



IMPORT INFORMATION SYSTEM
FOR IMPORT BUSINESS

by

Ms. Wilasinee Winmoon

A Final Report of the Three - Credit Course
CE 6998 Project

Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science
in Computer and Engineering Management
Assumption University

November, 2000

**IMPORT INFORMATION SYSTEM
FOR IMPORT BUSINESS**

by
Ms. Wilasinee Winmoon

A Final Report of the Three-Credit Course
CE 6998 Project

Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science
in Computer and Engineering Management
Assumption University

November 2000

Project Title	Import Information System for Import Business
Name	Ms. Wilasinee Winmoon
Project Advisor	Dr. Ketchayong Skowratananont
Academic Year	November 2000

The Graduate School of Assumption University had approved this final report of the three-credit course, CE 6998 PROJECT, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer and Engineering Management.

Approval Committee:

(Dr. Ketchayong Skowratananont)
Advisor

(Prof.Dr. Srisakdi Charmonman)
Chairman

(Dr. Chamnong ung irapanich)
Dean and Co-advisor

(Asst.Prof Dr. Boonmark Sirinaovakul)
Member

(Dr. Prapon Phasukyud)
Member

(Assoc.Prof. Somchai Thayarn ong)
MUA Representative

November 2000

ABSTRACT

This project presents the creation of the new import information system for Siam Engineering & Heavy Industry and a possibility to apply IT to improve Import Business Management for more benefits to the business. It also will provide detailed information and compare the cost-benefit analysis to make the best decision-making in business management.

As the business grows in rapid change, most company emphasized in increasing benefit and reduces cost. The company required accurate and reliable information. The current manual system is no longer supporting the business growth nowadays. There are many problems occurring including time-consumption, redundancy of data, document flow problem, outdated technology and inefficient operation for control and management.

Using system analysis and design methodology for the purpose of replacing the old manual system develops the new computerized system. The proposed system can improve the efficiency and effectiveness of heavy machinery import business and eliminate the paper work, speed up the product import information, up-date information, catch up to the latest technology, increase in the management efficiency in decision-making.

Besides, in term of data keeping, the computerized will help in storing important data in the safe place and prevent data loss regarding the safety tools. It means that the new product import information system will reduce all current problems and decrease unnecessary costs in the near future.

ACKNOWLEDGEMENTS

I am indebted to the following people who make contributions to this project. I would like to acknowledge their efforts and thank them for their contributions without them, this project would not have been possible.

I would like to express sincere gratitude to, Dr. Ketchayong, my project advisor, with his valuable suggestions, patient assistance, and constant encouragement has led me from the research inception to completion.

I would like to thank the Narupakorn family for their help in supporting place and facilities and Mr. Somkiat for his help in introducing the background of the project. And also my thanks for my management team who give me the opportunities to interview. I would like to express my special appreciation for my beloved family for their deep enthusiasm and continuous encouragement. Besides, I am forever grateful to my parents whose willingness to invest in my future has enabled me to achieve my educational goal.

St. Gabriel's Library

TABLE OF CONTENTS

<u>Chapter</u>	<u>Page</u>
ABSTRACT	
ACKNOWLEDGEMENTS	ii
LIST OF FIGURES	
LIST OF TABLES	vii
I. INTRODUCTION	1
1.1 Background of the Project	1
1.2 The Objectives of the Project	2
1.3 The Scope of the Project	2
1.4 Deliverables	3
1.5 Project Plan	4
II. THE EXISTING SYSTEM	5
2.1 Background of the Organization	5
2.2 Existing Business Function	8
2.3 Current Problems and Area of Improving	10
III. THE PROPOSED SYSTEM	13
3.1 User Requirement	13
3.2 System Design	14
3.3 Hardware and Software Requirement	27
3.4 Security and Controls	30
3.5 Cost and benefit Analysis	31

<u>Chapter</u>	<u>Page</u>
IV. SYSTEM IMPLEMENTATION	45
4.1 Building the New System	45
4.2 Testing	45
4.3 Conversion	46
4.4 Production and Maintenance	47
V. CONCLUSIONS AND RECOMMENDATIONS	48
5.1 Conclusions	48
5.2 Recommendations	50
APPENDIX A DATA FLOW DIAGRAM	51
APPENDIX B PROCESS SPECIFICATION	60
APPENDIX C DATABASE DESIGN	75
APPENDIX D DATA DICTIONARY	81
APPENDIX E REPORT	85
APPENDIX F ECONOMIC FEASIBILITY ANALYSIS	93
APPENDIX G USER INTERFACE	107
BIBIOGRAPHY	114

LIST OF FIGURES

Figure	Page
2.1 Project Plan	4
2.2 The Organization Chart	7
2.3 Context Diagram of Existing System	9
3.1 Hardware Configuration of the Proposed System	29
3.2 Break-Even Analysis	38
3.3 Payback Period	43
A.1 Context Diagram of Proposed System	52
A.2 DFD Level 0	53
A.3 DFD Level 1 Process 1 (Receive Order)	54
A.4 DFD Level 1 Process 2 (Check Product Availability)	55
A.5 DFD Level 1 Process 3 (Issue Purchase Order)	56
A.6 DFD Level 1 Process 4 (Receive Product)	57
A.7 DFD Level 1 Process 5 (Update Stock)	58
A.8 DFD Level 1 Process 6 (Sell Product)	59
C.1 Physical Schema	76
E.1 Product Information Report	86
E.2 Customer Record Report	87
E.3 Weekly Order Report	88
E.4 Monthly Order Report for Individual Customer	89
E.5 Supplier Record	90
E.6 Monthly Purchase Order Report	91
E.7 Weekly Unavailable Product Report	92

<u>Figure</u>	<u>Page</u>
F.1 Break-Even Point for Candidate 1	99
F.2 Break-Even Point for Candidate 3	101
F.3 Payback Period for Candidate 1	103
F.4 Payback Period for Candidate 3	105
G.1 Sales Order Web Interface	108
G.2 Customer Information Web Interface	109
G.3 Sales Order Menu	110
G.4 Customer Menu	111
G.5 Inventory Menu	112
G.6 Supplier Menu	113



LIST OF TABLES

<u>Table</u>	<u>Page</u>
3.1 Candidates System Matrix	17
3.2 Feasibility Analysis Matrix	19
3.3 Cost Comparison between Existing and Proposed System	37
3.4 Payback Period Analysis	42
5.1 Degree of Achievement of Proposed System	49
B.1 Process Specification of Process 1.1	61
B.2 Process Specification of Process 1.2	61
B.3 Process Specification of Process 1.3	62
B.4 Process Specification of Process 2.1	62
B.5 Process Specification of Process 2.2	63
B.6 Process Specification of Process 2.3	63
B.7 Process Specification of Process 2.4	64
B.8 Process Specification of Process 2.5	64
B.9 Process Specification of Process 2.6	65
B.10 Process Specification of Process 3.1	65
B.11 Process Specification of Process 3.2	66
B.12 Process Specification of Process 3.3	66
B.13 Process Specification of Process 3.4	67
B.14 Process Specification of Process 3.5	67
B.15 Process Specification of Process 3.6	68
B.16 Process Specification of Process 3.7	68
B.17 Process Specification of Process 4.1	69

<u>Table</u>	<u>Page</u>
B.18 Process Specification of Process 4.2	69
B.19 Process Specification of Process 4.3	70
B.20 Process Specification of Process 4.4	70
B.21 Process Specification of Process 5.1	71
B.22 Process Specification of Process 5.2	71
B.23 Process Specification of Process 5.3	71
B.24 Process Specification of Process 5.4	72
B.25 Process Specification of Process 6.1	72
B.26 Process Specification of Process 6.2	73
B.27 Process Specification of Process 6.3	73
B.28 Process Specification of Process 6.4	73
B.29 Process Specification of Process 6.5	74
C.1 File Structure of Customer File	77
C.2 File Structure of Invoice File	77
C.3 File Structure of Order File	78
C.4 File Structure of Product File	78
C.5 File Structure of Purchase Order File	79
C.6 File Structure of Supplier File	79
C.7 File Structure of Received Product File	80
D.1 Data Dictionary of Customer File	82
D.2 Data Dictionary of Invoice File	82
D.3 Data Dictionary of Order File	83
D.4 Data Dictionary of Product File	83
D.5 Data Dictionary of Purchase Order File	83

<u>Table</u>	<u>Page</u>
D.6 Data Dictionary of Supplier File	84
D.7 Data Dictionary of Received Product File	84
F.1 Cost Comparison between Existing and Proposed System for Candidate 1	98
F.2 Cost Comparison between Existing and Proposed System for Candidate 3	100
F.3 Payback Period Analysis of Candidate 1	102
F.4 Payback Period Analysis of Candidate 3	104
F.5 Return on Investment Analysis	106



I. INTRODUCTION

1.1 Background of the Project

Siam Engineering and Heavy Industry (SEI) is an importer selling both used & new heavy machinery. The customers of our company will be mostly in construction business. The company expands their business into a variety of products such as farming tractor, agricultural equipment, engine & parts. They are very successful in this business field with their long patience and intention to be the leader in this business.

As time goes by, SEI found that the current manual system is not enough for their growing business, they cannot catch up with the latest competitor technology in the market. There are many problems occur, especially in the Import System area, which is the most important part of the import business. There are many signals, which show that manual import system is not suitable for the growing importing business anymore. First, there are a lot of documents to deal with foreign suppliers. As the company is expanding into a variety of products, it is difficult to have all document processes done manually. Second, when the customer would like to order the product that we don't have in our stock, we have to contact the supplier to support the customer's needs, even though it will not satisfy them on time. Third, the company cannot catch up with the latest Information Technology. They do not know the competitor's information and also the foreign supplier market.

With the current requirements of the business, the user realized that the company needs to have a MIS (management information system) to have total control over the product order and product information. The computerized importing process will not only help the oversea officers but also can support the other departments in high-speed time. It also assists the management team to make further decision in ordering market

product to serve the customer's need in suitable situation. The system will also create systematic reports to help all of them in decision making. The automation will save more time than the old manual system.

1.2 The Objectives of the Project

The objectives of the project are as follows:

- (1) To study the existing manual system.
- (2) To analyze the problems of the existing system.
- (3) To identify the business requirement of the import system.
- (4) To identify the information system requirement.
- (5) To suggest and design a computer information system to handle the product order and other processes of the product import information system with effectiveness.
- (6) To make the end users convenient and aware of the new system.

1.3 The Scope of the Project

The scope of the project includes automation of the following:

- (1) Analysis of the existing system, design and development of a computerized system for Siam Engineering and Heavy Industry (SEI).
- (2) Development of a system, which helps catch up with the latest technology.
- (3) The design of the screen layout for end users system.
- (4) Establishment of the product importing information system for the product importing process to make reliable information.
- (5) The facilitation of the workflow among the departments - sales, warehouse, oversea, accounting department.
- (6) To create the systematic reports for all regarding segments to help analyze and decision making.

1.4 Deliverables

The deliverables of the new computerized system are as follows:

- (1) Reports including daily report, weekly report, monthly report, supplier information, informal report.
- (2) User Interfaces and Screen Layout.
- (3) The Computerized Program.



1.5 Project Plan

No	Activities	June				July				August				September				October				November			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1	System analysis																								
	- Identify existing process & system																								
	- Identify problems																								
	- Documentation or work flows																								
2	Detailed Analysis and Design																								
	- Gather information about the effective																								
	system to find out the candidates																								
	- Analysis and select the candidates																								
	- Develop DFD, Structure chart																								
	of the proposed																								
3	Implementation																								
	- Screen Layout																								
	- Report Layout																								
	- Programming																								
	- Data Conversion																								
	- Testing																								
	- Documentation & Training																								
	- Proposed Process and system starts																								

Figure 2.1. Project Plan.

II. THE EXISTING SYSTEM

2.1 Background of Organization

Siam Engineering & Heavy Industry (SEI) is an importer selling both used and new heavy machinery. Mr. Sawang Chinchalongporn established the company in 1970. The company has 50 employees with the area of 3 rai located in Pathumthani. It has a yearly sales volume of 180 million bahts.

Most of SEI's customers are in construction businesses who deal with the project jobs such as government project, educational institution project. Due to the economic crisis, the sales volume is also dropping and there are a lot of exceeding expenses. However, heavy machines are still needed in construction business, but the growth has slowed down.

The company's purpose is to find the best product with the highest quality in the fastest time to compete in the market. SEI tries to provide a good condition of the product with reasonable price for the customers and also maintain the intention to expand the business to the global market. However, the company has realized that the current manual importing system is not good enough and outdated. So the company needs to change into the modern system.

The company is divided into 4 departments as follows:

(1) Warehouse department

Warehouse is to maintain the updated stock availability and to deal with the Sales & Marketing department in product selling. The department has to balance the available stock for sell and also prepare for the safety stock (to maintain balance of stock for sell). All stock information will be updated to support Sales & marketing department's convenience to attract

the customer's need on time. The department also has to check the quantity of the product to match with the accounting department.

(2) Sales & Marketing department

The department is responsible for increasing sales volume but also needs supporting information from all departments. They have to check the stock of products and follow up the new product information from overseas department if the customer wants to buy the product that is not in the stock. They have to study all product information from the important issue of each department. The main duty is to deal with the customer during the sales process until the customer gets the product. To help the company increase in sales volume, they have to closely follow up the customer feedback to improve the product quality and to reflect the overseas department to find out the product that customer wants.

(3) Accounting department

The department tasks involve keeping the detailed records of product cost and also record the revenue and expense of the company. They will involve in any process regarding paying or receiving cash or even any financial documents.

(4) Overseas department

The department tasks involve connecting foreign suppliers to find out the best product to support Sales & marketing department along with reasonable prices that can compete in the market. They have to deal with the warehouse department to ask for the recent quantity of each product to search for the inadequate product for the customer's need. They have to contact the foreign supplier to create the good relationship for the next

future dealing in business. They also have to connect with the accounting department. If they order the products according to each department order and the products already arrived either by ship or airmail, they will have to send the receipt or invoice to the accounting department. They also have to deal with outside organization who will give them more information benefit to the company.

To create the benefit to maximize profits by reducing exceeding expense and increasing sales volume, they have to make fast decision making and have a unique working team. In order to get the above benefit, they have to come up with high technology to catch up with competitor.

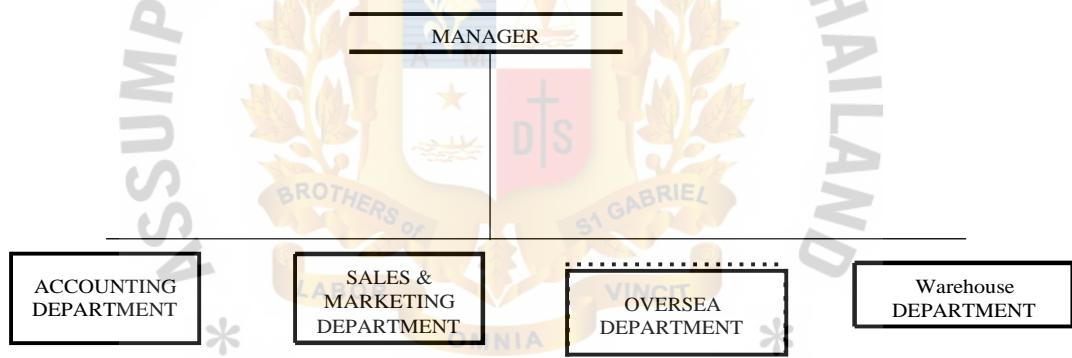
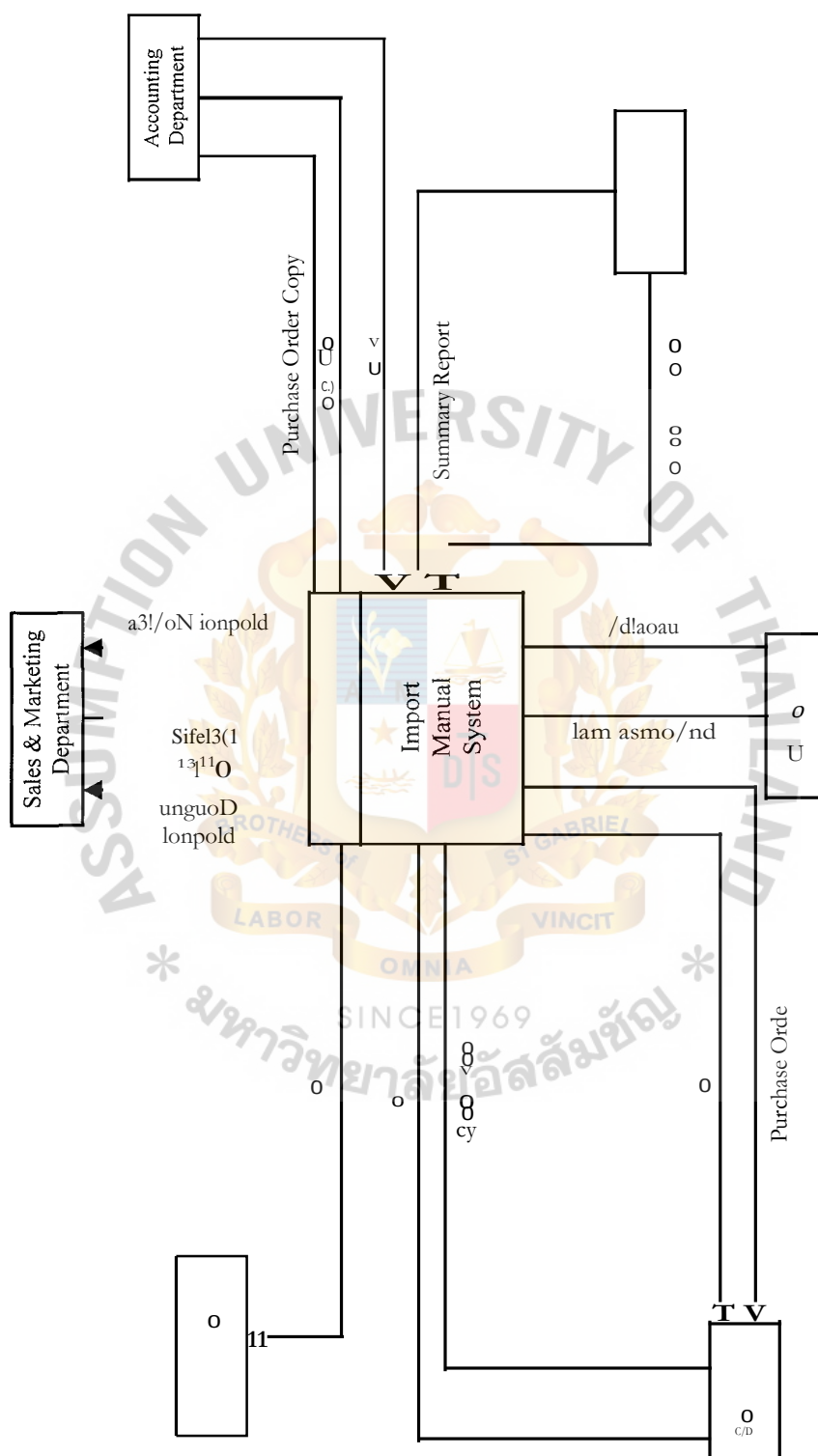


Figure 2.1 Organization Chart of Siam Engineering and Heavy Industry.

2.2 Existing Business Function

SEI was a small company who is running an importing business on a manual basis for both connecting with foreign suppliers or finding out the competitor's information. The current system requirement is only paperwork by using facsimile or telephone contact to the foreign country. The cost is very high. When they need any document, they have to request the supplier to send by mail. The process begins when the customers order product to the Sales & marketing department. Then the Sales department will check the product availability to confirm to the customer if they have in stock. If they have that product in stock, the Sales department can confirm the customer and start the process of product selling. If there is no product in stock, it will go to the step of issuing the purchase order. This step will occur suddenly right after the overseas department gets the product order. They will try to find the supplier to support the product and confirm to the supplier after selected the product by opening L/C and request for Performa invoice. After a period of time, product arrival will be the next process. Each department concerned will check this process. Each invoice copy is distributed to the department concerned if the product is not correct, it can be rejected. Then the warehouse department will update stock into their stock card to record the date arrived, product name, and quantity. The last process will be the process of selling product to the customer according to the customer's order along with the kind of product arrived.



2.3 Current Problems and Areas for Improvement

2.3.1 Current Problems

The existing manual system of import causes many problems:

(1) Time Consumption

To contact the foreign supplier by mail, request for information or brochure to support the Sales & marketing department, will consume a lot of time for their response. The suppliers have to spend more time to find out the product information and then send back to us by mail. If they are in a hurry, they will fax to us but it is unlikely to happen because the cost is higher than by mail. It means that the customer could be unsatisfied to be kept waiting and they could probably cancel the order, which could lead to a decrease in sales volume.

(2) Inaccurate Information

According to the above problem, we will take time in ordering some lot of product. The wrong product information could occur when they agree at the first agreement until the product arrives. It takes some time, so some mistakes could happen.

(3) Document Problems

According to the recent system, the oversea staffs have to deal with many documents regarding other departments also e.g. inquiry, type invoice, purchasing order, product knowledge, and summary reports. To gain some information, the staffs waste time to find each related document. All documents need to be stored in a safe storage. Keeping in unsystematic record will lead to data redundancy and loss. A high workload can cause mistakes in working among departments such as the oversea staff may

MS (C7,11)
St. Gabriel's library Au
15 U

forget to send copies to the accounting department while giving to the inventory department or forget to contact supplier according to the sales requested.

(4) Exceeding in Unnecessary Expenses

To contact the foreign supplier by using facsimile or even by international phone call. They could not avoid these expenses because the company is a business importer so it is necessary to find products to support the Sales & marketing department.

(5) Management Problems

It is very difficult to make the summary report to the management team due to the delay of the information or any supplier's information conclusion. The management team cannot forecast their order or any annual budget in the next purchasing order.

2.3.2 Areas for Improvement

From the problems mentioned above, we will make the improvement areas only on the importing system. The new system will be implemented for three sections, which are time consumption, document flows, and management problems.

(1) Time Consumption

There should be a new system that enables the staffs to provide information to support sales & marketing department. It means that we will apply Information Technology (IT) to the import business by using Internet phone or e-mail instead of facsimile.

(2) Document Flow

Unnecessary paper works should be cut off. All documents should be simplified and systematic. The flow of document between each department

will go smoothly and also between each document can link efficiently. That confirms the document will not be lost or abundant.

Management Problem

There should be a new system where the staffs can provide the updated information to the manager as he requested. Then the manager can catch up with the latest information, which enables him to make the best decision in operating the business plan, and also in forecasting the sales volume and perceiving the market trend.



III. THE PROPOSED SYSTEM

The purpose of the new system is mainly to solve the problem over two areas:

- (1) Operational Level
 - (a) Reducing the number of errors done by the staff
 - (b) Reducing the number of workload both on documentation & time consumption.

- (2) Management Level

Providing most updated information to support decision-making.

3.1 User Requirement

User requirements are very important for developing the system, as a source of the project. To find out the user requirement, we discuss the issue with all oversea staffs, managers and owner. The simple question we ask them is how they expect a proposed system to will serve them.

The staffs need the proposed system to improve their work on importing system and information updating. The managers require various types of reports, both formal and informal, for making a decision, whereas the owner expects the new system to be a company's weapon to success in the near future.

The proposed system will replace the current manual system with the computerized one. These tasks are advancing product import information, purchasing, and reporting. The user requirement conclusions are as follows:

- (1) Performs the right procedures properly.
- (2) Presents information and instructions in an acceptable and effective fashion.
- (3) Produces accurate results.
- (4) Provides user-friendly interface and method of interaction.

The user requirement can be stated that the new proposed system should be able to perform as follows:

- (1) The reduction in working processes that exists in the existing system.
- (2) Reduce error of working processes.
- (3) Reduce the redundancy of the kept data.
- (4) Reduce time and unnecessary expenses.
- (5) Generate right reports upon the right request.
- (6) Provide necessary data to analyze the management report.

3.2 System Design

In this section, the new purposed system is designed with an objective to solve the current problems of the existing system and to meet all user requirements that will be focused on the logical, implementation — independent aspects of a system. It is the evaluation of alternative solutions, which will be our solution.

3.2.1 Candidate Solutions

We should define candidate solutions from our user requirement, not only in hardware but also in software specification or any other related things that must be concerned. Also we should collect any necessary data related in finding the solution, such as interview the experts, gather information to find alternative solution and research technical specification that details the characteristic of each candidate solution. There are many aspects to consider the candidates, all of which are portions of computerized system, software tool requirement, benefits, server and workstation, method of data processing, hardware devices in output, input, and also storage devices. These three alternative candidate solutions are as follows:

St. Gabriel's T

(1) Candidate Solution 1

This first solution, the applications will be developed by Microsoft Access 8.0 that allows developers to build — in report function for any user to design database and display at his/her requirement. It will be connected to the Microsoft Access, which is not the same as average RDBMS and consists not only of the basic data, but also of related items we use to work with the data.

(2) Candidate Solution 2

The second solution, the applications will be developed by Microsoft Visual Basic 6.0 — the software tool that allows developers to build application and use Microsoft SQL Server Version 7 as database manager which is accessible in native mode without need for an ODBC driver. The server will operate on Microsoft NT Server Edition, and the clients on Microsoft Windows 98. The system will be constructed under the multi — user client — server architecture. And it also allows to design and develop the applications in the most efficient and comfortable method, together with Microsoft Office 2000 — the most popular desktop application for generating reports. With our own designed user interface, we could reduce the complexity of controlling Database Management System. Database Engine enables Visual Basic to access the different database platforms.

(3) Candidate Solution 3

The last solution, the applications will be developed by Microsoft Visual Fox Pro 6.0. It is appropriate for building the multi—tier application and 32-bit database application. The data is connected through Jet Database

Engine 3.5. The platform is Microsoft Windows NT 4.0. The client's Operating system is Windows 98.

3.2.2 Candidate System Matrix

The Matrix allows us to compare and evaluate candidate system on the basis of several characteristics. Each solution has advantages and disadvantages. This must be shown in the form of table that the columns represent candidate solution whereas the rows represent characteristic (see in Table 3.1). All solutions are analyzed, compared and evaluated in the portion of system computerized, benefits, hardware, software specification, method of data processing, input and output devices and storage devices. The best solution will be selected to implement in the proposed system.



Table 3.1. Candidates System Matrix.

Characteristics	Candidate 1	Candidate 2	Candidate 3
Portion of System Computerized	Import — Information System to control the product order & information	Import — Information System to control the product order & information	Import - Information System to control the product order & information
Benefits	Being specifically designed for the database management	Supporting user requirement and business processes with easy maintenance & modification. Using front — end technology to customize interface as needed	Supporting DBMS and satisfy some user requirements
Server and Workstation	(1) Pentium III 800 MHz with SD Ram 128 MB, Window NT (1 unit) (2) Intel Pentium III 550 MHz, 64 MB SD Ram (5 units)	(1) Pentium III 800 MHz with SD Ram 128 MB, Window NT (1 unit) (2) Intel Pentium III 550 MHz, 64 MB SD Ram (5 units)	(1) Pentium III 600 MHz with SD RAM 128 MB, Window NT (1 unit) (2) Intel Pentium III 550 MHz, 64 MB SD Ram (5 units)
Software Tools Needed	Microsoft Access 8.0	(1) Microsoft Visual Basic 6.0 (2) SQL Server (3) Visio 5.0 (4) Internet Explorer 4.0	(1) Visual Fox Pro 6.0 (2) Visio Professional 5.0 (3) Internet Explorer 4.0
Application Software	Custom Solution	Custom Solution	Package Solution
Method of Data Processing	Client / Server	Client / Server	Client / Server
Output Devices and Implications	(1) Dot Matrix Printer: Epson LQ 1170 (2) Laser Printer HP Laser Jet 1100	(1) Dot Matrix Printer: Epson LQ 1170 (2) Laser Printer HP Laser Jet 1100	(1) Dot Matrix Printer: Epson LQ 1170 (2) Laser Printer HP Laser Jet 1100
Input Devices and Implications	Keyboard & Mouse	Keyboard & Mouse	Keyboard & Mouse
Storage Devices and Implications	Hard Disk 20GB arrayed capability	Hard Disk 10GB arrayed capability	Hard Disk 20GB arrayed capability

3.2.3 Feasibility Analysis Matrix

After we identified the alternative candidate solutions, then we should analyze each solution for feasibility. In addition, to determine whether the solution is feasible, or achievable, the organization's resources and constraints should be given. There are 4 major criteria of feasibility analysis; namely operational feasibility, technical feasibility, schedule feasibility and economic feasibility. The legal feasibility is not included since no candidate solution seems to be against the law. In this feasibility analysis, each candidate is analyzed and given the score in all criteria. The highest total score determines the best solutions for implementing the proposed system.

- (1) Operational feasibility: we use it to measure the acceptability of the end user, how well the solution will meet the business requirement. The solution that fails or satisfies the requirement in some degree is of no meaning.
- (2) Technical feasibility: we use it to measure how practical solutions are and whether the proposed solution can be implemented with the available hardware, software, and technical resources.
- (3) Schedule feasibility: we use it to measure how long each candidate takes in development. The system must be implemented within an accepted period of time because some case has time limitation.
- (4) Economic feasibility: we use it to measure whether the benefits of the proposed solution outweigh the costs. This feasibility is the most important of our measures.

Table 3.2. Feasibility Analysis Matrix.

Feasibility Criteria	Weight	Candidate 1	Candidate 2	Candidate 3
Operational Feasibility	30%	Only supports Import system and current business would have to be modified to take advantage of computerized system. Score: 90	Fully supports user required functionality. Scores: 100	Support import system but current business processes have to be modified to take the advantage of software functionality. Score: 80
Technical Feasibility - Technology - Experts	30%	Microsoft Access is highly user — friendly tool, which provides the integrated report designer. Required to hire or train Microsoft Access experts to perform modification for integration requirement. Score: 85	Microsoft Visual Basic will work well to respond to different queries with different views of database with SQL server. Easy to find programmer because VB is the most popular to learn among programmers. Score: 95	MS Visual FoxPro is user-friendly software tool, which has efficient built-in database management system. It also provides integrated report design. It serves fast development. Adequate available in Thailand. Score: 90
Economic Feasibility - Cost to Develop - Payback Period (Discounted) - Net Present value - Return on Investment - Detailed calculated	30%	Approximately 377,900 bahts Approximately 1 year Approximately 1,371,327 bahts 52.51% See Appendix F Score: 90	Approximately 452,900 Baht Approximately 1 year and 3 months Approximately 1,296,328 bahts 48.26% See Appendix F Score: 80	Approximately 400,900 Baht Approximately 1 year and 1 month Approximately 1,348,327 bahts 51.18% See Appendix F Score: 85
Schedule Feasibility	10%	6 months Score: 85	6 months Score: 85	8 months Score: 70
Ranking	100%	88%	91%	83.5%

3.2.4 Data Flow Diagram

DFD are used as a starting point for designing the proposed system since this diagram will illustrate graphically all the work flow of the five processes within the proposed system. The proposed system is designed to control major activities of product import information consisting of the following processes:

(1) Receive Order

This process will start with the Sales & Marketing department contact with the customer in order to know what they would like to buy. After the customer orders the product, the Sales department will receive the order requisition after doing the process. In this process the order details will be recorded in the order master file for the purpose of retrieving in the future.

(2) Check Product Availability

The Sales & marketing department will send the order details to check the product availability for that product. They have to prepare for the customer's needs. The system will come to check the availability of product balance. If they have product stock, the Sales department can confirm the customer about the product. If they do not have the products in stock, the system will record unavailable products into the product master file. Then the system will print out purchase proposal, together with unavailable product report, to manager for making a decision and approval. By the way, if a product is ready for sell, the system will notify it to the Sales & marketing department. System will update the stock balance immediately after the Sales department withdraws product from warehouse.

(3) Issue Purchase Order

This process starts when the manager approves a purchase proposal by sending purchase allowance to the process. The systems will do the purchasing process. First, it will retrieve unavailable product details and supplier's detail for oversea staffs to determine which supplier we can buy product with. After sending inquiries to each potential supplier, the process will choose the supplier who can give the company the best price and automatically save the quotation detail in Supplier file. The process will issue a purchase order to the supplier. In each month, the process will issue monthly purchase report to manager for control and management.

(4) Receive Product

This process will retrieve a detail of purchasing order to match up with invoice sent by supplier. If there is nothing wrong and the company doesn't need to reject invoice note because of errors, the process will go into the next step by retrieving unavailable product details to check out with received products. If the products are approved correct, the system will automatically add the new balance of product in product files. Then it will be ready to print manager a report, informing the number of products on hand now.

(5) Update Stock

When the Sales & marketing department completes its order requisition, the system will retrieve the order details for checking with product information. If all product items are found correct, their quantity will be added in the product master file and the process will read order and notify the Sales & marketing department product order confirm, which is

prepared to be fulfilled. In this process, the system can print out product report to manager for control.

(6) Selling Product

In this process, the system will retrieve customer details as information to issue the receipt for customer. At the same time the system will update stock by withdrawing order quantity from product records. Customer details will be sent to the manager to know the situation and also record the receipt into the Receipt file.

See the Context Diagram of the Proposed System and Data Flow Diagram Level 0, see Appendix A, Figure A.1 and Figure A.2 respectively.

3.2.5 Software Design and Structure Chart

The final step involves software design. In this step, we are concerned with how programming specification is presented to the computer program for implementing. The technique involved is structure design. The concept of structured design is the software design discipline, encompassing a set of design rules and techniques for designing a system from the top down in a hierarchical fashion and refined to greater levels of detail. As the design is formulated, it is documented in a structure chart. The structure is a top-down chart, showing each level of design, its relationship to other levels, and its place in the overall design structure, it can document one program, one system, or part of one program.

3.2.6 Process Specification

Process specifications describe the transformations occurring within the lowest — level processes of the data flow diagrams. They express the logic for each process. (Process Specifications are shown in Appendix B)

3.2.7 Database Design

Database is a collection of data organized to serve or service many applications efficiently at the same time by storing and managing data so that they appear to be in one location and also by centralizing the data and minimizing redundant data. It is very important issue in designing the database. We should perform data analysis at first that is a process, which prepares a data model for implementation as a simple, non-redundant, flexible and adaptable database.

The process of creating small stable data structures from complex groups of data when designing a relational database is called "Normalization". If a database has been carefully thought out, with a clear understanding of business information needs and usage, the database model will most likely be in some normalized form. An entity is in the first normal only in the condition when it contains no repeated attributes. An entity is in the second normal if it contains no partial dependencies and in the third form if it contains no derived attribute. (See Database schema and Normalization in Appendix C)

3.2.8 Data Dictionary

This is an automated or manual file that stores definitions of data elements and data characteristics such as usage, physical representation, ownership (who in the organization is responsible for maintaining the data), authorization, and security. This data is maintained in a database. (The data dictionary is shown in Appendix D)

3.2.9 User Interface Design and Prototyping

The users and management team has to make important business decision based on system output. However, there will be a lot of mistakes if they worry only about output, input design is also important because you will waste time if your input has some mistakes. So the input should be easy — to — use and user — friendly to the end users. Good input design prevents users key the wrong input and then good output

design will come up. The managers and users will not waste time to interpret or try to understand the output result when they need urgent decision — making.

In the system development, we have to be careful about the necessary of input information. We are designing the input & prototype to test according to the user requirement. See Appendix G.

3.2.10 Output Design and Prototyping

Basically, output can be divided into two types:

- (1) External Output: System output that is generated for External Party. The examples for this are purchase order and Performa invoice.
- (2) Internal Output: The company uses internal output for operation, control, it can also be classified into two types:
 - (a) Detailed Report: Show all data about each transaction and can provide backup for future reference. The report will show the details of product purchased within a month or year.
 - (b) Summary Report: This report is for Management to overview the performance of each department.

Output Design in Appendix E.

3.2.11 Application Architecture

At this time, we come to system design, which is the requirement of detail design. During general design, we identify the application or information system architecture. Four major aspects to be considered are network architecture, data architecture, interface architecture and process architecture.

- (1) Network Architecture: Two — tiered client / server

The company will apply the local area network (LAN). One server will connect clients by two — tiered client / server architecture. Under the

architecture, all four machines are interconnected by unshielded twisted pair cable. All business data, mainly about Product information, will be stored on a data server and the business logic and user interface on three clients.

When the clients run their own application and need data, they will send the server requests for the data. As soon as the server gets them, it will retrieve the data from the database and send them back to these clients. Such a translation will take place back and forth between the clients and their server. Data can be shared among the clients that can be executed separately.

(2) Data Architecture: Relational Database

The company prefers the relational database technology. In a relational system, the user sees the data as tables and the operators available to the user for dealing with the data by the user as tables, and the operators available to the user for dealing with the data are operators who manipulate tables.

With relational database, we can assign some sort of account number for each raw material record. A database of product record would have a field for these accounts. That is easy for us to relate each product to the appropriate raw materials the production requires.

The company chooses SQL Server as a database management system. SQL Server will give the benefit in terms of storing data, entering data, searching and easily managing data and so on. Since most databases are stored away from the application, the database is self — documenting, which is easy to change and manage.

(3) Interface Architecture: Online Processing

We choose Visual Basic to develop our own application because of the GUI technology the visual basic has. Using Visual Basic to make user interface is just like a drawing. It is very easy to learn and do. We just drag and drop any controls we want to use onto the template and change design by setting new properties at our own wills. Working in such way, we can change input and output interface at any time until we are sure that our designed interface will be user — friendly to anyone, even a drum user.

The company needs a new system that can provide all users up—to—dated information. So it is a bad decision if we do not apply online processing to our system. The main contribution to support the idea is that batch processing updates data at one specified time period but the data we work with, with regard to the product information, needs to be updated all the time. So they are mismatching. On — line processing seems to be the best way out, since it could provide manager the most updated of product information status at hands to make any decision. Moreover, inquiries and reports can be processed immediately.

(4) Process Architecture: Visual Basic

The company uses Visual Basic to develop the application. Visual Basic has a predefined set of user actions, called events, which it will recognize. We write our program code to tell Visual Basic what we want the program to do in response to these events. We write code only for the events that have meaning to our program. If we want to recognize when the user double — clicks a button, we write code for that events, but if a single click

has no meaning in our program, we write no code and the event will be ignored. These entire special features we gain from the use of Visual Basic.

3.3 Hardware and Software Requirement

The Proposed system requires the following hardware components.

- | | |
|--|--------|
| (1) Server | 1 set |
| <ul style="list-style-type: none"> (a) PENTIUM III 800 MHz (b) Motherboard Support SCSI Hard Disk (c) SD Ram 128 MB (d) Hard Disk SCSI 20 GB (e) 1.44 MB 3.5" Floppy Disk Drive (f) CD-ROM Creative 52 x (g) Logitech Mouse and Keyboard (h) Monitor 15" Non Radiation | |
| (2) PC Client | 4 sets |
| <ul style="list-style-type: none"> (a) Intel Pentium III 600 MHz (b) Seagate 15 GB XTE 66 Hard disk (c) 64 MB SD RAM (d) 1.44 MB 3.5" Floppy Disk Drive (e) Keyboard and Mouse (f) Monitor 15" Non Radiation | |
| (3) Printer | |
| (a) Dot Matrix Printer: Epson LQ — 1170 | 2 sets |
| (b) Laser Printer: HP Laser Jet 1100 | 2 sets |
| (4) Ethernet LAN card | 4 sets |

(5) Network Peripheral

- (a) 10/100 Mbps Speed HUB (8 ports)
- (b) UTP Cable

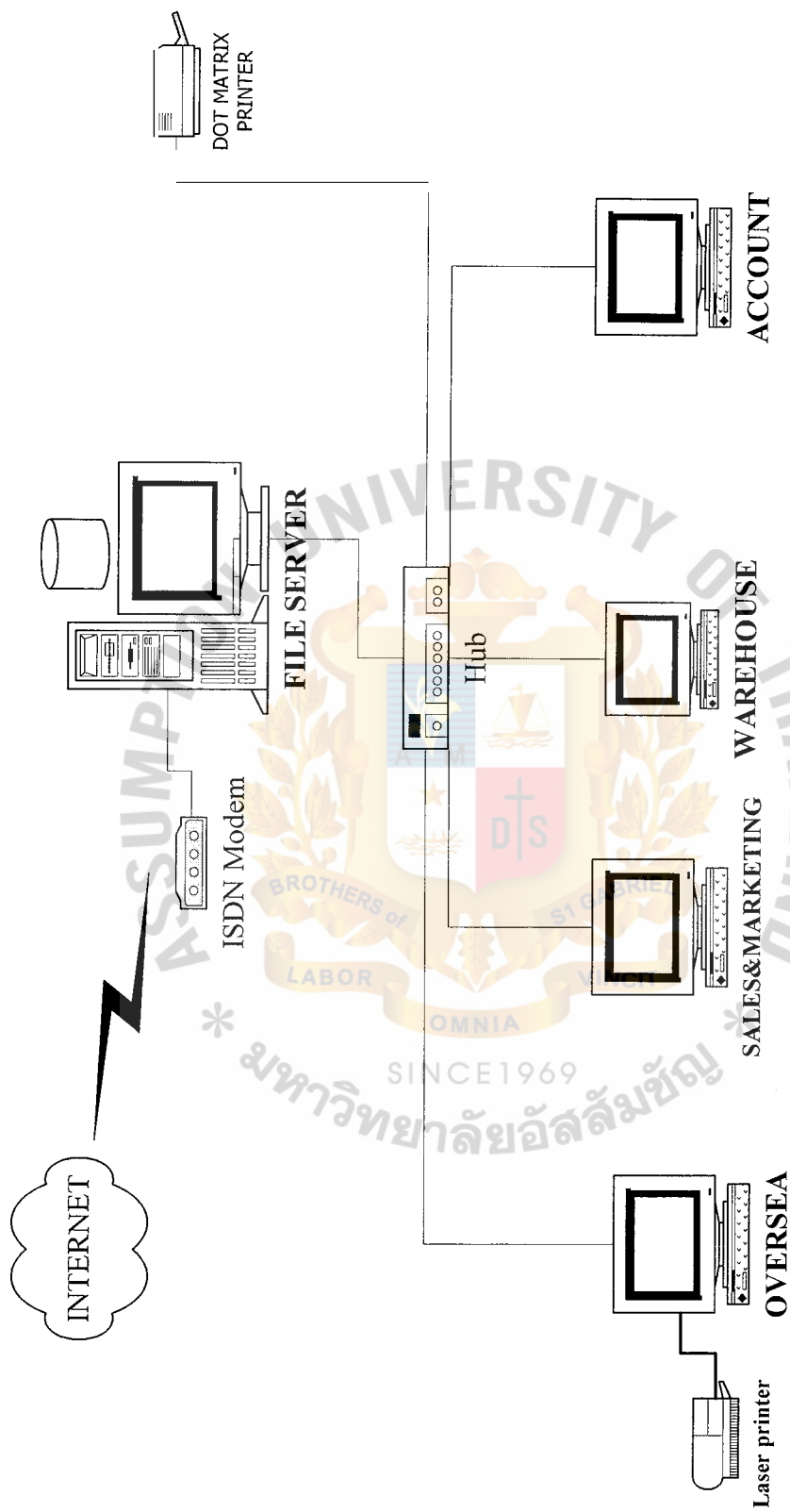
(6) UPS 200 VA Power

1 set

The software requirement can be concluded as follows:

- (1) Microsoft Office 97
- (2) Microsoft Window 98
- (3) Microsoft Windows NT
- (4) Microsoft Visual Basic 6.0
- (5) Microsoft SQL Database Server
- (6) Gateway Engine: Wingate





tem.
S
d Sy
e
os
Prop
he f t
ion t
ura
fig
Con
are
dw
Har

co
bA

3.4 Security and Controls

3.4.1 Security

There are many things concerned about the security of the system. Measurement, procedure, and control methods are required to protect the system from:

- (1) Intrusion and unauthorized access to the system from unauthorized person
- (2) Viruses
- (3) Electronic failure
- (4) Hardware and software failure

The protection and control methods are to be implemented in the purposed system as follows:

- (1) Use software detection algorithm to verify the data, preventing the database from redundancy and inaccuracy.
- (2) User authentication is applied to the system. The password is applied to prove user authentication or either username to control the system in a given area for authorized person only.
- (3) Virus detection program will be installed in all computers and run weekly.
The diskettes from unknown source should not be used in any computer.
- (4) Install UPS to prevent data loss from electronic power down or failure.
- (5) Install back up data to the system to prevent data loss from hardware and software failure.
- (6) Provide system usage training session to the end-users on regular basis.

3.4.2 Control

- (1) Input control: use software built in algorithm to check the validity and accuracy of the data and also prevent the data from redundancy.

- (2) Output control: set and customize the application software to produce the standardized output or reports.
- (3) Human control: sometimes human is dangerous to the computer so there are some rules set to anyone who enters in to the computer room such as no smoking, no drink, no enter with out permission, only one person is assigned to lock the server room.
- (4) System maintenance: hardware should be checked on regular basis to prevent the system from unexpected failure.

3.5 Cost and Benefit Analysis

3.5.1 Cost Analysis

Cost analysis is very important to indicate whether the benefits of the new import system are valuable investment or not. Cost comparison between the existing system and the new system should be made.

- (1) Cost of the exiting system includes:
 - (a) Annual Operating Cost: includes salary of manager and officer, office supplies, utility, miscellaneous.
- (2) Cost of the proposed system includes:
 - (a) Personnel: In the proposed system, we emphasize mostly on computerized system. We intend to train the officers to have computer awareness. We need computer officer instead of manager who doesn't understand computer.
 - (b) Training Cost: includes end-user training cost and other education program and seminar regarding their field.

St. Gabriel's Library

- (c) New hardware and software: includes the cost of new hardware and the cost of new application software e.g. packages software and system software.
- (d) Set up cost: includes the installation cost of hardware and software of the system.
- (e) Office Supplies
- (f) Salary
- (g) Depreciation Expense
- (h) Utility
- (i) Miscellaneous



Estimated Cost of the Existing System:

Fixed Cost

Typewriter	10,000
Copier Machine	<u>40,000</u>
Total Fixed Cost	<u>50,000</u>

Operation Cost

Personnel Cost:

Manager 1 person	12,000	144,000
Staffs 6 @ 7,000	42,000	<u>504,000</u>
Total		<u>648,000</u>

Office Supplies &
Miscellaneous Cost:

Office Supply Cost	25,000
Utility Cost	30,000
Miscellaneous (3,000@month)	<u>36,000</u>
Total	91,000

Depreciation Cost 10,000

Total Operation Cost 749,000

Total Annual Existing Cost

799,000

Estimated Project Cost:

1. Development Cost

<u>New Hardware:</u>	
File Server1@60,000	60,000
Clients 4@35,000	140,000
Laser Printer HP Laser Jet 5	30,400
2@15,200	
Epson LQ-1170 Dot Matrix 2@ 7,500	15,000
UPS1@ 3,500	3,500
Back Up Hard Disk1@ 6,000	6,000
Network Accessories 1@ 9,000	9,000
Total	263,900
<u>New Software:</u>	
Microsoft Office 971@12,000	12,000
Microsoft Window NT 1@30,000	30,000
Microsoft VB 6.0 1@10,000	10,000
Microsoft SQL Server 1@65,000	65,000
Gateway Engine : Wingate	10,000
Total	127,000
<u>Implementation Cost:</u>	
Software development	40,000
Set up Cost	12,000
Training Cost	10,000
Total	<u>62,000</u>

Total Development Cost		<u>452,900</u>
------------------------	--	----------------

2. Operation Cost

Personnel Cost:

<u>Manager 1@12,000</u>	12,000	144,000
<u>Staffs 3@7,000</u>	21,000	<u>252,000</u>
Total		396,000

Office Supplies & Miscellaneous Cost:

Office Supply Cost	12,500	
Utility Cost	15,000	
Internet Monthly Service	20,000	
Maintenance Cost	10,000	
Miscellaneous 1,500/month	<u>18,000</u>	
Total		75,500
Depreciation Cost	<u>60,000</u>	
Total		<u>60,000</u>
Total Operation Cost		<u>531,500</u>
Total Projected Annual Costs		<u>984,400</u>

3.5.2 Break-even Analysis

Break-even point shows that the level of the accumulative cost of the existing system will be equal to the accumulative cost of the proposed system. At the beginning, the cost of the proposed system will be higher than the existing cost due to the company's heavy investment on expensive development cost e.g. hardware, software, training course, and in-house programming. However, these costs are paid only once at the beginning of investment. It means that these costs will be paid again in the other next years. So the cost of development will be at the decreasing rate. In the long run, we can see that the proposed system will be more effective in reducing annual operating cost respectively. After we compare both systems in the near future, cost of the existing system will be higher than the proposed system.

Break-even point is the period that the cost of both systems is different at zero. The break-even point can be calculated from the interpolation technique by the method of summing the number of years where the cost difference between both systems is still positive and the fraction of year where the cost difference is still positive.

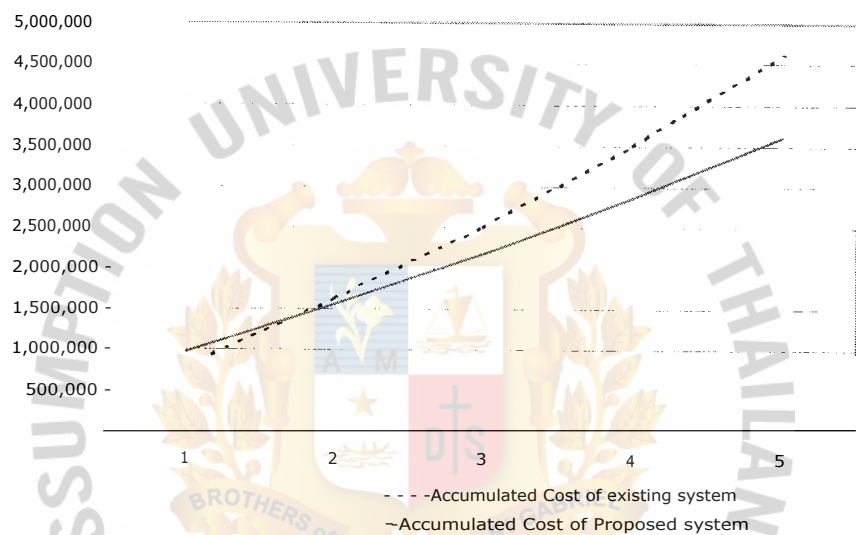
$$1 \text{ year} \frac{+185,400}{(185,400) - (-60,850)} = 1 \text{ Year} + 0.75 \text{ year} \\ 1 \text{ Year 9 Months}$$

Table 3.3 shows the cost comparison between the existing system and the proposed system. Figure 3.2 shows the break-even point.

St. Gabriel's Ilbrar

Table 3.3. Cost Comparison between Existing and Proposed System.

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Cost of Manual System	50,000					
Fixed Cost:						
Operating Cost:						
Personnel:						
Manager		144,000	158,400	174,240	191,664	210,830
Staffs		504,000	554,400	609,840	670,824	737,906
Office Supplies Costs:						
Office Supply Cost		25,000	27,500	30,250	33,275	36,603
Utility Cost		30,000	33,000	36,300	39,930	43,923
Miscellaneous		36,000	39,600	43,560	47,916	52,708
Depreciation Cost		10,000	10,000	10,000	10,000	10,000
Total	50,000	749,000	822,900	904,190	993,609	1,091,970
Accumulated Cost of existing system		799,000	1,621,900	2,526,090	3,519,699	4,611,669
Cost of Computerized System	452,900					
Development Cost:						
Operating Cost:						
Personnel:						
Manager		144,000	158,400	174,240	191,664	210,830
Staffs		252,000	277,200	304,920	335,412	368,953
Office Supplies & Miscellaneous Cost:						
Office Supply Cost		12,500	13,750	15,125	16,638	18,301
Maintenance Cost		10,000	11,000	12,100	13,310	14,641
Utility Cost		15,000	16,500	18,150	19,965	21,962
Internet Monthly Service		20,000	20,000	20,000	20,000	20,000
Miscellaneous		18,000	19,800	21,780	23,958	26,354
Depreciation Cost:		60,000	60,000	60,000	60,000	60,000
Total	452,900	531,500	576,650	626,315	680,947	741,041
Accumulated Cost of Proposed system		984,400	1,561,050	2,187,365	2,868,312	3,609,353
COST DIFFERENCE		185,400	- 60,850	- 338,725	- 651,388	- 1,002,316



* Figure 3.2. Break-Even Analysis. *

3.5.3 Benefit Analysis

The benefit of the proposed system can be divided into two categories, which are tangible benefit and intangible benefit.

Tangible Benefit

The major meaning of tangible benefit is the cost reduction of every occurred expense.

- (1) Personal cost reduced because the computerized system can replace the staff.

Reduce from 6 staffs to 3 staffs

(3 staffs * 7,000 bahts * 12 months) 252,000 bahts

- (2) Decrease in Office Supplies Cost such as paper and stationary.

Reduce from 10% to 5%. (Save from 25,000 to 12,500)

12,500 bahts

- (3) Utility cost is reduced yearly 10% to 5%.

Save from 30,000 to 15,000 bahts

15,000 bahts

- (4) Miscellaneous cost is reduced at 10% to 5% yearly

which save from 3,000 per month to 1,500 per month.

18,000 bahts

- (5) Sale volume is increased for 20% or 60,000 bahts per month 720,000 bahts

or (60,000 * 12 months), derived from:

Estimated sale volume per month derived from

operating the proposed system 360,000 bahts

Less Average sales volume per month derived from

Operating the existing system 300,000 bahts

Increased sales volume per month (20%) 60,000 bahts

Total estimated tangible benefit derived from reduced operating cost is 217,500 bahts.

Total estimated tangible benefit derived from increased sale volume is 720,000 bahts.

Total estimated tangible benefit derived from operating the proposed system is 937,500 bahts (217,500+720,000)

Intangible Benefit

- (1) Increase in data accuracy and quality of data, report and document.
- (2) More timely and beneficial information.
- (3) Updated information.
- (4) No data redundancy.
- (5) Retrieve information faster.
- (6) Reduce the volume of paperwork.
- (7) More efficient of working processes and working time.
- (8) Reduction of workload of employees.
- (9) Other departments have more guideline to develop their own new system.
- (10) Provide efficiency report to manager.
- (11) Improve decision-making.
- (12) Better service and response time to the customers.
- (13) Increase customer satisfaction.

It can be described that the new system can increase efficiency and effectiveness of the operation. With all benefits occurred, it is estimated that the sales volume will increase and cost of operation will decrease. The total benefit derived from operate the new system is estimated to be 937,500 bahts for the first year and it increases at 10% annually.

3.5.4 Payback Period Analysis

Payback Period is mostly used as a criterion in evaluating the proposed investment. Payback period analysis is to determine the exact period that the investor gets the initial investment back derived from the cash inflows. In term of annuity, divide cash inflows in each year in equal amount. Payback period is found by dividing the initial investment by annual cash inflow. Yearly cash inflows will be accumulated until we get the initial payment back or it means that payback period will show how long the project takes in return on initial investment. It mostly deals with cash inflows more than accounting profits and it will ignore the time value of money too. The investor will accept or reject this project including the determination of maximum desired payback period.

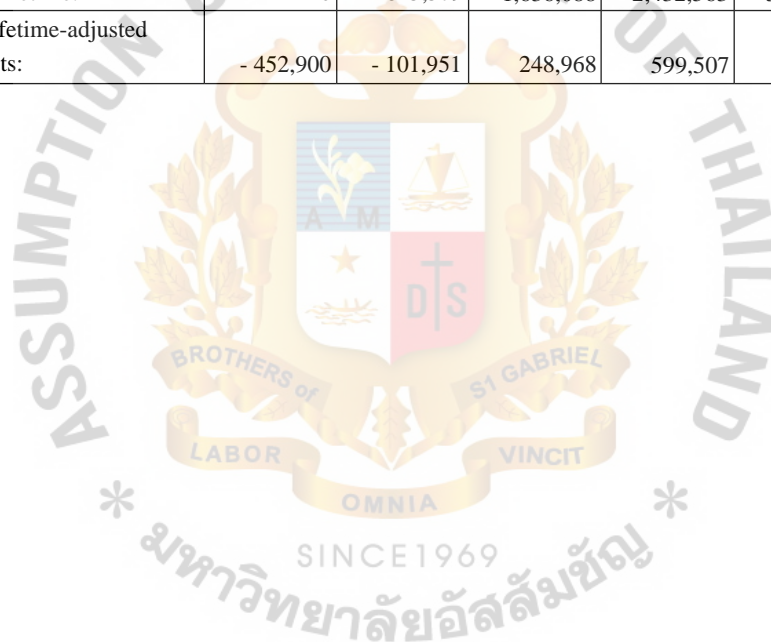
Payback period Analysis is shown in Table 3.4. The payback period is calculated from interpolation techniques to find the exact date by summing the number of years where the cost difference is still positive plus the fraction of year of such cost difference.

$$\begin{aligned} 1 \text{ year} + \frac{-101,951 - 0}{(-101,951 - 248,968)} &= 1 \text{ year} + 0.29 \text{ year} \\ &= 1 \text{ year 3 months} \end{aligned}$$

The desired payback period is 2 years or less is preferred. So our project is acceptable since it takes only a year to get our investment back. The project with such a short payback is liquid and less risky. We can invest money left elsewhere. Moreover, the short payback period will give more chance in Marketing condition, interest rate, or another factors that effect the hazard changing.

Table 3.4. Payback Period Analysis.

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Development Cost:	- 452,900					
Annual Operating Cost:		- 531,500	- 576,650	- 626,315	- 680,947	- 741,041
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted costs (adjusted to present value):	- 452,900	- 474,630	- 459,590	- 445,936	- 433,082	- 420,170
Cumulative time-adjusted costs over lifetime:	- 452,900	- 927,530	- 1,387,120	- 1,833,056	- 2,266,138	- 2,686,308
Benefits derived from operation of new system:	0	924,500	1,016,950	1,118,645	1,230,510	1,353,560
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted benefits (adjusted To present value):	0	825,579	810,509	796,475	782,604	767,469
Cumulative time-adjusted benefits over lifetime:	0	825,579	1,636,088	2,432,563	3,215,167	3,982,636
Cumulative lifetime-adjusted costs + benefits:	- 452,900	- 101,951	248,968	599,507	949,029	1,296,328



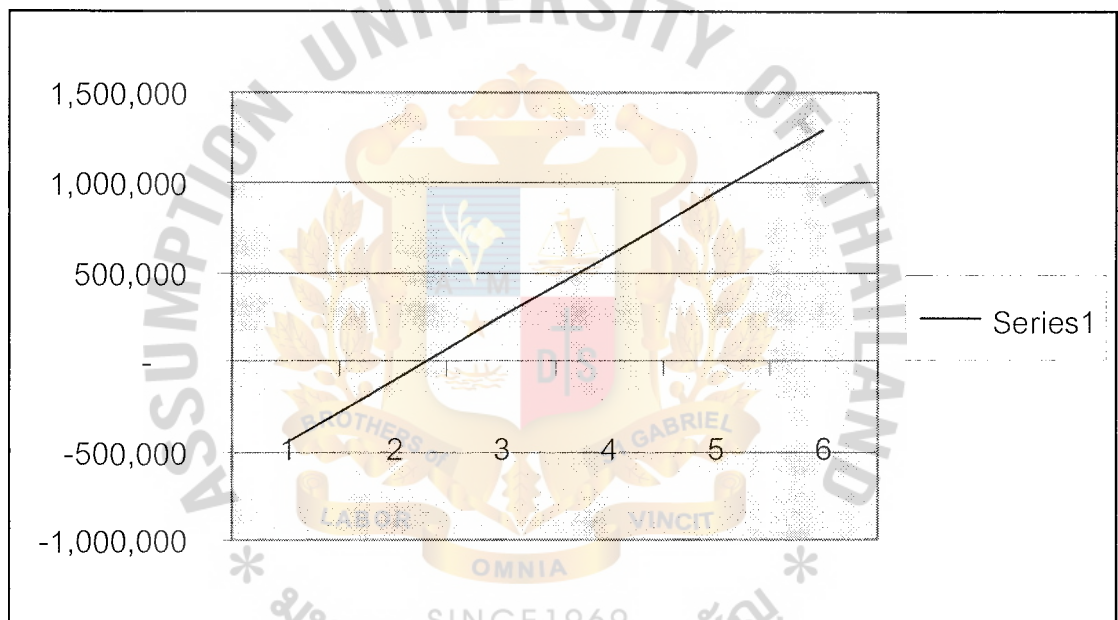


Figure 3.3. Payback Period.

3.5.5 Return of Investment Analysis

The return-on-investment (ROI) analysis technique compares the lifetime profitability of alternative solution or project. The return-on-investment is the percentage rate that measures the relationship between the amounts the business gets back from an investment and the amount invested. The return-on-investment lifetime for the project is calculated as follows:

$$\begin{aligned}\text{ROI} &= \frac{(\text{Estimated lifetime benefits} - \text{Estimated lifetime costs})}{\text{Estimated lifetime costs}} \\ &= \frac{(3,982,636 - 2,686,308)}{2,686,308} \\ &= 48.26 \%\end{aligned}$$

Normally, the company sets a minimum acceptable ROI at 20% for all investment that means the project will be approved for implement.

IV. SYSTEM IMPLEMENTATION

The implementation of the proposed system will start after the management team approves all steps and decides to replace the existing system. There are four stages to implement the system.

4.1 Building the New System

This stage includes programming all required modules and integrating them into the application program that meets all user requirements.

Microsoft VB is selected to be the programming language that is used in this project. All processes specification that was designed will be programmed. Visual Basic is event-driven programming language. It is not like linear programming in which the program starts at the top and then directly through the code when it is executed. Event-driven program flow is controlled by the objects drawn on the screen. Besides, VB will be also used to handle the database also.

After programming, both hardware and software must be integrated together to build the complete system. During programming, hardware compatibility is also the major concerns of the development. Hardware and application software will be integrated by operating system, which is Microsoft Windows 2000.

4.2 Testing

The testing system is the most important stage for the development of the proposed system. It can give the opportunity to the programmer to find the error, hidden error, hidden failure, bug, and any further requirements that happened and the program may miss these errors. It can also discover modification requirement of the process design or even the new process requirement of the system. Thus, the testing system is the final steps before converting into the new system.

The testing steps are as follows:

(1) Unit testing

Or called program testing. It is testing of all modules and source all codes to find out the system failure. If we can find out the failure, we can find the solution to correct those failures.

(2) System testing

It is the whole testing of hardware and software, which will be tested. System failure will be corrected such as storage device capability, recovery and re-start capability.

(3) Acceptance testing

End users and the management team will test and review to find out that it is suitable for user requirement. After we meet the objective, both end user and management team will certify the system. We can see that the above testing will be appropriate for the programmer or computer specialist. Only this testing is suitable for end user and management team.

4.3 Conversion *

It is the step of converting the old system into the new system. This step has many approaches for this proposed system. The pilot study will be selected. This study introduces the new system only to a limited area of the organization, such as single department or operating unit. When this pilot version is completed and it works smoothly, it is installed throughout the rest of the organization, either simultaneously or in stages.

4.4 Production and Maintenance

After the new system is installed and conversion is complete, the system is said to be in production. During this stage, both users will review the system and technical specialists to determine how it will meet its initial objectives and to decide whether any reversions or modifications are in order. Maintenance means to change in hardware, software, documentation, or procedures to a production system to correct errors, meet new requirements, or improve processing efficiency.



V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

As we know that the existing system is not good enough for the company's expanding plan. The competitors tried to catch up with the latest technology to increase the company's efficiency and effectiveness. The customers want fast response in ordering product with high quality. If the company is still using manual system, we cannot compete with the other company or even satisfy customer's needs.

In the near future, the manual system will be outdated, not efficient, time consuming, and cannot follow the latest technology, which will be our important obstacles in expanding the business. Thus, the computerized system is suitable for the growing company nowadays. This computerized system offers many benefits to the company such as updating information in ordering, checking, and in finding the information. In the old system, we encounter problems about manual documentation, time-consumption in every process, outdated information.

This proposed system would give more benefits to all departments including the management team. Inventory department can balance the stock and respond rapidly to the oversea department in the over stock or inadequate stock to supply to the customers. The production line will be on time as the production plan is set in producing and also plan for the product parts assemble. Sales and marketing department can respond quickly to the customer to satisfy their needs. The management team will receive the perfect report as required and also can make a good decision. Finally, the oversea department can erase the redundant report and work fast along with the latest technology and also support the other departments in efficiency and effectiveness.

5.2 Recommendations

To make the proposed system efficient and have more benefits, the company has to continue improving to another concerned process. The product importing information is quite important to the company's business. It can tell the fact about the product itself, the pros and cons of the product imported, and the product price & condition. If we lose some information, it will be harmful to the business, so the system controller has to be careful when converting into the new system. They have to have a good plan to support the system failure.

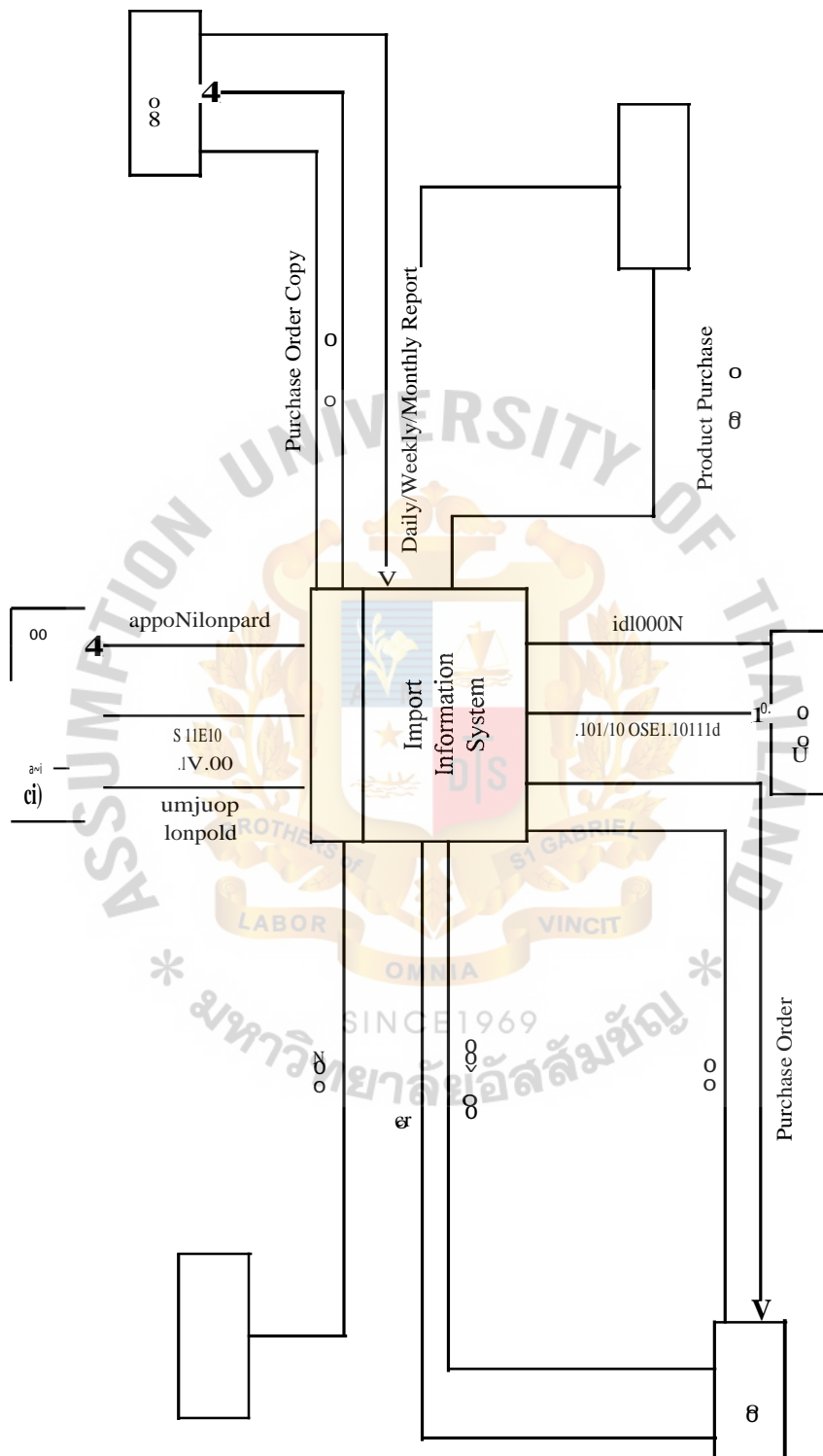
The next thing that the company has to realize is the training course for the staffs who never work with the computerized system to prevent the human errors and bring it to the system failure. This will cost much to the company in recovering the lost data both in tangible and intangible cost.

The company should have a specialist to take care of the whole system and advise the staffs when encountered abnormal problems. If these problems occur and operation stops, the staff does not know how to do, then it will make the company increase some cost.

The management team have to follow and continue checking the result of the proposed process to consider if the new process meets the user requirement or the company achieves the objective in operating the new system.

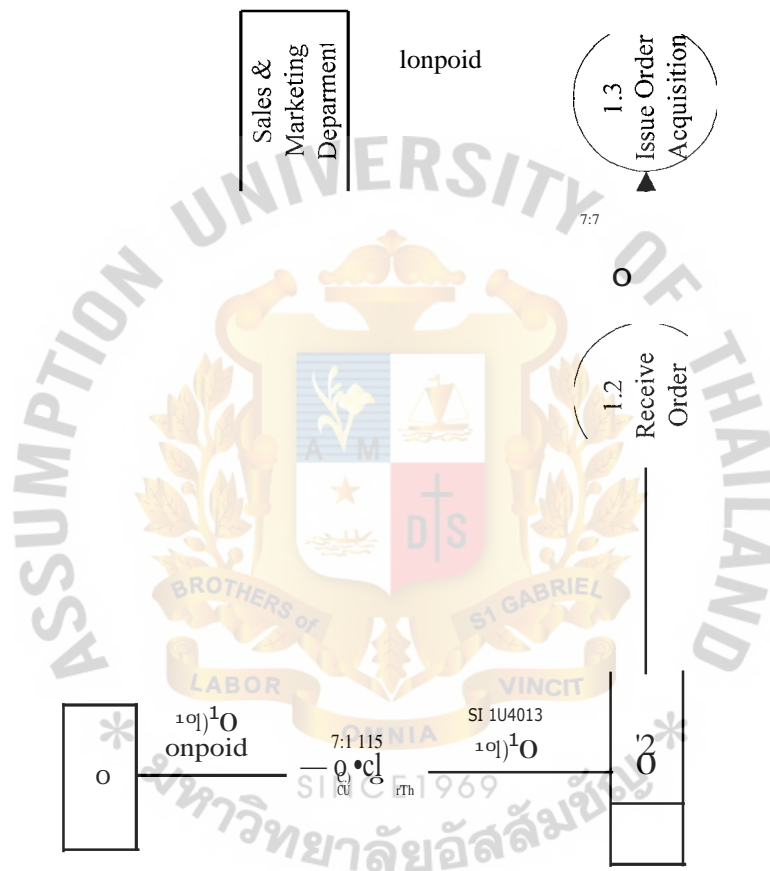
The last recommendation, in the future the company should expand the business to auction system which is suitable for the importer like us. Through online auction, both foreign suppliers and customers can find their satisfying price by the bid and offer method. It helps the company reach new supplier and customer around the world.





Context Diagram of The Proposed System.

b.0



DFD Level 1 Process 1 (Receive Order).

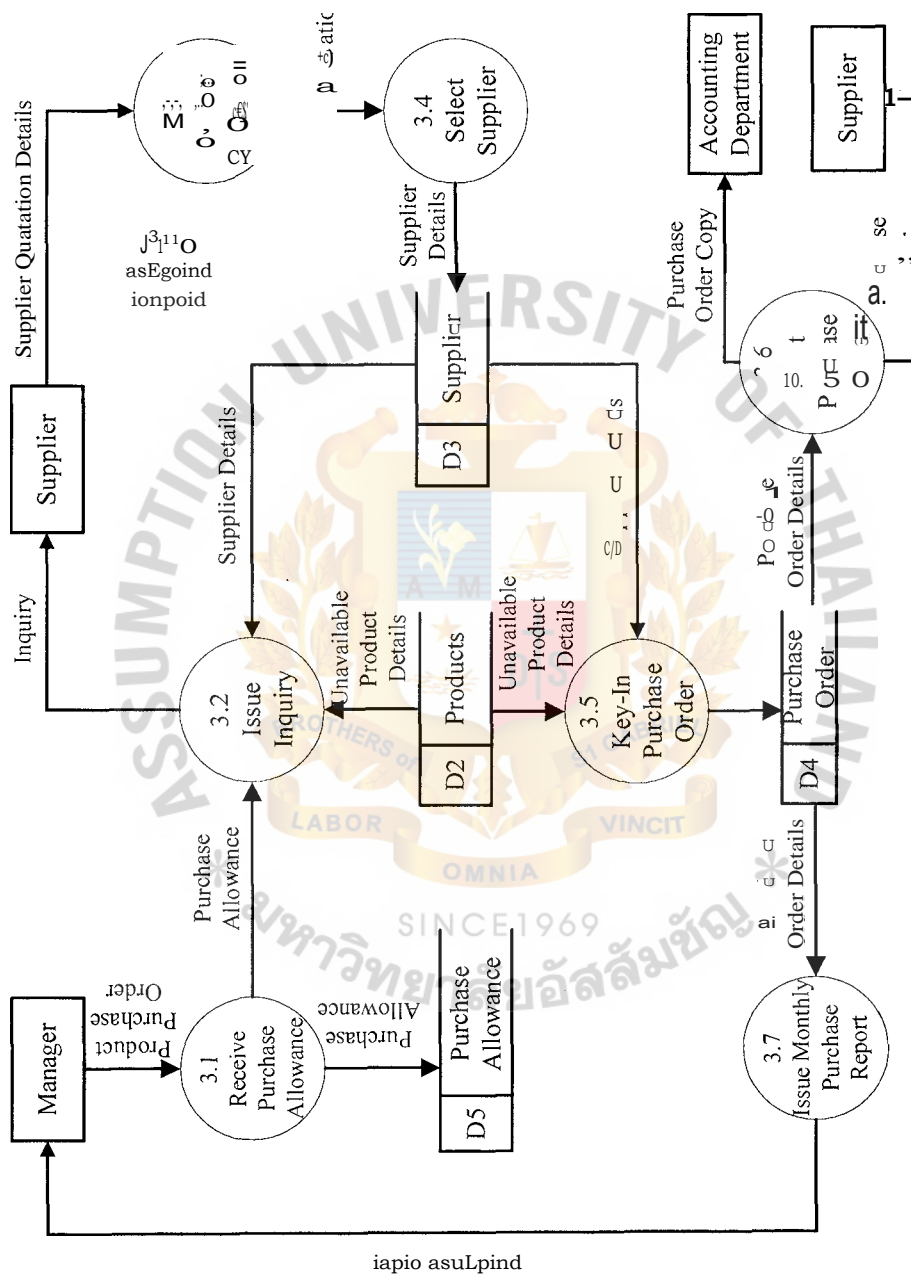


Fig. 5. DFD Level 1 Process 3 (Issue Purchase Order).

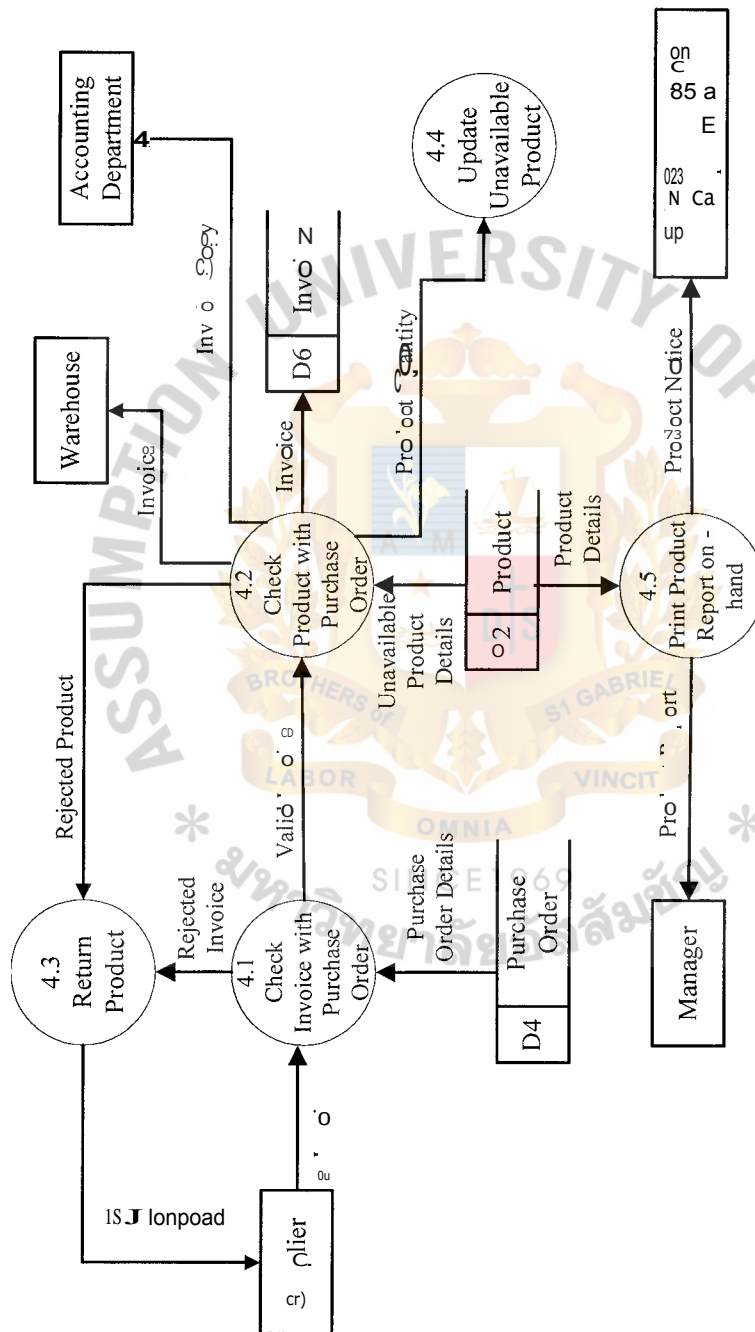
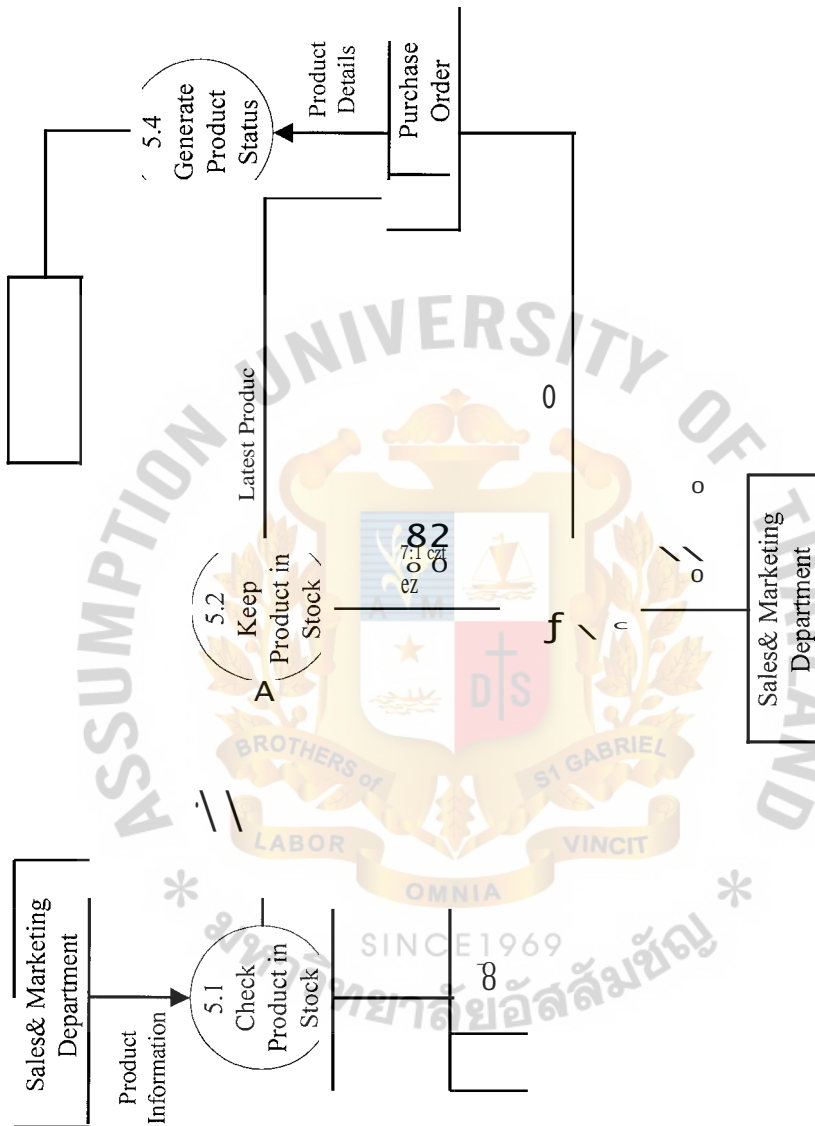


Figure A.6. DFD Level 1 Process 4 (Receive Product).





APPENDIX B

PROCESS SPECIFICATION

Table B.1. Process Specification of Process 1.1.

Process Name	Record Product Order
Input:	Product Order
Output:	Order Details
Process:	<ol style="list-style-type: none"> 1. Receive Product Order details from Customer 2. Verify Order Details 3. Verify Order No. 4. Key — in the order details into Request Order File
Attachment	<ul style="list-style-type: none"> • Sales and Marketing department • Customer • Orders

Table B.2. Process Specification of Process 1.2.

Process Name	Receive Order
Input:	Order details
Output:	Orders
Process:	<ol style="list-style-type: none"> 1. Receive Requested Order details from Sales & Marketing Department 2. Verify Order Details 3. Verify Order No.
Attachment	<ul style="list-style-type: none"> • Sales and Marketing department • Orders

Table B.3. Process Specification of Process 1.3.

Process Name	Issue Order Requisition
Input:	Order Details
Output:	Order Requisition
Process:	<ol style="list-style-type: none"> 1. Read Requested Order Details 2. Verify Order Details 3. Verify Order No. 4. Key — in Order Requisition
Attachment	<ul style="list-style-type: none"> • Sales and Marketing department • Orders

Table B.4. Process Specification of Process 2.1.

Process Name	Record Requested Order
Input:	Order details
Output:	Requested Order Record
Process:	<ol style="list-style-type: none"> 1. Receive Requested Order detail from Sales & Marketing Department 2. Verify Order Details 3. Verify Order No. 4. Key — in the order detail into Request Order File
Attachment	<ul style="list-style-type: none"> • Sales and Marketing department • Orders

Table B.5. Process Specification of Process 2.2.

Process Name	Check Product Availability
Input:	Product No. Counted Product Available Quantity Balance
Output:	The verified product balance
Process:	<ol style="list-style-type: none"> 1. Read Product No. from Requested Order 2. Check the physical number of ordered product in Warehouse 3. Match the physical balance with logical Balance 4. Send the accurate product balance to process 2.3
Attachment	<ul style="list-style-type: none"> • Orders • Warehouse • Products

Table B.6. Process Specification of Process 2.3.

Process Name	Compare Balance and Request
Input:	<ol style="list-style-type: none"> 1. Verified product balance 2. Ordered Quantity
Output:	<ol style="list-style-type: none"> 1. Product Status Confirmation 2. Product Quantity Unavailable
Process:	<ol style="list-style-type: none"> 1. Read ordered quantity form requested order 2. Read Product balance of ordered product 3. Compare the requested quantity with balance quantity 4. Send product status confirmation to Sales & Marketing if balance quantity is enough 5. Go to process 2.4 if balance quantity is less than requested quantity
Attachment	Sales and Marketing Department

Table B.7. Process Specification of Process 2.4.

Process Name	Key-in Unavailable Product
Input:	The Details of unavailable Product
Output:	Unavailable Product Record
Process:	<ol style="list-style-type: none"> 1. Read the detail of unavailable Product Record 2. Create unavailable Product No. 3. Key-in unavailable product detail into Unavailable Product
Attachment	Products

Table B.8. Process Specification of Process 2.5.

Process Name	Purpose Product Purchase
Input:	The Product Details
Output:	Purchase Proposal
Process:	<ol style="list-style-type: none"> 1. Read the product details record 2. Create the purchase product proposal 3. Key-in purchase product proposal to manager
Attachment	Products

Table B.9. Process Specification of Process 2.6.

Process Name	Print Unavailable Product Report
Input:	Product Detail from Product File
Output:	Product Requisition
Process:	<ol style="list-style-type: none"> 1. Read Unavailable Product from Unavailable Product File 2. Print Unavailable Product Report 3. Send a report to manager
Attachment	<ul style="list-style-type: none"> • Product • Manager

Table B.10. Process Specification of Process 3.1.

Process Name	Receive Purchase Allowance
Input:	Product Purchase Allowance
Output:	Purchase Allowance
Process:	<ol style="list-style-type: none"> 1. Receive Product Purchase Allowance from Manager 2. Key-in Purchase allowance into Purchase Allowance
Attachment	<ul style="list-style-type: none"> • Manager • Purchase Allowances

Table B.11. Process Specification of Process 3.2.

Process Name	Issue Inquiry
Input:	Supplier Details Purchase Allowance Unavailable Product Record
Output:	Inquiries
Process:	1. Read Supplier details from Supplier File 2. Read Unavailable Product Detail from Product File 3. Issue Inquiries to prospective customers 4. Send Inquiries to Suppliers
Attachment	<ul style="list-style-type: none"> • Products • Suppliers

Table B.12. Process Specification of Process 3.3.

Process Name	Gather Quotations
Input:	Supplier Quotation details
Output:	Supplier Quotations
Process:	1. Receive quotations from all prospective suppliers 2. Gather Quotations 3. Send Quotations to Oversea Department for negotiation prices
Attachment	Suppliers

Table B.13. Process Specification of Process 3.4.

Process Name	Select Supplier
Input:	Supplier Quotation details
Output:	Selected Supplier No.
Process:	<ol style="list-style-type: none"> 1. Select the best supplier who can supply products at right price 2. Retrieve that supplier's No.
Attachment	Supplier

Table B.14. Process Specification of Process 3.5.

Process Name	Issue Purchase Order
Input:	<ol style="list-style-type: none"> 1. Unavailable Product Detail 2. Selected Customer Name 3. Customer Details
Output:	Purchase Order Record
Process:	<ol style="list-style-type: none"> 1. Read Unavailable Product Details 2. Read Customer Details 3. Verify Customer Details 4. Key-in Purchase Order Form
Attachment	<ul style="list-style-type: none"> • Purchase Order No. • Suppliers • Products

St. Gabriel's library

Table B.15. Process Specification of Process 3.6.

Process Name	Print Purchase Order
Input:	Purchase Order No.
Output:	Purchase Order
Process:	<ol style="list-style-type: none"> 1. Read Purchase Order No. 2. Print Purchase Order 3. Send Purchase Order to Accounting Department and Supplier
Attachment	<ul style="list-style-type: none"> • Supplier • Accounting Department • Purchase Orders

Table B.16. Process Specification of Process 3.7.

Process Name	Print Monthly Purchase Report
Input:	Purchase Order Details
Output:	Purchase Report
Process:	<ol style="list-style-type: none"> 1. Read Purchase Order 2. Print Purchase Order Report 3. Send Purchase Order Report to Manager
Attachment	<ul style="list-style-type: none"> • Manager • Purchase Orders

St. Gabriel's Library

Table B.17. Process Specification of Process 4.1.

Process Name	Check Invoice with Purchase Order
Input:	Supplier's Invoice
Output:	<ol style="list-style-type: none"> 1. Rejected Invoice 2. Correct Invoice
Process:	<ol style="list-style-type: none"> 1. Receive Supplier Invoice from Supplier 2. Check Invoice with Purchasing Order
Attachment	<ul style="list-style-type: none"> • Purchase Orders

Table B.18. Process Specification of Process 4.2.

Process Name	Check Product with Purchase Order
Input:	Supplier's Invoice
Output:	Product Quantity
Process:	<ol style="list-style-type: none"> 1. Receive Invoice 2. Read Unavailable Product Details 3. Check whether the product from Supplier is according to the invoice 4. Return Product to Supplier if the quantity and quality is not suitable for the product standard 5. Record Invoice into Invoice Files 6. Send Copies of Invoice to Accounting Department
Attachment	<ul style="list-style-type: none"> • Invoices • Products • Suppliers

Table B.19. Process Specification of Process 4.3.

Process Name	Update Unavailable Product
Input:	Product Quantity from Invoice
Output:	Updated Product Record
Process:	<ol style="list-style-type: none"> 1. Read Product Quantity from Invoice 2. Update Product Status 3. Add Product Quantity into Product Files
Attachment	<ul style="list-style-type: none"> • Products

Table B.20. Process Specification of Process 4.4.

Process Name	Print Product Report On Hand
Input:	Product Quantity
Output:	Product Report Product Notice
Process:	<ol style="list-style-type: none"> 1. Read Product for sell 2. Print Product Report for Manager 3. Print Product Notice notifying Sales & Marketing Department
Attachment	<ul style="list-style-type: none"> • Sales & Marketing Department • Manager • Products

Table B.21. Process Specification of Process 5.1.

Process Name	Check Product in Stock
Input:	Product Information Product Details
Output:	Verified Product Quantity
Process:	<ol style="list-style-type: none"> 1. Receive New Product Information from Sales & Marketing Department 2. Retrieve Product Record from Products File 3. Check whether the product quantity is enough to serve ordered product
Attachment	<ul style="list-style-type: none"> • Sales & Marketing Department • Products

Table B.22. Process Specification of Process 5.2.

Process Name	Keep Product in Stock
Input:	Product Quantity
Output:	Updated Product Balance
Process:	<ol style="list-style-type: none"> 1. Read New Product Quantity 2. Add the latest product quantity into Products File 3. Send Product Details into Process 5.3
Attachment	<ul style="list-style-type: none"> • Products

Table B.23. Process Specification of Process 5.3.

Process Name	Inform Product Confirm
Input:	Product Details
Output:	Product Confirm
Process:	<ol style="list-style-type: none"> 1. Read Product Details 2. Issue Product Confirm notifying Sales & Marketing Department
Attachment	<ul style="list-style-type: none"> • Products • Sales & Marketing Department

Table B.24. Process Specification of Process 5.4.

Process Name	Generate Product Status
Input:	Product Details
Output:	Product Report
Process:	<ol style="list-style-type: none"> 1. Read Product details from Product Files 2. Print Product Report to Update Manager of current stock balance
Attachment	<ul style="list-style-type: none"> • Products • Manager

Table B.25. Process Specification of Process 6.1.

Process Name	Receive Product List
Input:	Product List
Output:	Withdrawn Product to be sold to Customer
Process:	<ol style="list-style-type: none"> 1. Receive Product List from Sales & Marketing Department 2. Record product list into Product List Files 3. Send Product List to Oversea Department who withdrawn product to customer
Attachment	<ul style="list-style-type: none"> • Product Lists • Oversea Department • Sales & Marketing Department

Table B.26. Process Specification of Process 6.2.

Process Name	Issue Receipt
Input:	1. Customer Details 2. Product Details
Output:	Receipt
Process:	1. Read Customer Record with Customer No. 2. Read Product Record with Product No. 3. Issue Receipt 4. Record Receipt 5. Send receipt to Oversea Department
Attachment	<ul style="list-style-type: none"> Receipts Products Customer

Table B.27. Process Specification of Process 6.3.

Process Name	Update Product Balance
Input:	Product Quantity
Output:	Updated Product Balance
Process:	1. Read Product Quantity 4. Update Quantity balance in Product Files
Attachment	<ul style="list-style-type: none"> Products

Table B.28. Process Specification of Process 6.4.

Process Name	Sell Product
Input:	Product Confirm
Output:	Product and Receipt
Process:	1. Receive product confirm from Oversea Department 2. Send a confirm to customer
Attachment	<ul style="list-style-type: none"> Customer Oversea Department

Table B.29. Process Specification of Process 6.5.

Process Name	Print Customer Report
Input:	Receipt
Output:	Receipt Report
Process:	<ol style="list-style-type: none"> 1. Read Receipt from Receipt File 2. Print Receipt Report for Manager
Attachment	<ul style="list-style-type: none"> • Receipts • Manager





PHYSICAL SCHEMA

Customer

Cus No	Cus Name	Bill_Addr	Ship Addr	Cust_Tel	Cus Fax
Cus Mobile	Last_Sale	Last_Payment	Balance	Discount	Credit_Allow

Invoice

Invoice_No	Order No	Cus_No	Delivery_Date	Issue Date
------------	----------	--------	---------------	------------

Order

Order No	Cus_No	Product_No	Order Quantity
Order Date	Order Due	Pay_Type	Salesperson

Product

Product_No	Product Name	Product Des	Unit_Price	Outst Balance
------------	--------------	-------------	------------	---------------

Purchase Order

PO No	Supplier No	Product_No	Purchase_Date
PO Date	Unit_Price	Qty Purchase	Total Amount

Supplier

SNo	S_Name	Contact Person	S Address	S Tel
S Fax	S Payment_Term	Se Mail	S_Product	Latest Purchase

Latest Payment	Discount	Credit Balance
----------------	----------	----------------

Received Product

S Name	Product No	Delivery_Unit	Unit_Price	Delivery_Date
--------	------------	---------------	------------	---------------

Figure C.1. Physical Schema.

Table C.1. File Structure of Customer File.

FILE STRUCTURE			
FILE NAME : CUSTOMER			
FIELD NAME	TYPE	LENGTH	DEC
CUS_NO	NUMERIC	8	
CUS NAME	CHARACTER	30	
BILL_ADDR	CHARACTER	200	
SHIP_ADDR	CHARACTER	200	
CUSJEL	NUMERIC	10	
CUS_FAX	NUMERIC	10	
CUS_E_MAIL	CHARACTER	30	
CUS_MOBILE	NUMERIC	10	
LAST SALE	DATE	10	
LAST_PAY	DATE	10	
BALANCE	NUMERIC	15	2
DISCOUNT	NUMERIC	5	2
CREDIT ALL	NUMERIC	4	

Table C.2. File Structure of Invoice File.

FILE STRUCTURE			
FILE NAME : INVOICE			
FIELD NAME	TYPE	LENGTH	DEC
INVOICE NO	CHARACTER	8	
ORDER NO	CHARACTER	8	
CUS NO	CHARACTER	8	
DELIVERY_DATE	DATE	10	
ISSUE DATE	DATE	10	

Table C.3. File Structure of Order File.

FILE STRUCTURE			
FILE NAME : ORDER			
FIELD NAME	TYPE	LENGTH	DEC
ORDER_NO	NUMERIC	8	
CUS_NO	NUMERIC	8	
PRODUCT_NO	NUMERIC	8	
ORDER_QUANTITY	NUMERIC	10	
ORDER_DATE	DATE	10	
ORDER_DUE	DATE	10	
PAY_TYPE	CHARACTER	10	
SALESPERSON	CHARACTER	10	

Table C.4. File Structure of Product File.

FILE STRUCTURE			
FILE NAME : PRODUCT			
FIELD NAME	TYPE	LENGTH	DEC
PRODUCT_NO	CHARACTER	8	
PRODUCT_NAME	CHARACTER	15	
PRODUCT_DESP	CHARACTER	200	
UNIT_PRICE	NUMERIC	8	2
OUT_BALANCE	NUMERIC	15	

St. Gabriel's Library

Table C.5. File Structure of Purchase Order File.

FILE STRUCTURE			
FILE NAME: PURCHASE ORDER			
FIELD NAME	TYPE	LENGTH	DEC
PO NO	NUMERIC	8	
S_NO	NUMERIC	8	
PRODUCT_NO	NUMERIC	8	
PURCHASE DATE	DATE	10	
PO DATE	DATE	10	
UNIT PRICE	NUMERIC	8	2
QTY PURCHASE	NUMERIC	9	
TOTAL	NUMERIC	15	2

Table C.6. File Structure of Supplier File.

FILE STRUCTURE			
FILE NAME : SUPPLIER			
FIELD NAME	TYPE	LENGTH	DEC
S_NO	NUMERIC	8	
S NAME	CHARACTER	10	
CONTACT	CHARACTER	10	
S_ADDRESS	CHARACTER	200	
S TELEPHONE	NUMERIC	10	
S_FAX	NUMERIC	10	
S_PAYMENT	NUMERIC	10	2
SE MAIL	CHARACTER	10	
S PRODUCT	CHARACTER	15	
LATEST PURCHASE	DATE	10	
LATEST PAYMENT	DATE	10	
DISCOUNT	NUMERIC	8	2
CREDIT BALANCE	NUMERIC	5	

Table C.7. File Structure of Received Product File.

FILE STRUCTURE			
FILE NAME : RECEIVED PRODUCT			
FIELD NAME	TYPE	LENGTH	DEC
S NO	NUMERIC	8	
PRODUCT_NUMBER	NUMERIC	8	
DELIVERY UNIT	NUMERIC	10	
UNIT_PRICE	NUMERIC	5	2
DELIVERY DATE	DATE	10	





Table D.6. Data Dictionary of Supplier File.

Supplier	Definition
S_No	The unique identification of supplier
S Name	Supplier Name
Contact Person	The name of contact person
S Address	The Supplier Address
S Telephone	Telephone of Supplier
S_Fax	Fax No. of Supplier
S_Payment term	The method of payment the company does with Supplier
S e mail	E-mail of Supplier
S_Product	The name of product supplier supplied to the company
Last Date Purchase	The latest date company purchased
Last_Payment_Date	The latest date company paid the bill
Discount	The discount rate supplier gives the company
Credit Balance	The amount of money company did not pay to the supplier

Table D.7. Data Dictionary of Received Product File.

Received Product	Definition
S_No	The supplier identification
Product Number	The Product identification
Delivery_Unit	The amount of raw material supplier delivers to the company
Unit Price	The price of raw material per unit
Delivery_Date	The Data the company receives raw material from supplier



Siam Engineering & Heavy Industry Co., Ltd.
Product Information Report
Issue Date: October 1, 2000

Item	Product No.	Product Name	Description	Outstanding Unit	Price/Unit	Total
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

Figure E.1. Product Information Report.

Siam Engineering & Heavy Industry Co., Ltd.
Customer Record Report
Issue Date: October 1, 2000

Figure E.2. Customer Record Report.

Siam Engineering & Heavy Industry Co., Ltd.
Weekly Order Report
Issue Date: October 1, 2000

Item	Order No.	Customer Name	Product Name	Quantity	Price / Unit	Total
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

Figure E.3. Weekly Order Report.

Siam Engineering & Heavy Industry Co., Ltd.
Monthly Order Report for Individual Customer
Customer Name: _____
Issue Date: October 1, 2000

Item	Order No.	Ordered Quantity	Price / Unit	Total	Remark
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Figure E.4. Monthly Order Report for Individual Customer.

Siam Engineering & Heavy Industry Co., Ltd.
Supplier Report
Issue Date: October 1, 2000

Item	Supplier No.	Supplier Name	Supplier Product	Address	Tel / Fax / e-mail	Credit Term
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

Figure E.S. Supplier Report.

St. Gabriel's Library

Siam Engineering & Heavy Industry Co., Ltd.
Monthly Purchase Order Report
Issue Date: October 1, 2000

Item	Purchase Order No.	Supplier No.	Product No.	Purchase Order Date	Price / Unit	Quantity	Total
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

Figure E.6. Monthly Purchase Order Report.

Siam Engineering & Heavy Industry Co., Ltd.
Weekly Unavailable Product Report
Issue Date: October 1,2000

Item	Product No.	Description	Unit on Hand	Price / Unit	Status	Remark
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

Figure E.7. Weekly Unavailable Product Report.



APPENDIX F
ECONOMIC FEASIBILITY
ANALYSIS

St. Gabriel's Library

Estimated Project Cost for Candidate 1

1. Development Cost

New Hardware

File Server1@60,000	60,000
Clients 4@35,000	140,000
Laser Printer HP Laser Jet 5 2@15,200	30,400
Epson LQ-1170 Dot Matrix 2@ 7,500	15,000
UPS1@ 3,500	3,500
Back Up Hard Disk1 @ 6,000	6,000
Network Accessories 1@ 9,000	9,000
Total	263,900

New Software

Microsoft Office 971@12,000	12,000
Microsoft Window NT 1@30,000	30,000
Gateway Engine: Wingate	10,000
Total	52,000

Implementation Cost

Software development	40,000
Set up Cost	12,000
Training Cost	10,000
Total	62,000

Total Development Cost 377,900

2. Operation Cost

Personnel Cost:

Manager 1(a),12,000	12,000	144,000
Staffs 3@7,000	21,000	<u>252,000</u>
Total		396,000

Office Supplies & Miscellaneous Cost:

Office Supply Cost	12,500	
Utility Cost	15,000	
Internet Monthly Service	20,000	
Maintenance Cost	10,000	
Miscellaneous 1,500/month	<u>18,000</u>	
Total		75,500
Depreciation Cost	60,000	
Total		<u>60,000</u>
Total Operation Cost		<u>531,500</u>
Total Projected Annual Costs		<u>909,400</u>

Estimated Project Cost for Candidate 3

Development Cost

New Hardware:

File Server1@60,000	60,000
Clients 4 @,35,000	140,000
Laser Printer HP Laser Jet 5 2@15,200	30,400
Epson LQ-1170 Dot Matrix 2@ 7,500	15,000
UPS1@ 3,500	3,500
Back Up Hard Disk1@ 6,000	6,000
Network Accessories 1@ 9,000	9,000
Total	263,900

New Software

Microsoft Office 971@12,000	12,000
Microsoft Window NT 1@30,000	30,000
Microsoft Visual Fox Pro 6.0 1@23,000	23,000
Gateway Engine: Wingate	10,000
Total	75,000

Implementation Cost

Software development	40,000
Set up Cost	12,000
Training Cost	10,000
Total	62,000

Total Development Cost	<u>400,900</u>
------------------------	----------------

2. Operation Cost

Personnel Cost

Manager 1(y.;12,000	12,000	144,000
Staffs 3@7,000	21,000	<u>252,000</u>
Total		396,000

Office Supplies & Miscellaneous Cost

Office Supply Cost	12,500	
Utility Cost	15,000	
Internet Monthly Service	20,000	
Maintenance Cost	10,000	
Miscellaneous 1,500/month	<u>18,000</u>	
Total		75,500
Depreciation Cost	60,000	
Total		<u>60,000</u>
Total Operation Cost		<u>531,500</u>
Total Projected Annual Costs		<u>932,400</u>

Table F.1. Cost Comparison between Existing and Proposed System for Candidate 1.

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Cost of Manual System	50,000					
Fixed Cost:						
Operating Cost:						
Personnel:						
Manager		144,000	158,400	174,240	191,664	210,830
Staffs		504,000	554,400	609,840	670,824	737,906
Office Supplies Costs:						
Office Supply Cost		25,000	27,500	30,250	33,275	36,603
Utility Cost		30,000	33,000	36,300	39,930	43,923
Miscellaneous		36,000	39,600	43,560	47,916	52,708
Depreciation Cost		10,000	10,000	10,000	10,000	10,000
Total	50,000	749,000	822,900	904,190	993,609	1,091,970
Accumulated Cost of existing system		799,000	1,621,900	2,526,090	3,519,699	4,611,669
Cost of Computerized System	377,900					
Development Cost:						
Operating Cost:						
Personnel:						
Manager		144,000	158,400	174,240	191,664	210,830
Staffs		252,000	277,200	304,920	335,412	368,953
Office Supplies & Miscellaneous Cost:						
Office Supply Cost		12,500	13,750	15,125	16,638	18,301
Maintenance Cost		10,000	11,000	12,100	13,310	14,641
Utility Cost		15,000	16,500	18,150	19,965	21,962
Internet Monthly Service		20,000	20,000	20,000	20,000	20,000
Miscellaneous		18,000	19,800	21,780	23,958	26,354
Depreciation Cost:		60,000	60,000	60,000	60,000	60,000
Total	377,900	531,500	576,650	626,315	680,947	741,041
Accumulated Cost of Proposed system		909,400	1,486,050	2,112,365	2,793,312	3,534,353
COST DIFFERENCE		110,400	- 135,850	- 413,725	- 726,388	-1,077,316

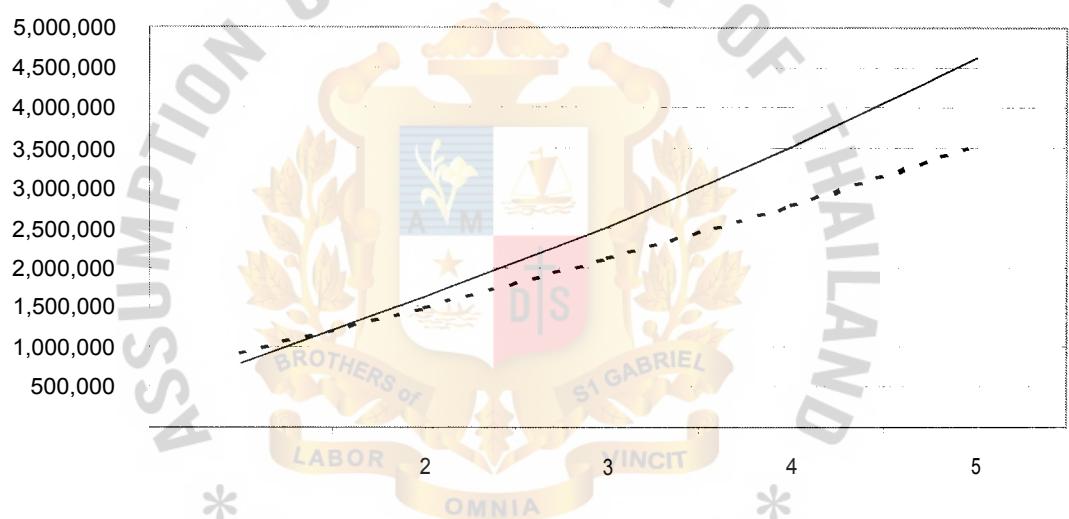


Figure F.1. Break-Even Point for Candidate 1.

Table F.2. Cost Comparison between Existing and Proposed System for Candidate 3.

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Cost of Manual System	50,000					
Fixed Cost:						
Operating Cost:						
Personnel:						
Manager		144,000	158,400	174,240	191,664	210,830
Staffs		504,000	554,400	609,840	670,824	737,906
Office Supplies Costs:						
Office Supply Cost		25,000	27,500	30,250	33,275	36,603
Utility Cost		30,000	33,000	36,300	39,930	43,923
Miscellaneous		36,000	39,600	43,560	47,916	52,708
Depreciation		10,000	10,000	10,000	10,000	10,000
Total	50,000	749,000	822,900	904,190	993,609	1,091,970
Accumulated Cost of existing system		799,000	1,621,900	2,526,090	3,519,699	4,611,669
Cost of Computerized System	400,900					
Development Cost:						
Operating Cost:						
Personnel:						
Manager		144,000	158,400	174,240	191,664	210,830
Staffs		252,000	277,200	304,920	335,412	368,953
Office Supplies &						
Miscellaneous Cost:						
Office Supply Cost		12,500	13,750	15,125	16,638	18,301
Maintenance Cost		10,000	11,000	12,100	13,310	14,641
Utility Cost		15,000	16,500	18,150	19,965	21,962
Internet Monthly Service		20,000	20,000	20,000	20,000	20,000
Miscellaneous		18,000	19,800	21,780	23,958	26,354
Depreciation Cost:		60,000	60,000	60,000	60,000	60,000
Total	400,900	531,500	576,650	626,315	680,947	741,041
Accumulated Cost of Proposed system		932,400	1,509,050	2,135,365	2,816,312	3,557,353
COST DIFFERENCE		133,400	- 112,850	- 390,725	- 703,388	-1,054,316

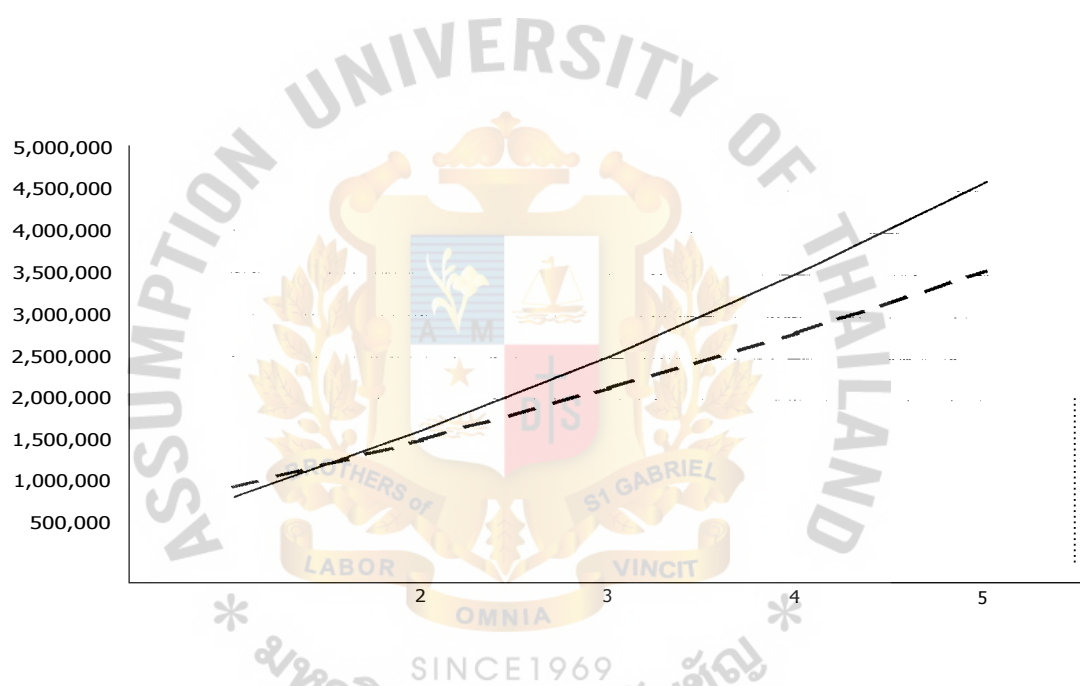


Figure F.2. Break-Even Point of Candidate 3.

Table F.3. Payback Period Analysis of Candidate 1.

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Development Cost:	- 377,900					
Annual Operating Cost:		- 531,500	- 576,650	- 626,315	- 680,947	- 741,041
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted costs (adjusted to present value):	- 377,900	- 474,630	- 459,590	- 445,936	- 433,082	- 420,170
Cumulative time-adjusted costs over lifetime:	- 377,900	- 852,530	- 1,312,120	- 1,758,056	- 2,191,138	- 2,611,308
Benefits derived from operation of new system:	0	924,500	1,016,950	1,118,645	1,230,510	1,353,560
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted benefits (adjusted to present value):	0	825,579	810,509	796,475	782,604	767,469
Cumulative time-adjusted benefits over lifetime:	0	825,579	1,636,088	2,432,563	3,215,167	3,982,636
Cumulative lifetime-adjusted costs + benefits:	- 377,900	- 26,951	323,968	674,507	1,024,029	1,371,327

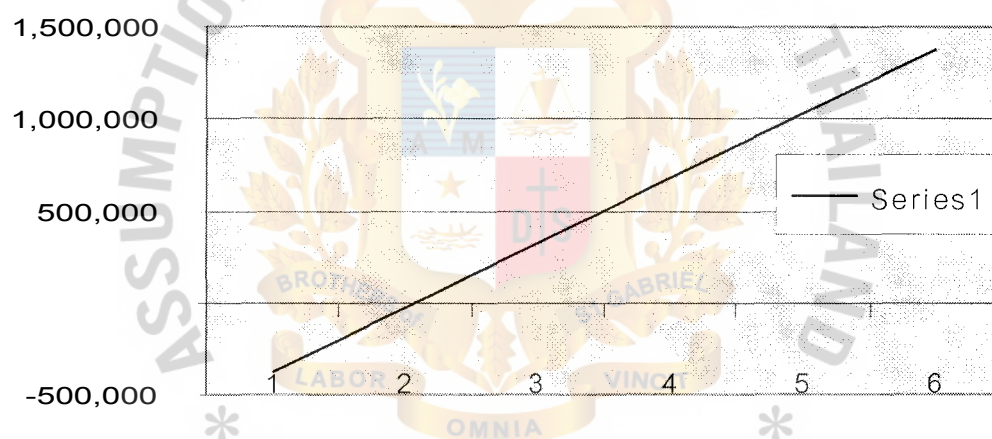


Figure F.3. Payback Period for Candidate 1.

Table F.4. Payback Period Analysis of Candidate 3.

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Development Cost:	- 400,900					
Annual Operating Cost:		- 531,500	- 576,650	- 626,315	- 680,947	- 741,041
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted costs (adjusted to present value):	- 400,900	- 474,630	- 459,590	- 445,936	- 433,082	- 420,170
Cumulative time-adjusted costs over lifetime:	- 400,900	- 875,530	- 1,335,120	- 1,781,056	- 2,214,138	- 2,634,308
Benefits derived from operation of new system:	0	924,500	1,016,950	1,118,645	1,230,510	1,353,560
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted benefits (adjusted to present value):	0	825,579	810,509	796,475	782,604	767,469
Cumulative time-adjusted benefits over lifetime:	0	825,579	1,636,088	2,432,563	3,215,167	3,982,636
Cumulative lifetime-adjusted costs + benefits:	- 400,900	- 49,951	300,968	651,507	1,001,029	1,348,327

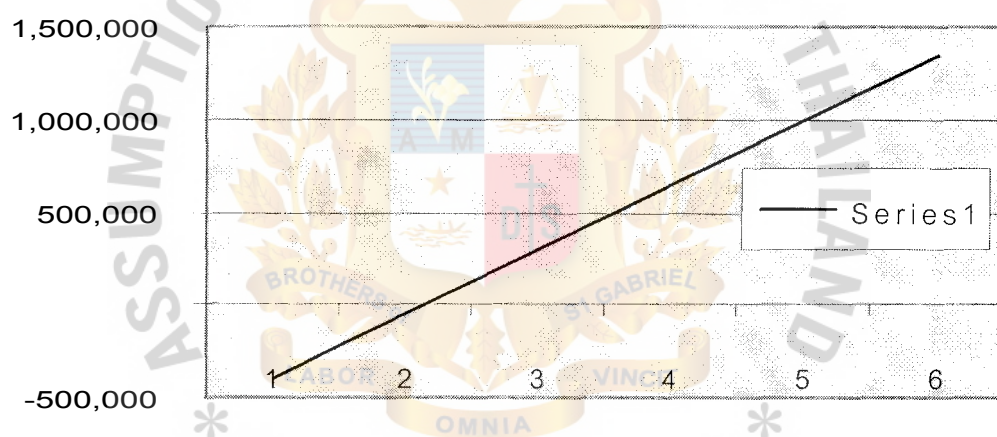


Figure F.4. Payback Period for Candidate 3.

Table F.5. Return on Investment Analysis.

	Candidate 1	Candidate 2	Candidate 3
Estimated lifetime benefits:	3,982,636	3,982,636	3,982,636
Estimated lifetime costs:	2,611,308	2,686,308	2,634,308
Return on investment (baht)	1,371,328	1,296,328	1,348,328
Return on investment (%)	52.51%	48.26%	51.18%

* All are time-adjusted values



Ndal tÖglagefilig d tiedVy

file Edit View Favorhes fools Help



[Company Profile](#)
[Group of Companies](#)
[Product Catalog](#)
[Order Products](#)
[General Inquiry](#)
[Contact Us](#)



Product Order - Order Information

Order Seq.	Product No.	Product Name	Unit Price	Ordered Units	Tot al Amount
1 1	Machine 1	M00000X1	1200000	1	200000
2	:Machine 2	J>0.M. 000(2	i200000	1	200000
3	il3vlachine 3	3	i200000 i	1	2000001
4 i	(Machine 4	J 700000000(4	:200000 I	1	200000'
i	(Machine 5	J X0000 5	200000 i	1	200000
Total Amount					100000011'i
Net Amount)0000000(

Payment Information

Type Of Payment: ☒ Cash ☐ Check (1' Credit Term

Conditions

Figure G.1. Sales Order Web Interface.

Sales Order Menu
X

5salesOrder
Customer Inventory Suppliers PO Report Helps

Purchasing Information

Order No

Order No

Customer Name

Sales Person

Purchasing

Payment Details

Order Date

Paid by

☒ Cash ☐ t^ .Check

☐ Credit Term

☐ Others

Seq.	Product Name	Quantity	Total
1	125353 Machine 1	2	2500000
2			
Total			

?

Please contact Programmer if there are
ny trouble with the use of application by
the tel no. zzzmoc

Figure G.3. Sales Order Menu.

Customer Menu

SalesOrder Customer Inventory Suppliers PO Report Helps

Customer ID

Customer Name

Billing Address

Shipping Address

Address

Tel.

Fax.

E-Mail

Customer Order History

Seq.	Order No.	Payment	Credit Allowance	Balance
1				
2				

Send E-Mail I EDIT Delete Update

Figure G.4. Customer Menu.

Inventory Menu

SalesOrder
Customer
Inventory
Suppliers
PO Report
Helps

Product ID 1

Product Nam

Product Description

Avialability

No. Of Stock 10

At Date 19/11/00

At Time 12.44 p.m.

Reorder

Unit Price 1-

Change Unit Price (Require Password)

EDIT

Delete

Update

Figure G.5. Inventory Menu.

Supplier Menu

SalesOrder Customer Inventory Suppliers PO Report Helps

Supplier ID

Supplier Name

Address

Address

Tel.

Fax.

E-Mail I

Purchasing History

Seq.	PO Date	PO No.	Amount	Credit Allowance
1				
2				

EDIT Delete Update

Figure G.6. Supplier Menu.

BIBLIOGRAPHY

1. Adams, Dennis A. and James R. Mensching. Managing an Information System. New Jersey, USA.: Prentice-Hall, Inc.1991
2. Denzle R., David R. and Steven Melnyk. Operation Management: A Value-Driven Approach. Missouri, USA.: McGraw-Hill Inc.,1996.
3. Kndall, Kenneth E. and Julie E. Kendall. System Analysis and Design. Englewood Cliffs, New Jersey, USA.: Prentice-Hall International Inc.,1995.
4. Laudon, Kenneth C. and Jane P. Laudon. Management Information System, Fourth Edition. Ohio, USA.: Prentice-Hall, Inc., 1996.
5. Lomis, Mary E. S. Data Management and File Structure. London, Great Britain: Prentice-Hall International Inc.,1989.
6. McLeod, Raymond, Jr. System Analysis and Design: An Organizational Approach. Forth Worth: Ohio, USA.: Dryden Press, 1997.
7. Senn, James A. Analysis & Design of Information System, Second Edition. Singapore: McGraw Hill Inc., 1989.

St. Gabriel's Library