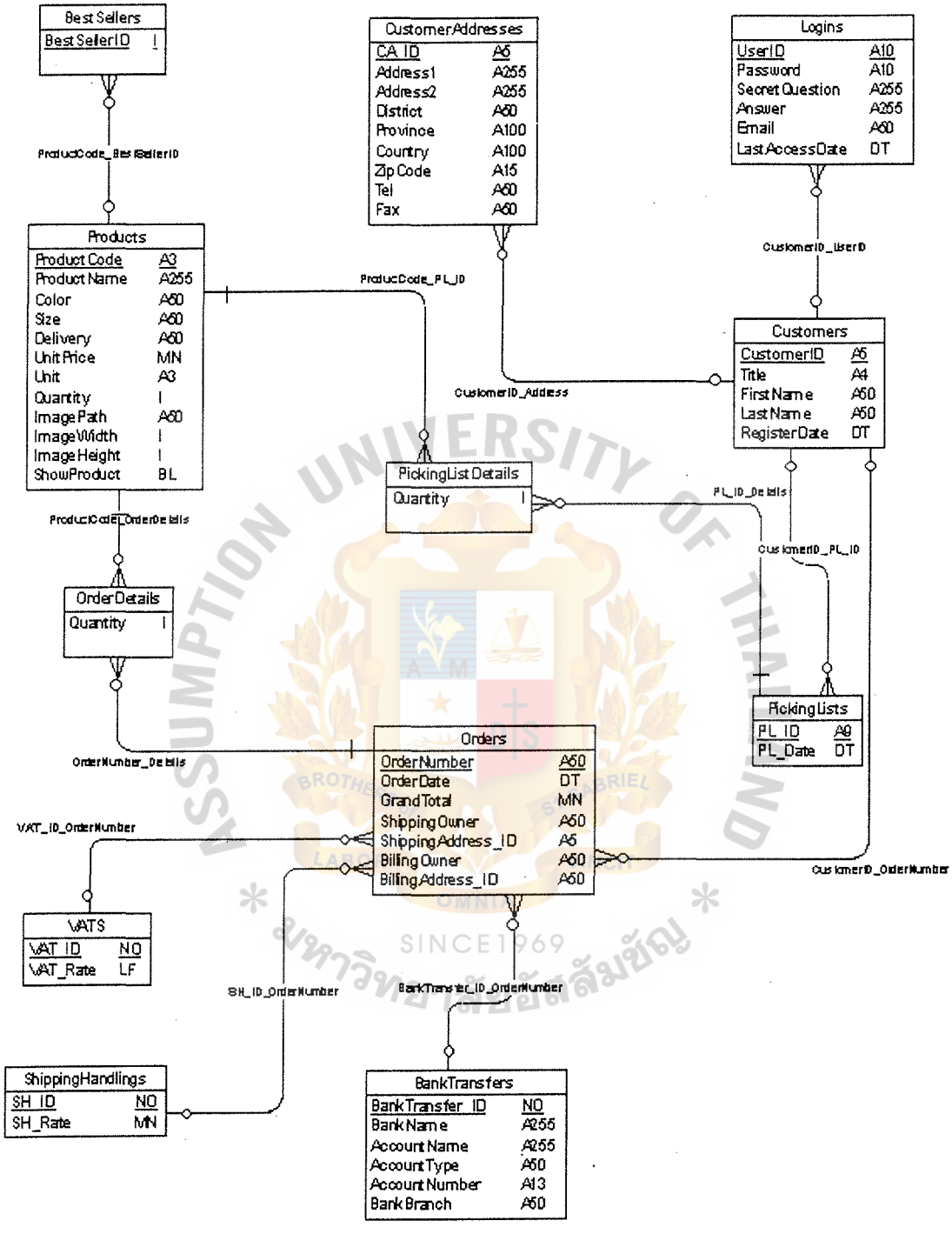

Figure D.1. Logical Data Model of ER Diagram of Product Ordering Database.

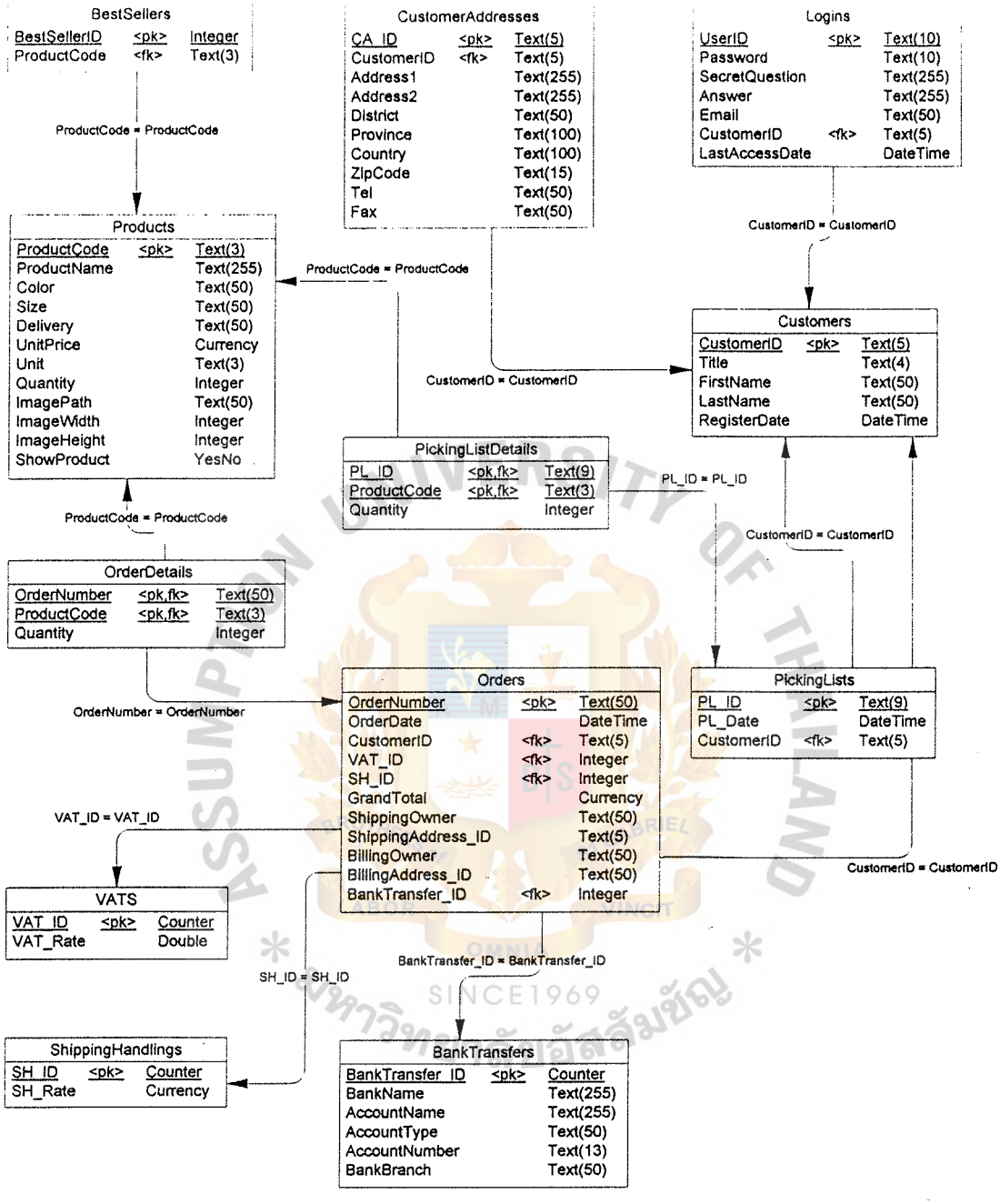

Figure D.2. Physical Data Model of ER Diagram of Product Ordering Database.

APPENDIX E

DATABASE DESIGN

ASSUMPTION UNIVERSITY OF THAILAND
BROTHERS OF ST GABRIEL
LABOR OMNIA VINCIT
SINCE1969
มหาวิทยาลัยอัสสัมชัญ

Product Ordering Database

Table E.1. Structure of Customers Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	CustomerID	varchar (5)	Y	Y				Primary Key
2	Title	varchar (4)						Attribute
3	FirstName	varchar (50)						Attribute
4	LastName	varchar (50)						Attribute
5	RegisterDate	date						Attribute

Table E.2. Structure of CustomerAddresses Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	CA_ID	varchar (5)	Y	Y				Primary Key
2	CustomerID	varchar (5)	Y			Customers		Attribute
3	Address1	varchar (255)						Attribute
4	Address2	varchar (255)						Attribute
5	District	varchar (50)						Attribute
6	Province	varchar (100)						Attribute
7	Country	varchar (100)						Attribute
8	ZipCode	varchar (15)	Y					Attribute
9	Tel	varchar (50)						Attribute
10	Fax	varchar (50)						Attribute

Table E.3. Structure of Logins Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	UserID	varchar (10)	Y	Y				Primary Key
2	Password	varchar (10)						Attribute
3	SecretQuestion	varchar (255)						Attribute
4	Answer	varchar (255)						Attribute
5	Email	varchar (50)						Attribute
6	CustomerID	varchar (5)	Y			Customers		Attribute
7	LastAccessDate	date						Attribute

Table E.4. Structure of Products Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	ProductCode	varchar (3)	Y	Y				Primary Key
2	ProductName	varchar (255)						Attribute
3	Color	varchar (50)						Attribute
4	Size	varchar (50)						Attribute
5	Delivery	varchar (50)						Attribute
6	UnitPrice	money						Attribute
7	Unit	varchar (3)						Attribute
8	Quantity	int						Attribute
9	ImagePath	varchar(255)						Attribute
10	ImageWidth	int						Attribute
11	ImageHeight	int						Attribute
12	ShowProduct	bit						Attribute

Table E.5. Structure of BankTransfers Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	BankTransfer_ID	int	Y	Y				Primary Key
2	BankName	text (255)						Attribute
3	AccountName	text (255)						Attribute
4	AccountType	text (50)						Attribute
5	AccountNumber	text (13)						Attribute
6	BankBranch	text (50)						Attribute

Table E.6. Structure of VATs Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	VAT_ID	int	Y	Y				Primary Key
2	VAT_Rate	real						Attribute

Table E.7. Structure of PickingLists Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	PL_ID	varchar (9)	Y	Y				Primary Key
2	PL_Date	date						Attribute
3	CustomerID	varchar (5)	Y			Customers		Attribute

Table E.8. Structure of ShippingHandlings Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	SH_ID	int	Y	Y				Primary Key
2	SH_Rate	money						Attribute

Table E.9. Structure of PickingListDetails Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	PL_ID	varchar (9)	Y	Y		PickingLists		Primary Key
2	ProductCode	money	Y	Y		Products		Primary Key
3	Quantity	int						Attribute

Table E.10. Structure of Orders Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	OrderNumber	varchar (50)	Y	Y				Primary Key
2	OrderDate	date						Attribute
3	CustomerID	varchar (5)	Y			Customers		Attribute
4	VAT_ID	int				VATs		Attribute
5	SH_ID	int				ShippingHandlings		Attribute
6	GrandTotal	money						Attribute
7	ShippingOwner	varchar (50)						Attribute
8	ShippingAddress_ID	varchar (5)	Y			CustomerAddresses		Attribute
9	BillingOwner	varchar (50)						Attribute
10	BillingAddress_ID	varchar (50)	Y			CustomerAddresses		Attribute
11	BankTransfer_ID	int	Y			BankTransfers		Attribute

Table E.11. Structure of OrderDetails Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	OrderNumber	varchar (50)	Y	Y		Orders		Primary Key
2	ProductCode	varchar (3)	Y	Y		Products		Primary Key
3	Quantity	int						Attribute

Table E.12. Structure of Logins Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	AdminID	varchar (10)	Y	Y				Primary Key
2	AdminPassword	varchar (10)						Attribute
3	AdminSecretQuestion	varchar (255)						Attribute
4	AdminAnswer	varchar (255)						Attribute
5	AdminLastAccessDate	date						Attribute

Table E.13. Structure of BestSellers Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	BestSellerID	int	Y	Y				Primary Key
2	ProductCode	varchar (3)	Y			Products		Attribute

APPENDIX F

PROCESS SPECIFICATION

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PROCESS SPECIFICATION

Table F.1. Process Specification of Process 0.

Items	Description
Process Name:	Context Diagram
Data In:	New customer info Customer order & payment Item number or description Order items Shipped order
Data Out:	Item information Customer billing statement Order picking list Accounts receivable report Sales report
Process:	(1) Add Customer Record (2) Search Item (3) Add Customer Order (4) Prepare Picking Slips (5) Slip Customer Order (6) Create Customer Billing Statement (7) Produce Sales Report (8) Produce Accounts Receivable Report
Attachment:	

Table F.2. Process Specification of Process 1.

Items	Description
Process Name:	Add Customer Record
Data In:	New customer info.
Data Out:	Customer record

Process:	(1) Read customer data
	(2) Check existing record in Customer Master File
	(3) If record not found then
	Do add new customer
	Else
	Alert message "Customer had in Customer Master File"
	End if

Attachment:	(1) Customer (2) Data Store D1

Table F.3. Process Specification of Process 2.

Items	Description
Process Name:	Search Item
Data In:	Item info. (Criteria such as item number or item name) Item record
Data Out:	Item information (Result return record set)

Process:	(1) Read item set to be a criteria
	(2) Seek item record in Item Master File
	(3) If record not found then
	Alert message "Record not found"
	Else
	Return record set of item information
	End if

Attachment:	(1) Customer (2) Data Store D2

Table F.4. Process Specification of Process 3.

Items	Description
Process Name:	Add Customer Order
Data In:	Customer order Customer record Item record
Data Out:	Pending order
Process:	(1) Read customer record (2) Read customer order (3) Get item order (4) For each item order Do Add new item record into Order File Read next item order Until end of order file
Attachment:	(1) Customer (2) Data Store D3

Table F.5. Process Specification of Process 4.

Items	Description
Process Name:	Prepare Picking Slips
Data In:	Pending order
Data Out:	Order picking list
Process:	(1) Read pending order from Order File (2) For each item order Do Add new picking list Read next item order Until end of pending order file
Attachment:	(1) Inventory

Table F.6. Process Specification of Process 5.

Items	Description
Process Name:	Slip Customer Order
Data In:	Customer name and address Order item
Data Out:	Shipped order
Process:	(1) Read order item (2) Read customer name and address (3) Create ship customer order
Attachment:	(1) Inventory (2) Data Store D1 (3) Customer

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Table F.7. Process Specification of Process 6.

Items	Description
Process Name:	Create Customer Billing Statement
Data In:	Customer order Order record Item record
Data Out:	Customer billing statement
Process:	(1) Read order record (2) Get customer record (3) Read item record (4) For each item order Do Amount = Amount + value of item Read next item record Until end of order file (5) Calculate vat included
Attachment:	(1) Customer (2) Data Store D1 (3) Data Store D2 (4) Data Store D3

Table F.8. Process Specification of Process 7.

Items	Description
Process Name:	Produce Sales Report
Data In:	Order record Customer record
Data Out:	Sales record
Process:	(1) Read order record from Order File (2) Get customer record from Customer File (3) For each item order Do Produce sales report Read next item order Until end of order file
Attachment:	(1) Manager (2) Data Store D1 (3) Data Store D3

Table F.9. Process Specification of Process 8.

Items	Description
Process Name:	Produce Accounts Receivable Report
Data In:	Order record Customer record
Data Out:	Accounts receivable report
Process:	(1) Read order record from Order File (2) Get customer record from Customer File (3) For each item order Do Produce accounts receivable report Read next item order Until end of order file
Attachment:	(1) Accounting (2) Data Store D1 (3) Data Store D3

Table F.10. Process Specification of Process 1.1.

Items	Description
Process Name:	Validate Customer Info
Data In:	New customer info.
Data Out:	Valid customer information Customer info. Input format error

Process:	(1) Verify customer information
	(2) If customer data is correct then
	Do create customer record
	Else
	Alert message "Customer info. or input error"
	End if

Attachment:	(1) Customer (2) Data Store D1

Table F.11. Process Specification of Process 1.2.

Items	Description
Process Name:	Create Customer Record
Data In:	Valid customer information
Data Out:	Customer record

Process:	(1) If customer data is correct then
	Add new customer record into Customer Master File
	End if
	(2) If no error found then
	Alert message "Add new successfully"
	Else
	Alert message "Add new error"
	End if

Attachment:	(1) Data Store D1

Table F.12. Process Specification of Process 2.1.

Items	Description
Process Name:	Validate Item Info
Data In:	Item info. (Criteria such as item number or item name)
Data Out:	Valid item info Item info or input format error

Process:	(1) Verify item information
	(2) If item data is correct then
	Do retrieve item record
	Else
	Alert message Item info. or input error"
	End if

Attachment:	(1) Customer (2) Data Store D2

Table F.13. Process Specification of Process 2.2.

Items	Description
Process Name:	Query Item Record
Data In:	Valid item info Item record
Data Out:	Valid item info Item record
Process:	(1) Retrieve item information (2) Display item information
Attachment:	(1) Customer (2) Data Store D2

Table F.14. Process Specification of Process 3.1.

Items	Description
Process Name:	Validate Customer Account
Data In:	Customer order
Data Out:	Valid customer information Customer not found error

Process:	(1) Read customer order
	(2) Find customer record from Customer Master File
	(3) If found customer account then
	Do Validate Order Item
	Else
	Alert message "Customer record not found or input error"
	End if

Attachment:	(1) Customer (2) Data Store D1

Table F.15. Process Specification of Process 3.2.

Items	Description
Process Name:	Validate Order Item
Data In:	Customer order Item record
Data Out:	Valid item Item not found error

Process:	(1) Get customer order
	(2) Read item from order
	(3) Seek item record in Item Master File
	If found item record then
	Do Update Item Quantity
	Else
	Alert message "Item record not found"
	End if

Attachment:	(1) Customer (2) Data Store D2

Table F.16. Process Specification of Process 3.3.

Items	Description
Process Name:	Update Item Quantity
Data In:	Valid item
Data Out:	Order item record
Process:	(1) Read order record (2) For each item record in order Do Update item quantity Read next item record Until end of order file
Attachment:	

Table F.17. Process Specification of Process 3.4.

Items	Description
Process Name:	Calculate Order Totals
Data In:	Valid customer information Item price Order item record Shipping costs
Data Out:	Pending order
Process:	(1) Read item record (2) For each item order Do Total = Total + value of item Read next item record Until end of order file
Attachment:	(1) Data Store D2 (2) Data Store D3 (3) Data Store D4

Table F.18. Process Specification of Process 4.1.

Items	Description
Process Name:	Add Picking List
Data In:	Pending order
Data Out:	Picking list record
Process:	(1) Read pending order (2) For each item order Do Add picking list Read next item order Until end of order file
Attachment:	(1) Data Store D5

Table F.19. Process Specification of Process 4.2.

Items	Description
Process Name:	Create Order Picking List
Data In:	Picking list record
Data Out:	Order picking list
Process:	(1) Read picking list record (2) Create order picking list
Attachment:	(1) Data Store D5 (2) Inventory

Table F.20. Process Specification of Process 5.1.

Items	Description
Process Name:	Validate Order Item
Data In:	Order items Picking list record
Data Out:	Valid order items

Process:	(1) Read order items
	(2) Do
	Seek item record in Item Master File
	If found item record then
	Do Prepare customer info
	Else
	Alert message "Order item not match"
	End if
	Read next order items
	Until end of order file

Attachment:	(1) Inventory (2) Data Store D5

Table F.21. Process Specification of Process 5.2.

Items	Description
Process Name:	Prepare Customer Info
Data In:	Valid order items Customer name and address
Data Out:	Shipped order
Process:	(1) Read customer name and address (2) Read order items (3) For each order item Do Add to prepare shipped order Read next order item Until end of order file
Attachment:	(1) Data Store D1 (2) Customer

Table F.22. Process Specification of Process 6.1.

Items	Description
Process Name:	Validate Customer Order
Data In:	Customer record Order record Item record
Data Out:	Valid customer order

Process:	(1) Read item from order
	(2) Get customer record
	(3) Do
	Seek item record in Item Master File
	If found item record then
	Do create billing statement
	Else
	Alert message "Item record not found"
	End if
	Read next order items
	Until end of order file

Attachment:	(1) Data Store D1 (2) Data Store D2 (3) Data Store D3

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Table F.23. Process Specification of Process 6.2.

Items	Description
Process Name:	Create Billing Statement
Data In:	Valid customer order
Data Out:	Customer billing statement
Process:	(1) Read order record (2) For each item order Do Amount = Amount + value of item Read next item record Until end of order file (4) Calculate vat included (5) Print out billing
Attachment:	(1) Customer

Table F.24. Process Specification of Process 7.1.

Items	Description
Process Name:	Create Sales Report
Data In:	Order record Customer record
Data Out:	Sales record
Process:	(1) Read order record from Order File (2) Get customer record from Customer File (3) For each item order Do Produce sales report Read next item order Until end of order file
Attachment:	(1) Data Store D1 (2) Data Store D3 (3) Manager

Table F.25. Process Specification of Process 8.1.

Items	Description
Process Name:	Create Accounts Receivable Report
Data In:	Order record Customer record
Data Out:	Accounts receivable report
Process:	(1) Read order record from Order File (2) Get customer record from Customer File (3) For each item order Do Produce accounts receivable report Read next item order Until end of order file
Attachment:	(1) Data Store D1 (2) Data Store D3 (3) Accounting

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APPENDIX G

STRUCTURE CHART

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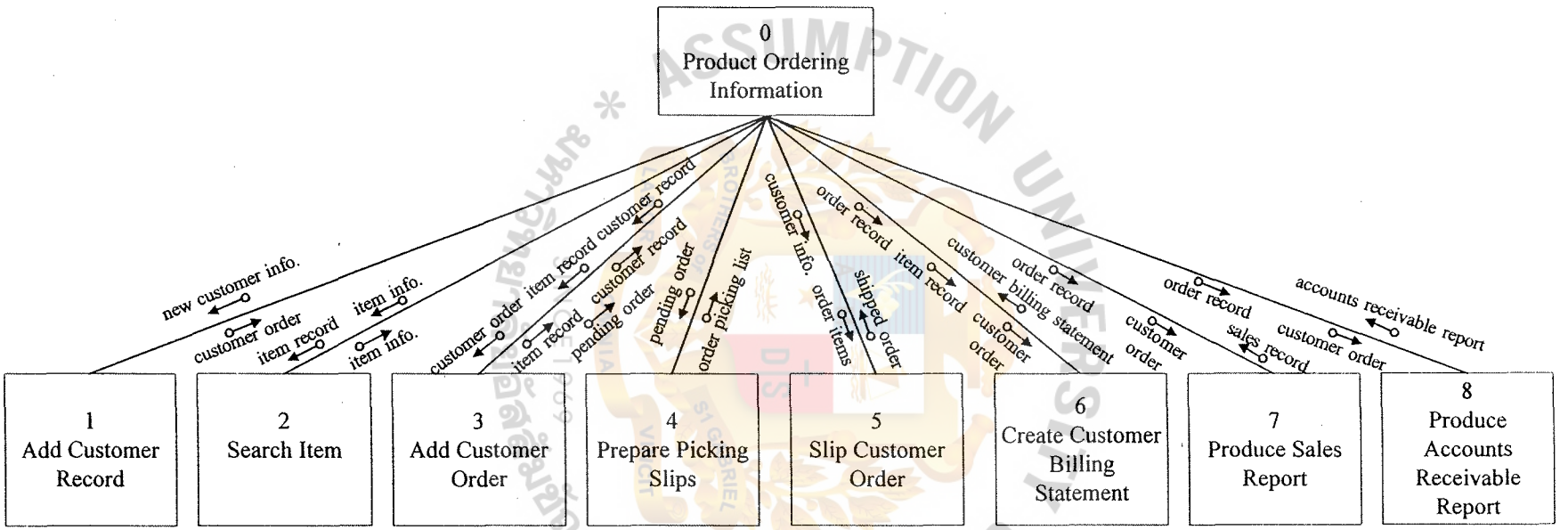

Figure G.1. Product Ordering Information Process.

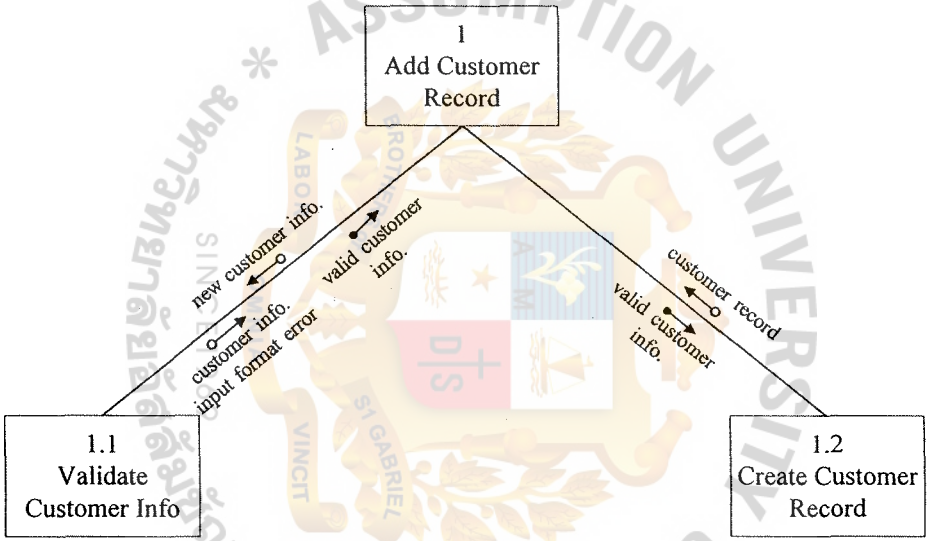

Figure G.2. Add Customer Record Process.

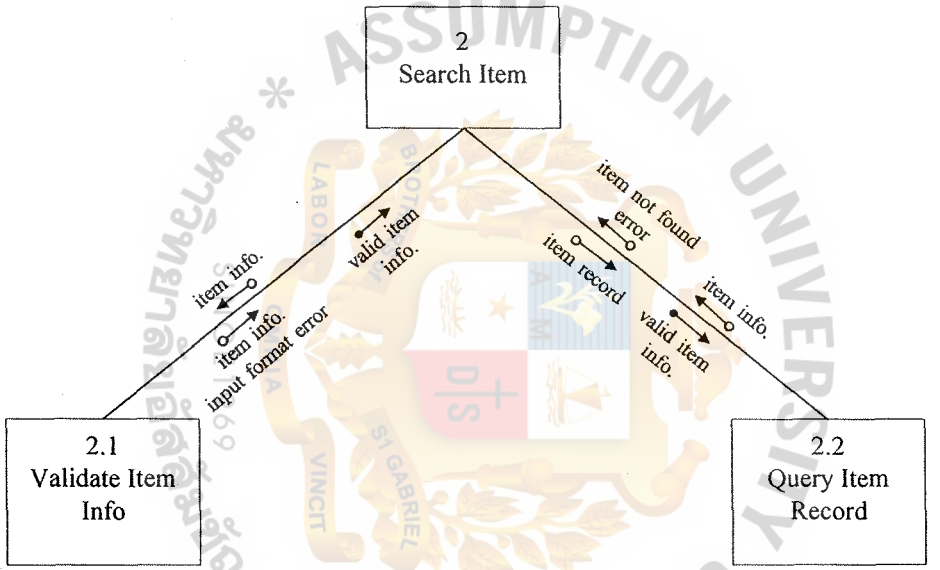

Figure G.3. Search Item Process.

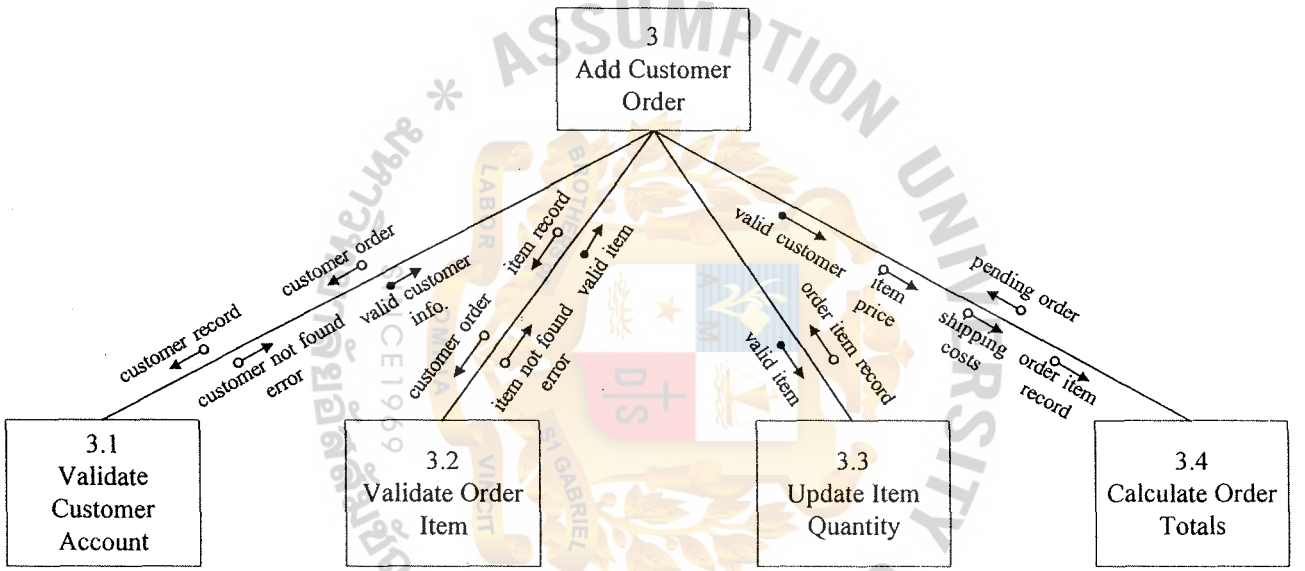

Figure G.4. Add Customer Order Process.

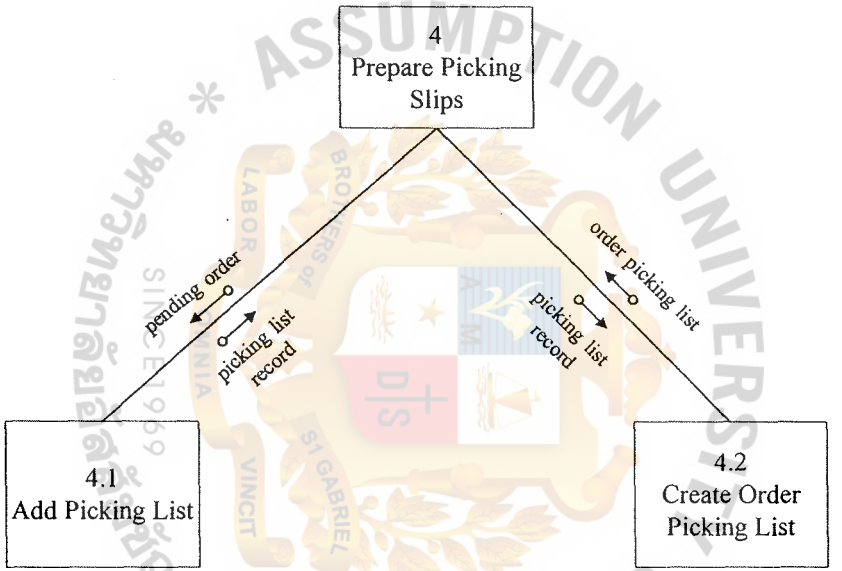

Figure G.5. Prepare Picking Slips Process.

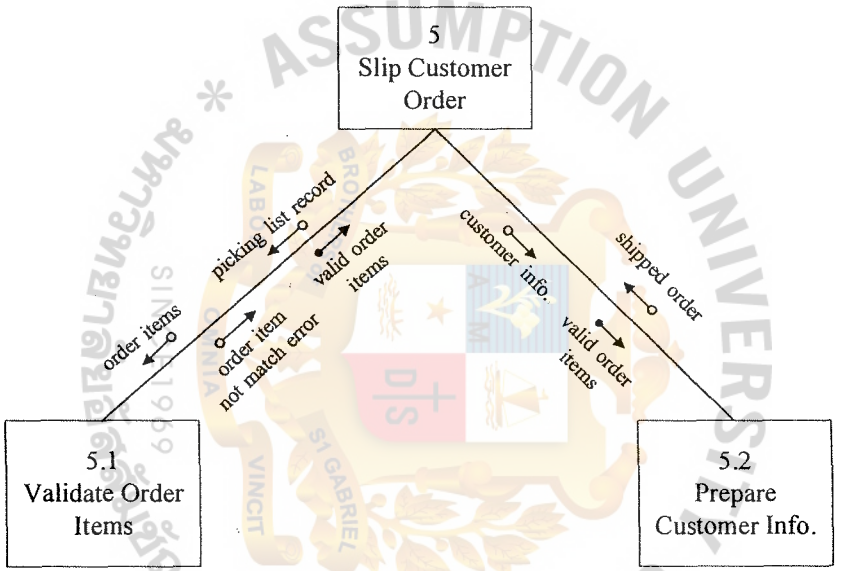

Figure G.6. Slip Customer Order Process.

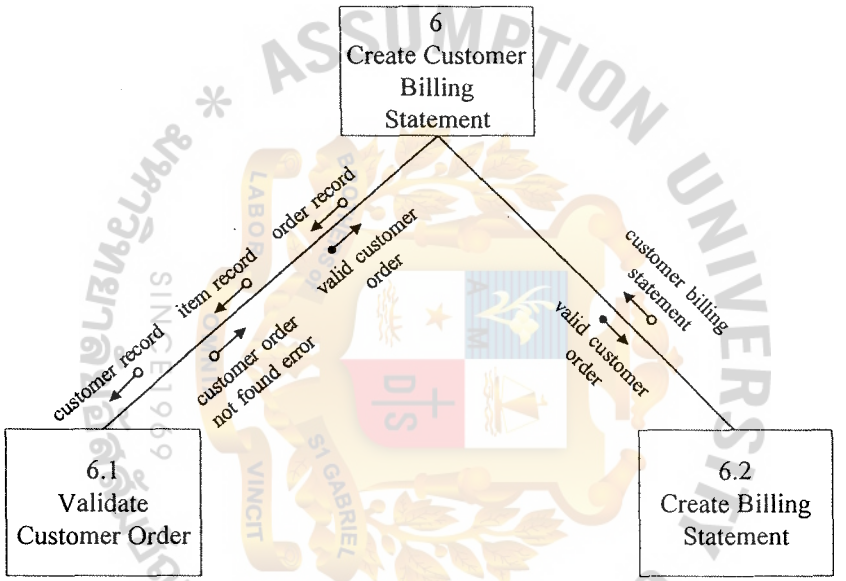

Figure G.7. Create Customer Billing Statement Process.

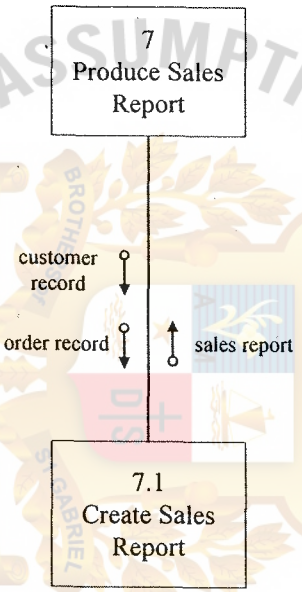

Figure G.8. Produce Sales Report Process.

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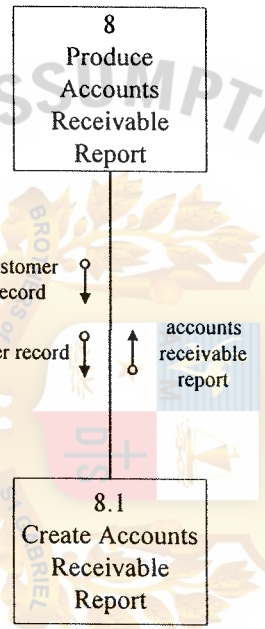

Figure G.9. Produce Accounts Receivable Report Process.

APPENDIX H

DATA DICTIONARY

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DATA DICTIONARY

Table H.1. Data Dictionary of Paper Ordering Database.

Field Name	Meaning
CustomerID	The customer identification
Title	The customer's title of courtesy
FirstName	The customer name
LastName	The customer surname
RegisterDate	The date is registered as new customer.
CA_ID	The customer address identification
Address1	The customer location's No., Moo, Soi
Address2	The customer location's Street, Tambol
District	The customer location's district
Province	The customer location's province
Country	The customer location's country
ZipCode	The customer location's zip code or postal code
Tel	The customer location's telephone number
Fax	The customer location's fax number
UserID	The customer login's user identification
Password	The customer login's password
SecretQuestion	The secret question is used when the customers forget their login's password
Answer	The answer of secret question is used when the customers forget their login's password
Email	The customers' e-mail is used for sending their order receipt, product and news information of Hana Electric Co., Ltd.
LastAccessDate	The customer's latest login date
ProductCode	The product code or number
ProductName	The product number or description
Color	The product color
Size	The product size
Delivery	The product delivery information
UnitPrice	The product unit price
Unit	The product unit or measure
Quantity	The product quantity
ImagePath	The product image relative path such as images/products/999.jpg that image filename is same as product code
ImageWidth	The product image width is measured as pixels such as 280 pixels
ImageHeight	The product image height is measured as pixels such as 210 pixels
ShowProduct	The product display status such as Yes or No
BankTransfer_ID	The bank identification is used for transferring the money

Table H.1. Data Dictionary of Paper Ordering Database (Continued).

Field Name	Meaning
BankName	The bank name
AccountName	The bank's account name
AccountType	The bank's account type such as saving, current, and etc.
AccountNumber	The bank's account number
BankBranch	The bank branch
VAT_ID	The value-added tax identification
VAT_Rate	The value-added tax rate such as 7%
PL_ID	The picking list identification
PL_Date	The picking list date
SH_ID	The shipping and handling identification
SH_Rate	The shipping and handling rate such as 100 baht.
OrderNumber	The order number of customer
OrderDate	The order date of customer
GrandTotal	The order grand total
ShippingOwner	The customer identification is used for shipping the product to customer
BillingOwner	The customer identification is used for billing the receipt to customer
AdminID	The administrator login's user identification
AdminPassword	The administrator login's password
AdminSecretQuestion	The secret question is used when the administrator forget their login's password
AdminAnswer	The answer of secret question is used when the administrator forget their login's password
AdminLastAccessDate	The administrator's latest login date
BestSellerID	The product best seller identification

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