



Project Management System for Outsource Intelligence Software Co., Ltd

by

Ms.Porsip Wattanasin

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

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

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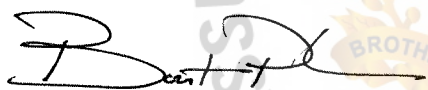
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The Graduate School of Assumption University has approved this final report of the three-credit course, CS 6998 System Development Project, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer Information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

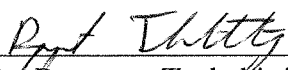
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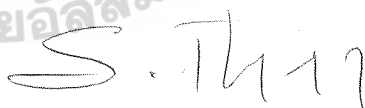
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ABSTRACT

Outsource Intelligence Software Co., Ltd (OIS) is the outsourcing company which support customer in Information Technology project. Each project will based on customer and have its own project manager. The most important goals are to ensure the correctly and up-to-date information and report for tracking activity daily to management team. This information use to analyze workload for each staff under each project. This study covers analysis, design and implementation of Project Management System of outsourcing project.

Object-Oriented Systems Analysis and Design is applied to the proposed system, which includes scope definition, problem analysis, requirement analysis, system design, construction and testing and installation and delivery. To gain a better understanding of the new system requirements, the functional models are drawn to depict the system specification. For each process, many models are applied such as Data Flow Diagram, Functional Modeling, Structural Modeling, Behavioral Modeling, Entity Relationship Diagram, Feasibility study, Candidate Matrix Analysis, Cost and Benefit Analysis, etc.

With the proposed system, it will use a computerized system with client/server architecture. All data will be kept in database using SQL Server database. The application is developed by using Visual Basic.Net with a user-friendly interface. Information can easily be retrieved in a short time. Documents and reports preparation can also be prepared in less time. It solves the problem of the Existing System and provides better information support for management.

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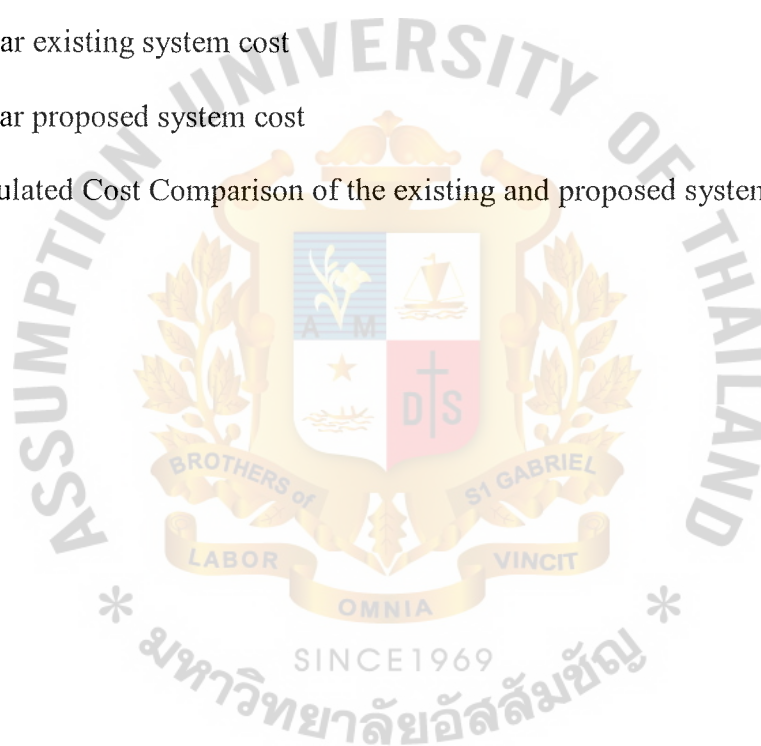
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I. INTRODUCTION

1.1 Background of the Project

Outsource Intelligence Software Co., Ltd (OIS) is the outsourcing company which supports customers in Information technology projects. Each project will be based on customer and have its own project manager.

OIS needs the new system to facilitate the working process according to project basis and support tracking performance appraisal in management system. Project Management System (PMS) is the system that will be created for supporting this operation. OIS desires to track task of staff in projects that are responsible for the Project Leader, System Analyst, and Quality Assurance. Project Management System (PMS) will serve customers to track the daily activities of the outsourcing and estimate the performance that affects to business planning and decision support system with reports from the system.

With OIS Outsourcing Services, clients can benefit by improving business processes, core business focus, cost control, technical specialization and quality services. Within the Outsourcing scope of services, OIS can provide customized services for IT Help Desk Support, Desktop Management Services, Hardware Maintenance Services, and Network Services.

So, the project management system will be developed to provide the efficiency and effectiveness for the organization's working system and reduce time for gathering each task detail such as task date, project, time and participant staff. It is paperless, faster and more accurate. Moreover, it will help the management level to do the strategic planning for the organization with the various kinds of reports provided by this system

The system will operate on Windows System that is implemented by Microsoft Visual Basic.NET Application.

1.2 Objectives of the Project

The objectives of the project management system are as follows:

- To study and analyze problems the existing Project Management System.
- To find out the solutions for those problems.
- To increase productivity in accordance with objectives and goals of the company.
- To improve the efficiency and effectiveness of the company and reduce costs in regards to elimination of the problems identified in existing system.
- To develop and test the software package for the information of the system developed by software package called Microsoft Visual Studio.NET.
- To design the Project Management System that is suitable and effective to the work processes of the organization, based on all requirements both functional and non-functional requirements specified by users.

1.3 Scope of the Project

The existing system of the project management system is based on a manual and partially computerized system. Most of the data are stored on paper or individual machine in the form of Microsoft Excel and Microsoft Word. It requires many Administrators to collect and analyze information into usable format for presenting performance to staff. The existing system will occur with problem of human and loss of paper.

The new proposed project management system will be developed to replace the existing system. This system is design to reduce human errors, provide real time system and reports to the management. The advantage of the proposed system is accuracy, a

faster process to provide convenience to the organization. The proposed system also reduces the number of Administrators, reduces the number of errors, increases the number of customer contracts and decreases maintenance costs.

After studying and analyzing of the existing system by identifying the user's requirements and possible solutions for each problem, this project has the ability to handle the following tasks:

1. Operate Daily Tasks (Add, Edit, Delete and Search).
2. Operate Project information: Schedule Plan, Project Team, Contract Point and Customer. (Add Edit, Delete and Search).
3. Real time checking tasks.
4. Show detail daily tasks.
5. Generate weekly/monthly performance reports.
6. Generate weekly/monthly detail report per project.
7. Generate weekly/monthly summary report per project.
8. Present performance of staff compare with project schedule plan.

The Project Management System (PMS) is the software implementation project which is developed on Microsoft Visual Basic versic.NET. This project has the main purpose in the management system based on the project for everyone in the project team. The management and human resource department will see the reports from the system and report to customer; the staffs will entry their task in to the system, sale representative will use the data from the system to analyze and present to the customer.

1.4 Deliverables

At the end of this project, deliverables of the proposed project management system will include:

1. Hardware Specification

2. Software Specification
3. Network Diagram
4. Functional Models
5. Structural Models
6. Behavioral Models
7. Input and Output Design
8. Cost and Benefit Analysis
9. Test Plan
10. Conversion Plan

1.5 Project Plan

System Request – Project Management System

Project sponsor: Project Manager

Business Problems:

1. There are human errors in gathering tasks so it leads to inaccurate details with actual tasks.
2. Project Leader cannot manage and control the performance of staff.
3. Customers cannot get actual report of outsourcing project

Business Need:

The project has been developed to track task performance to satisfy and provide convenience for the project manager, Human Resource Department and Customers.

Business Value:

The company expects that the system will increase sales volume and contracts by tracking performance of projects team and improve services which will reduce customer complaints and improve customer satisfaction.

- Accuracy in tasks tracking.
- Satisfy customer requirements.
- Create customer reliability for outsourcing project development.
- Add value for customers to make contracts with the company.
- Create Reports to keep tasks and calculate the performance for present existing users and expected users.

Special Issues or Constraints:

1. The Sales Department will simply manipulate the data and help them to make customer decisions.
2. The system will help the organization in data sharing; therefore human resource can access data to cross check the sales department can access data to check and present customers the performance of each project.

The project plan of the proposed project management system takes around 4 months. From the project schedule, it can be divided into:

1) Analysis of the existing system and requirement analysis

At the beginning, the company will define the objective and scope of the project management system first. Next we will study the existing system and define the problem. Then we will create project initiation and gather user requirement. Then we will study the work process, hardware and software system of the existing system in order to understand how the current system is working in the organization. Then, we will do the cost and benefit analysis to compare between the existing and the proposed system.

2) Analysis and design of the proposed system

In this process, the company will use the information from the first process to analyze and design the new proposed system. We will analyze the existing system and

prepare to design functional models, structural models, and behavioral models for the new proposed system. This also includes the input and output design of the new proposed system.

3) Implementation of the proposed system

After analyzing and designing the new system, it is ready to build the application in this process. The company will start to develop the application and then after that we will start the test phase. We will implement the system by software and hardware installation, create end-user and operation manual, training and support after implementation. This project plan of Project Management System is given in Figure 1.1



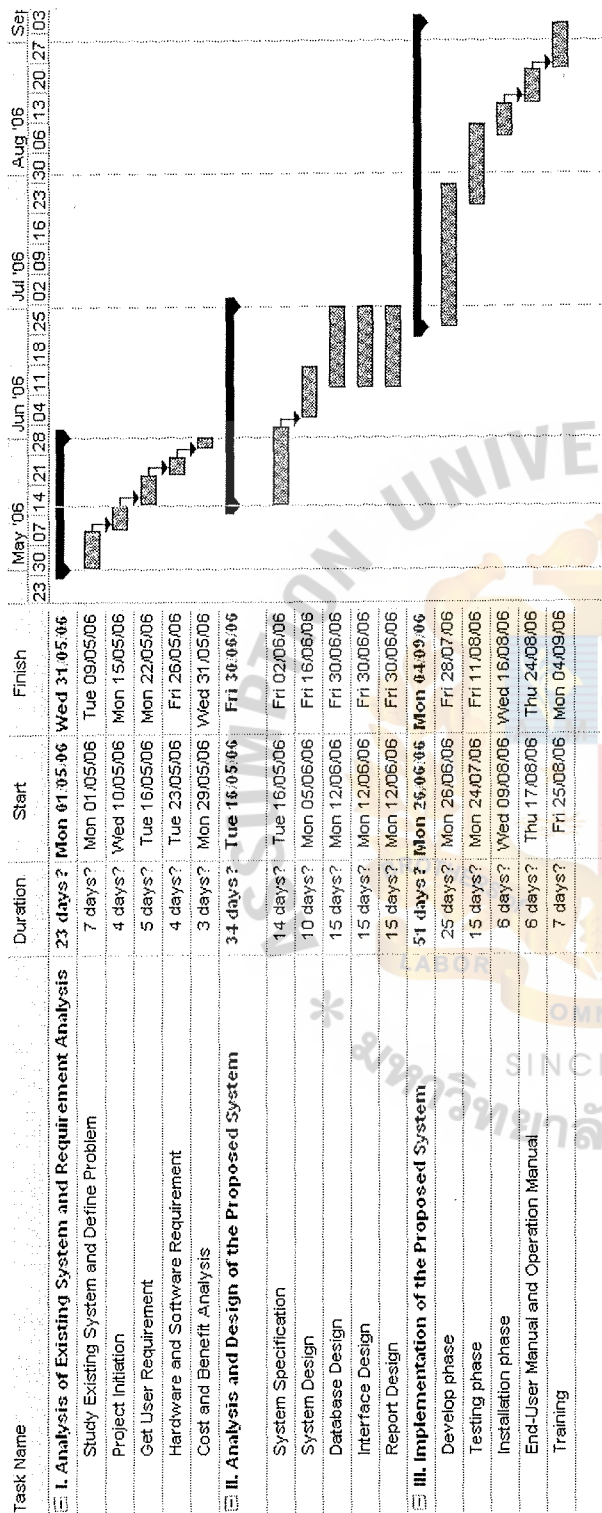


Figure 1.1. Project Plan of Project Management System.

II. THE EXISTING SYSTEM

2.1 Background of the Organization

Outsource Intelligence Software Co., Ltd (OIS) is the outsourcing company which supports customers in Information Technology project. Each project will be based on customers and have its own project manager. The project work with their customers is done by contract basis.

In working, they have many options for the customer. They develop and support the project for that in IT administrator. The company provides staff and consultants in specific projects that customers need. They have expert staff in IT Administration and Engineering to support customers by man-power or by man-month. OIS has standards to track performance of staff by recording task at work time to present customers for each project.

The mission is to combine services to satisfy the customer. The customers need not hire other outsourcing companies to work on the existing line of service. The company will serve them by focusing on the premium service quality.

There are four major departments are as follows:

(1) Human Resource Department

Human Resource Department is responsible to set up employee welfare, payroll hiring new work force and also responsible in Administration activity inside the organization.

(2) Sales Department

Sales Department is responsible in setting up and approaching the target market, and also set the sales strategy.

(3) System Integration Department

System Integration Department is responsible to provide software products and support to customers.

(4) System Engineering Department

System Engineering Department is responsible to provides customized services for IT Helpdesk Support, Desktop Management Service, Hardware Maintenance Services, and Network Services.

The organization structure of Outsource Intelligence Software Co., Ltd is shown in Figure 2.1 Organization Chart

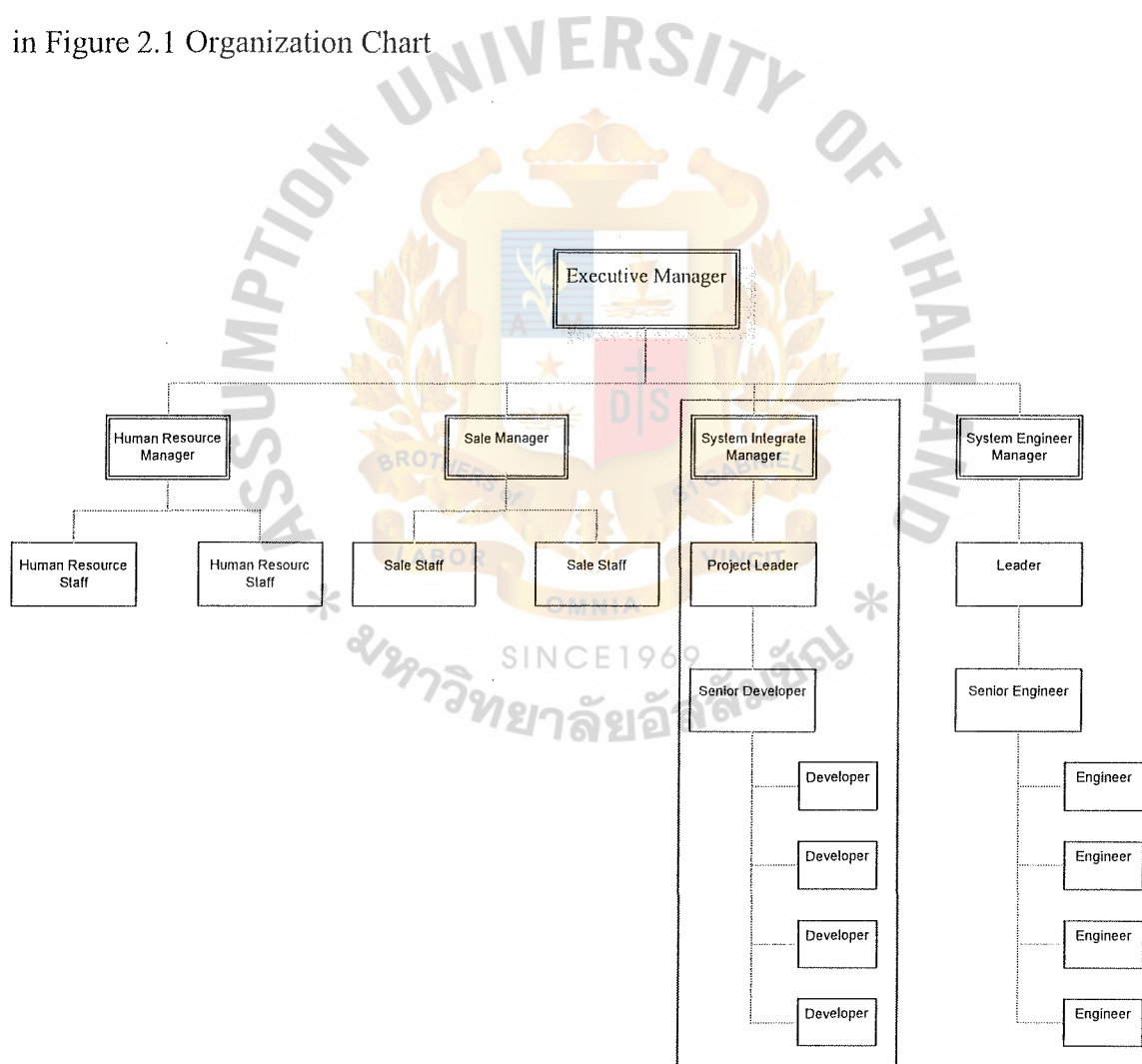


Figure 2.1. Organization Chart

2.2 Business Functions and Operations

The existing business working processes is partially computerized. It can be summarized as follows:

Process 1: Project Description System

The contract has been signed by the customer; Project manager will inform the customer about project description to assign staff to the project first. Project description includes responsibility, contract period, expense, contract point, participant staff and information of the project.

Process 2: Task System

After the teams are formed and the project is initiated, they will assign each job to system analyst and programmer. System analyst will use Microsoft Project to create the project schedule for each job based on project. Programmers will use Microsoft excel to collect task description into the file server every work day

Process 3: Report System

All daily task description and project information will be consolidated into the report and sent to the management team and customer to review the progress and performance of all job done. Report is used for Human Resource Department and sale representative to evaluate and analyze profile of employees.

The existing business function of the organization can be draw in the context data flow diagram as Figure 2.2 Existing Context Data Flow Diagram

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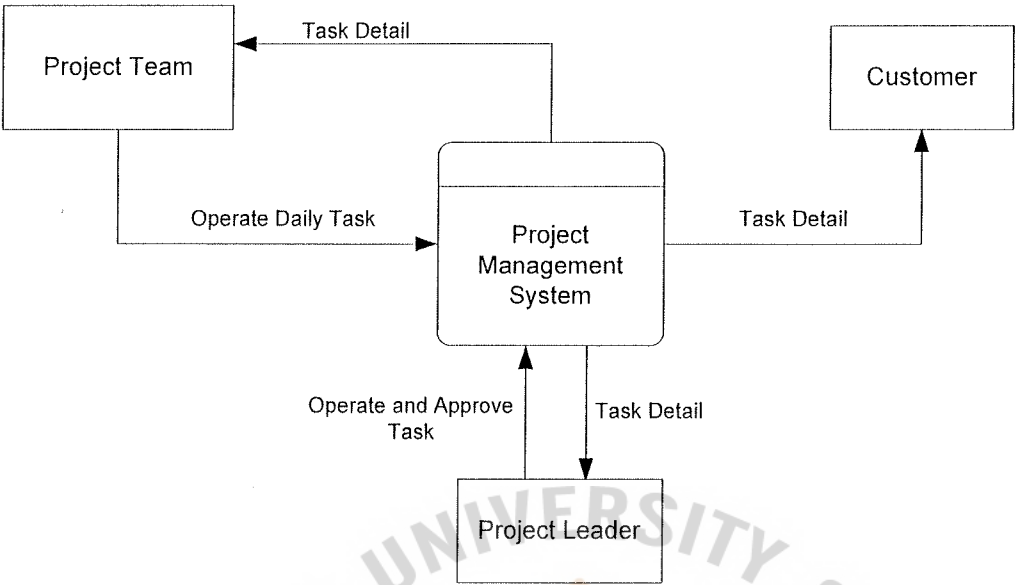


Figure 2.2. Existing Context Data Flow Diagram

2.3 Current Problems and Areas for Improvement

2.3.1 Problems

Problems which can be found in the existing system are divided into 3 main areas.

Problem in Job Control Management

- 1) Difficult to track the status and detail of each job. Project Manager cannot track the status of the job and how many job that handle by each staff.
- 2) Difficult to enter the tasks and details of each job. Staff cannot enter the tasks of job to achieve the timescales that related with the workload of each staff.
- 3) Difficult to track the approved tasks. Project manager cannot track the approved task immediately.
- 4) Delay to present the report to customer. Project manager cannot present the detail/summary or performance of project to customers immediately that causes a delay in reports to customers and affect the billing of each project.

Problem in People Control Management

- 1) Difficult to know the overall working time table of all jobs which are taken by each staff. This issue can cause internal communication inefficiency within the organization.
- 2) Do not know the responsible tasks taken by each staff. Project manager cannot get the information of job done by each staff. Then the Project manager or sales representative may assign project to each staff that have knowledge and skill.
- 3) Difficult to control the task of each staff. No history record of tasks which are done by each staff. This may give the distorted view of staff's performance.

Problem in Document Control Management

- 1) Need paper in approval system. Existing manual approval system wastes paper and time.
- 2) Waste of space to keep documents and difficult to find the documents when needed.
- 3) Redundant documents because documents are created by individual staff. The most recent updated document becomes the problem issue.
- 4) Wastes time to create reports for management team. Because all information that from many sources makes it more difficult in generating reports for management team.
- 5) Lack of tools for analyzing and categorizing information and reports.
- 6) Risk losing documents. Each staff will kept documents that may be lost.
- 7) No standard documents which make it difficult to analyze and categorize data into usable information.

2.3.2 Areas of Improvements

- 1) The new proposed project management system helps the organization reduce human work time and save paper.
- 2) The collection of data is more systematic with a fast tracking system.
- 3) The reports are more in usable format. The new proposed project management system provides more system view to see existing data. They are reliable and accurate information.
- 4) Reduce human errors.
- 5) There is the opportunity to integrate the data from the project management system to the human resource and sales department in the future.

2.4 Existing Computer System

The existing computer system in the organization is based on client-server technology. The company has servers in head office and site office to allow staff to keep the information and program as a file server.

Each staff has individual computer either computer desktop or notebook. Staff who work at customer site will have notebook computers. The application that everyone will have and be familiar the computer is the Microsoft Office Application.

For network architecture in the existing system, the working procedure of the organization is based on each branch office or customer site. Only some applications are centralized. The servers on each location are connecting through leased line via a router. All documents will be kept in the servers.

In a three-tier environment, a separate computer (application server) performs the business logic, although some part may still be handled by the user's machine. The application server in a three-tier client/server environment provides middle tier processing between the user's machine and the database management system (DBMS). The network system is shown in the Figure 2.3 Existing Computer System

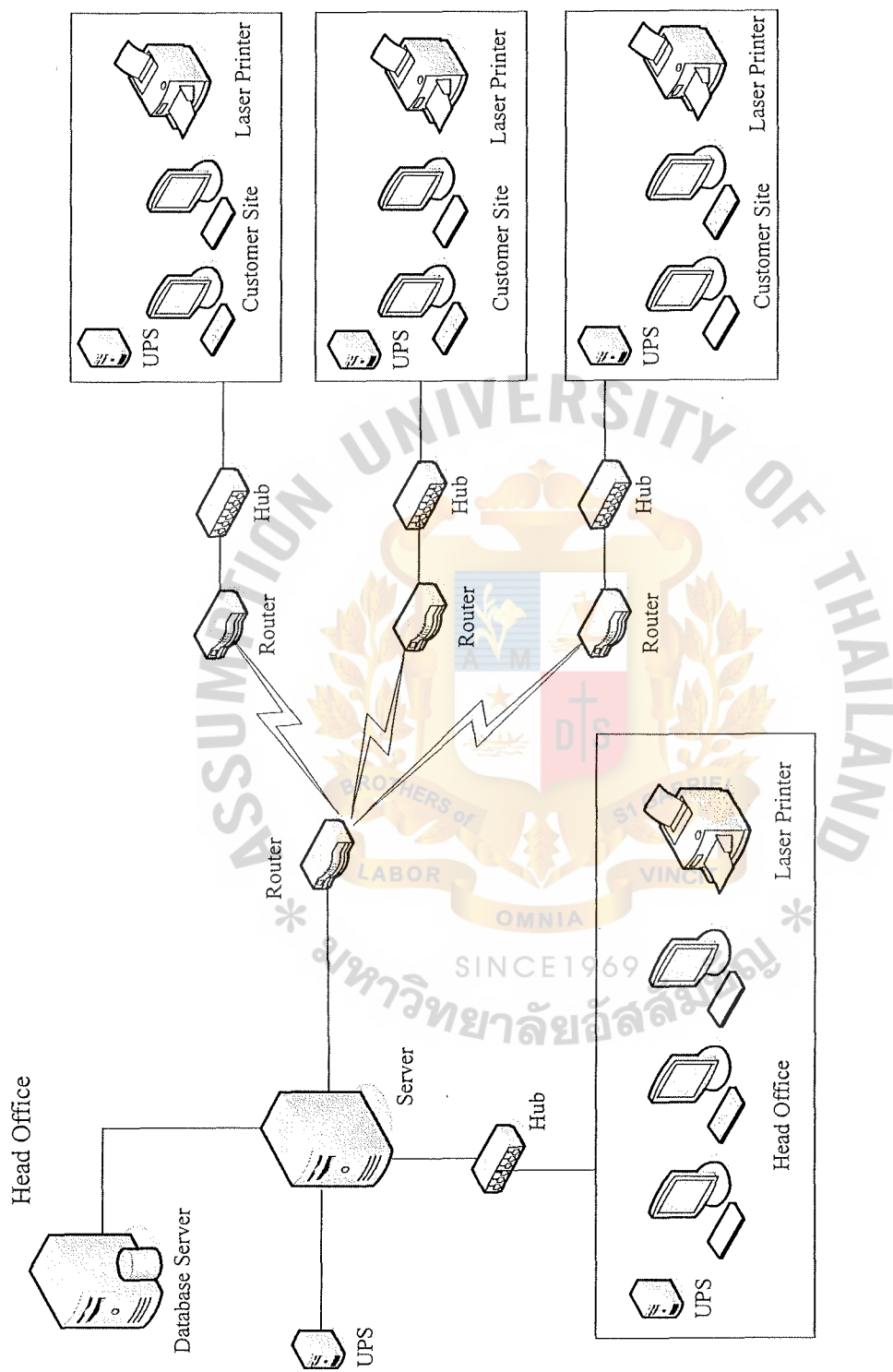


Figure 2.3. Existing Computer Configuration

III. THE PROPOSED SYSTEM

3.1 Requirements Analysis

3.1.1 Functional Requirements

Currently, the manual system is used for handling all tasks in the project. The staff will use the MS Excel, MS Word and MS Project in creating the documents.

The basic requirements of the users towards the system are included:

- The system can manage all tasks of the project which integrate the project management, task management and performance management.
- The system can operate all tasks/project description (Add, Edit, Delete)
- The system can operate customer information (Add, Edit, Delete)
- The system will keep all documents in the file server for all staff and management team.
- The approval system of all documents must be integrated into this system.
- The project manager and all staff can view all detail information of each project or each staff from this system.
- The system will produce different types of reports for different purposes.
- The system will calculate the performance of each project or each staff.

3.1.2 Non-functional Requirements

The Project Management System has to be able to support the following functions:

- The system will be able real time system.
- System will be able to authorize to entry the system.

- System should provide security to prevent unauthorized access to the documents.

3.2 System Design

3.2.1 Functional Modeling

Functional Modeling models describe business process and the interaction of an information system with its environment. In object-oriented system development, two types of models are used to describe the functionality of an information system: activity diagrams and use cases. Activity diagrams support the logical modeling of business processes and workflows. Use cases are used to describe the basic functional modeling as a means to document and understand requirements, and to understand the functional or external behavior of the system. It will be shown in the APPENDIX B: FUNCTIONAL MODELING

From use case diagram, there are eight use cases which are:

Use case 1: Manage Daily Task

This use case describes how the staff or manager can view daily task, enter daily task, edit the task detail and delete the daily task.

Use case 2: Manage Job Profile

This use case describes how the staff or manager can view job profile, enter job profile, edit the job profile detail and delete the job profile.

Use case 3: Manage Project Profile

This use case describes how the staff or manager can view project profile, enter project profile, edit the project profile and delete the project profile.

Use case 4: Manage Customer Profile

This use case describes how the staff or manager can view customer profile, enter customer profile, edit the task detail and delete the customer profile.

Use case 5: Approve Task

This use case describes how managers can approve the task.

Use case 6: Unapproved Task

This use case describes how managers can create unapproved tasks.

Use case 7: Print Detail/Summary Report

This use case describes how the staff or manager can print detail/summary reports.

Use case 8: Print Performance Report

This use case describes how sales staff or manager can print performance reports.

3.2.2 Structural Modeling

Structural model describes the structure of the data that supports the business process in an organization. During the analysis phase, the structural model presents the logical organization of data without indicating how the data are stored, created, or manipulated so that analysts can focus on the business without being distracted by technical details. Later, during the design phase, the structural model is updated to reflect exactly how the data will be stored in databases and files. It will be shown in the APPENDIX C: STRUCTURAL MODELING

3.2.3 Behavioral Modeling

Behavioral models describe the internal dynamic aspects of an information system that supports the business processes in an organization. During the analysis phase, behavioral models describe what the internal logic of the processes is without specifying how the processes are to be implemented. Later, in the design and implementation phases, the detailed design of the operations contained in the object is fully specified. It will be shown in the APPENDIX D: BEHAVIORAL MODELING

3.2.4 Data Modeling

Data Modeling is a technique of organizing and documenting a system's data. Data modeling is depicted in a graphical diagram, which is called an entity relationship diagram or ERD. There are three levels of entity-relationship diagram: context data model, key-based data model and fully attributed data model. The data model is also analyzed into the third normal form of database system concepts. It will be shown in APPENDIX A: DATAFLOW DIAGRAM and APPENDIX E: ER DIAGRAM

3.2.5 Database Design

Database Design is a technique for designing the database that will be used in the system. From ER diagram, we have already known the total entities and relationship of data in the proposed system. Each field (data) inside each entity will be mapped into tables and design the relationship of each table by using the primary and foreign key according to their relationship. The database will be shown in APPENDIX F: DATABASE TABLES

3.2.6 User Interface Design

Based on the functional modeling, we will know the data movement in the system. The process modeling will help us to create input required for the system. Input specifications have been derived from user requirement. It will shown in the APPENDIX G: USER INTERFACE DESIGN

3.2.7 Output Reports

Based on the functional modeling, Output specifications have also derived from user requirements. It will shown in APPENDIX H: OUTPUT REPORTS

3.3 Analysis of Candidate Solutions

The business requirements for an improved information system, we can finally address how the new proposed system including computer-based alternatives might be implemented with technology. The purpose of the decision analysis phase is to identify candidate solutions, analyze those candidate solutions, and recommend a target system that will be designed, constructed, and implemented.

To do the feasibility analysis, the candidate system matrix will be used for identifying candidate system solutions and analyze those solutions for feasibility. The criteria in the candidate system matrix below will be used for comparing the candidate system.

- Candidate number one is an alternative of the software application package.
- Candidate number two is an alternative of the new application development which is developed by MS Access.
- Candidate number three is an alternative of the new application development which is developed by Visual Basic.NET application with MS SQL server.

The candidate system matrix, Payback Analysis and Net Present Value (NPV) for three candidate will be shown in the APPENDIX I: COST ANALYSIS OF CANDIDATE SOLUTIONS and the Payback Analysis and Net Present Value (NPV) for candidate 3 is shown in the Table 3.1, 3.2 and Figure 3.1

Table 3.1. Payback Analysis (Candidate3) in Baht

Cash Flow Description	Years					
	0	1	2	3	4	5
Development Cost	-1,700,000					
Maintenance Cost	-	-20,000	-20,000	-20,000	-20,000	-20,000
Discount factor for 12%	1	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost (adjusted to present value)	-1,700,000	-17,860	-15,940	-14,240	-12,720	-11,340
Cumulative time-adjusted costs over lifetime	-1,700,000	-1,717,860	-1,733,800	-1,748,040	-1,760,760	-1,772,100
Benefits derived from operation of new system	0	900,000	990,000	1,089,000	1,197,900	1,317,690
Discount factor for 12%	1	0.893	0.797	0.712	0.636	0.567
Time-adjusted benefits (current of present value)	0	803,700	789,030	775,368	761,864	747,130
Cumulative time-adjusted benefits over lifetime	0	803,700	1,592,730	2,368,098	3,129,962	3,877,093
	0	1	2	3	4	5
Cumulative lifetime Time-adjusted costs + Benefits	-1,700,000	-914,160	-141,070	620,058	1,369,202	2,104,993

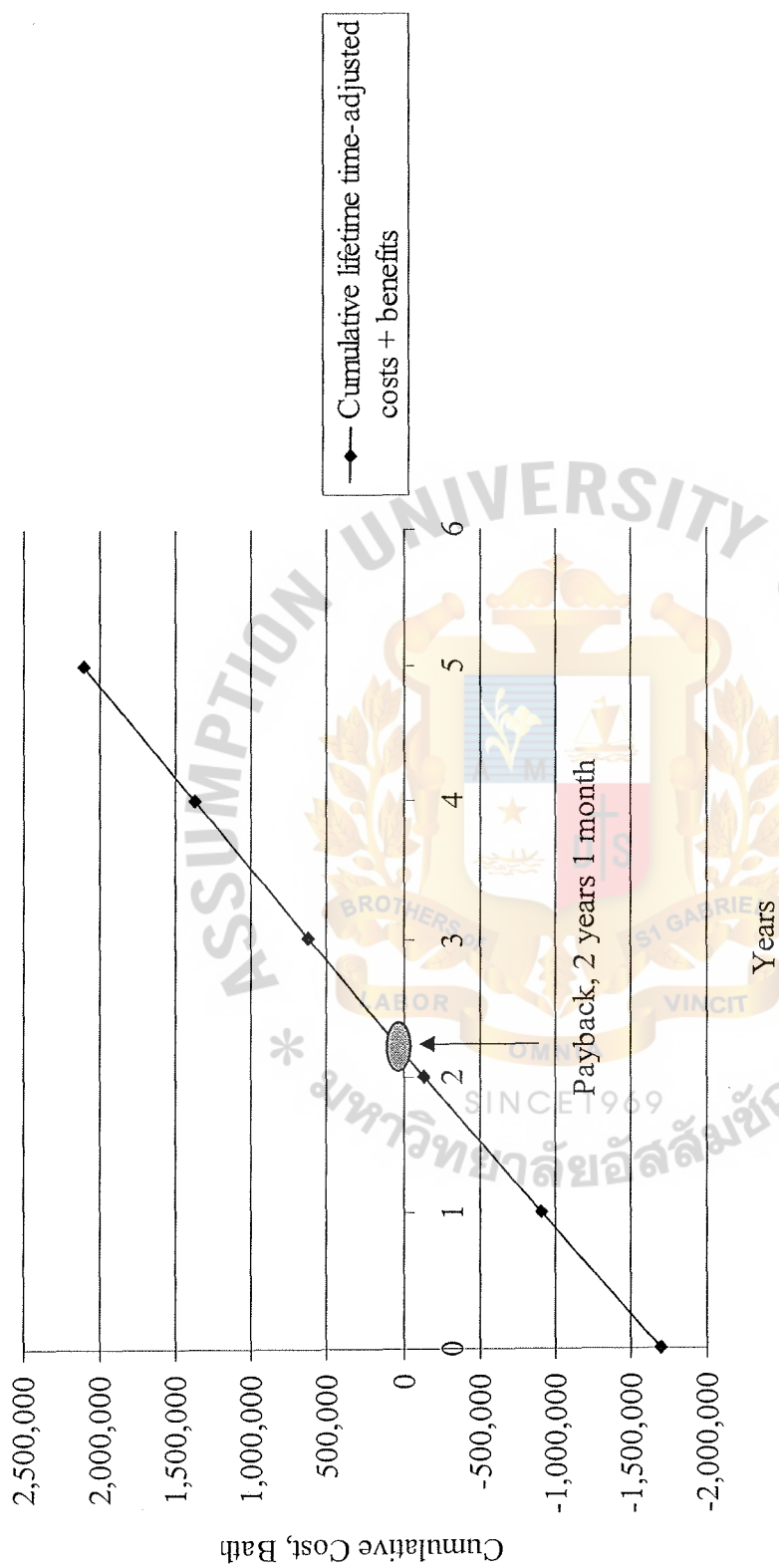


Figure 3.1. Payback Analysis (Candidate3)

Table 3.2. Net Present Value Analysis (Candidate3)

Cash Flow Description	Years						Total
	0	1	2	3	4	5	
Development Cost	-1,700,000						
Maintenance Cost	-	-20,000	-20,000	-20,000	-20,000	-20,000	
Discount factor for 12%	1	0.893	0.797	0.712	0.636	0.567	
Present Value of Annual costs	-1,700,000	-17,860	-15,940	-14,240	-12,720	-11,340	
Total present value of lifetime costs							-1,772,100
Benefits derived from operation of new system	0	900,000	990,000	1,089,000	1,197,900	1,317,690	
Discount factor for 12%	1	0.893	0.797	0.712	0.636	0.567	
Present value of annual benefits	0	803,700	789,030	775,368	761,864	747,130	
Total present value of Lifetime benefits							3,877,093
NET PRESENT VALUE OF THIS ALTERNATIVE							2,104,993

In conclusion, after analyzing and ranking, From Table 3.3 Feasibility Analysis Matrix illustrated below, the candidate 3 is selected as it provides the best benefits to the system and organization with the details as follows:

Operational Feasibility

The candidate number three will be more competitive as it is the custom design application which will be suitable with the organizational need. The candidate number two is the custom design application but will not be flexible with the organizational need.

Technical Feasibility

The candidate number three will be more competitive because it is suitable and flexible to implement further.

Economic Feasibility

The candidate number two has the least cost and Payback analysis than candidate number three, but for the Net Present Value, the candidate three has the most value.

Schedule Feasibility

As candidate number one is the software application package, the implementation time will be less than the other candidates which are custom developed.

Table 3.3. Feasibility Analysis Matrix (APPENDIX I)

Feasibility Criteria	Weight	Candidate 1	Candidate 2	Candidate 3
Operational Feasibility Functionality.	30%	Only supports the basic functions and operations of Project management system requirements and current business processes would have to be modified to satisfy required functionality.	same as candidate 1	Fully supports user's required functionality
Political.		The system needs more training to all stakeholders as it is the ready made application which has the specific function as standard.	The system will be accepted by all stakeholders easily as it is design specifically for organization.	Same as Candidate 2
		score: 75	score: 75	score: 100

Table 3.3. Feasibility Analysis Matrix (Continued)

Feasibility Criteria	Weight	Candidate 1	Candidate 2	Candidate 3
Technical Feasibility Technology.	30%	Project Software Package has only been on the market 1 year. Maturity of product is a risk and company charges an additional monthly fee for technical support.	Microsoft Office has been used as the standard application for the organization. But Microsoft Access is not flexible program.	Microsoft Visual Basic.NET is famously and effectively language for developer. So, The technical team is familiar with visual basic language.
Expertise.		Required to hire or train VB expertise to perform modifications for integration requirement.	Required to train MS Access and Macro expertise.	Same as candidate 1
		score: 70	score: 60	score: 90

Table 3.3. Feasibility Analysis Matrix (Continued)

Feasibility Criteria	Weight	Candidate 1	Candidate 2	Candidate 3
Economic Feasibility	30%			
Cost to develop:		Approximately 2,500,000 baht.	Approximately 1,500,000 baht	Approximately 1,700,000 baht
Payback period (discounted):		Approximately 3 years 6 months	Approximately 2 years	Approximately 2 years 1 months
Net present value:		Approximately 1,088,693 baht	Approximately 2,032,462 baht	Approximately 2,104,993 baht
Detailed calculations:		See Net Present Value and Payback Analysis Table	See Net Present Value and Payback Analysis Table	See Net Present Value and Payback Analysis Table
		score: 60	score: 90	score: 85
Schedule Feasibility	10%	1-2 Months	3-4 Months	3-4 Months
		score: 90	score: 85	score: 85
Ranking	100%	70.5	76	90.5

3.4 Hardware and Software Requirements

3.4.1 Hardware Requirements

In this project, there is no need to purchase new hardware. We can use the existing hardware with the proposed project management system. The software will be implemented and installed to operate in the existing server. The clients can connect to the server through local area network of the company. Each location (Customer Site) is connected through a leased line. Each client or computer has already been installed the proposed project management system program. Moreover, is already implemented in the organization.

3.4.2 Software Requirements

In this project, there is a need for a software project so Microsoft visual studio.NET is used to develop the program. For server software there is no additional software required for this proposed system. The existing clients (either workstation or computer notebook) are already installed all necessary software application that will support the new proposed system.

3.4.3 Network Requirements

There is no additional network requirement for this proposed project as the existing network is already worked with the proposed project. But some configurations are needed to connect the server in each location through leased line of the company.

3.5 Security and Control

The security and control system helps to ensure that the system is run as planned and the errors are detected and corrected before the system has an effect. Security and control for the proposed system can be listed as follows

3.5.1 Authentication and Authorization (System Security)

To protect against unauthorized access to access the system, each user has to login with their name and password. Otherwise the system would not allow accessing the application.

3.5.2 Data Security

1) Eliminate Electric blackout

Electric blackout could accidentally damage both data and the system.

To prevent this disaster, we will use the UPS to back up the electric power and send electric power to the power supply when the electric blackout occurs.

2) Administrator Control

User will not be authorized to change the configuration and the setting of the system. The Administrator will monitor and audit the system and database to prevent any loss or damage.

3) To protect from Physical destruction

Physically, the computer system is vulnerable. The computer should be placed in a safe place that is allowed only authorized access. The application and database server should be placed in a safe place in order to avoid any physical destruction.

4) Virus Protection

Each client will install Trend Micro Office Scan Client application and will update the new pattern from the server every time the user log into the organization's server to protect virus.

5) Backup and Recovery

Database will back up and recover that use in MS. SQL Server function in order to protect if from loss of data and any harmful event. The backup information would be ready to use for system recovery anytime required.

3.6 Cost and Benefit Analysis

The principal objective of the comparison is to evaluate the break-even point of the cost and benefit of the current system and the proposed system. The break-even point represents the time when the benefit is equal to the investment cost.

In the cost analysis, there are costs associated with fixed cost and operating cost. Fixed cost includes hardware and software cost while operation costs are the cost of operating the organization. Operating cost includes salary cost and office supply & miscellaneous cost. The salary cost is expected to increase by ten percent each year. The cost that is used for comparing between existing and proposed system will be the cost that has an effect only when the new proposed system is implemented to see the actual value of the investment.

The detailed costs of existing system and proposed system, the total and accumulated cost of existing system and proposed system, the cost comparison will be shown in the APPENDIX I: COST ANALYSIS OF CANDIDATE SOLUTIONS in Figure I.12 Accumulated Cost Comparison of the existing and proposed system

Break-even analysis is the other technique that is used to see the point of time that the proposed system will start to pay back the benefit to the organization.

The cost comparison in Figure I.12 Accumulated Cost Comparison of the existing and proposed system, the break-even period of implementing the proposed system is

approximately one year one month. This is because of the decrease in the operation cost after the proposed system has been implemented.



IV. PROJECT IMPLEMENTATION

4.1 Overview of Project Implementation

Project implementation is the process of system construction and delivery of the new proposed system to the organization. The project implementation must follow the project plan or timeline that has been specified in the earlier section. The process of project implementation must include.

1) Hardware and software acquisition, development and installation. In this project, the external software development is used. The proposed system will be implemented in the existing environment of the organization. So, it needs not be acquired or install any new hardware or any software in the organization.

2) Coding

Coding is the process of developing the proposed system to the organization according to pre-specified requirements. The final output will meet the users' requirements.

3) Testing

After the program has been designed and installed, module testing, unit or program testing, and integrated testing is required to ensure that the new system has less errors and can work well with the other systems in the company. Various techniques are used for fulfilling this objective.

4) System Conversion

System conversion is the process to set up the plan for converting the existing system to the proposed system. The conversion plan is set up as a guideline. The conversion technique is applied according to their purposes.

5) Documentation and Training

Documentation and Training is the process of creating the user or technical manual and aiming for training the existing users to use the proposed system. The objective of training is to have more understanding of the proposed system.

4.2 Coding

Coding is the process of developing the proposed system by designing and creating the instructions for the system according to users' requirements, system analysis documents and system design documents. The proposed program will be developed by Microsoft Visual Studio.NET application. Developer will be developing the proposed system.

4.3 Testing

After the developed system has been coded, the next process is the testing process. The purposed of the testing is to be installed for use in the organization. The test plan is created for this testing process.

Before testing, the system analyst should prepare test case, then they will test by following the test case. Module testing would help to check errors in the program module. It can detect errors in coding and errors in logic. After finishing all modules testing, unit or program testing is used to check the program to verify the way of system is working and to check whether each module can work together or not. Integrated testing is checked to see whether the proposed system can share data or work with the other existing system properly. When all testing is finished, the testing document plans and testing results should be made, so that when the company has to do testing again in the future, programmers can use these plans and results to do the testing again.

4.4 System Conversion

Conversion is the process of changing from an existing manual system to a new proposed system. The conversion is performed according to the conversion plan, which is set up from the earlier processes.

Parallel conversion will be applied to this system. Parallel conversion is the most secure method of converting the existing system to the proposed system. This conversion operates in both the existing and proposed system for a period of time. This conversion is ensuring that before discard the old system, all problems will have been solved.

4.5 Documentation and Training

Documentation will be produced after the proposed system is fully tested and all errors are fixed. This includes the system design and user manual about the proposed system. The system design will be used by developers to refer details of the proposed system in technical term. The user manual will explain how to use the program correctly.

The user training course is an important process in system implementation. The objective of training courses is to make user understand, become familiar and be able to use the program correctly.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

This report is mostly concerned with the design of Project Management System. The existing system raises many issues and problems such as the time consumed during the operation process, is difficult to generate reports, working redundancy, etc. A new computerized system for the Project Management System is designed to replace the manual system. It is expected to provide more up date information for decision making. Moreover, it provides convenience and fast services for recording, finding data or reporting the information.

In order to analyze the major factors that have affected the process, cost-benefit analysis and uncertain events should be examined.

The proposed system costs 1, 700,000 baht for development and maintenance cost of 20,000 baht per year. The payback period of is approximately 1 year 1 month with the net present value of 2,104,993 baht. The implementation period is around 3-4 months.

For the system cost comparison between existing system and proposed system, the accumulated cost of the existing system is 8,641,288 baht while the proposed system is 5,934,166 baht. So, the break even point is around one year and one month that the net cash flow of the project will turn out to be positive value. All of these indicators indicate that this project is worth investing.

The study has proposed a new system for Project Management System. The context diagram of the proposed system demonstrates the system. The database management system also enables better point of service operation than the old process does. It provides an effective system, which increases efficiency in point of service.

After the system survey, the information has been collected in order to support the system design process. Valuable information was received from investigating, analyzing and classifying the function and activities of the operation.

The proposed system will directly benefit staff and can reduce the workload. The managers will get better reports in a more timely manner that can better facilitate their decision making and provide them with more though looks at the operation and control. In addition, customers will get better and faster reports from the staff that will create customer satisfaction.

Table 5.1. Degree of achievement of proposed system

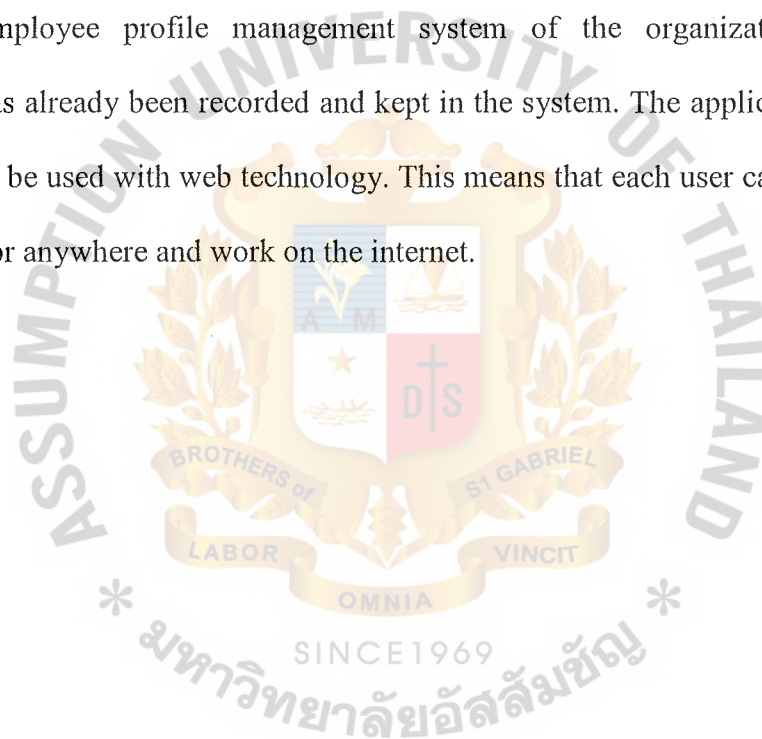
Process	Existing System	Proposed System
Create Daily Task (per task)	5 minutes	1 minute
Create Project Information (per project)	15 minutes	5 minutes
Create Customer Information (per customer)	15 minutes	5 minutes
Approve Task (per project)	10 minutes	5 minutes
Create Report (per project)	30 minutes	5 minutes

5.2 Recommendations

Information system technology plays an important role in operating the business. Most organizations may gain a competitive advantage if they apply the information system in their organization properly.

The proposed system does not only help the user to get rid of tedious tasks, but also provides efficient and effective performance of business. Data in the proposed system will be correct and perform quickly to help the management.

In the future, this system can expand the scope to cover the human resources system or employee profile management system of the organization as some information has already been recorded and kept in the system. The application can also be modified to be used with web technology. This means that each user can access from customer site or anywhere and work on the internet.





APPENDIX A

DATAFLOW DIAGRAM

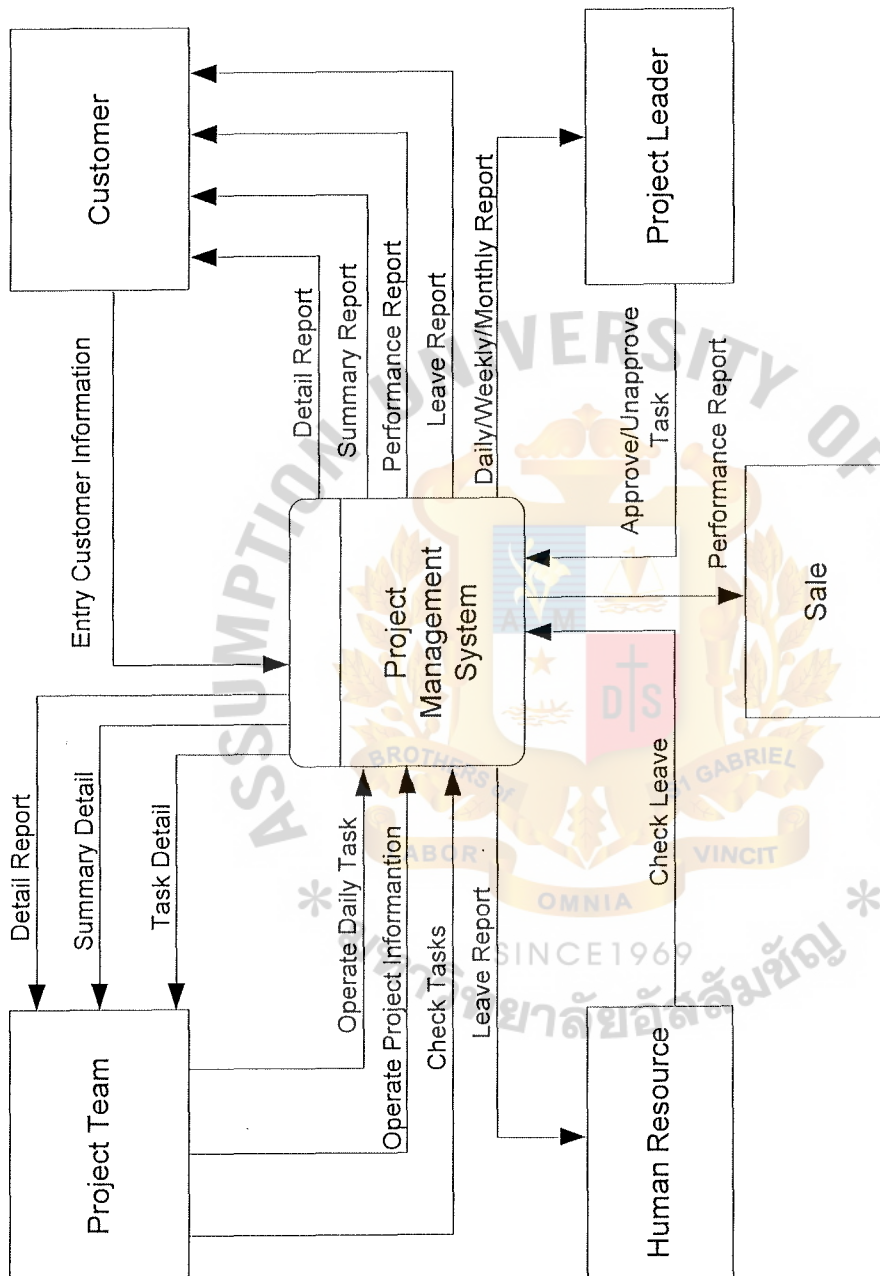


Figure A.1. Context Diagram



APPENDIX B

FUNCTIONAL MODELING

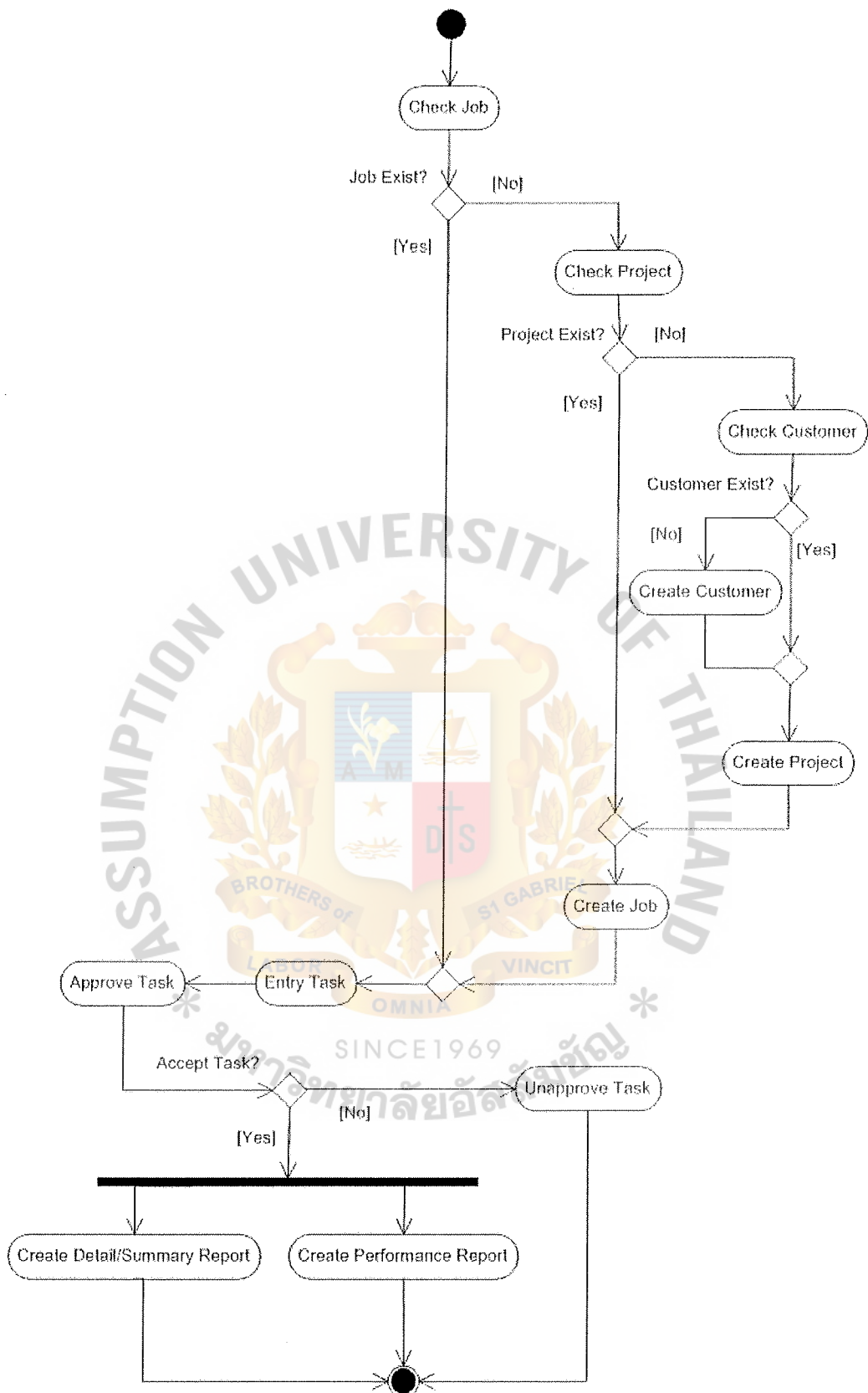


Figure B.1. Activity Diagram

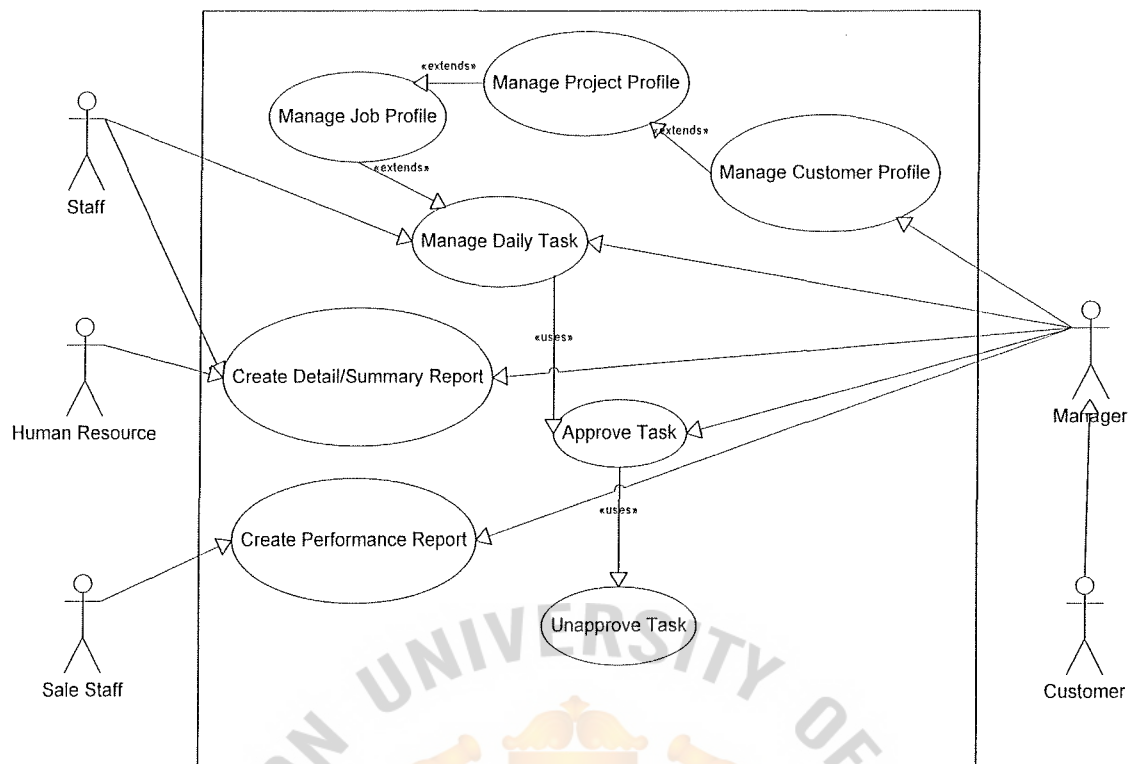


Figure B.2. Use Case Diagram

USE CASE DESCRIPTION

Table B.1. Use Case Description of Manage Daily Task

Use Case : Manage Daily Task	ID : <u>1</u>	Importance Level : <u>High</u>
Primary Actor : Staff, Manager		
Stakeholders and interests : Staff : Want to manage daily task such as view, add, edit and delete daily tasks. Manager : Want to manage daily task such as view, add, edit and delete daily tasks.		
Brief Description : This use case describes how staff or manager can view daily task, entry daily task, edit the task detail and delete the daily task.		
Trigger : Staff, Manager search to view daily task detail Type : External		
Relationships : Association : Staff, Manager Include : - Extend : Manage Job Profile Generalization : -		
Normal Flow of Events : <div>1. The staff or manager submits to the system a search request, with search criteria.</div> <div>2. The system provides a list of brief daily task that match those criteria.</div> <div>3. The staff or manager can choose to add a new task, edit an individual task, delete an individual task</div> <div>if he chooses to view daily tasks, "sub flow 3S-1 : View daily tasks" is performed.</div> <div>if he chooses to entry daily task, "sub flow 3S-2 : Entry daily task" is performed.</div> <div>if he chooses to edit daily task, "sub flow 3S-3 : Edit daily task" is performed.</div>		

Table B.1. Use Case Description of Manage Daily Task (Continued.)

<p>if he chooses to delete daily task, "sub flow 3S-4 : Delete daily task" is performed.</p> <p>4. The staff or manager repeats step 1 to 4 or leave the system.</p>
<p>Subflows :</p> <p>3S-1: View daily tasks</p> <ol style="list-style-type: none"> 1. The system retrieves detail information of the specified daily tasks. 2. The staff or manager can choose to edit this task, or delete this task. if he chooses to edit daily task, "sub flow 3S-3 : Edit daily task" is performed. if he chooses to delete daily task, "sub flow 3S-4 : Delete daily task" is performed. 3. The staff or manager leaves the detailed view. <p>3S-2: Entry daily task</p> <ol style="list-style-type: none"> 1. The system provides a blank daily task form. 2. The staff or manager fills in new task data or cancel. 3. The system validates the filled in information. 4. The system records the new daily task. 5. The system show successful adding of daily task message. <p>3S-3: Edit daily task</p> <ol style="list-style-type: none"> 1. The system provides a daily task form filled with the current task information. 2. The staff or manager fills in and new daily task or decide to cancel 3. The system validates the filled in information. 4. The system update the daily task with new information. 5. The system show successful editing of daily task message. <p>3S-4: Delete daily task</p> <ol style="list-style-type: none"> 1. The system asks The staff or manager for confirmation. 2. The staff or manager confirms or cancel. 3. The system deletes the daily task. 4. The system show a successful deletion message.

Table B.1. Use Case Description of Manage Daily Task (Continued.)

Alternative / Exceptional Flows :

1a [When the system can not find any daily task that matches the criteria]

1. The system shows a daily task not found message.

3S-2-2a and 3S-3-2a [When he decides to cancel the operation]

1. The system aborts the operation.

3S-2-3a and 3S-3-3a [When the filled in information is not valid]

1. The system shows an invalid filled in data those invalid data highlighted.
2. The Staff or Manager repeats step 2 until data are valid.



Table B.2. Use Case Description of Manage Job Profile

Use Case : Manage Job Profile	ID : 2	Importance Level : <u>High</u>
Primary Actor : Staff, Manager		
Stakeholders and interests : Staff : Want to manage job such as view, add, edit and delete job profile. Manager : Want to manage job such as view, add, edit and delete job profile.		
Brief Description : This use case describes how staff or manager can view job profile, entry job profile, edit the job profile detail and delete the job profile.		
Trigger : Staff, Manager search to view job profile detail Type : External		
Relationships : Association : Staff, Manager Include : - Extend : Manage Project Profile Generalization : -		
Normal Flow of Events : <ol style="list-style-type: none"> 1. The staff or manager submits to the system a search request, with search criteria. 2. The system provides a list of brief job profile that match those criteria. 3. The staff or manager can choose to add a new job, edit an individual job, delete an individual job. if he chooses to view job profile, "sub flow 3S-1 : View job profile" is performed. if he chooses to entry job profile, "sub flow 3S-2 : Entry job profile" is performed. if he chooses to edit job profile, "sub flow 3S-3 : Edit job profile" is performed. if he chooses to delete job profile, "sub flow 3S-4 : Delete job profile" is performed. 4. The staff or manager repeats step 1 to 4 or leave the system. 		

Table B.2. Use Case Description of Manage Job Profile (Continued.)

Subflows :

3S-1: View job profile

1. The system retrieves detail information of the specified job profile.
2. The staff or manager can choose to edit this job or delete this job.
if he chooses to edit job profile, "sub flow 3S-3 : Edit job profile" is performed.
if he chooses to delete job profile, "sub flow 3S-4 : Delete job profile" is performed.
3. The staff or manager leaves the detailed view.

3S-2: Entry job profile

1. The system provides a blank job profile form.
2. The staff or manager fills in new job data or cancel.
3. The system validates the filled in information.
4. The system records the new job profile.
5. The system show successful adding of job profile message.

3S-3: Edit job profile

1. The system provides a job profile form filled with the current job information.
2. The staff or manager fills in and new job or decide to cancel
3. The system validates the filled in information.
4. The system updates the job profile with new information.
5. The system show successful editing of job profile message.

3S-4: Delete daily task

1. The system asks the staff or manager for confirmation.
2. The staff or manager confirms or cancel.
3. The system deletes the job profile.
4. The system shows a successful deletion message.

Table B.2. Use Case Description of Manage Job Profile (Continued.)

Alternative / Exceptional Flows :
1a [When the system can not find any job profile that matches the criteria]
1. The system shows a daily task not found message.
3S-2-2a and 3S-3-2a [When he decides to cancel the operation]
1. The system aborts the operation.
3S-2-3a and 3S-3-3a [When the filled in information is not valid]
1. The system shows an invalid filled in data those invalid data highlighted.
2. The Staff or Manager repeats step 2 until data are valid.



Table B.3. Use Case Description of Manage Project Profile

Use Case : Manage Project Profile	ID : <u>3</u>	Importance Level : <u>High</u>
Primary Actor : Staff, Manager		
Stakeholders and interests : Staff : Want to manage project profile such as view, add, edit and delete project profile. Manager : Want to manage project profile such as view, add, edit and delete project profile.		
Brief Description : This use case describes how staff or manager can view project profile, entry project profile, edit the project profile and delete the project profile.		
Trigger : Staff, Manager search to view project profile detail Type : External		
Relationships : Association : Staff, Manager Include : - Extend : Manager Customer Profile Generalization : -		

Table B.3. Use Case Description of Manage Project Profile (Continued.)

Normal Flow of Events :

1. The staff or manager submits to the system a search request, with search criteria.
2. The system provides a list of brief project profile that match those criteria.
3. The staff or manager can choose to add a new project, edit an individual project, delete an individual project.
if he chooses to view project profiles, "sub flow 3S-1 : View project profiles" is performed.
if he chooses to entry project profile, "sub flow 3S-2 : Entry project profile" is performed.
if he chooses to edit project profile, "sub flow 3S-3 : Edit project profile" is performed.
if he chooses to delete project profile, "sub flow 3S-4 : Delete project profile" is performed.
4. The staff or manager repeats step 1 to 4 or leave the system.

Table B.3. Use Case Description of Manage Project Profile (Continued.)

Subflows :

3S-1: View project profiles

1. The system retrieves detail information of the specified project profiles.
2. The staff or manager can choose to edit this task, or delete this task.
 if he chooses to edit project profile, "sub flow 3S-3 : Edit project profile" is performed.
 if he chooses to delete project profile, "sub flow 3S-4 : Delete project profile" is performed.
3. The staff or manager leaves the detailed view.

3S-2: Entry project profile

1. The system provides a blank project profile form.
2. The staff or manager fills in new task data or cancel.
3. The system validates the filled in information.
4. The system records the new project profile.
5. The system show successful adding of project profile message.

3S-3: Edit project profile

1. The system provides a project profile form filled with the current task information.
2. The staff or manager fills in and new project profile or decide to cancel
3. The system validates the filled in information.
4. The system update the project profile with new information.
5. The system show successful editing of project profile message.

3S-4: Delete project profile

1. The system asks The staff or manager for confirmation.
2. The staff or manager confirms or cancel.
3. The system deletes the project profile.
4. The system shows a successful deletion message.

Table B.3. Use Case Description of Manage Project Profile (Continued.)

Alternative / Exceptional Flows :
1a [When the system can not find any project profile that matches the criteria]
1. The system shows a project profile not found message.
3S-2-2a and 3S-3-2a [When he decides to cancel the operation]
2. The system aborts the operation.
3S-2-3a and 3S-3-3a [When the filled in information is not valid]
3. The system shows an invalid filled in data those invalid data highlighted.
4. The Staff or Manager repeats step 2 until data are valid.



Table B.4. Use Case Description of Manage Customer Profile

Use Case : Manage Customer Profile	ID : 4	Importance Level : <u>High</u>
Primary Actor : Manager		
Stakeholders and interests : Manager: Want to manage customer profile such as view, add, edit and delete customer profile.		
Brief Description : This use case describes how staff or manager can view customer profile, entry customer profile, edit the task detail and delete the customer profile.		
Trigger : Manager search to view customer profile detail Type : External		
Relationships : Association : Manager Include : - Extend : - Generalization : -		
Normal Flow of Events : <ol style="list-style-type: none"> 1. The manager submits to the system a search request, with search criteria. 2. The system provides a list of brief customer profile that match those criteria. 3. The manager can choose to add a new task, edit an individual task, delete an individual task if he chooses to view customer profiles, "sub flow 3S-1 : View customer profiles" is performed. if he chooses to entry customer profile, "sub flow 3S-2 : Entry customer profile" is performed. if he chooses to edit customer profile, "sub flow 3S-3 : Edit customer profile" is performed. if he chooses to delete customer profile, "sub flow 3S-4 : Delete customer profile" is performed. 4. The manager repeats step 1 to 4 or leave the system. 		

Table B.4. Use Case Description of Manage Customer Profile (Continued.)

Subflows :

3S-1: View customer profiles

1. The system retrieves detail information of the specified customer profiles.
2. The manager can choose to edit this customer, or delete this customer.
if he chooses to edit customer profile, "sub flow 3S-3 : Edit customer profile" is performed.
if he chooses to delete customer profile, "sub flow 3S-4 : Delete customer profile" is performed.
3. The manager leaves the detailed view.

3S-2: Entry customer profile

1. The system provides a blank customer profile form.
2. The manager fills in new customer data or cancel.
3. The system validates the filled in information.
4. The system records the new customer profile.
5. The system show successful adding of customer profile message.

3S-3: Edit customer profile

1. The system provides a customer profile form filled with the current customer information.
2. The manager fills in and new customer profile or decide to cancel
3. The system validates the filled in information.
4. The system updates the customer profile with new information.
5. The system show successful editing of customer profile message.

3S-4: Delete customer profile

1. The system asks the manager for confirmation.
2. The manager confirms or cancels.
3. The system deletes the customer profile.
4. The system shows a successful deletion message.

Table B.4. Use Case Description of Manage Customer Profile (Continued.)

Alternative / Exceptional Flows :
1a [When the system can not find any customer profile that matches the criteria]
1. The system shows a customer profile not found message.
3S-2-2a and 3S-3-2a [When he decides to cancel the operation]
1. The system aborts the operation.
3S-2-3a and 3S-3-3a [When the filled in information is not valid]
1. The system shows an invalid filled in data those invalid data highlighted.
2. The manager repeats step 2 until data are valid.



Table B.5. Use Case Description of Manage Approve Task

Use Case : Approve Task	ID : <u>5</u>	Importance Level : <u>High</u>
Primary Actor : Manager		
Stakeholders and interests : Manager : Want to approve task		
Brief Description : This use case describes how manager can approve task.		
Trigger : Manager search to view daily task detail		
Type : External		
Relationships : Association : Manager Include : Unapprove task Extend : - Generalization : -		
Normal Flow of Events : <ol style="list-style-type: none"> 1. The manager submit to the system a search request, with search criteria 2. The system provides a list of brief daily task profile that match those criteria 3. The manager can choose the individual daily task to be approved. 4. The system updates the daily task in approve flag record. 5. The system show successful approve of daily task message. 		
Subflows : -		
Alternative / Exceptional Flows : <ol style="list-style-type: none"> 1a [When the system can not find any daily task that matches the criteria] <ol style="list-style-type: none"> 1. The system shows a daily task not found message. 		

Table B.6. Use Case Description of Unapproved Task

Use Case : Unapproved Task	ID : 6	Importance Level : <u>High</u>
Primary Actor : Manager		
Stakeholders and interests : Manager : Want to create unapproved task		
Brief Description : This use case describes how manager can create unapproved task.		
Trigger : Manager search to view daily task detail		
Type : External		
Relationships : Association : Manager Include : Unapproved task Extend : - Generalization : -		
Normal Flow of Events : <ol style="list-style-type: none"> 1. The manager submit to the system a search request, with search criteria 2. The system provides a list of brief daily task profile that match those criteria 3. The manager can choose the individual approved daily task to be unapproved. 4. The system updates the daily task in approve flag record. 5. The system show successful unapproved of daily task message. 		
Subflows : -		
Alternative / Exceptional Flows : <ol style="list-style-type: none"> 1a [When the system can not find any daily task that matches the criteria] 2. The system shows a daily task not found message. 		

Table B.7. Use Case Description of Print Detail/Summary Report

Use Case : Print Detail/Summary Report	ID : 7	Importance Level : <u>High</u>
Primary Actor : Staff, Manager		
Stakeholders and interests : Human Resource Staff : Want to print Performance Report to check leave history. Staff : Want to print Detail/Summary Report Manager : Want to print Detail/Summary Report		
Brief Description : This use case describes how staff or manager can print detail/summary report.		
Trigger : Staff, Human Resource, Manager selects criteria to print report. Type : External		
Relationships : Association : Staff, Human Resource Staff, Manager Include : - Extend : - Generalization : -		
Normal Flow of Events : <ol style="list-style-type: none"> 1. The staff or manager submit to the system a print report request, with report criteria 2. The system provides a report of approved daily task that match those criteria 3. The system generate report in Microsoft excel. 4. The system show successful print report message. 		
Subflows : -		
Alternative / Exceptional Flows : 2a [When the system can not find any approved daily task that matches the criteria] <ol style="list-style-type: none"> 1. The system generate blank report in Microsoft excel. 		

Table B.8. Use Case Description of Print Performance Report

Use Case : Print Performance Report	ID : 8	Importance Level : <u>High</u>
Primary Actor : Staff, Manager		
Stakeholders and interests : Sale Staff : Want to print Performance Report and present to prospect customer. Manager : Want to print Performance Report and sent to owner project customer.		
Brief Description : This use case describes how sale staff or manager can print performance report.		
Trigger : Sale Staff, Human Resource and Manager select criteria to print report. Type : External		
Relationships : Association : Sale Staff, Manager Include : - Extend : - Generalization : -		
Normal Flow of Events : <ol style="list-style-type: none"> 1. the sale, human resource staff or manager submit to the system a print report request, with report criteria 2. The system provides a report of approved daily task that match those criteria 3. The system calculate performance and generate report in Microsoft excel. 4. The system show successful print report message. 		
Subflows : -		
Alternative / Exceptional Flows : 2a [When the system can not find any approved daily task that matches the criteria] <ol style="list-style-type: none"> 1. The system generate blank report in Microsoft excel. 		



APPENDIX C

STRUCTURAL MODELING

Table C.1. Potential Class

Noun or Noun phrase		reason for selecting potential classes
Staff	Y	"Staff"
Manager	N	Not relevant for current project
Daily Task	Y	"DAILY TASK"
Daily Task Detail	Y	Attribute of Daily Task
Search Request	N	Not relevant for current project
Search Criteria	N	Not relevant for current project
Job Profile	Y	"JOB"
Project Profile	Y	"PROJECT"
Customer Profile	Y	"CUSTOMER"
Approve flag record	Y	Attribute of Daily Task
Approved daily task	N	Not relevant for current project
Detail/Summary Report	N	Not relevant for current project
Report Request	N	Not relevant for current project
Report Criteria	N	Not relevant for current project
Human Resource Staff	N	Not relevant for current project
Sale Staff	N	Not relevant for current project
Performance Report	N	Not relevant for current project
Leave History	N	Not relevant for current project
Current Job	Y	Type of "JOB"
New Job	Y	Type of "JOB"
Current Project	Y	Type of "PROJECT"
New Project	Y	Type of "PROJECT"
Current Customer	Y	Type of "CUSTOMER"
New Customer	Y	Type of "CUSTOMER"

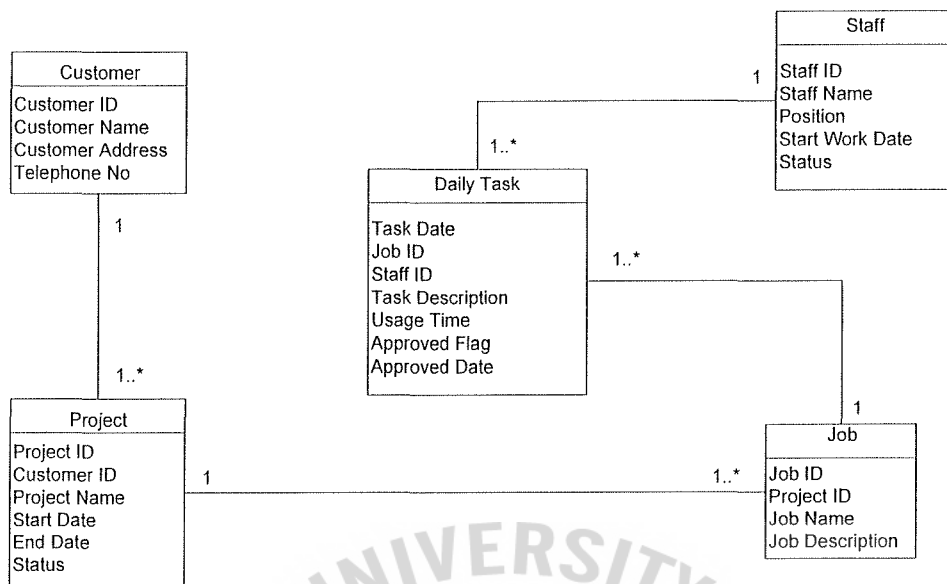


Figure C.1. Class Diagram



APPENDIX D

BEHAVIORAL MODELING

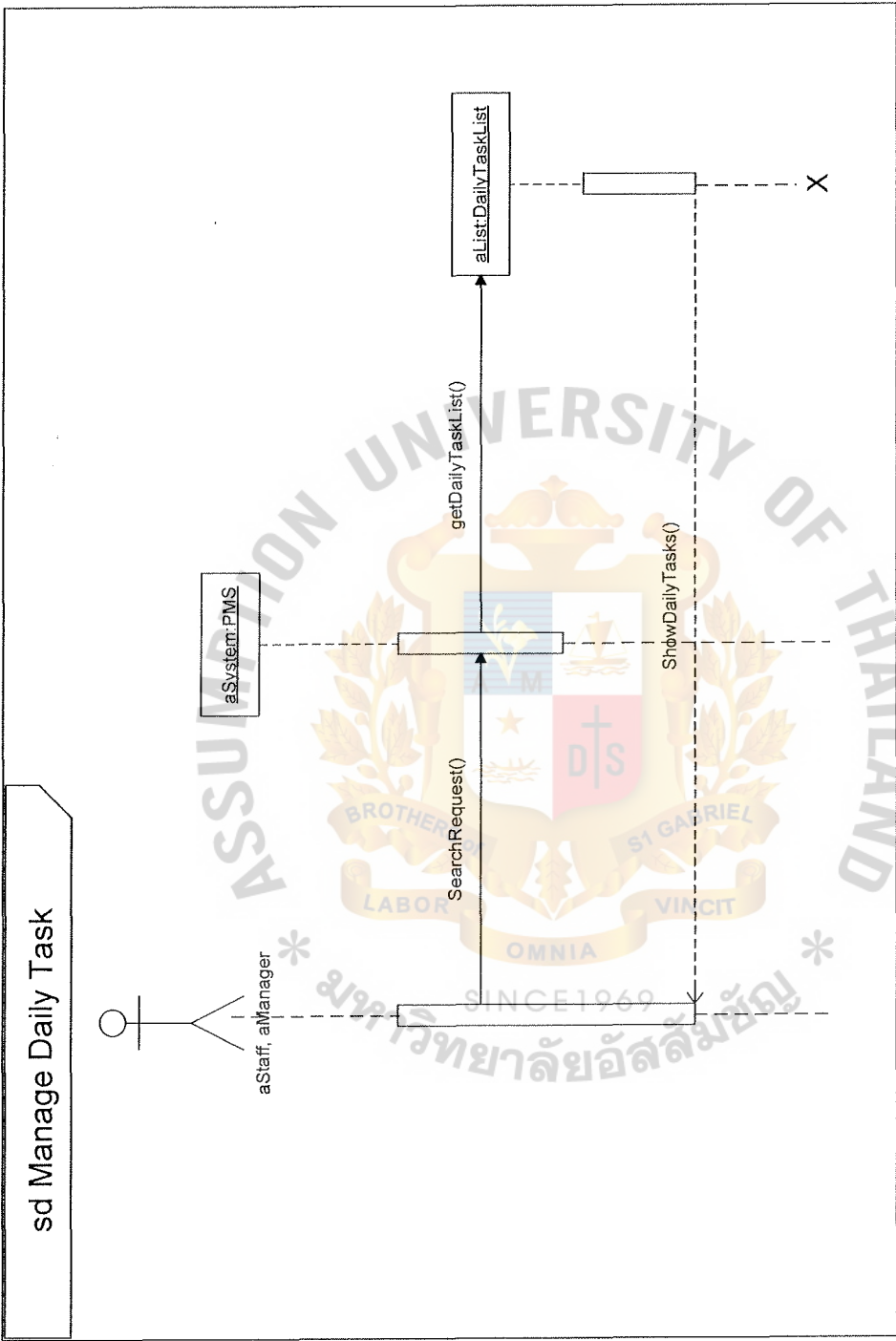


Figure D.1.1. Sequence Diagram for Manage Daily Task

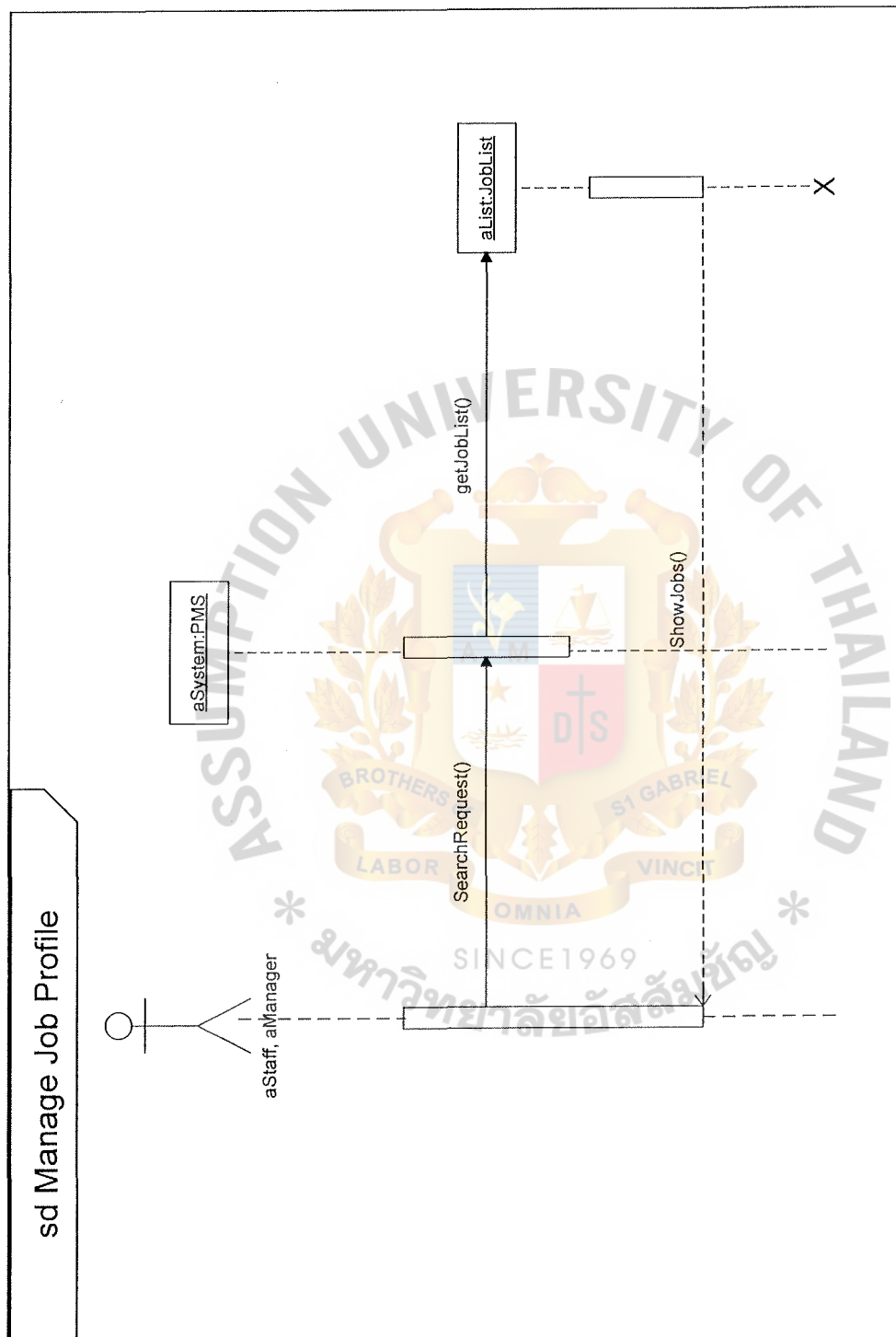


Figure D.2. Sequence Diagram for Manage Job Profile

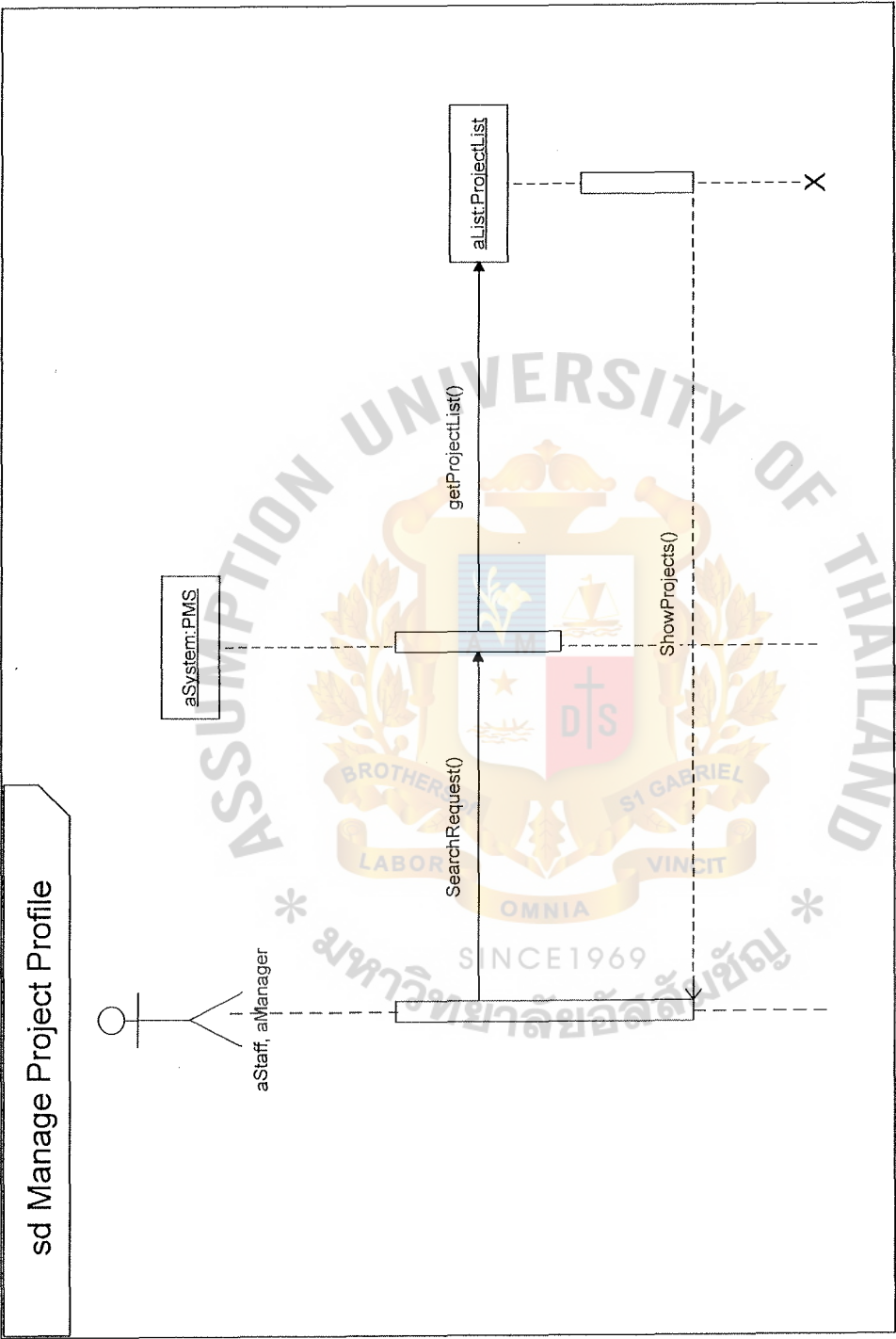


Figure D.3. Sequence Diagram for Manage Project Profile

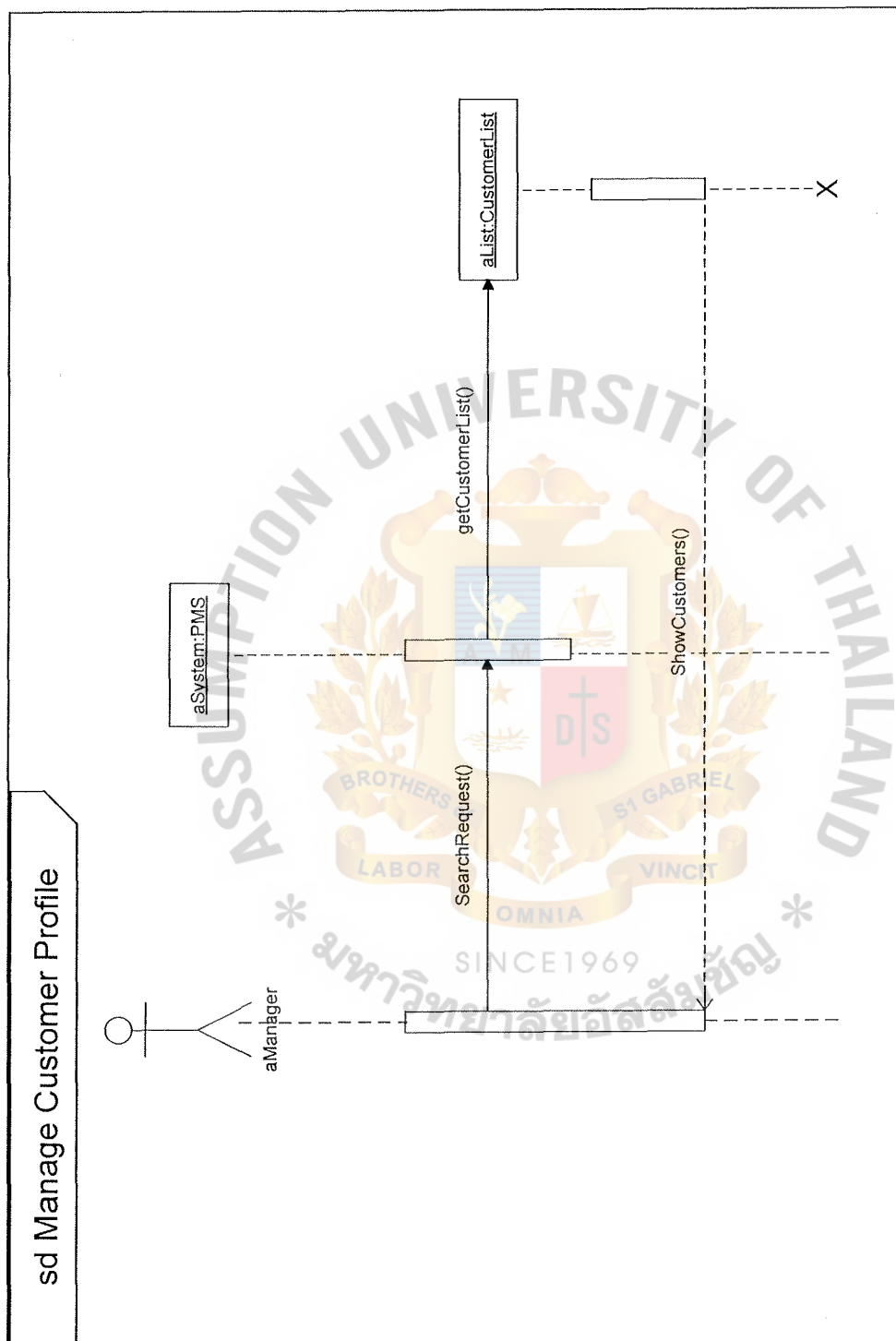


Figure D.4. Sequence Diagram for Manage Customer Profile

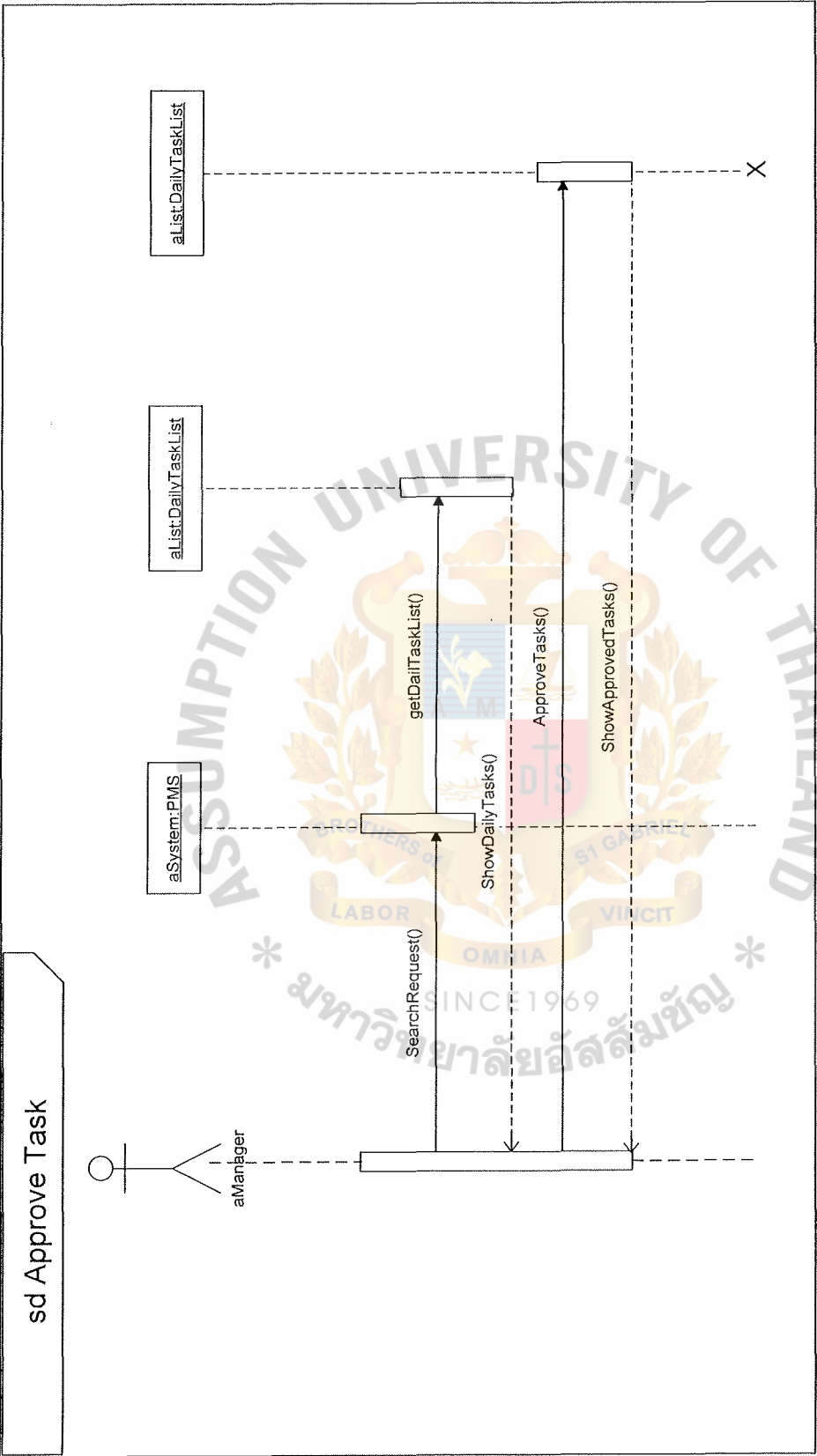


Figure D.5. Sequence Diagram for Approve Task

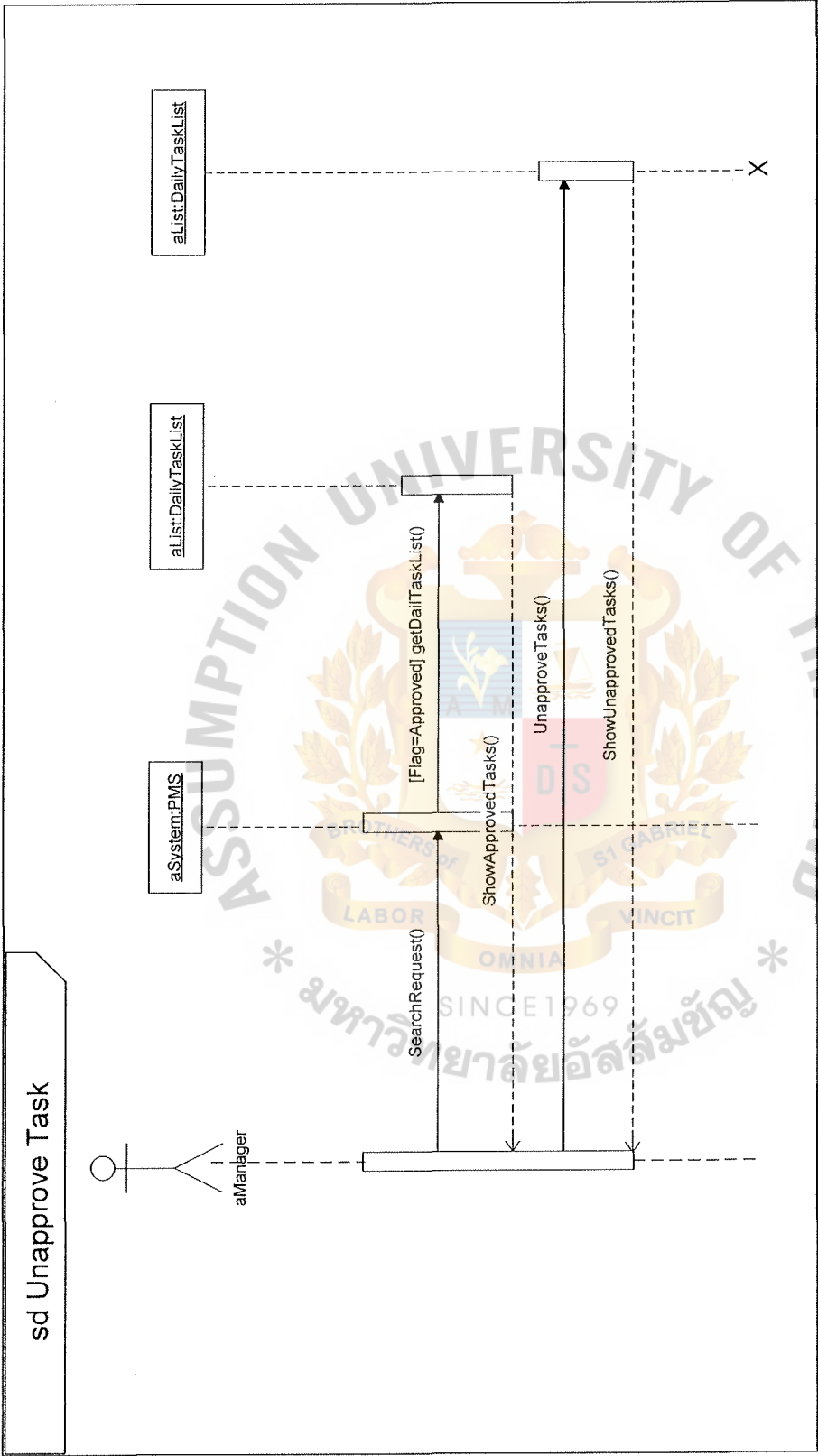


Figure D.6. Sequence Diagram for Unapprove Task

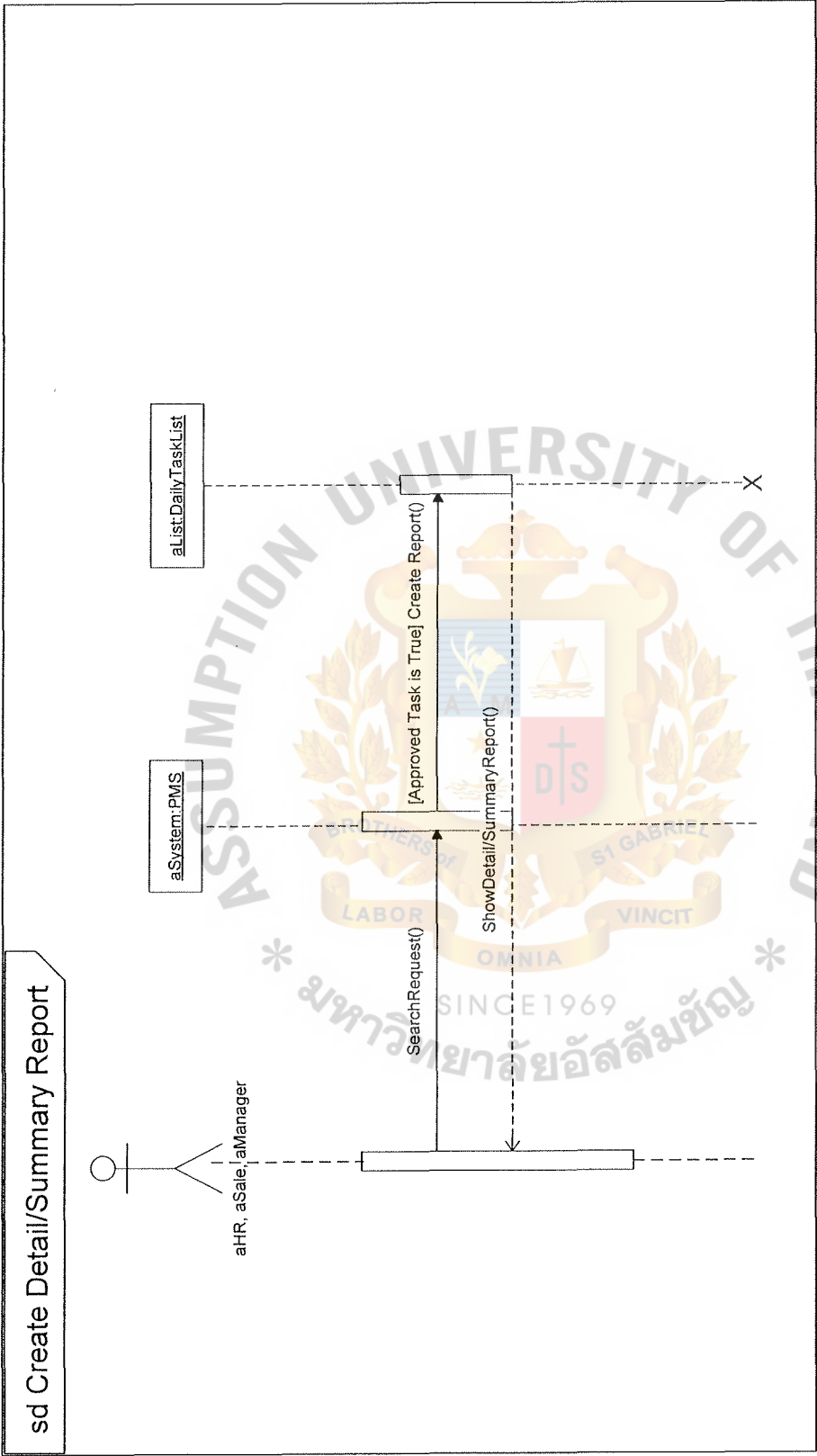


Figure D.7. Sequence Diagram for Create Detail/Summary Report

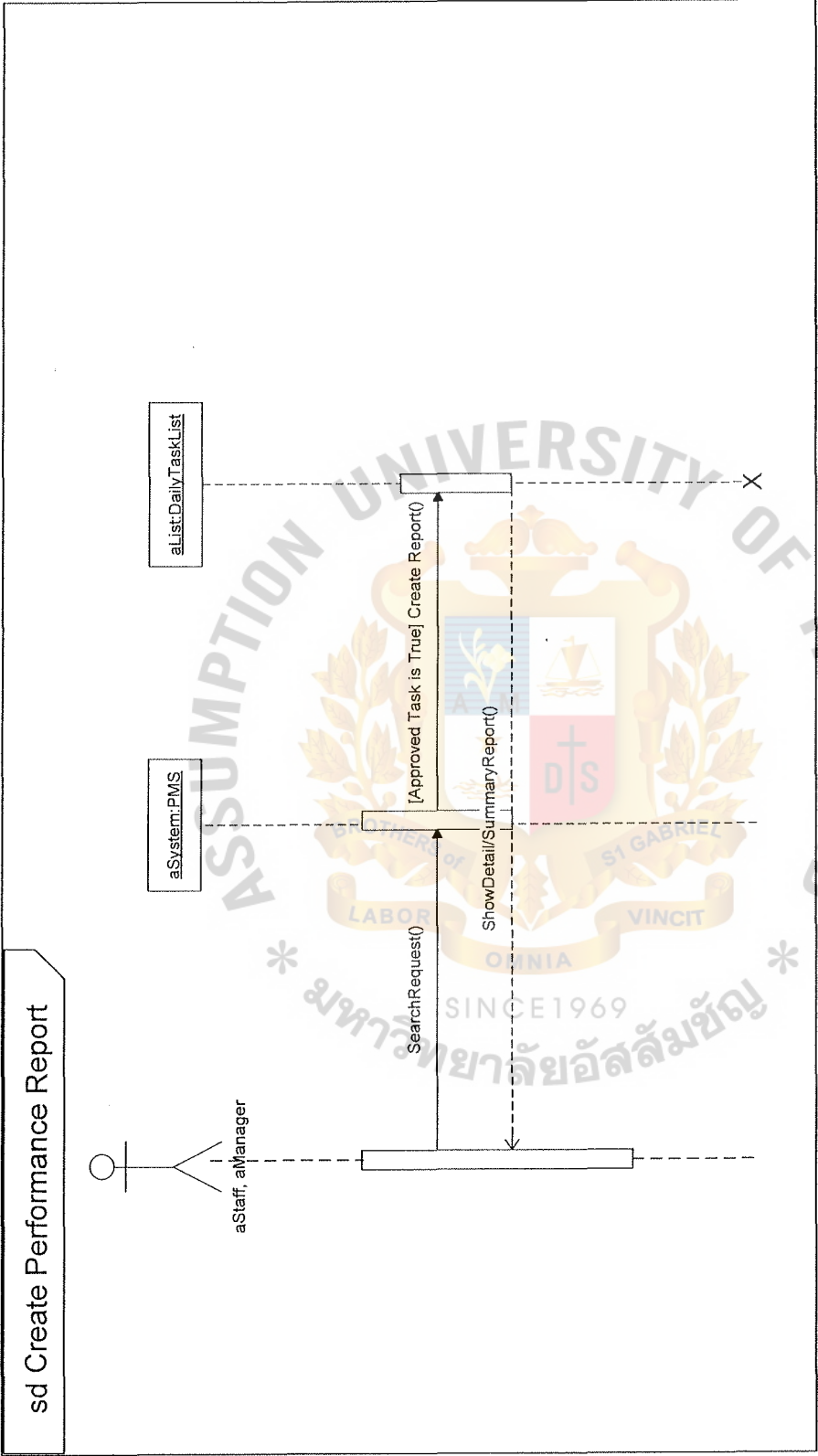


Figure D.8. Sequence Diagram for Create Performance Report

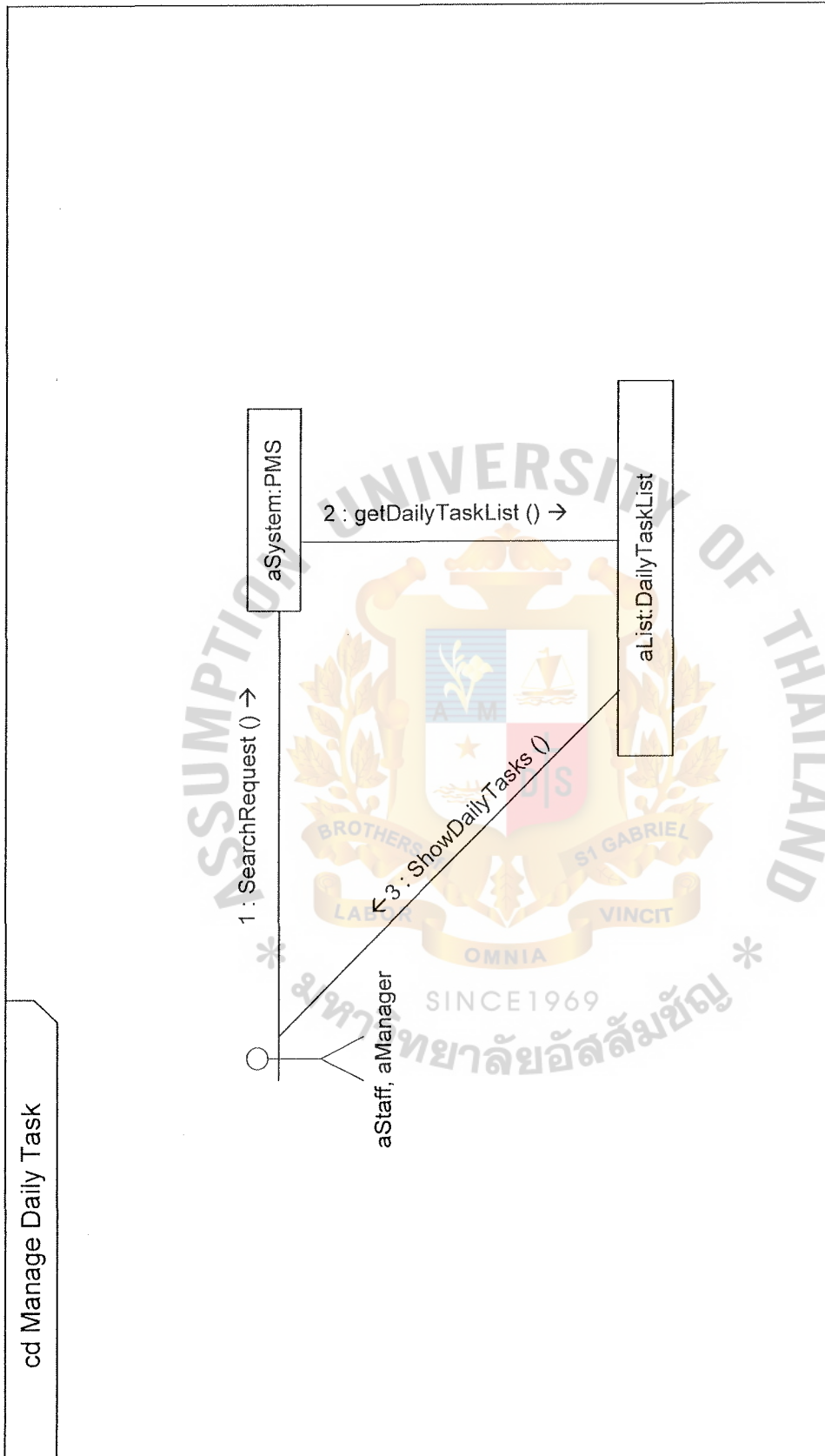


Figure D.9. Communication Diagram for Daily Task

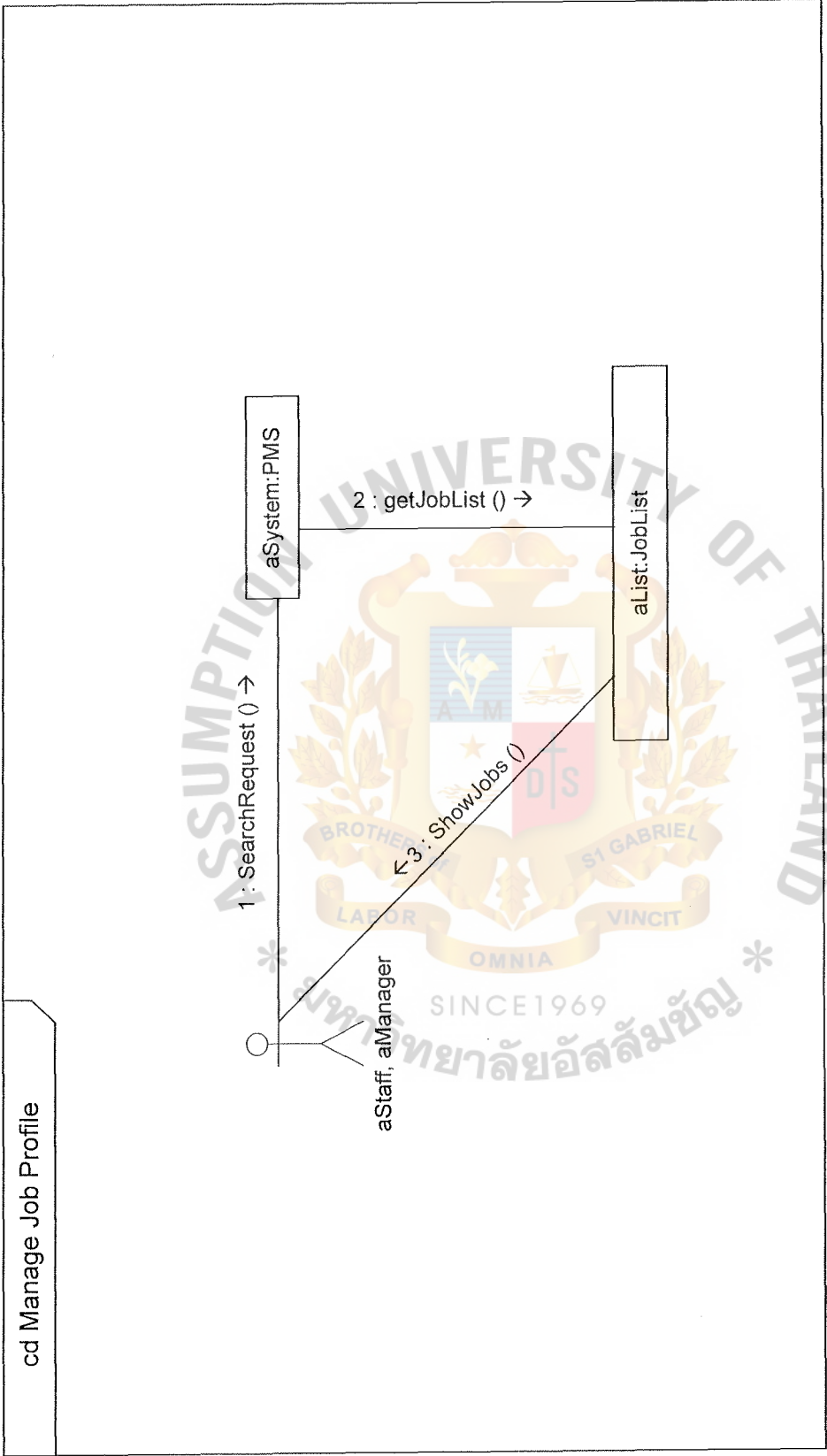


Figure D.10. Communication Diagram for Job Profile

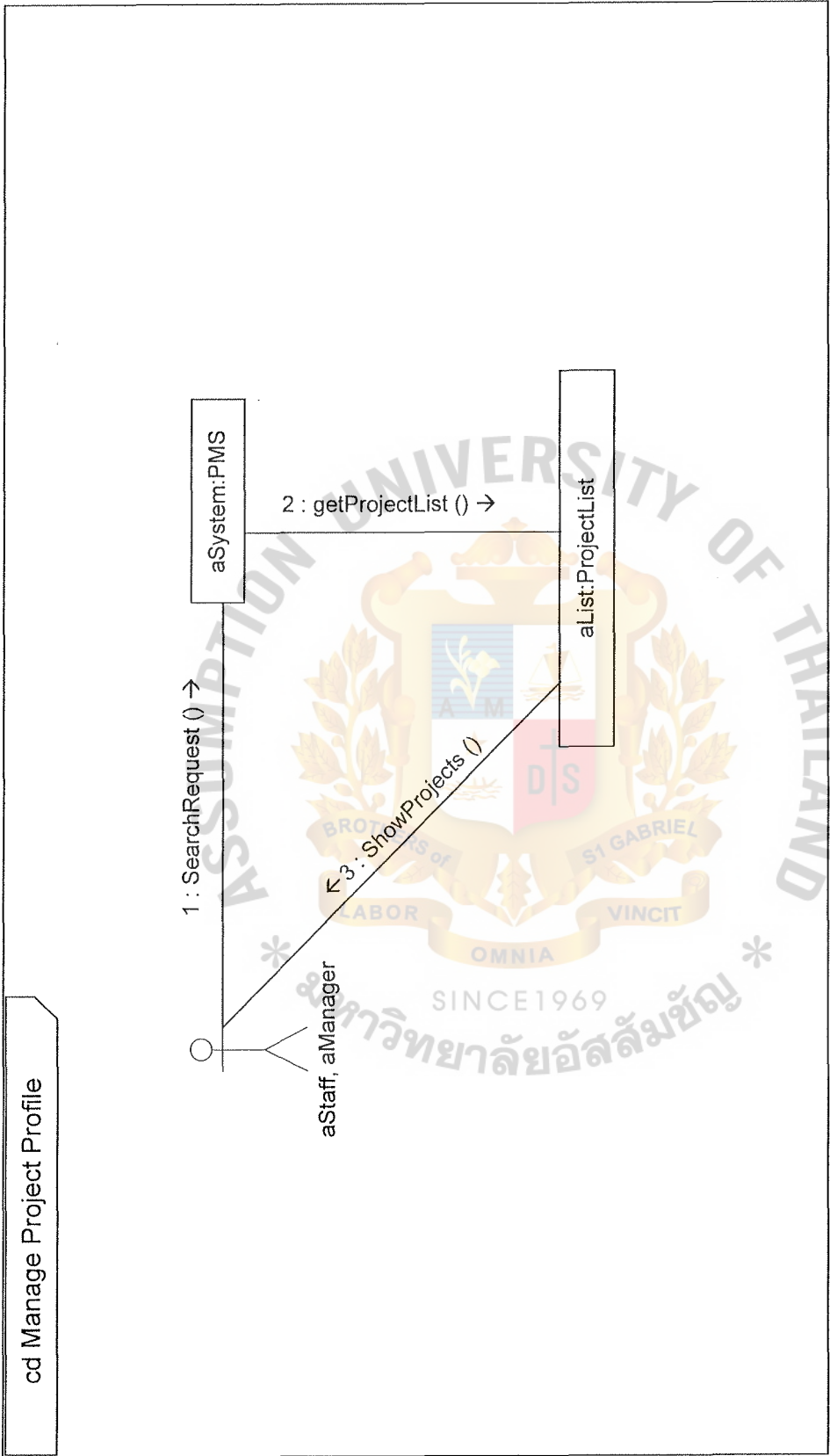


Figure D.11. Communication Diagram for Manage Project Profile

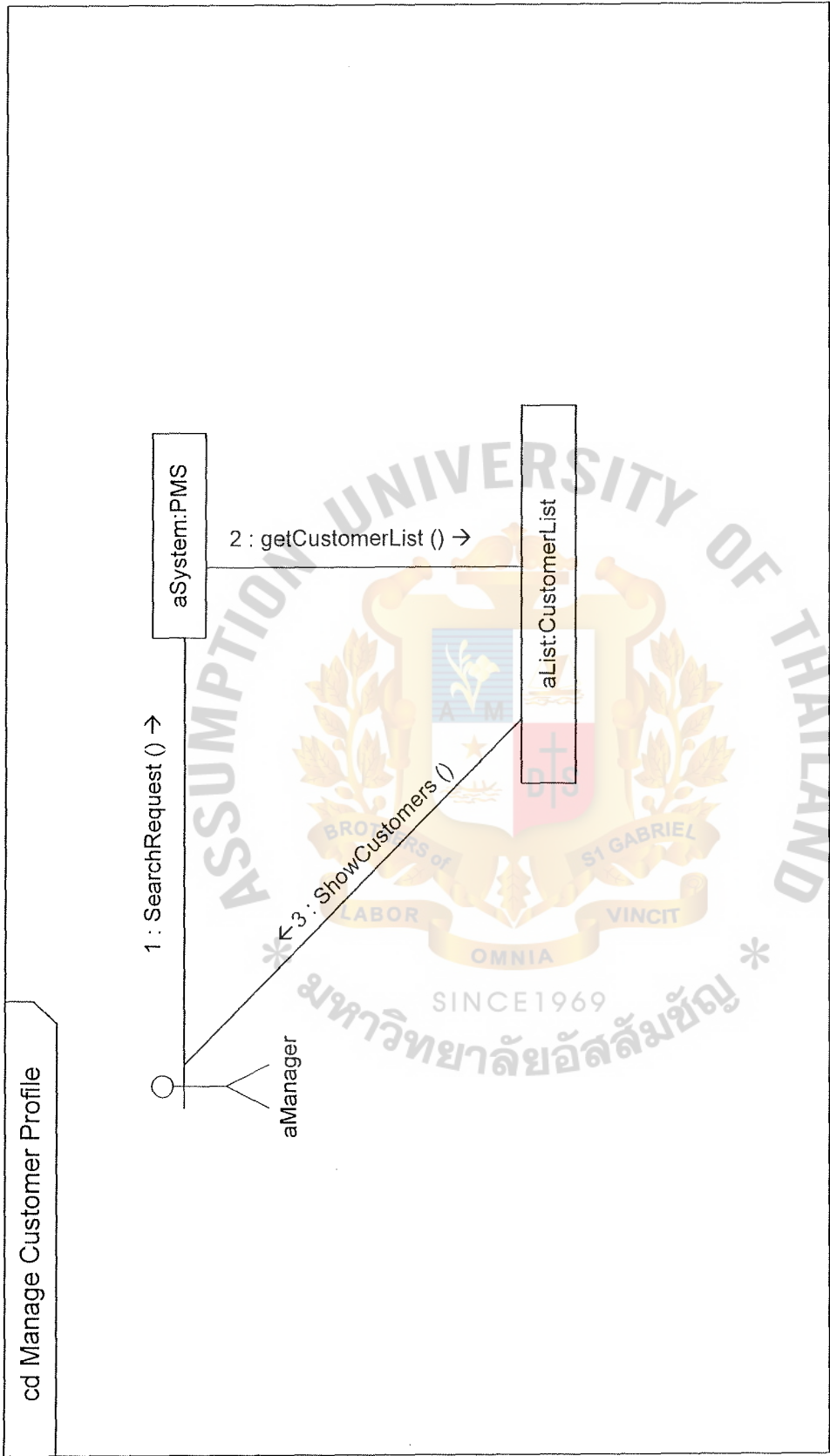


Figure D.12. Communication Diagram for Manage Customer Profile

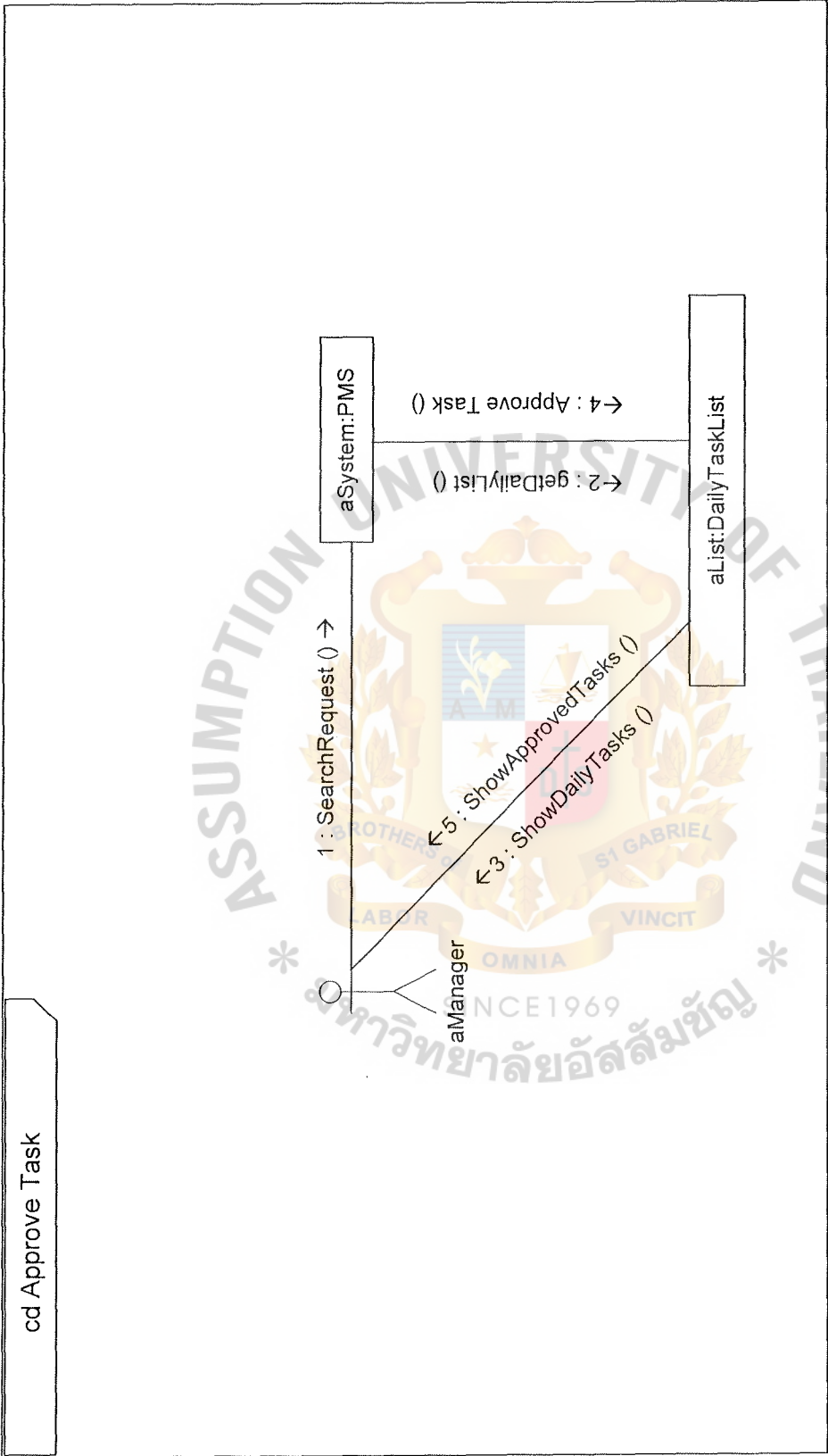


Figure D.13. Communication Diagram for Approve Task

cd Unapprove Task

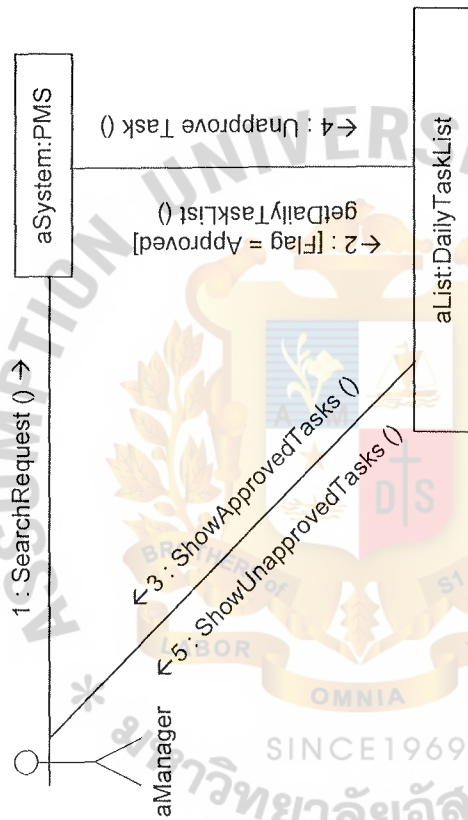


Figure D.14. Communication Diagram for Unapprove Task

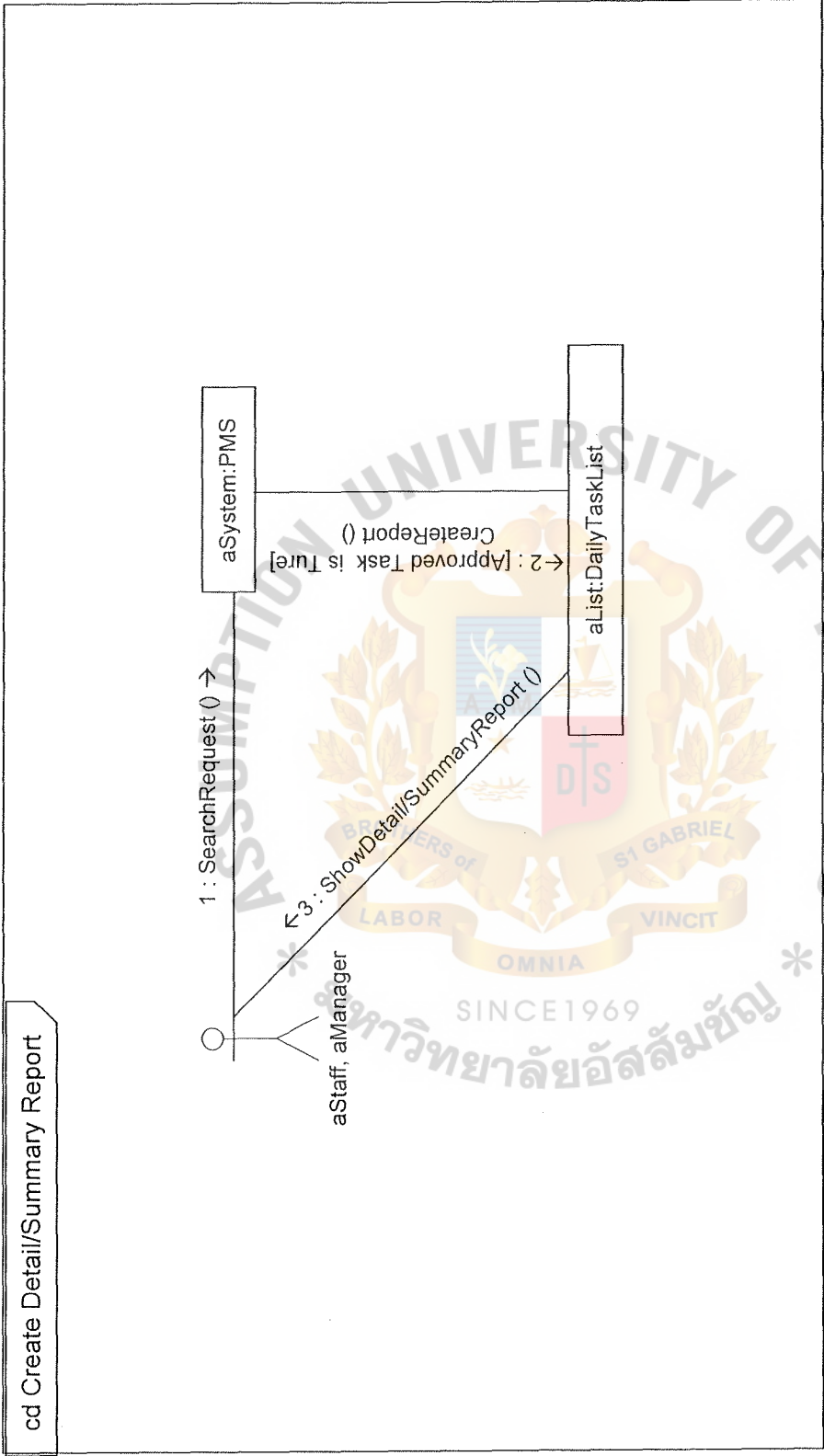


Figure D.15. Communication Diagram for Create Detail/Summary Report

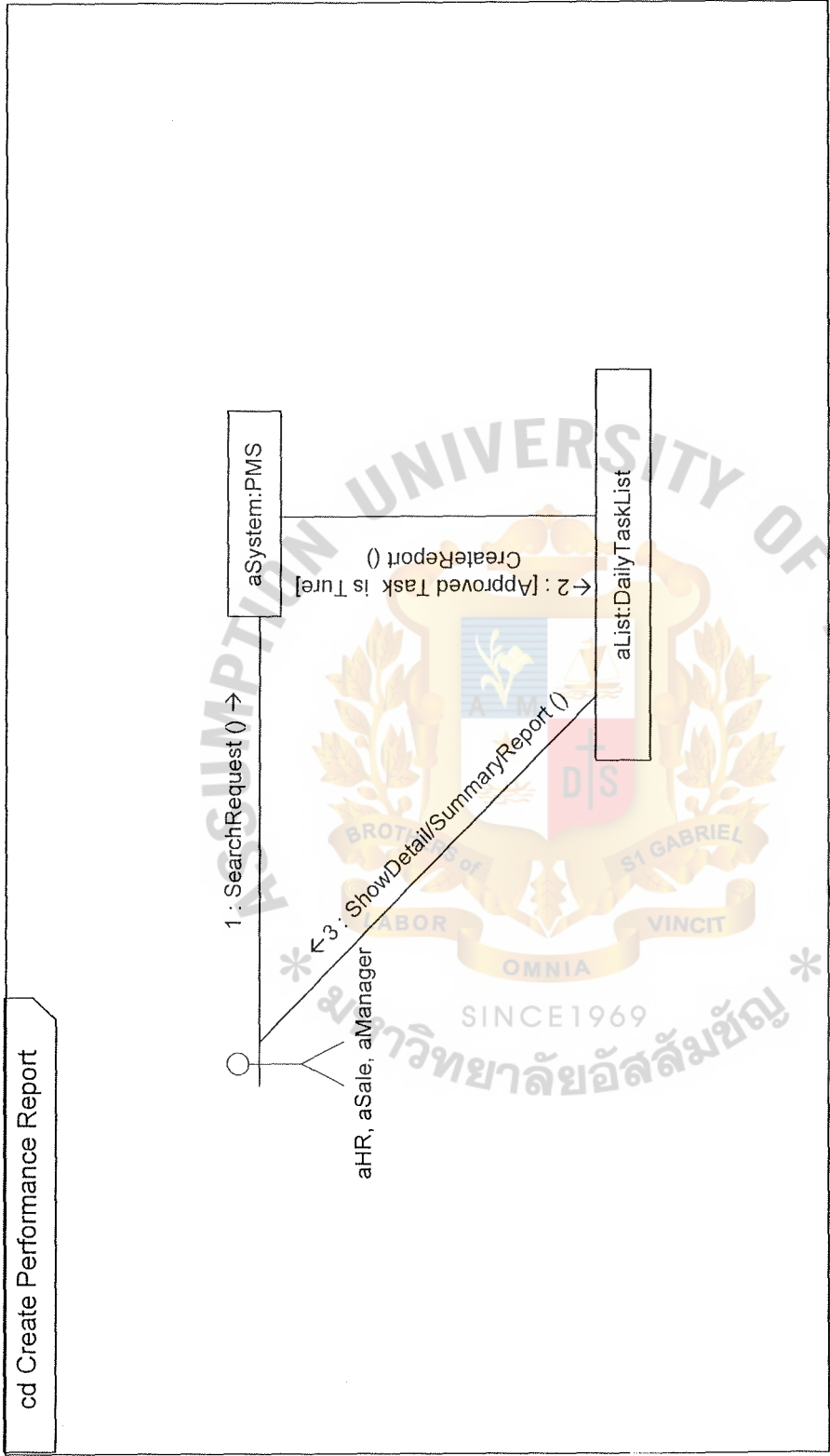


Figure D.16. Communication Diagram for Create Performance Report



APPENDIX E

ENTITY RELATIONSHIP DIAGRAM

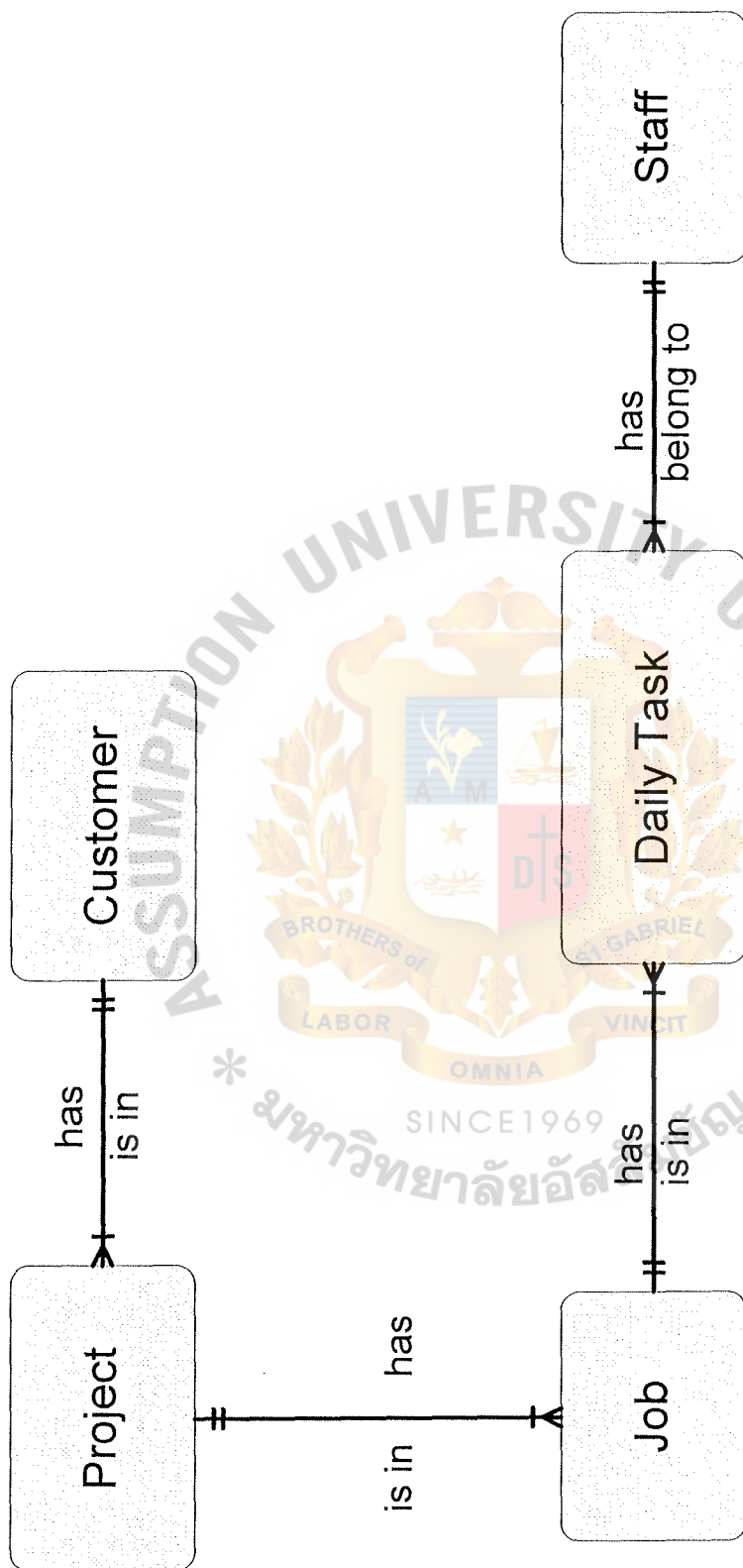


Figure E.1. Context Entity Relationship Diagram

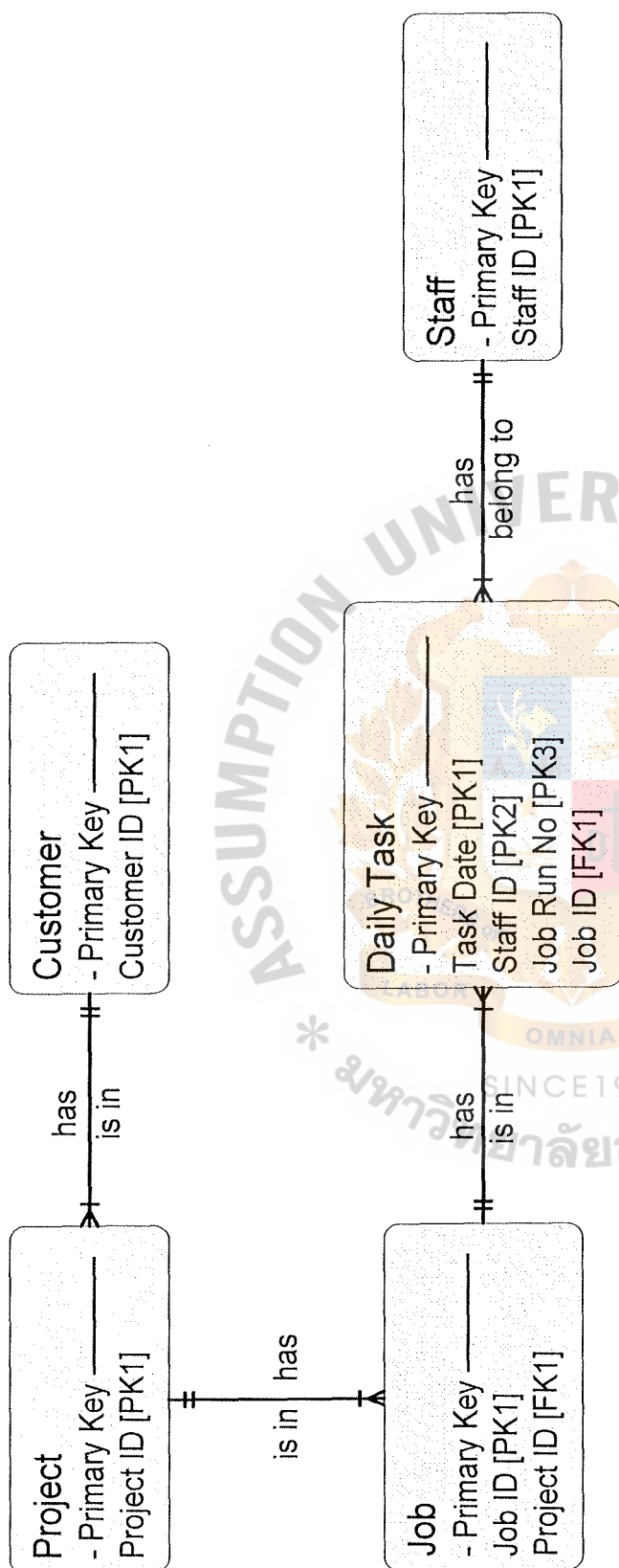


Figure E.2. Key Based Entity Relationship Diagram

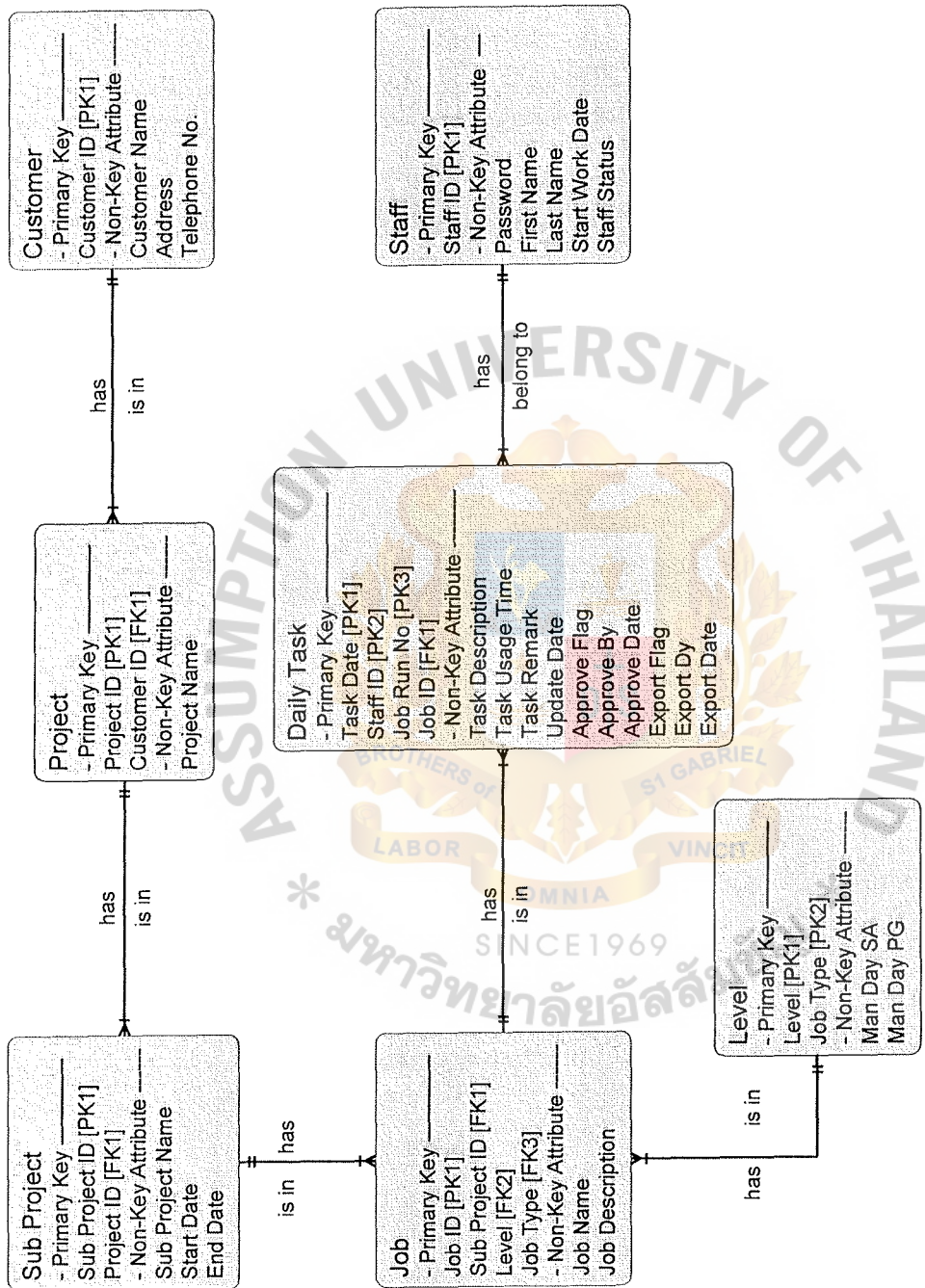


Figure E.4. Entity Relationship Diagram in Third Normal Form



APPENDIX F
DATABASE TABLE

DATABASE TABLES

Table F.1. Daily Task Table

Attribute name	Data type	Length	Default Value	Unique	Null	Key Type	Foreign to Table
TaskDate	Date		Current Date	Y	N	Primary Key	
StaffID	Text	6	Unique ID	Y	N	Primary Key	
JobRunNo	Integer		Unique ID	Y	N	Primary Key	
JobID	Text	10	None	N	N	Foreign Key	
TaskDescription	Text	256	None	N	N	Attribute	
TaskUsageTime	Integer		None	N	N	Attribute	
TaskRemark	Text	256	None	N	N	Attribute	
UpdateDate	Date		Current Date	N	N	Attribute	
ApproveFlag	Text	1	None	N	Y	Attribute	
ApproveBy	Text	6	None	N	Y	Attribute	
ApproveDate	Date		None	N	Y	Attribute	
ExportFlag	Text	1	None	N	Y	Attribute	
ExportBy	Text	6	None	N	Y	Attribute	
ExportDate	Date		None	N	Y	Attribute	

Table F.2. Staff Table

Attribute name	Data type	Length	Default Value	Unique	Null	Key Type	Foreign to Table
<u>StaffID</u>	Text	6	Unique ID	Y	N	Primary Key	
Password	Text	10	None	N	N	Attribute	
FirstName	Text	15	None	N	N	Attribute	
LastName	Text	25	None	N	N	Attribute	
StartWorkDate	Date		None	N	N	Attribute	
StaffStatus	Text	1	None	N	N	Attribute	

Table F.3. Customer Table

Attribute name	Data type	Length	Default Value	Unique	Null	Key Type	Foreign to Table
<u>CustomerID</u>	Text	10	Unique ID	Y	N	Primary Key	
CustomerName	Text	30	None	N	N	Attribute	
Address	Text	100	None	N	N	Attribute	
TelephoneNo.	Text	10	None	N	N	Attribute	

Table F.4. Project Table

Attribute name	Data type	Length	Default Value	Unique	Null	Key Type	Foreign to Table
<u>ProjectID</u>	Text	10	Unique ID	Y	N	Primary Key	Sub-Project
CustomerID	Text	10	None	N	N	Foreign Key	
ProjectName	Text	30	None	N	N	Attribute	

Table F.5. Sub-Project Table

Attribute name	Data type	Length	Default Value	Unique	Null	Key Type	Foreign to Table
<u>SubProjectID</u>	Text	15	Unique ID	Y	N	Primary Key	Job
<u>ProjectID</u>	Text	10	None	N	N	Foreign Key	
SubProjectName	Text	50	None	N	N	Attribute	
StartDate	Date		None	N	N	Attribute	
EndDate	Date		None	N	N	Attribute	

Table F.6. Job Table

Attribute name	Data type	Length	Default Value	Unique	Null	Key Type	Foreign to Table
<u>JobID</u>	Text	15	Unique ID	Y	N	Primary Key	Daily Task
SubProjectID	Text	15	None	N	N	Foreign Key	
Level	Text	1	None	N	N	Foreign Key	
JobType	Text	5	None	N	N	Foreign Key	
JobName	Text	50	None	N	N	Attribute	
JobDescription	Text	100	None	N	N	Attribute	

Table F.7. Level Table

Attribute name	Data type	Length	Default Value	Unique	Null	Key Type	Foreign to Table
<u>Level</u>	Text	1	Unique ID	Y	N	Primary Key	Job
JobType	Text	5	Unique ID	Y	N	Primary Key	Job
ManDaySA	Integer		None	N	N	Attribute	
ManDayPG	Integer		None	N	N	Attribute	



APPENDIX G

USER INTERFACE DESIGN

Customer

Search

Customer ITTI Co., Ltd. Find

Customer Information

Name ITTI Co., Ltd.

Address Silom Complex Tower, 28th Zone H Fl., No. 191 Silom Rd., Silom, Bangrak, BKK.

Telephone Number 0-2231-3851

Exit Save Cancel

Figure G.1. Customer Profile Form

Project

Search

Customer ITTI Co., Ltd. Project Data Warehouse Find

Project Information

Project Name Data Warehouse

Customer ITTI Co., Ltd. Exit Save Cancel

Figure G.2. Project Profile Form

Job

Search

Job Project

Sub Project

Job Information

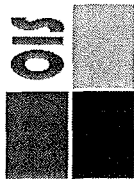
Job Level

Sub Project Job Type

Figure G.4. Job Profile Form



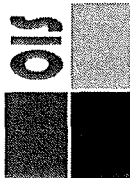
APPENDIX H
OUTPUT REPORTS



Staff : Porsip Wattanasin
Project : Data Warehouse
Customer : ITTI Co., Ltd
Date : 01 July 2006 To 05 July 2006

Task Date	Job	Task Description	Usage Time	Remark	Update Date	Approve Flag	Approve By	Approve Date
01/07/2006	Report for Production	Meeting with user.	4-00	-	08/07/2006	TRUE	410234	09/07/2006
01/07/2006	Report for Production	Create User Requirement	4-00	-	08/07/2006	TRUE	410234	09/07/2006
02/07/2006	Report for Production	Create User Requirement	4-00	-	08/07/2006	TRUE	410234	09/07/2006
02/07/2006	Report for Production	Create High Level Design.	4-00	-	08/07/2006	TRUE	410234	09/07/2006
03/07/2006	Report for Production	Create Design Spec.	4-00	-	08/07/2006	TRUE	410234	09/07/2006
04/07/2006	Report for Production	Create User Interface	4-00	-	08/07/2006	TRUE	410234	09/07/2006
05/07/2006	Report for Production	Create Schedule	4-00	-	08/07/2006	TRUE	410234	09/07/2006

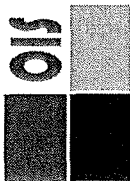
Figure H.1. Detail Report



Project : Data Warehouse
Customer : ITTI Co., Ltd
Month: July 2006

E	Programming & Operation				GRAND Total Of Man/Day (Plan)	GRAND Total Of Man/Day (Actual)	Leave (Day)	Holiday (Day)
	M	C	Man/Day (Plan)	Man/Day (Actual)				
Staff :	PORSIP W.	460197						
Role :	SA							
	0.00	5.00	25.00	20.00	25.00	20.00	0.00	1.00
Role :	PG							
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total of PORSIP W.								
	0.00	5.00	25.00	20.00	25.00	20.00	0.00	1.00
Staff :	PIMNGUEN K.	460192						
Role :	PG							
	0.00	2.50	10.00	0.00	10.00	0.00	1.00	1.00
Total of PIMNGUEN K.								
	0.00	2.50	10.00	0.00	10.00	0.00	1.00	1.00

Figure H.2. Summary Report



Project : Data Warehouse
Customer : ITTI Co., Ltd
Duration 01 July 2006 To 15 August 2006

Role	Person Incharge	System Analysis & Design										GRAND Total Of Man/Day (PLAN)	GRAND Total Of Man/Day (Actual)
		Plan					Actual						
		E	M	C	Man/Day	E	M	C	Man/Day				
SA	PORSIP W.	0.00	4.00	1.00	21.00	0.00	4.00	1.00	18.00		26.25	20.00	
PG	PIMNGUEN K.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		8.75	8.00	
PG	SUPAPORN R.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		7.50	6.00	
Total of Job Report for Production					21.00				18.00		42.50	34.00	

Figure H.3. Performance Report



APPENDIX I

COST ANALYSIS OF CANDIDATE SOLUTION

Table I.1. Candidate System Matrix

Candidate System Matrix			
Characteristics	Candidate 1	Candidate 2	Candidate 3
Portion of System	Project Management System Program from Software House Corp. would be purchased and customized to satisfy the functionalities.	Project Management system	Same as candidate 2.
Benefits	The purchased solution can be quickly and easily implemented as it is the package software that ready for use in basic operations and functions.	Support user requirement in local area.	Fully supports user required business processes plus more efficient interaction with the Project Management.
Servers and Workstations	Technically architecture dictates Pentium 4,Ms Windows 2003 servers and workstations(clients)	Same as candidate 1.	Same as candidate 1.

Table I.1. Candidate System Matrix (Continued.)

Characteristics	Candidate 1	Candidate 2	Candidate 3
Software tools Needed	MS Visual Basic 6.0 Enterprise Edition and Crystal Report for customization of the package to provide report writing and integration	Microsoft Access 2003 and Microsoft Excel to produce the report	MS Visual Basic.NET and Crystal Report for customization of the package to provide report writing and integration
Application Software	Package solution	Custom solution	Custom solution
Method of Data Processing	Client/Server	Same as candidate 1.	Same as Candidate 1.
Output Devices and Implications	(2) Existing HP LAN laser printers	Same as candidate 1.	Same as candidate 1.
Input Devices and Implications	keyboard & mouse	Same as candidate 1.	Same as candidate 1.
Storage Devices and Implications	MS SQL Server DBMS with 100GB arrayed capability	MS Access DBMS	Same as candidate 1.

Table I.2. Payback Analysis (Candidate1) in Baht

Cash Flow Description	Years					
	0	1	2	3	4	5
Development Cost	-2,500,000					
Maintenance Cost	-	-80,000	-80,000	-80,000	-80,000	-80,000
Discount factor for 12%	1	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost (adjusted to present value)	-2,500,000	-71,440	-63,760	-56,960	-50,880	-45,360
Cumulative time-adjusted costs over lifetime	-2,500,000	-2,571,440	-2,635,200	-2,692,160	-2,743,040	-
						2,788,400
Benefits derived from operation of new system	0	900,000	990,000	1,089,000	1,197,900	1,317,690
Discount factor for 12%	1	0.893	0.797	0.712	0.636	0.567
Time-adjusted benefits (current of present value)	0	803,700	789,030	775,368	761,864	747,130
Cumulative time-adjusted benefits over lifetime	0	803,700	1,592,730	2,368,098	3,129,962	3,877,093
	0	1	2	3	4	5
Cumulative lifetime Time-adjusted costs + Benefits	-2,500,000	-1,767,740	-1,042,470	-324,062	386,922	1,088,693

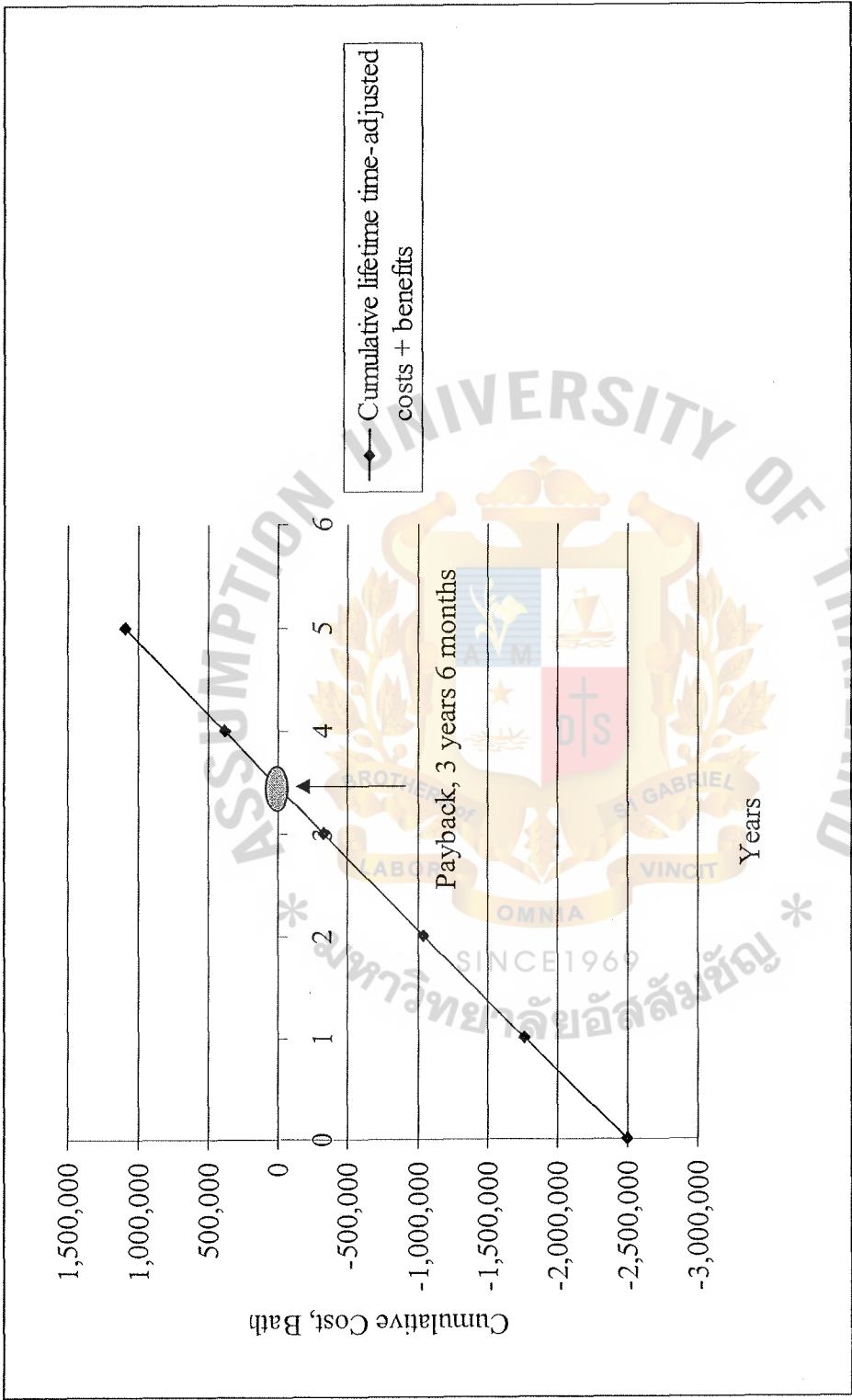


Figure I.1. Payback Analysis (Candidate1)

Table I.3. Payback Analysis (Candidate2) in Baht

Cash Flow Description	Years					
	0	1	2	3	4	5
Development Cost	-1,500,000					
Maintenance Cost	-	-80,000	-88,000	-96,800	-106,480	-117,128
Discount factor for 12%	1	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost (adjusted to present value)	-1,500,000	-71,440	-70,136	-68,922	-67,721	-66,412
Cumulative time-adjusted costs over lifetime	-1,500,000	-1,571,440	-1,641,576	-1,710,498	-1,778,219	-1,844,630
Benefits derived from operation of new system	0	900,000	990,000	1,089,000	1,197,900	1,317,690
Discount factor for 12%	1	0.893	0.797	0.712	0.636	0.567
Time-adjusted benefits (current of present value)	0	803,700	789,030	775,368	761,864	747,130
Cumulative time-adjusted benefits over lifetime	0	803,700	1,592,730	2,368,098	3,129,962	3,877,093
	0	1	2	3	4	5
Cumulative lifetime Time-adjusted costs + Benefits	-1,500,000	-767,740	-48,846	657,600	1,351,744	2,032,462

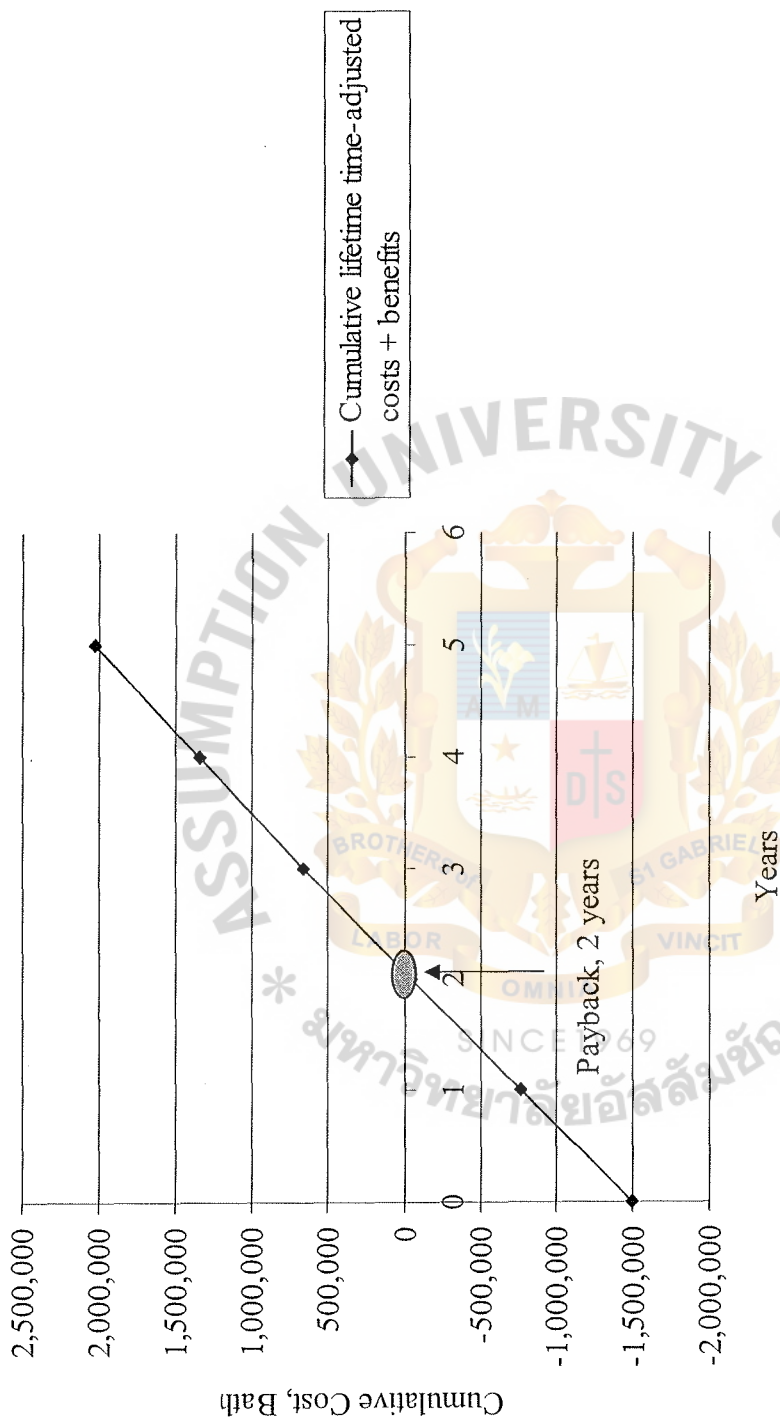


Figure I.2. Payback Analysis (Candidate2)

Table I.4. Payback Analysis (Candidate3) in Baht

Cash Flow Description	Years					
	0	1	2	3	4	5
Development Cost	-1,700,000					
Maintenance Cost	-	-20,000	-20,000	-20,000	-20,000	-20,000
Discount factor for 12%	1	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost (adjusted to present value)	-1,700,000	-17,860	-15,940	-14,240	-12,720	-11,340
Cumulative time-adjusted costs over lifetime	-1,700,000	-1,717,860	-1,733,800	-1,748,040	-1,760,760	-1,772,100
Benefits derived from operation of new system	0	900,000	990,000	1,089,000	1,197,900	1,317,690
Discount factor for 12%	1	0.893	0.797	0.712	0.636	0.567
Time-adjusted benefits (current of present value)	0	803,700	789,030	775,368	761,864	747,130
Cumulative time-adjusted benefits over lifetime	0	803,700	1,592,730	2,368,098	3,129,962	3,877,093
	0	1	2	3	4	5
Cumulative lifetime Time-adjusted costs + Benefits	-1,700,000	-914,160	-141,070	620,058	1,369,202	2,104,993

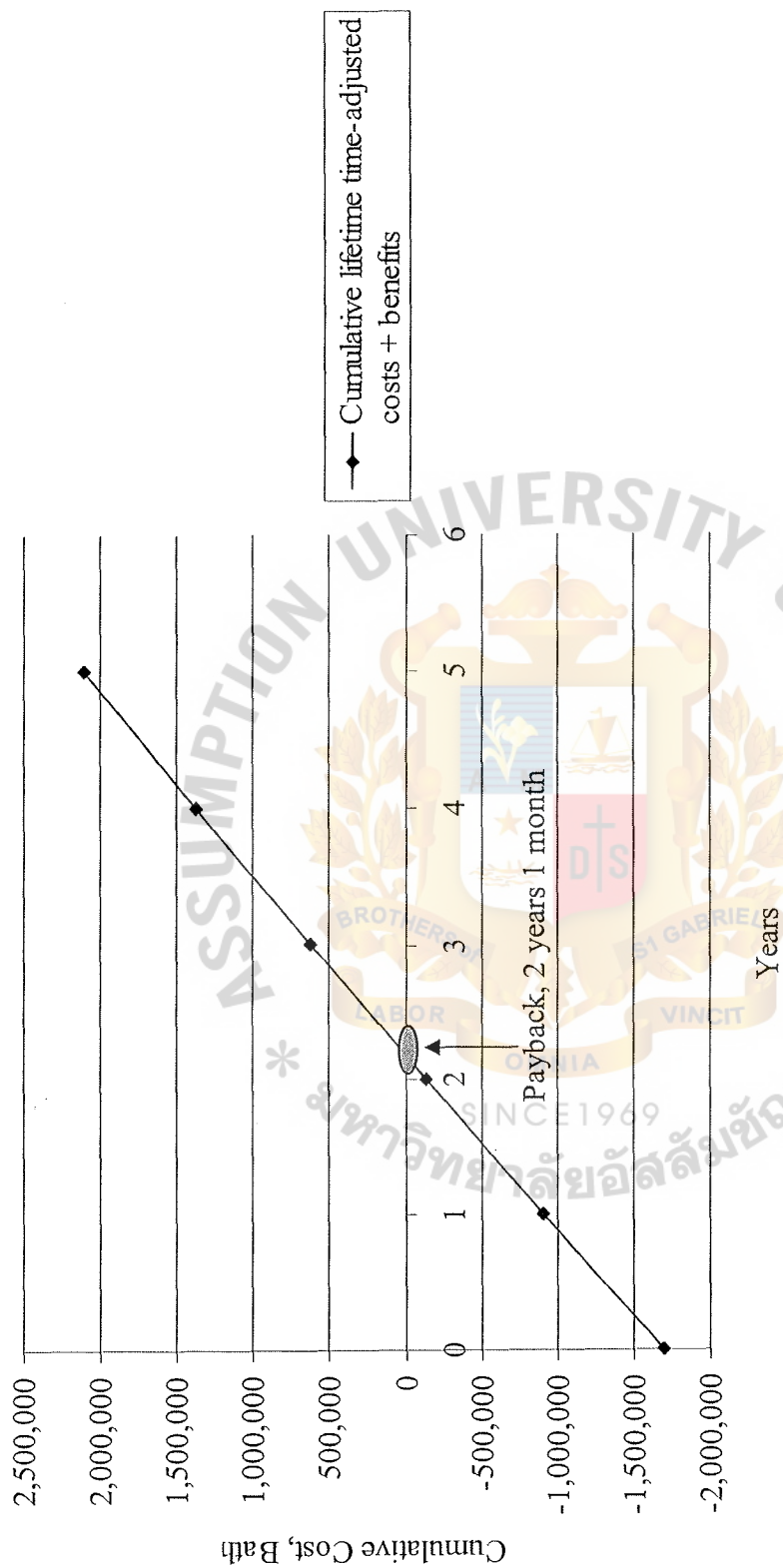


Figure I.3. Payback Analysis (Candidate3)

Table I.5. Net Present Value Analysis (Candidate1)

Cash Flow Description	Years					
	0	1	2	3	4	5
Development Cost	-2,500,000					
Maintenance Cost	-	-80,000	-80,000	-80,000	-80,000	-80,000
Discount factor for 12%	1	0.893	0.797	0.712	0.636	0.567
Present Value of Annual costs	-2,500,000	-71,440	-63,760	-56,960	-50,880	-45,360
Total present value of lifetime costs						-2,788,400
Benefits derived from operation of new system	0	900,000	990,000	1,089,000	1,197,900	1,317,690
Discount factor for 12%	1	0.893	0.797	0.712	0.636	0.567
Present value of annual benefits	0	803,700	789,030	775,368	761,864	747,130
Total present value of Lifetime benefits						3,877,093
NET PRESENT VALUE OF THIS ALTERNATIVE						1,088,693

Table I.6. Net Present Value Analysis (Candidate2)

Cash Flow Description	Years						Total
	0	1	2	3	4	5	
Development Cost	-1,500,000						
Maintenance Cost	-	-80,000	-88,000	-96,800	-106,480	-117,128	
Discount factor for 12%	1	0.893	0.797	0.712	0.636	0.567	
Present Value of Annual costs	-1,500,000	-71,440	-70,136	-68,922	-67,721	-66,412	
Total present value of lifetime costs							-1,844,630
Benefits derived from operation of new system	0	900,000	990,000	1,089,000	1,197,900	1,317,690	
Discount factor for 12%	1	0.893	0.797	0.712	0.636	0.567	
Present value of annual benefits	0	803,700	789,030	775,368	761,864	747,130	
Total present value of Lifetime benefits							3,877,093
NET PRESENT VALUE OF THIS ALTERNATIVE							2,032,462

Table I.7. Net Present Value Analysis (Candidate3)

Cash Flow Description	Years						Total
	0	1	2	3	4	5	
Development Cost	-1,700,000						
Maintenance Cost	-	-20,000	-20,000	-20,000	-20,000	-20,000	
Discount factor for 12%	1	0.893	0.797	0.712	0.636	0.567	
Present Value of Annual costs	-1,700,000	-17,860	-15,940	-14,240	-12,720	-11,340	
Total present value of lifetime costs							-1,772,100
Benefits derived from operation of new system	0	900,000	990,000	1,089,000	1,197,900	1,317,690	
Discount factor for 12%	1	0.893	0.797	0.712	0.636	0.567	
Present value of annual benefits	0	803,700	789,030	775,368	761,864	747,130	
Total present value of Lifetime benefits							3,877,093
NET PRESENT VALUE OF THIS ALTERNATIVE							2,104,993

Table I.8. Existing system Cost

Cost Items	Years				
	1	2	3	4	5
Fixed cost:					
Hardware Cost:					
Hardware Maintenance Cost	30,000	30,000	30,000	30,000	30,000
Total Fixed Cost	30,000	30,000	30,000	30,000	30,000
Operating Cost:					
<i>Salary Cost:</i>					
Manager 1 person @ 40,000	480,000	528,000	580,800	638,880	702,768
Admin Staff 5 person @ 15,000	900,000	990,000	1,089,000	1,197,900	1,317,690
<i>Total monthly salary cost</i>	100,000	110,000	121,000	133,100	146,410
<i>Total annual salary cost</i>	1,380,000	1,518,000	1,669,800	1,836,780	2,020,458
<i>Office Supplies & Miscellaneous:</i>					
Stationery	2,500	2,750	3,000	3,300	3,600
Paper	3,500	3,850	4,200	4,550	5,000
Utility	4,000	4,400	4,800	5,200	5,600
Miscellaneous	1,000	1,100	1,200	1,300	1,400
<i>Total office supplies & miscellaneous</i>	11,000	12,100	13,200	14,350	15,600
Total Operating Cost	1,391,000	1,530,100	1,683,000	1,851,130	2,036,058
Total Cost	1,421,000	1,560,100	1,713,000	1,881,130	2,066,058
Accumulated Cost	1,421,000	2,981,100	4,694,100	6,575,230	8,641,288

Table I.9. Proposed system Cost

Cost Items	Years				
	1	2	3	4	5
Fixed cost:					
Hardware Cost:					
Hardware Maintenance Cost	10,000	10,000	10,000	10,000	10,000
Total Maintenance Cost	10,000	10,000	10,000	10,000	10,000
Software Cost:					
Development Cost	1,700,000	0	0	0	0
Software Maintenance Cost	20,000	20,000	20,000	20,000	20,000
Total Software Cost	1,720,000	20,000	20,000	20,000	20,000
Total Fixed Cost:	1,730,000	30,000	30,000	30,000	30,000
Operating Cost:					
Salary Cost:					
Manager 1 person @ 40,000	480,000	528,000	580,800	638,880	702,768
Admin Staff 2 person @ 15,000	180,000	198,000	217,800	239,580	263,538
Total monthly salary cost	70,000	77,000	84,700	93,170	102,487
Total annual salary cost	660,000	726,000	798,600	878,460	966,306
Office Supplies & Miscellaneous:					
Stationery	1,500	1,750	2,000	2,250	2,500
Paper	2,500	3,000	3,400	3,800	4,200
Utility	3,000	3,300	4,800	5,200	5,600
Miscellaneous	1,000	1,100	1,200	1,300	1,400
Total office supplies & miscellaneous	8,000	9,150	11,400	12,550	13,700

Table I.9. Proposed system Cost (Continued.)

Total Operating Cost	668,000	735,150	810,000	891,010	980,006
Total Computerized Cost	2,398,000	765,150	840,000	921,010	1,010,006
Accumulated Cost	2,398,000	3,163,150	4,003,150	4,924,160	5,934,166



Table I.10. Five year existing system cost

Year	Total Cost	Accumulate Cost
1	1,421,000	1,421,000
2	1,560,100	2,981,100
3	1,713,000	4,694,100
4	1,881,130	6,575,230
5	2,066,058	8,641,288
Total	8,641,288	

Table I.11. Five year proposed system cost

Year	Total Cost	Accumulate Cost
1	2,398,000	2,398,000
2	765,150	3,163,150
3	840,000	4,003,150
4	921,010	4,924,160
5	1,010,006	5,934,166
Total	5,934,166	

Table I.12. Accumulated Cost Comparison of the existing and proposed system

Year	Accumulated Existing System Cost	Accumulated Proposed System Cost
0	1,421,000	2,398,000
1	2,981,100	3,163,150
2	4,694,100	4,003,150
3	6,575,230	4,924,160
4	8,641,288	5,934,166

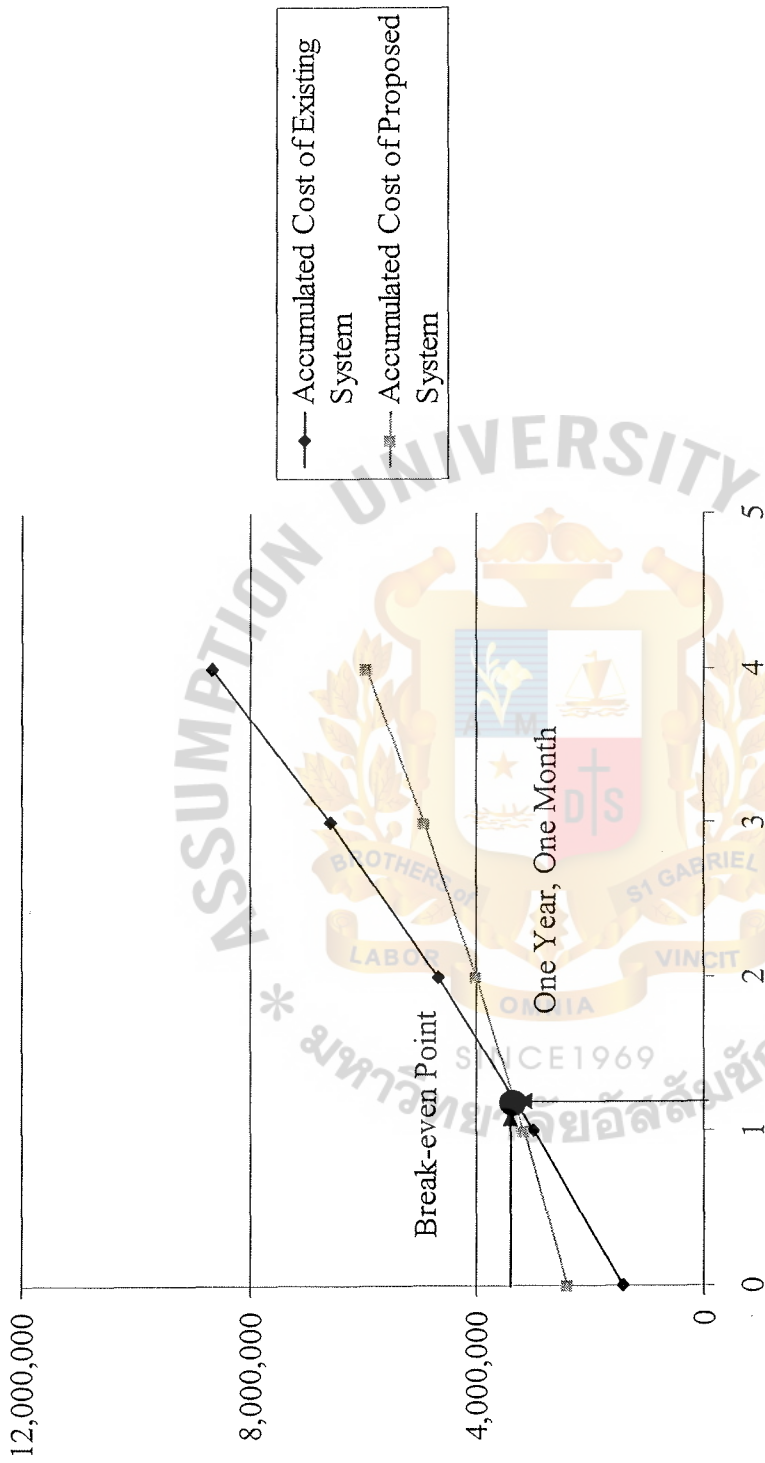


Figure I.4. Accumulated Cost Comparison of existing and proposed system

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