Recruitment Service Information System for BISCO Placement Co.,Ltd.

by

Ms. Proadpran Phimanratana

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

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

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Project Title	Recruitment Service Information System for BISCO Placement Co., Ltd.
Name	Ms. Proadpran Phimanratana
Project Advisor	Assoc.Prof.Dr. Ouen Pin-ngern
Academic Year	July 2003

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

Approval Committee :

(Assoc.Prof.Dr. Ouen Pin-ngan)
Advisor

(Prof.Dr. Srisakdi Charmonman)
Chairman

(Air Marshal Dr. Chulit Meesajjee)
Dean and Co-advisor

(Asst.Prof.Dr. Vichit Avatchanakorn)
Member

(Assoc.Prof.Dr. Somchai Thayarnyong)
MUA Representative

July 2003

ABSTRACT

This project presents system analysis and design in Recruitment Service Information System for BISCO Placement Company Limited. The current system is the manual system that generates the problem in performing efficiently and effectively in the business operation.

The current system has shown the delay of recruitment activities process as the new system design phase will cover the new computerized system to increase the performance of over all related activities and the organization.

The proposed system is expected to provide easy-to-use computer application. The information is more precise, updated, and can be gathered quicker for the operational functions, as the system will manage the standardized procedures to benefit all operational functions.

ACKNOWLEDGEMENTS

This project is completely done according to the advice from those who have guided it. The writer would like to thank them for their dedication, time, useful guidance and suggestion, especially the advisor of this project, Assoc.Prof.Dr. Ouen Pin-ngern, who provided many helpful suggestions and ideas throughout the whole course.

Moreover, the writer appreciates the suggestions from respected committee members, Air Marshal Dr. Chulit Meedajjee, Prof.Dr. Srisakdi Charmonman, Asst. Prof.Dr. Vichit Avatchanakorn and Assoc.Prof. Somchai Thayarnyong, the Project Committee Members of Graduate School.

Finally, the writer would like to thank those who have read, reviewed and commented on this project.

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1.1 Background of the Project

Due to the increase of foreign labor demand today, the recruitment business is a major business in supporting the rapid growth of this industry. Regardless of how the process is organized, the manpower system is always an essential focal point. The recruitment company represents the workers and the employers, and is the key source of information pertaining to the services offered. It is the place where the training and testing takes place and typically serves as a sounding board for worker or client complaints. From Bisco's perspective, the recruitment company is the liaison between management and the coordination of all client services. The manpower service serves as the main channel of communication and information for the company and is the central point of the company's business activity. The majority of recruiting companies earn the bulk of their revenue and profits from workers commission fees, and testing fees, so it is essential that the manpower department be well organized to maximize recruitment, and to make the testing process efficient.

The manpower function is not only responsible for the recruitment but also responsible for dissemination of information, coordination of worker/client services, charting of status reports, record worker history files, maintenance of client accounts, settlement and collection of worker accounts and providing managerial reports for management. To control the accuracy and efficiency of data in each transaction is difficult for the existing recruitment service information system, which is basically a paper system. From this cause it is necessary for the recruitment service process to improve the existing system to the proposed system which is more efficient and well designed in order to operate and process all the recruitment service functions effectively

accurately and without being time consuming.

Therefore, the proposed recruitment service information system will be able to reduce a lot of paperwork and generate all reports such as recruitment report, revenue report, statistical reports and any managerial job easily. Finally, the company can gain more benefits and able to reduce some costs by using this proposed system.

1.2 Objectives of the Project

The project proposes to develop the existing manual system to the new system that can run on Windows platform in order to support all functions of the recruitment service information system. This project can enhance the business function in terms of capability and control by using a new computerized database, which contains all the necessary information for recruitment tasks. The objectives of this project are as follows:

(1) To analyze the existing system and design the new computerized system for more effective works.

(2) To identify user requirements.

(3) To identify business requirements.

(4) To identify information system requirements.

(5) To design the new computerized system for more effective works to the recruitment service information system.

(6) To improve the efficiency and effectiveness of the organization about recruitment service information system.

(7) To utilize the use of database approach to generate the variety of information report which is valuable to the management decision making process.

1.3 Scope of the Project

The project covered major parts of the recruitment service information system which can be described as follows:

(1) Support information for manpower department which the recruitment division will select the qualified worker or recruit new applicant for other required and record the updated information.

(2) The quota acquired which include name of client, type of demand order, dates of issue and receipt and the quota remain and used will be recorded as historical data to support the management decision making.

(3) The paper work will be replaced to be the computerize system and need to generate the processing report in a period of time.

(4) The departed worker information will be recorded to support the support division to solve the worker problem.

1.4 Deliverables

The deliverables of the recruitment service information system include:

(1) Data Modeling for Recruitment Service Information System

(2) Process Modeling for Recruitment Service Information System

(3) Input and Output Screen for Job Application Record

(4) Application Report

(5) Applicant In-Hand Verification Input and Output Screen

(6) Applicant In-Hand Verification Report

(7) Application Consolidation Input and Output Screen

(8) Testing Report

(9) Quota Registration Input and Output Screen

(10) Visa Application Input and Output Screen

(11) Visa Submission Report

(12) Quota Registration Input and Output Screen

(13) Official Document and Report

(a) By Quota

(b) By Monthly

(14) Mobilization Input and Output Screen

(15) Mobilization Report

1.5 Project Plan

The project plan of Recruitment Service Information System for BISCO Placement Co., Ltd. will be shown in Figure 1.1.

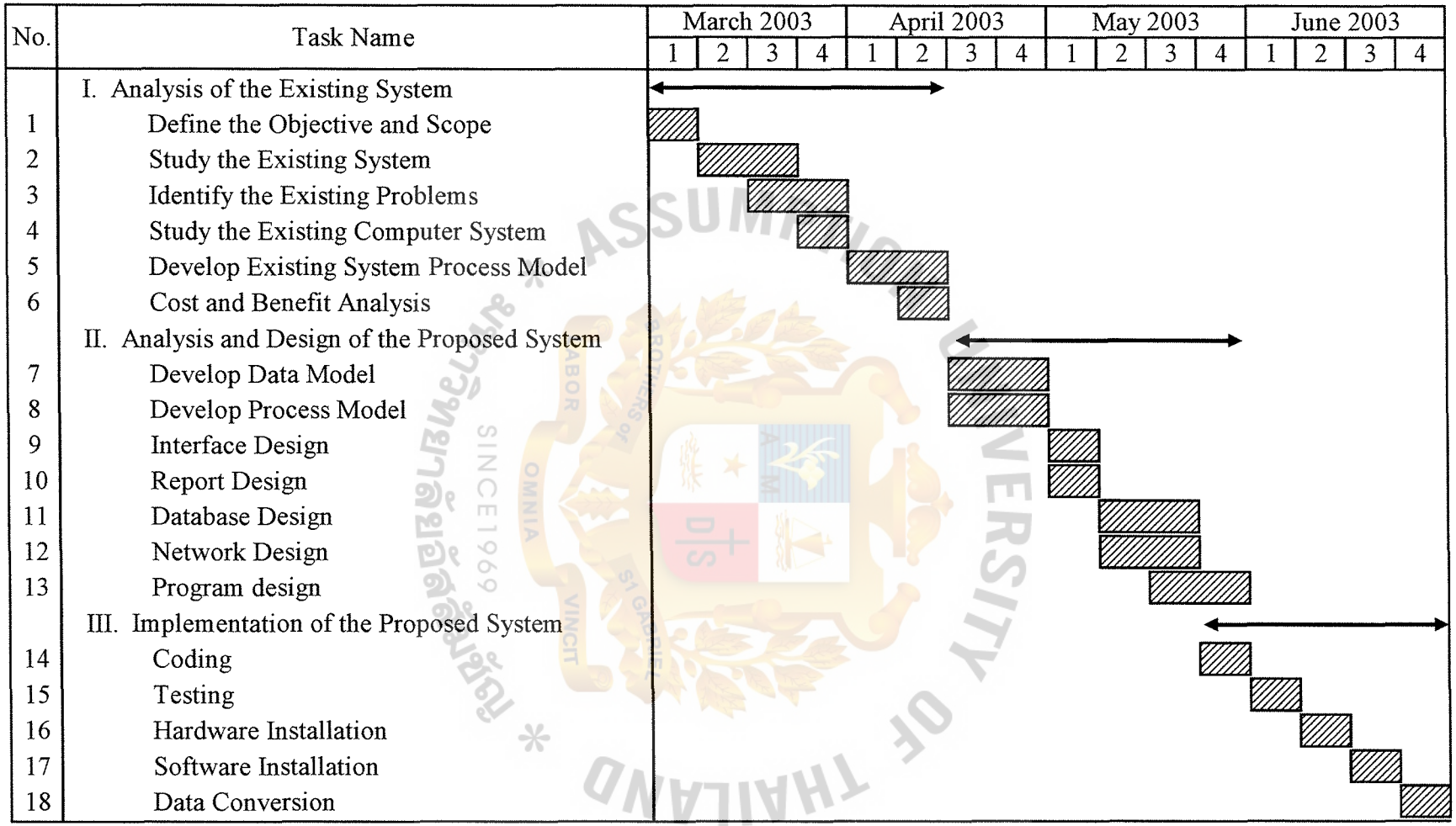

Figure 1.1. Project Plan of Recruitment Service Information System.

II. THE EXISTING SYSTEM

2.1 Background of the Company

BISCO Placement Co., Ltd., the land stands on the area of 3,200 square meter and Building is located on 1,600 square meter of land in 387 Onnut 39, Sukhumvit 77 Road, Pravet District, Bangkok, is a government approved and licensed (No. Tor 5122/2530) for overseas recruitment agency and has placed a guarantee bond of 5 million baht as surety. BISCO Placement Co., Ltd. was founded in 1987 as a dynamic and energetic manpower agency recruiting Thai skilled workers for overseas employment primarily in the construction, mechanical and manufacturing industries. Employers can be assured that all recruitment activities comply with the labour export laws of Thailand.

For the past 14 years, BISCO have serviced foreign companies with successfully recruited and dispatched thousands of workers to such diverse countries as Taiwan, Singapore, Saudi Arabia, Brunei, Kuwait and Libya. BISCO has received a Letter of Commendation for its recruitment activities and acknowledging it to be "one of the leaders in recruitment" and recommending its services to employers.

BISCO Placement Co., Ltd. has 4 major departments in running business as follows:

(1) Training and Testing Department

The primary function is pre-testing and pre-qualifying manpower prior to participation on train and test programs or for final selection in cases where international skill certification is not required.

(2) Marketing Department

Marketing Department is responsible to propose the recruitment service to the oversea clients and prepare quotations for manpower supply,

handle the demand orders and to review and approve the demand orders to ensure that they can be met in accordance with company abilities and standards.

(3) Manpower Department

The department is responsible for processing the manpower supply. The main duties are labor recruitment, selection procedure, expatriation processing, manpower deployment, arrival service and ongoing support.

(4) Accounting Department

The department deals with all accounting and financing function.

The organization chart will be shown in Figure 2.1.

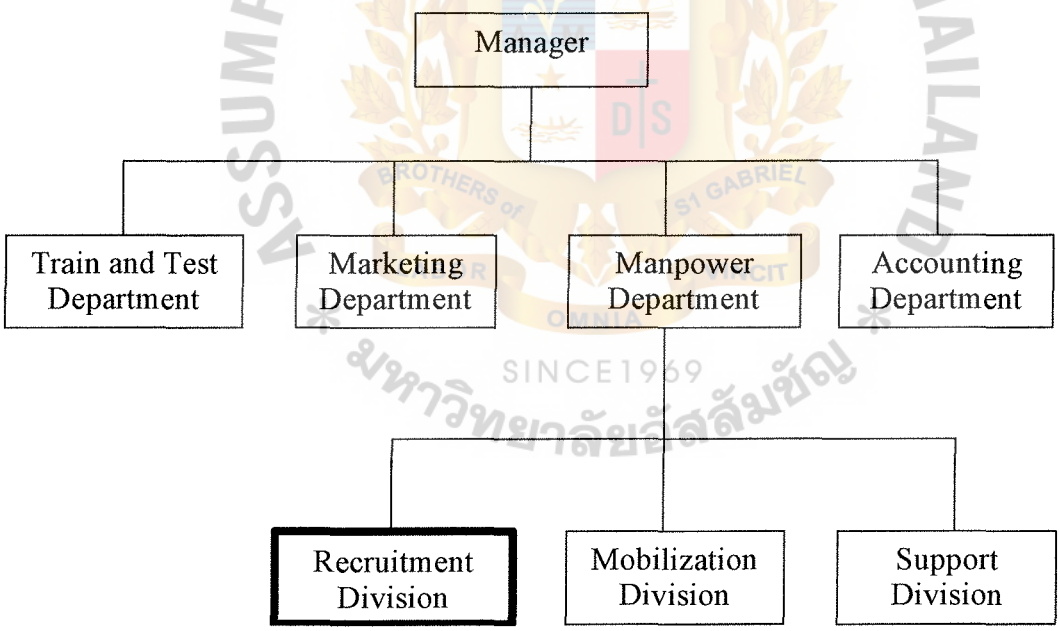

Figure 2.1. Bisco Placement Co., Ltd. Organization Chart.

2.2 Existing Business Function

Recruitment Services companies are different from most other business enterprises based upon their treatment of the worker who is perceived as a customer, the services they offer, and their unique accounting and information system structure. Recruitment service business comprises the business that provides services, primarily recruitment of workers, and testing and qualification of these workers. The maintenance of accurate qualified worker availability status and identification of the client and the client's specific needs are critical to coordination of the recruitment services. The majority of recruitment services companies earn the bulk of their revenue and profits from the contracted worker commission fees, so it is essential that the administration department be well organized to maximize recruitment and contracting. The administration office business functions is shown in Figure 2.2 and explained below.

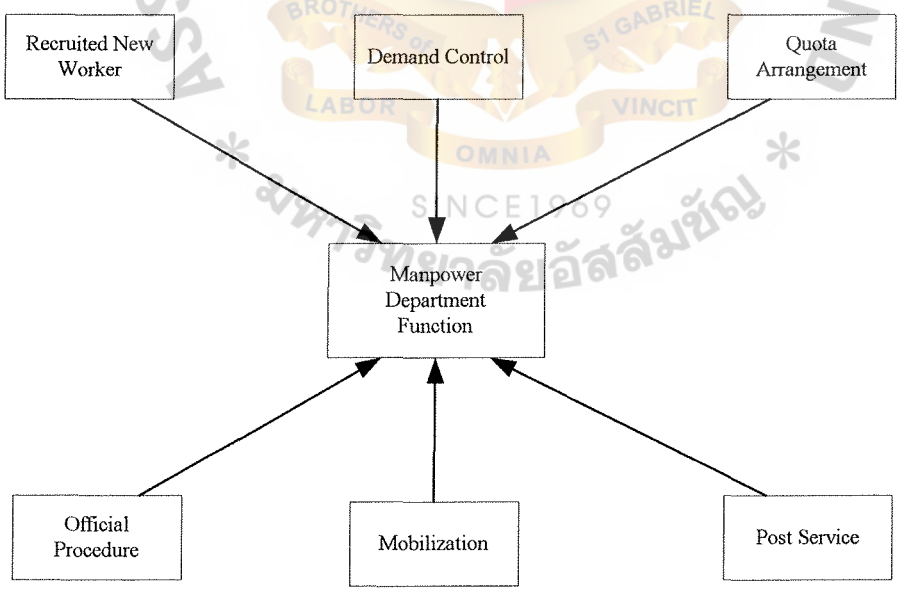

Figure 2.2. Manpower Department Function Diagram.

(1) Recruited New Worker

The most obvious and important function performed at the manpower department function is the handling of the new recruitment process, after the company has been hired by the overseas client. The main purpose of the company is to maximize the number of hired workers, to guarantee the revenue. Within the realm of recruiting workers, the new recruitment process will be concerned with four aspects as: (1) finding prospective worker candidates; (2) testing and certification of applicants; (3) carrying out the registration procedure; and (4) selecting the qualified workers. The company accepts applications from the prospective workers. The application can be made by mail, with an agent, or in person at our office. Additionally, agents often intervene and lead to an application and therefore a note of commissioned hiring may need to be made. Upon acceptance the application is processed and a record of the expected testing and/or certification dates, worker data, required qualifications, and any additional information is recorded. A letter or notice of testing and/or confirmation is sent to the worker at the completion of the application process.

(2) Demand Control

After the oversea clients agreed to use the company service, they will pass the power attorney and demand letter to the company to recruit workers on their behalf. The manpower department has responsibility to control demand availability and qualification of the selected workers to meet the clients needed. Furthermore, the department is certainly the main source of worker information and processing. The office's answers to questions concerning job qualification testing procedure or commission fees will

certainly be important to the workers' selection among alternatives. In addition the information about the internal services, the department is normally called upon to furnish information about the overseas environment. Hence, one of the important support functions of the department is to provide accurate information concerning the internal and external about the company.

(3) Quota Arrangement

From the demand control function, each demand letter has specified quota number and quota quantities. The manpower department will arrange the workers and quota according to the client requested. The client will get the collection of worker registration information, after selected, is recorded and assembled in an inactive worker file for future process. The data normally is used as market tool by the company. Such questions as: Who were our workers? Where does our market come from? How many persons, on average, do we send every month? can be answered simple evaluative techniques. The development of long-range marketing strategy should be enhanced given that the company has some knowledge of the client who it is catering to and attracting. This type of information certainly can be of significant value to the company. Management may be unaware of the existence of the data found in the worker history file and the manpower department may have to initiate the classifying and profiling of the company's clients.

(4) Official Procedure

The main part of manpower department function is to process official function. The department office process generates the official documents

and reports to submit to Thai Labor Department to approve. The documents need to be precise and accurately to avoid the rejection which will cause delayed process. The official documents are comprised of The Approval of the Recruitment Labor to Work Oversea Letter (Jor Tor 2), The Approval of Mobilization Labor to Work Oversea Letter (Jor Tor 3), The Worker Name List (Jor Ngor 11), The Employemt Contract Agreement, etc. The approval document can be published to the workers in order to use to be the reference for their financial process. The recruitment part will pass the workers' necessary documents, which are ID card copied, House Registration copied, Medical Report, Military Service Certificate and photo, to the manpower department to process the official document. After re-checking process, these documents will be delivered to Thai Labor Department for the approbation.

(5) Mobilization

After the company has approved from the Thai Labor Department, the marketing section will contact the clients for preparing mobilized the workers. The coordination of worker services is direct responsibility of the administration office, and is the branch of the company organization that meshes the front- and the back-of-the-house areas. All in at the administration office performs the document function that leads to the coordination of the service and non-service departments with the workers' requirements. Manpower department will arrange the departing procedure and transportation according to various countries. Workers will be informed the schedule and necessary information about go working aboard. The

workers need to sign the employment agreement contract with the company which will be used for post service reference documents.

(6) Post Service

The Manpower Department is also required to provide the company with an accurate status of each worker at any point in time. The status of each worker is essential knowledge to the working of the post service (especially in terms of assignment) and the recruiting department. One of the most essential roles of the manpower function is to keep served as the liaison between the workers and the clients. Additionally, the department also serves as a sounding board of worker and client complaints, and as a reporting booth for related problems. Once the company becomes aware of worker dissatisfaction or unrest, correctives can be initiated which may enhance the stay abroad, or at least reduce the worker's discomfort.

The company is notorious for generating volumes of paperwork that document the worker's records and documents, and often finds itself inefficient due to overloading. The source of documentation that proves the specifics of a worker's professional/personal information and payments, is the minimum requirement for data input into an effective information system. What normally happens is that a record of a given event, is made at least once in the recruitment or testing department and then sent to the manpower department for posting to the worker's file. Hence, the redundancy in processing and unnecessary reentry of the same piece of data needs to be resolved. Hence as in other aspects of the manpower office, sophisticated data processing technology evolving with the intent of minimizing the handling and tedious processing of company data.

2.3 Current Problems Analysis and Areas for Improvements

2.3.1 Current Problem

By analyzing problem of the existing recruitment service information system using **PIECES** framework: **P** - the need to improve **Performance**; **I** - the need to **Information** (and data); **E** - the need to improve **Economics**, control costs or increase profits; **C** - the need to improve **Control** or security; **E** - the need to improve **Efficiency** of people and processes; **S** - the need to improve **Service** to workers, clients, partners, employee, etc. so the current problems, opportunities and directives of the existing system can be summarized as follows:

Performance

(1) Throughput which is the amount of work performed over some period of time is very low. In the high season, or favorable economic times, when the company has a lot of workers coming through, the existing system can perform in average about 70-80 workers per day for the process of testing and certification, processing documentation, check availability of qualified workers, worker registration, testing assignment and departure of workers. The system takes a lot of time to operate those events so it suffers very much when checking on the status of the workers.

(2) Response time, which is the average delay between a request and a response to that request, is very slow. When the system has a lot of processing, response time is about 15-20 minutes per one worker to complete the registration process, so it effects the number of throughput.

(3) The existing system is not reliable. The system is easy to crash, or papers get misplaced, if it has to handle a lot of processing at the same time.

Information

(1) Information is not accurate and contains some redundancy.

(2) Information is difficult to produce. The procedure of generating report is complex and cumbersome. It is very difficult to prepare statistical and managerial reports for decision-making process of the directors.

(3) Input data is difficult to control the accuracy and redundancy.

(4) Error of input data can make worker registration process difficult and time consuming.

(5) The same data is captured more than once or contains some errors.

(6) Data is stored redundantly in multiple files and/or databases so it is difficult and takes time to search worker profiles and update/insert/delete or query worker history.

(7) Stored data (e.g. worker profile, worker history) is not accurate.

(8) Data is not flexible which means data is not easy to meet new information needs from stored data.

(9) The system has no feature in back up and recovery process for the stored data in case of the system crashed or unexpected situation.

Economics

(1) Costs of this project are unknown.

(2) Costs are untraceable to source.

(3) A lot of paperwork involved in the system can be reduced.

(4) The existing administration office system can be improved.

(5) The number of administration office services can be increased.

Control

The existing system has too little security or control so:

(1) Input data is not adequately edited.

(2) Crimes (e.g. fraud, embezzlement) are (or can be) committed against data.

(3) Redundantly stored data (e.g. worker profile) is inconsistent in different files or databases.

(4) Data privacy regulations or guidelines are being (or can be) violated.

(5) Processing errors is occurring either by people, machines, or software.

(6) Decision-making error is occurring. The wrong decision comes from the inaccurate data or information.

Efficiency

(1) People (e.g. administration staff or workers), machines or computers waste time.

(a) Data is redundantly input or copied.

(b) Data is redundantly processed.

(c) Information is redundantly generated.

(2) Lack of computer skills resulted in information redundancy and delay in processing.

(3) Effort required for tasks is excessive e.g. it is very important to process accurate official document and due to a lot of information to key in per day, the administration officer can make some mistakes.

(4) Materials required for tasks are excessive.

Service

(1) The system produces inaccurate results.

(2) The system is not easy to learn and use.

(3) The system is inflexible to change or inflexible to new or exceptional situations.

(4) The system is incompatible with other systems.

(5) The system is not coordinated with other systems.

2.3.2 Areas of Improvement

The areas for improvements of the existing system can be summarized as follows:

(1) Relational Database is recommended in order to be easy for updating, or changing any information. In addition, it can prevent data redundancy.

(2) Reduce processing time by using computerized system.

(3) The technology and system for this new system must be widely accepted including hardware and software.

(4) Security and control system must be developed in order to protect the confidential information from unauthorized persons.

(5) The system must be designed for further expansion.

III. THE PROPOSED SYSTEM

3.1 Requirements Analysis and System Specification

The major requirement for the proposed recruitment service information system is not only to try to solve the current problems from the existing recruitment service system but also to try to improve the recruitment service system in order to have a better performance in process and maintain information needed for operation and management. The proposed recruitment service information system will be able to handle all functions of the recruitment service especially related to the reservation functions, produce the required reports and view or search for information of the recruitment system. The system specification has to provide the main functions as advance recruitment service, demand control, quota registration, official process, mobilization, post service, and generating reports.

From the information gathering or fact-finding and analyzing the existing system, the user requirements and system specifications are categorized as function and nonfunctional requirements in order to make them more readable, understandable and traceable as follows:

(a) Functional requirement - is a function or feature that must be included in the recruitment service information system to satisfy the business need and be acceptable to the users.

(1) The system should process recruitment system since recruited new worker, application process, quota registration process, checking demand control, mobilization arrangement until provide after service information after the end of process.

(2) The system should record application details, applicant profiles, worker profile, worker history and other related information.

(3) The system should handle and quickly determine job qualification and quota available for worker selection and booking for the quota.

(4) The system should modify the applicant and worker profile and history.

(5) The system should produce all required reports such as daily and monthly process report, statistic report, revenue report, and other managerial reports.

(b) Nonfunctional requirement – is a description of the features, attributes, and characteristics of the system as well as any constraints that may limit the boundaries of the proposed solution. The PIECES framework from problem analysis is used for classifying nonfunctional requirements as follows :

Performance

(1) The acceptable throughput is about 200-250 per day.

(2) The acceptable response time for completing all check in transactions is reduced to about 5-10 minutes per one guest.

Information

(1) The input data should have validation and verification checking for accuracy and reduce redundancy.

(2) The system should be able to operate and store data in both Thai and English and in an appropriate format.

(3) The system should insert, update, delete and search the information easily and quickly.

(4) The required information should be operated and retrieved easily and not have a lot of time consuming.

(5) Data stored should be well designed, accurate and have no redundancy.

Economics

(1) The transaction cost and paperwork must be reduced.

(2) The project should be finished within the budget.

(3) The system should be able to increase the number of workers and be able to compete with the job demand and other competitor companies.

(4) The project should finish and implement the new recruitment service information system within 5 months.

Control (and security)

(1) The system should be more reliable and able to handle a lot of processes and data simultaneously.

(2) The system should handle the job demand years in advance.

(3) The system should provide the security and access control.

(4) The system should provide the backup and recovery function to protect against the loss of data.

Efficiency

(1) The system should reduce some duplicated step in the recruitment process.

(2) Job qualifications and quota available can be reviewed easily and accurately.

(3) Job qualifications details, applicant profile and required information can be reviewed and checked immediately as required.

(4) All information for servicing to the applicants and clients can be checked easily and quickly.

(5) The system should produce all reports without time consuming.

Service

(1) The system should use Graphic User Interface design on Window platform instead of text mode which provides more user friendly for the administration officer.

(2) The system should be able to give all related information after input keyword only once.

(3) The system should allow users to define any type of reports.

(4) The system should be compatible for new trend of technology in the future.

3.2 Feasibility Analysis

Feasibility analysis is appropriate to the system analysis but particularly important to the decision analysis. Feasibility is the measure of how beneficial or practical the development of the recruitment service information system will be to Bisco Placement Company. Feasibility analysis is the process by which feasibility is measured.

In decision analysis, we must first identify alternative candidate solutions in form of a candidate matrix, which is a useful tool for effectively capturing, organizing and comparing the characteristics for different candidate system solution. Each candidate system solution must be analyzed for feasibility. A candidate matrix is analyzed based on characteristics of Interface, Data, Processes and Geography.

The second matrix is the feasibility analysis matrix, which complements the candidate systems matrix with an analysis and ranking of the candidate system. Feasibility analysis matrix corresponds to the same candidate solution as shown in the candidate system matrix. There are four categories of feasibility tests:

(1) Operational feasibility is a measure of how well the solution will work in the company. It is also a measure of how people feel about the recruitment system.

(2) Technical feasibility is a measure of the practicality of a specific technical solution and the availability of technical resources and expertise.

(3) Schedule feasibility is a measure of how reasonable recruitment service information system project timetable is.

(4) Economic feasibility is a measure of the cost-effectiveness of the recruitment service information system project or solution. This is often called a cost-benefit analysis because it deals with the costs and benefits of the information system.

The candidate systems matrix and feasibility analysis matrix will be shown in Tables 3.1 and 3.2 respectively.

Table 3.1. A Candidate Systems Matrix.

Characteristics	Candidate 1	Candidate 2	Candidate 3
Portion of System Computerized Brief description of that portion of the system that would be computerized in this candidate.	COTS package would be purchased and customized to satisfy required recruitment functionality.	Hiring the outsource company to analyze and develop the new recruitment system.	Same as candidate 2.
Benefits Brief description of the business benefits that would be realized for this candidate.	This solution can be implemented quickly because it's a purchased solution.	Fully supports user required business processes for recruitment system of Bisco Placement Company.	Same as candidate 2. Plus more efficient in dealing with user for any additional requirements.
Servers and Workstations A description of the servers and workstations needed to support this candidate.	Technically architecture dictates Pentium IV, MS Windows 2000 class servers and workstations (clients).	Same as candidate 1.	Same as candidate 1.
Software Tools Needs Software tools needed to design and build the candidate (e.g., database management system, emulators, operating systems, languages, etc.). Not generally applicable if applications software packages are to be purchased.	COTS package to provide report, integrity and customization MS SQL Server.	Delphi 5 to code program and Crystal Report to generate all required reports.	MS Visual Basic 6.0 to code program and Crystal Report to generate all required reports and the other additional reports.

Table 3.1. A Candidate Systems Matrix (Continued).

Characteristics	Candidate 1	Candidate 2	Candidate 3
Application Software A description of the software to be purchased, built, accessed, or some combination of these techniques.	Package Solution	Custom Solution	Same as candidate 2.
Method of Data Processing Generally some combination of: on-line, batch, deferred batch, remote batch, and real-time.	Client/Server Architecture.	Same as candidate 1.	Same as candidate 1.
Output Devices and Implications A description of output devices that would be used, special output requirements (e.g., network, preprinted forms, etc.) and output considerations (e.g., timing constraints)	(1) Fujitsu dot matrix printers. (1) HP Laser Jet (1) HP DeskJet	Same as candidate 1.	Same as candidate 1.
Input Devices and Implications A description of input methods to be used, input devices (e.g., keyboard, mouse, etc.), special input requirements (e.g., new or revised forms from which data would be input), and input considerations (e.g., timing of actual inputs).	Keyboard and mouse.	Same as candidate 1.	Same as candidate 1.

Table 3.1. A Candidate Systems Matrix (Continued).

Characteristics	Candidate 1	Candidate 2	Candidate 3
Storage Devices and Implications Brief description of what data would be stored, what data would be accessed from existing stores, what storage media would be used, how much storage capacity would be needed, and how data would be organized.	MS SQL Server DBMS with 250 GB arrayed capability.	Same as Candidate 1.	Same as Candidate 1.

Table 3.2. Feasibility Analysis Matrix.

Feasibility Criteria	Wt.	Candidate 1	Candidate 2	Candidate 3
Operational Feasibility Functionality. A description of to what degree the candidate would benefit the organization and how well the system would work. Political. A description of how well received this solution would be from both user management, user, and organization perspective.	30%	Some current recruitment business processes would have to be modified to take advantage of software functionality Score : 60	Fully supports user required and recruitment functionality. Score : 100	Same as candidate 2 Score : 100
Technical Feasibility Technology. An assessment of the maturity, availability (or ability to acquire), and desirability of the computer technology needed to support this candidate. Expertise. An assessment of the technical expertise needed to develop, operate, and maintain the candidate system.	30%	The package solution is easy and fast in implementation but maturity of product is a risk and company charges an additional monthly fee for technical support. Required to hire or train for COTS software package to perform modifications for integration requirements. Score : 65	Although all applications will be written by outsourcing programmers, company needs to hire programmers with some knowledge of Delphi and Crystal Report to maintain the new system. MS SQL Server is a mature technology based on version number. It is easy to find an expertise to take care the database. Score : 80	MS Visual Basic is one of the successful programming languages. The training will be simple and finding experienced programmers will be easy and much cheaper than other language programmers. MS Visual Basic is a mature technology based on version number. Score : 95

Table 3.2. Feasibility Analysis Matrix (Continued).

Feasibility Criteria	Wt.	Candidate 1	Candidate 2	Candidate 3
Economic Feasibility Cost to develop: Payback period (discounted): Net Present Value: Detailed calculations:	30%	 Approximately 564,000 Baht. Approximately 1 year 6 months Approximately 1,509,846 Baht. See Table 3.11, 3.12 & Figure 3.2, 3.3. Score : 60	 Approximately 573,500 Baht. Approximately 1 year 5 months Approximately 1,625,245 Baht. See Table 3.13, 3.14 & Figure 3.4, 3.5. Score : 50	 Approximately 1,079,100 Baht. Approximately 1 year 3 months Approximately 1,678,245 Baht. See Table 3.15, 3.16 & Figure 3.6, 3.7. Score : 55
Scheduled Feasibility An assessment of how long the solution will take to design and implement.	10%	Less than 4 months. Score : 90	9-12 months Score : 75	7-9 months Score : 80
Ranking	100%	64.5	76.5	83.0

Once the feasibility analysis has been completed for each candidate solution, we can compare the candidates and select one or more recruitment service system solutions to recommend to the company and administration officer who is the system owner and user respectively. From a feasibility analysis matrix (Table 3.2), after ranking or scoring all candidates on each criterion, the candidate system solution 3 has the highest scores which means the candidate system 3 offers the best overall combination of technical, operational, economic and schedule feasibility. Thus, the candidate system solution 3 is recommended to the Bisco Placement Company.

3.3 Data Modeling and Analysis

Data modeling is a technique for organizing and documenting the recruitment service system's data and sometimes called database modeling because it is eventually implemented as a database and defined business requirements for database. A simple logical data model called an entity-relationship diagram or ERD.

Entity Relationship Diagram (ERD) depicts data in terms of the entities and relationships described by the data. The first task in data modeling is to discover the fundamental entities in recruitment service system that are or might be described by data as shown in Table 3.3.

The next task in data modeling is to construct the context data model to establish the project scope. The context data model includes the fundamental business entities. We have completed this task in Figure A.1. The following task is a key-based data model. The key-based data model is to identify the key of each entity, eliminate nonspecific relationship and add associative entities. Figure A.2 is the key-based data model for the recruitment service information system project. Notice that the primary key is specified for each entity. The last task is a fully attributed data model. The fully attributed data model is to identify the remaining data attributes and sub setting criteria. Figure A.3 provides the fully attributed data model for the recruitment service information system project.

Table 3.3. Fundamental Entities for Recruitment Service Information System.

Entity Name	Business Definition
Applicant	The worker who walks in directly or agent provided to apply for the job is perceived as an applicant. The applicant will be registered to specific from his qualification or from testing.
Application Form	A form generated for keeping the applicant necessary information for recruitment process. For demand control function, applicant historical record will be required for fulfills unexpected demand requested.
Job	A worker demand requested from the client, which is approved to recruit oversea workers by the government. A job is divided to quota for separating group of workers.
Worker	The qualified applicant who is selected from the client or passes the test is perceived as a worker. A worker needs to submit necessary document for the record reference.
Quota	A specific job unit which is used to specify group of workers to go work in each job. A quota initiated by the job contactor.
Mobilization	A process event which the company provided service to the worker go work oversea.

3.4 Process Modeling

Process modeling is a technique used for organizing and documenting the structure and flow of data through the recruitment service system's processes and/or logic, policy, and procedures to be implemented by the recruitment service system's processes. The process modeling of recruitment service information system will be shown by the data flow diagram. Data flow diagram (DFD) depicts the flow of data through a system and the work or processing performed by recruitment service system.

(a) Context Data Flow Diagram

Before constructing process model, a system context data flow diagram is constructed to establish initial project scope. The context data flow diagram, which is illustrated in Figure B.1. defines the scope and boundary for the recruitment service information system project. Because the scope of the project is always subject to change, the context data flow diagram is also subject to constant change.

(b) Functional Decomposition Diagram

Decomposition is the act of breaking a system into its component subsystems, processes and subprocesses. A decomposition diagram, also called a hierarchy chart, shows the top-down functional decomposition and structure of a system. A functional decomposition diagram is drawn to partition the system into logical subsystems and/or functions. Figure B.2. is the functional decomposition diagram for the recruitment service information system project.

(c) Event diagram

An event is a logical unit of work that must be completed as a whole. An event is triggered by a discrete input to the recruitment service system

and is completed when the process of recruitment service has responded with the appropriate outputs. Using the decomposition diagram as an outline, we can draw one event diagram for each recruitment service event process. The event diagram shows the inputs, outputs and data store interactions for the event. An event diagram is constructed and validated for each event. Figure B.3. to Figure B.10 are the context diagrams for each single event of the recruitment service information system respectively.

3.5 System Design

The actual development of a system is simplified if a thorough system analysis has been performed. System design is defined as the tasks that focus on the specification of a detailed computer-based solution. System design focuses on the technical or implementation concerns of the recruitment service information system.

The identification of input data will lead to clerical specifications and the designing of forms for this purpose. A database or procedural process leading to storage is required. Normally, the change in input required to produce a desired output will lead to the construction of a database and a determination of the size of the database. A clear statement of the flow and computational evaluations that information must undergo will not only enhance the programming of the system, but will also lead to the selection of requisite equipment required to satisfy the system design. The largest single activity in the design of the recruitment service information system is usually in program development. A logical flow and control is designed to insure a proper input and output from the system. Next is the system interface design. The output, input and user interface or dialogue is what the end-user work with; so it is designed based on the opinion regarding an easy-to-learn and easy-to-use interface for the proposed the recruitment service system.

(a) Database Design

One of the system design tasks is to develop the corresponding database design specifications. Database is the shared resource and a collection of interrelated files. The purpose of this task is to prepare technical design specifications for a database that is adaptable to future requirements and expansion. Database design is the process of translating logical data model, which is the entity relationship diagram (ERD) into physical database schema. Data analysis and normalization are the techniques for removing impurities from a data model as a preface to designing the database. These impurities can make the database unreliable, inflexible and non-scalable. In this paper, the designed database will be constructed up to the third normal form (3NF) by normalizing at the ERD level. The three-steps of normalization are processed as follows:

(1) An entity is in first normal form (1NF) if it contains no repeating attributes. (that is, attributes that can have more that one value of a single instance of the entity).

(2) An entity is in second normal form (2NF) if it contains no partial dependencies (that is, non-key attribute whose value is dependent only on part of the entity's primary key).

(3) An entity is in third normal form if it contains no derived attributes (that is, calculated or logic-based attributes) or no transitive dependencies (that is, a non-key attribute whose value is dependent on another non-key attribute).

A database schema is the physical model for a database based on the chosen database technology. The rules for transforming a logical data model into a physical database schema are as follows:

(1) Each entity becomes a table.

(2) Each attribute becomes a field (column in the table).

(3) Each primary and secondary key becomes an index into the table.

(4) Each foreign key implements a possible relationship between instances to the table.

The entity relationship diagram (ERD) in a fully attributed data model that has already been depicted in Figure A.3. The physical database schema and file layout is shown in Appendix A.

(b) Structured Design

The structured design deals with the size and complexity of a program by breaking up the recruitment service program into a hierarchy of modules that result in a computer program that is easier to implement and maintain. The primary tool used in structured design is the structure chart. Structure charts are used to graphically depict a modular design of a program. Specially, they show how the program has been partitioned into smaller more manageable modules, the hierarchy and organization of those modules, and the communication interfaces between modules. Structure charts, however do not show the internal procedures performed by the module or internal data used by the module. Appendix B depicts the structure chart for the recruitment service information system program.

(c) User Interface Design

For user interface or dialogue design, the design considered such factors as terminal familiarity, possible errors and misunderstandings that the end-user may have or may encounter, the need for additional instructions or help at the certain points, and screen content and layout. We integrate output and input design into an overall user interface that establishes the dialogue between user and computer. The dialogue determines everything from starting the system or logging into the system, to setting options and preferences, to getting help. And the presentation of the outputs and inputs is also part of the interface. Most of today's user interfaces are graphical. Recall the basic structure of the graphical user interface (GUI) is provided within the computer operating system. In client/server information systems, the user interface client is implemented to execute within the PC operating system.

(d) Input Design

For inputs, it is crucial to design the data capture method to be used. The input can be classified according to two characteristics: (1) how the data is initially captured, entered and processed and (2) the method and technology used to capture and enter the data. Most new applications developed uses Graphical User Interfaces (GUI). Inputs are as simple as possible and designed to reduce the possibility of incorrect data being entered. Input controls are also defined to ensure that the data input to the computer is accurate and the recruitment service information system is protected against accidental and intentional errors and abuse, including fraud. The key points regarding the input design includes the following:

(1) Data capture is the identification and acquisition of new data to be input.

(2) A source document is a paper form used to record data that will eventually be input to a computer.

(5) Data entry is the process of translating the source document into a machine-readable format.

(6) Data input is the actual entry of data in a machine-readable format into the computer.

The example of input design for the recruitment service information system is displayed in Appendix C.

(e) Output Design

Transaction outputs is designed as preprinted forms onto which transaction details are printed. Reports and other outputs are usually printed directly onto paper or displayed on the terminal screen. The precise format and layout of the outputs is specified. Finally, internal controls are specified to ensure that the outputs are not lost, misrouted, misused, or incomplete. Moreover, outputs produced by the recruitment service information system present information to the users, managers, stakeholders, system auditor, etc. and are designed as such a visible component of the system. For the recruitment service information system, outputs are classified as follows:

(1) Internal outputs are intended for the company officers, Board of Directors, etc. within the organization. There are three sub-classes of internal outputs, which are detailed reports, summary reports and exception reports.

(2) External outputs leave the organization. External outputs are intended for applicants, clients, Thai Labor Department and regulatory agencies. They usually conclude or report on company business transaction.

(3) Turnaround outputs are those external outputs that eventually reenter the system as inputs e.g. application form, invoice.

(4) Screen outputs allow reports to be presented in graphical formats. Screen outputs require information on demand and printed out options are added to screen output designs.

Again, most new applications developed use Graphical User interface (GUI) and outputs are designed as clear and readable as possible and reduce the possibility of misunderstanding or lack on information. The following general principles are important for output design:

(1) The outputs should be simple to read and interpret.

(2) The timing of outputs is important.

(3) The distribution of outputs must be sufficient to assist in all relevant system users.

(4) The outputs must be acceptable to the system users who will receive and has to operate with them.

The example of output design for the recruitment service information system is displayed in Appendix D.

3.6 Hardware and Software Requirement

The next concern for the proposed recruitment service information system is the hardware and software specification to support the new recruitment service system. Both the hardware and software specification has to be provided based on the budget of

the project. The network configuration still stays in the same configuration as in the existing system which is the Local Area Network (LAN) on the basis of client/server architecture. The computer hardware and other devices are changed to the high powerful specification and compatible for the future technology. The recruitment service software or program is created to operate on Windows operating system. The hardware requirement, hardware configuration of the proposed system and software requirement will be shown as follows:

Table 3.4. The Hardware Specification and Estimate Cost for Computer Server.

Hardware	Specification	Cost
CPU	Pentium IV 1.5 GHz	15,000
Main board	ASUS CUV 4X	5,500
Hard Disk	20 GB	5,600
RAM	256 MB	5,000
Display Card	Geforce 2 GT DDR	12,000
CD-ROM	50X	1,850
Modem	56 kps.	2,500
Sound	Sound Bluster Live Value	2,500
Floppy Disk	1.44 MB	400
Display Monitor	Supports 1024*768 resolution	7,500
Case	Standard	1,150
Keyboard, Mouse	Standard	1,000
Total Price		60,000

Table 3.5. The Hardware Specification and Estimate Cost for PC Workstation.

Hardware	Specification	Cost
CPU	Celeron 1 GHz	10,000
Main Board	ASUS P3V 4X	4,500
Display Card	TNT2	5,000
Sound	Yamaha 744	800
Hard Disk	15 GB	4,500
RAM	128 MB	3,000
CD-ROM	50X	1,850
Floppy Disk	1.44 MB	400
Display Monitor	15" Monitor	4,000
Case	Standard	950
Keyboard, Mouse	Standard	1,000
Total Price		36,000

Table 3.6. The Specification Network Equipment and Others and Estimate Cost.

Item	Specification	Cost
3 LAN-Card	Standard 1 @ 500	1,500
Hub	10/100 mbps : 10 ports	2,500
Cable	UTP CAT 5	500
UPS	220V 50Hz	2,500
Printer	Fujitsu Dot Matrix Printer HP LaserJet HP DeskJet	8,500 15,000 6,500
Total Price		37,000

There are 3 PC Workstations and 1 server connected with 3 printers for the proposed recruitment service information system, which are shown in Figure 3.1. the proposed recruitment service hardware configuration.

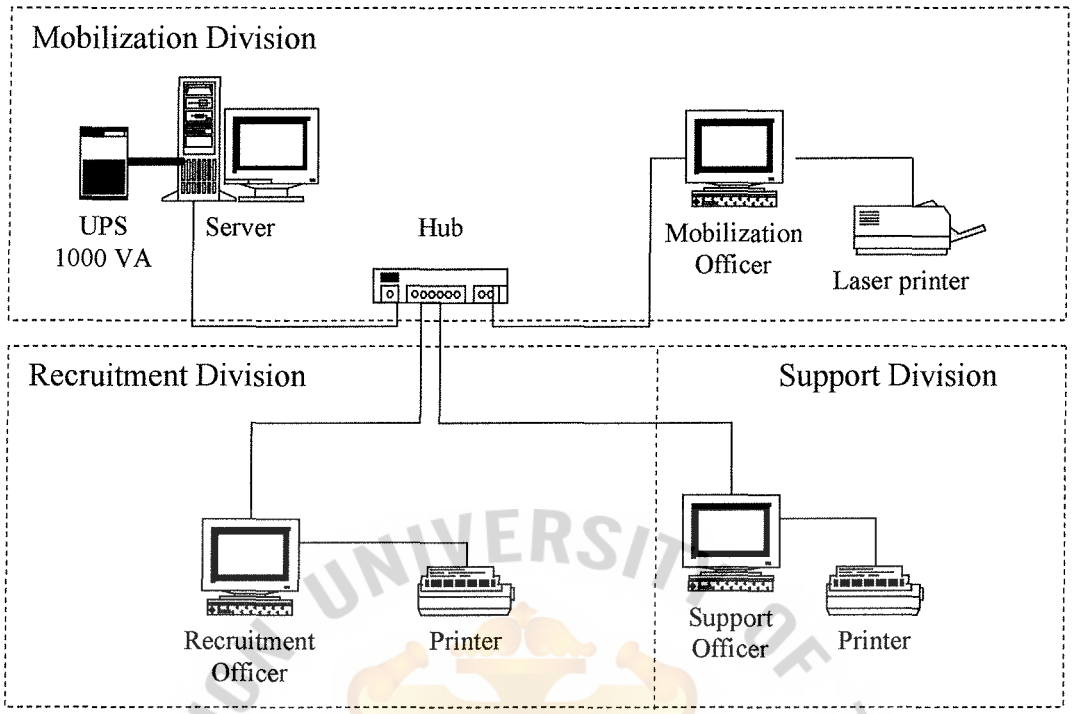

Figure 3.1. The Proposed Recruitment Service Hardware Configuration.

3.7 Security and Controls

Because data and information are the most important resource for doing business and making the business able to go on, security and control are one of the necessary parts in system development. The security and control for the recruitment service information system are considered as follows:

(a) Data Security and Control

Data security is the protection of data in the system consisting of input control, process control and output control. The objectives of data security are to contain availability, confidentiality and integrity. Data security can be done by both logical and physical protection. The procedures of data security and control are as follows:

(1) The verification for user authorization by entering user identification number or user-ID and password is required before accessing to the recruitment service system.

(2) The back up and recovery is provided to prevent the loss of data and data damaged from unexpected situation.

(3) Verification and validation checking for input data is required.

(4) The correctness and timeliness checking for input data is required. The system should make sure that data is input correctly and on time.

(5) No direct update is allowed. The user cannot update program or change data directly.

(6) When operation or program has the error, processing control must be able to tell and correct the error.

(7) The retention for output must be set, the system has to set the time for keeping the recruitment information or document in the company.

(8) When output report has error, the system must be able to tell the how to deal with the error.

(9) The output report must be checked and signed by administration officer.

(b) System Security and Control

(1) Audit control for system is required. The recruitment service system should have the features of an audit trial. It means there is a record of a transaction or an event so that the management can tell who performs an activity, when it occurs and what result is produced.

(2) The database system is necessary to enforce the security restrictions such as the data will be modified only by the authorized user.

(3) Database is designed to keep the data integrity and no redundancy.

(4) There is the Uninterrupted Power Supply (UPS) to prevent the loss of data during power failure.

(5) The user is able to access through the system within their authorized area only.

(6) The backup data of the system should be done daily.

3.8 Cost/Benefit Analysis

Economic feasibility has been defined as a cost/benefits analysis.

Costs fall into two categories. There are costs associated with developing the system, and there are costs associated with operating system. System development costs are usually onetime costs that will not recur after the project has been completed consisting of personal costs, computer usage, training, supply costs, duplication costs, equipment costs and cost of any new computer equipment and software. Unlike the system development cost, operating costs tend to recur throughout the lifetime of the system. The costs of operating a system over its useful lifetime can be classified as fixed costs which occur at regular intervals but relatively fixed e.g. software license payment and variable costs which occur in proportion to some usage factor e.g. costs of computer usage which vary with the work load. The existing system cost analysis and the estimation of development costs and operating costs for candidate system solution 1, 2, and 3 from Table 3.1 are displayed as follows:

(1) The existing recruitment service system cost analysis.

Table 3.7. Existing Recruitment Service Cost Analysis, Baht.

Cost Items	Years				
	1	2	3	4	5
Fixed Cost					
Hardware Maintenance Cost	5,000.00	5,400.00	5,832.00	6,298.56	6,802.44
Total Fixed Cost	5,000.00	5,400.00	5,832.00	6,298.56	6,802.44
Operation Cost					
Salary Cost :					
Department Manager					
1 persons @ 25,000	25,000.00	27,000.00	29,160.00	31,492.80	34,012.22
Administration Officer					
8 persons @ 8,000	64,000.00	69,120.00	74,649.60	80,621.57	87,071.29
Total Monthly Salary Cost	89,000.00	96,120.00	103,809.60	112,114.37	121,083.52
Total Annual Salary Cost	1,068,000.00	1,153,440.00	1,245,715.20	1,345,372.42	1,453,002.21
Office Supplies &					
Miscellaneous Cost :					
Stationary per Annual	15,000.00	16,200.00	17,496.00	18,895.68	20,407.33
Perper per Annual	15,000.00	16,200.00	17,496.00	18,895.68	20,407.33
Utility per Annual	10,000.00	10,800.00	11,664.00	12,597.12	13,604.89
Miscellanous per Annual	5,000.00	5,400.00	5,832.00	6,298.56	6,802.44
Total Annual Office Supplies					
& Miscellaneous Cost	45,000.00	48,600.00	52,488.00	56,687.04	61,222.00
Total Annual Operation Cost	540,000.00	583,200.00	629,856.00	680,244.48	734,664.04
Total Existing System Cost	1,613,000.00	1,742,040.00	1,881,403.20	2,031,915.46	2,194,468.69
Accumulated Cost	1,613,000.00	3,355,040.00	5,236,443.20	7,268,358.66	9,462,827.35

(2) Estimated Costs for Candidate System Solution 1

Development Costs

Personnel :

System Analyst (300 x 100/ hr) 1 person	30,000	baht

Expense :

COTS packaging Training (6,000/student) 3 persons	24,000	baht

New Hardware & Software :

Computer Server 1 set	60,000	baht
Computer Workstation (@ 36,000) 3 sets	108,000	baht
Network Equipment and Others 1 set	37,000	baht
Sever OS (Window 2000) 1 package	40,000	baht
Client OS (Window 98 @ 25,000) 3 packages	75,000	baht
DBM Software 1 page	40,000	baht
COTS Package Software 1 package	150,000	baht
Total Development Cost	564,000	baht

Maintenance Cost :

Onsite Service of COTS Package	15,000	baht
Maintenance Agreement for Server and Workstation	20,000	baht
Maintenance Agreement for DBMS Software	15,000	baht
Total Maintenance Cost	50,000	baht

Table 3.8. Estimated Costs for Candidate System 1, Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development Cost						
Personnel Cost						
System Analyst	30,000.00	-	-	-	-	-
Training Cost						
COTS Packaging Training	24,000.00	-	-	-	-	-
New Hardware Cost :						
Computer Server	60,000.00	-	-	-	-	-
Workstation	108,000.00	-	-	-	-	-
Network Equipment and others	37,000.00	-	-	-	-	-
New Software Cost :						
COTS Application Package	150,000.00	-	-	-	-	-
Server OS	40,000.00	-	-	-	-	-
Client OS	75,000.00	-	-	-	-	-
DBM Software	40,000.00	-	-	-	-	-
Total Development Cost	564,000.00	-	-	-	-	-
Operation Cost						
Personnel Cost :						
Technician 1 person@ 20,000	-	20,000.00	21,600.00	23,328.00	25,194.24	27,209.78
Senior Officer 3 persons@15,000	-	45,000.00	48,600.00	52,488.00	56,687.04	61,222.00
Officer 3 persons @ 10,000	-	30,000.00	32,400.00	34,992.00	37,791.36	40,814.67
Maintenance Cost:						
Onsite service of COTS package	-	15,000.00	16,200.00	17,496.00	18,895.68	20,407.33
Server and Client Maintenance	-	20,000.00	21,600.00	23,328.00	25,194.24	27,209.78
DBMS Software Maintenance	-	15,000.00	16,200.00	17,496.00	18,895.68	20,407.33
Office Supplies &						
Miscellaneous Cost :						
Stationary per Annual	-	9,000.00	9,720.00	10,497.60	11,337.41	12,244.40
Perper per Annual	-	7,000.00	7,560.00	8,164.80	8,817.98	9,523.42
Utility per Annual	-	6,500.00	7,020.00	7,581.60	8,188.13	8,843.18
Miscellanous per Annual	-	2,000.00	2,160.00	2,332.80	2,519.42	2,720.98
Total Annual Operation Cost	-	1,214,500.00	1,311,660.00	1,416,592.80	1,529,920.22	1,652,313.84
Total Cost of Candidate System 1	564,000.00	1,214,500.00	1,311,660.00	1,416,592.80	1,529,920.22	1,652,313.84
Accumulated Cost	564,000.00	1,778,500.00	3,090,160.00	4,506,752.80	6,036,673.02	7,688,986.87

(3) Estimated Costs for Candidate System Solution 2.

Development Costs

Personnel :

Outsourcing Company for Developing New System	200,000	baht

Expense :

Training Registration (4,500/student) 3 persons	13,500	baht

New Hardware & Software :

Computer Server 1 set	60,000	baht
Computer Workstation (@ 36,000) 3 sets	108,000	baht
Network Equipment and Others 1 set	37,000	baht
Sever OS (Window 2000) 1 package	40,000	baht
Client OS (Window 98 @ 10,000) 3 packages	75,000	baht
DBM Software 1 package	40,000	baht
Total Development Cost	573,500	baht

Maintenance Cost :

Maintenance Agreement for Server and Workstation	20,000	baht
Maintenance Agreement for DBMS Software	15,000	baht
Application Maintenance	15,000	baht
Total Maintenance Cost	50,000	baht

Table 3.9. Estimated Costs for Candidate System 2, Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development Cost						
Personnel Cost						
Outsourcing Company	200,000.00	-	-	-	-	-
Training Cost						
Training Registration	13,500.00	-	-	-	-	-
New Hardware Cost :						
Computer Server	60,000.00	-	-	-	-	-
Workstation	108,000.00	-	-	-	-	-
Network Equipment and others	37,000.00	-	-	-	-	-
New Software Cost :						
Server OS	40,000.00	-	-	-	-	-
Client OS	75,000.00	-	-	-	-	-
DBM Software	40,000.00	-	-	-	-	-
Total Development Cost	573,500.00	-	-	-	-	-
Operation Cost						
Personnel Cost :						
Programmer 1 person@ 18,000	-	18,000.00	19,440.00	20,995.20	22,674.82	24,488.80
Senior Officer 3 persons@15,000	-	45,000.00	48,600.00	52,488.00	56,687.04	61,222.00
Officer 3 persons @ 10,000	-	30,000.00	32,400.00	34,992.00	37,791.36	40,814.67
Maintenance Cost:						
Server and Client Maintenance	-	20,000.00	21,600.00	23,328.00	25,194.24	27,209.78
DBMS Software Maintenance	-	15,000.00	16,200.00	17,496.00	18,895.68	20,407.33
Application Maintenance	-	15,000.00	16,200.00	17,496.00	18,895.68	20,407.33
Office Supplies &						
Miscellaneous Cost :						
Stationary per Annual	-	9,000.00	9,720.00	10,497.60	11,337.41	12,244.40
Perper per Annual	-	7,000.00	7,560.00	8,164.80	8,817.98	9,523.42
Utility per Annual	-	6,500.00	7,020.00	7,581.60	8,188.13	8,843.18
Miscellanous per Annual	-	2,000.00	2,160.00	2,332.80	2,519.42	2,720.98
Total Annual Operation Cost	-	1,190,500.00	1,285,740.00	1,388,599.20	1,499,687.14	1,619,662.11
Total Cost of Candidate System 1	573,500.00	1,190,500.00	1,285,740.00	1,388,599.20	1,499,687.14	1,619,662.11
Accumulated Cost	573,500.00	1,764,000.00	3,049,740.00	4,438,339.20	5,938,026.34	7,557,688.44

(4) Estimated Costs for Candidate System Solution 3.

Development Costs

Personnel :

Outsourcing Company for Developing New System	150,000	baht

Expense :

Training Registration (3,500/student) 3 persons	10,500	baht

New Hardware & Software :

Computer Server 1 set	60,000	baht
Computer Workstation (@ 36,000) 3 sets	108,000	baht
Network Equipment and Others 1 set	37,000	baht
Sever OS (Window 2000) 1 package	40,000	baht
Client OS (Window 98 @ 10,000) 3 packages	75,000	baht
DBM Software 1 package	40,000	baht
Total Development Cost	520,500	baht

Maintenance Cost :

Maintenance Agreement for Server and Workstation	20,000	baht
Maintenance Agreement for DBMS Software	15,000	baht
Application Maintenance	15,000	baht
Total Maintenance Cost	50,000	baht

Table 3.10. Estimated Costs for Candidate System 3, Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development Cost						
Personnel Cost						
Outsourcing Company	150,000.00	-	-	-	-	-
Training Cost						
Training Registration	10,500.00	-	-	-	-	-
New Hardware Cost :						
Computer Server	60,000.00	-	-	-	-	-
Workstation	108,000.00	-	-	-	-	-
Network Equipment and others	37,000.00	-	-	-	-	-
New Software Cost :						
Server OS	40,000.00	-	-	-	-	-
Client OS	75,000.00	-	-	-	-	-
DBM Software	40,000.00	-	-	-	-	-
Total Development Cost	520,500.00	-	-	-	-	-
Operation Cost						
Personnel Cost :						
Programmer 1 person@ 18,000	-	18,000.00	19,440.00	20,995.20	22,674.82	24,488.80
Senior Officer 3 persons@15,000	-	45,000.00	48,600.00	52,488.00	56,687.04	61,222.00
Officer 3 persons @ 10,000	-	30,000.00	32,400.00	34,992.00	37,791.36	40,814.67
Maintenance Cost:						
Server and Client Maintenance	-	20,000.00	21,600.00	23,328.00	25,194.24	27,209.78
DBMS Software Maintenance	-	15,000.00	16,200.00	17,496.00	18,895.68	20,407.33
Application Maintenance	-	15,000.00	16,200.00	17,496.00	18,895.68	20,407.33
Office Supplies &						
Miscellaneous Cost :						
Stationary per Annual	-	9,000.00	9,720.00	10,497.60	11,337.41	12,244.40
Perper per Annual	-	7,000.00	7,560.00	8,164.80	8,817.98	9,523.42
Utility per Annual	-	6,500.00	7,020.00	7,581.60	8,188.13	8,843.18
Miscellanous per Annual	-	2,000.00	2,160.00	2,332.80	2,519.42	2,720.98
Total Annual Operation Cost	-	1,190,500.00	1,285,740.00	1,388,599.20	1,499,687.14	1,619,662.11
Total Cost of Candidate System 1	520,500.00	1,190,500.00	1,285,740.00	1,388,599.20	1,499,687.14	1,619,662.11
Accumulated Cost	520,500.00	1,711,000.00	2,996,740.00	4,385,339.20	5,885,026.34	7,504,688.44

Benefits normally increase profits or decrease costs, both highly desirable characteristics of a new information system. After this project is finished, the recruitment service information management system, Bisco will get these benefits. Benefits are classified as tangible or intangible as follows:

(a) Tangible Benefits

Tangible benefits are those that can be easily quantified or can be calculated.

(1) Fewer processing errors. The proposed system operates with more accuracy and completeness.

(2) Increased throughput. The performance of the proposed system is better. The number of workers that the recruitment service management information system can service per day is increased.

(3) Decreased response time. The recruitment service processing time for each worker e.g. processing of registration is reduced. The system responds to the entries and requests faster.

(4) Elimination of job steps. The new recruitment service system is able to provide or operate some work, instead of people having to do the work, so the staff can save a lot of time such as summary report or statistical report.

(5) Reduced expenses. The company can reduce a lot of paperwork and documenting involving the recruitment data and information.

(b) Intangible Benefits

Intangible benefits are those benefits believed to be difficult or impossible to quantify.

(1) Improved goodwill. The new recruitment service system provides quick and efficient services for the workers and clients, so they will

have a good experience with the process, and use Bisco's services again.

(2) Improve employee morale. The new system provides more user friendly and accurate data and information, so it is convenient for the staff to use, and does not have problems to disturb their work.

(3) Better service to community. The system not only is able to provide services for the workers and clients, but also able to provide services for other related departments in the company, such as provide information report as required.

(4) Better decision-making. The system is able to generate more accuracy and deeply in details as required for the reports related to the recruitment service system e.g. statistic report to the management level in order have enough information to make the decision.

Cost-Effectiveness is the technique to access economic feasibility. There are three popular techniques: payback analysis, return-on-investment (ROI) analysis and net present value. In order to analyze the candidate system 1,2 and 3 by these techniques, we need to refer to the development cost and operating cost in Tables 3.7., 3.8., 3.9. and 3.10. respectively. The payback analysis, return-on-investment (ROI) analysis and net present value for each candidate system are displayed as follows:

Table 3.11. Payback Analysis for Candidate System 1, Baht.

Cost Items	Years						
	0	1	2	3	4	5	6
Development Cost	-564,000.00	-	-	-	-	-	-
Operation & maintenance cost	-	-1,214,500.00	-1,311,660.00	-1,416,592.80	-1,529,920.22	-1,652,313.84	-1,784,498.95
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62	0.56
Time-adjusted costs (adjusted to present value)	-564,000.00	-1,105,195.00	-1,088,677.80	-1,062,444.60	-1,040,345.75	-1,024,434.58	-999,319.41
Cumulative time-adjusted costs over lifetime	-564,000.00	-1,669,195.00	-2,757,872.80	-3,820,317.40	-4,860,663.15	-5,885,097.73	-6,884,417.15
Existing System Operation Cost	0.00	1,613,000.00	1,742,040.00	1,881,403.20	2,031,915.46	2,194,468.69	2,370,026.19
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62	0.56
Time-adjusted benefits (current of present value)	0.00	1,467,830.00	1,445,893.20	1,411,052.40	1,381,702.51	1,360,570.59	1,327,214.67
Cumulative time-adjusted benefits over lifetime	0.00	1,467,830.00	2,913,723.20	4,324,775.60	5,706,478.11	7,067,048.70	8,394,263.36
Cumulative lifetime time-adjusted cost + benefits	-564,000.00	-201,365.00	155,850.40	504,458.20	845,814.96	1,181,950.97	1,509,846.22
The Payback Period is approximately 1 year 6 months.							
Lifetime ROI = (Estimated lifetime benefits - Estimated lifetime costs) / Estimated lifetime costs = 0.22*100 = 22%							

Table 3.12. Net Present Value Analysis for Candidate System 1, Baht.

Cost Items	Years						
	0	1	2	3	4	5	6
Development Cost	-564,000.00	-	-	-	-	-	-
Operation & maintenance cost	-	-1,214,500.00	-1,311,660.00	-1,416,592.80	-1,529,920.22	-1,652,313.84	-1,784,498.95
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62	0.56
Present value of annual costs	-564,000.00	-1,105,195.00	-1,088,677.80	-1,062,444.60	-1,040,345.75	-1,024,434.58	-999,319.41
Total present value of lifetime costs	-	-	-	-	-	-	-6,884,417.15
Existing System Operation Cost	0.00	1,613,000.00	1,742,040.00	1,881,403.20	2,031,915.46	2,194,468.69	2,370,026.19
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62	0.56
Present value of annual benefits	0.00	1,467,830.00	1,445,893.20	1,411,052.40	1,381,702.51	1,360,570.59	1,327,214.67
Total present value of lifetime benefits	-	-	-	-	-	-	8,394,263.36
NET PRESENT VALUE OF THIS ALTERNATIVE							**1,509,846.22**
The Net Present Value of this candidate system is 1,509,846.22							

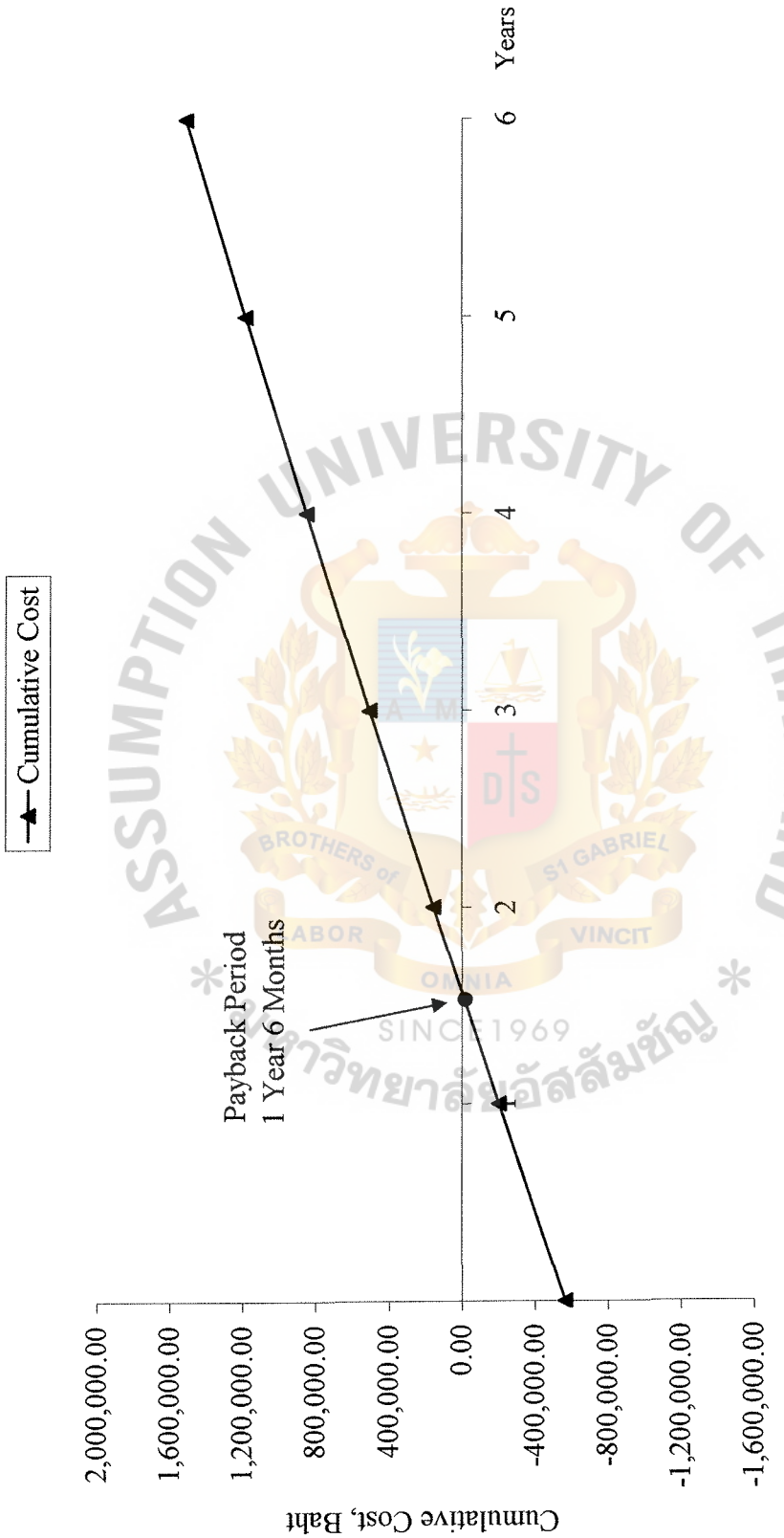

Figure 3.2. Payback Analysis for Cadidate System 1.

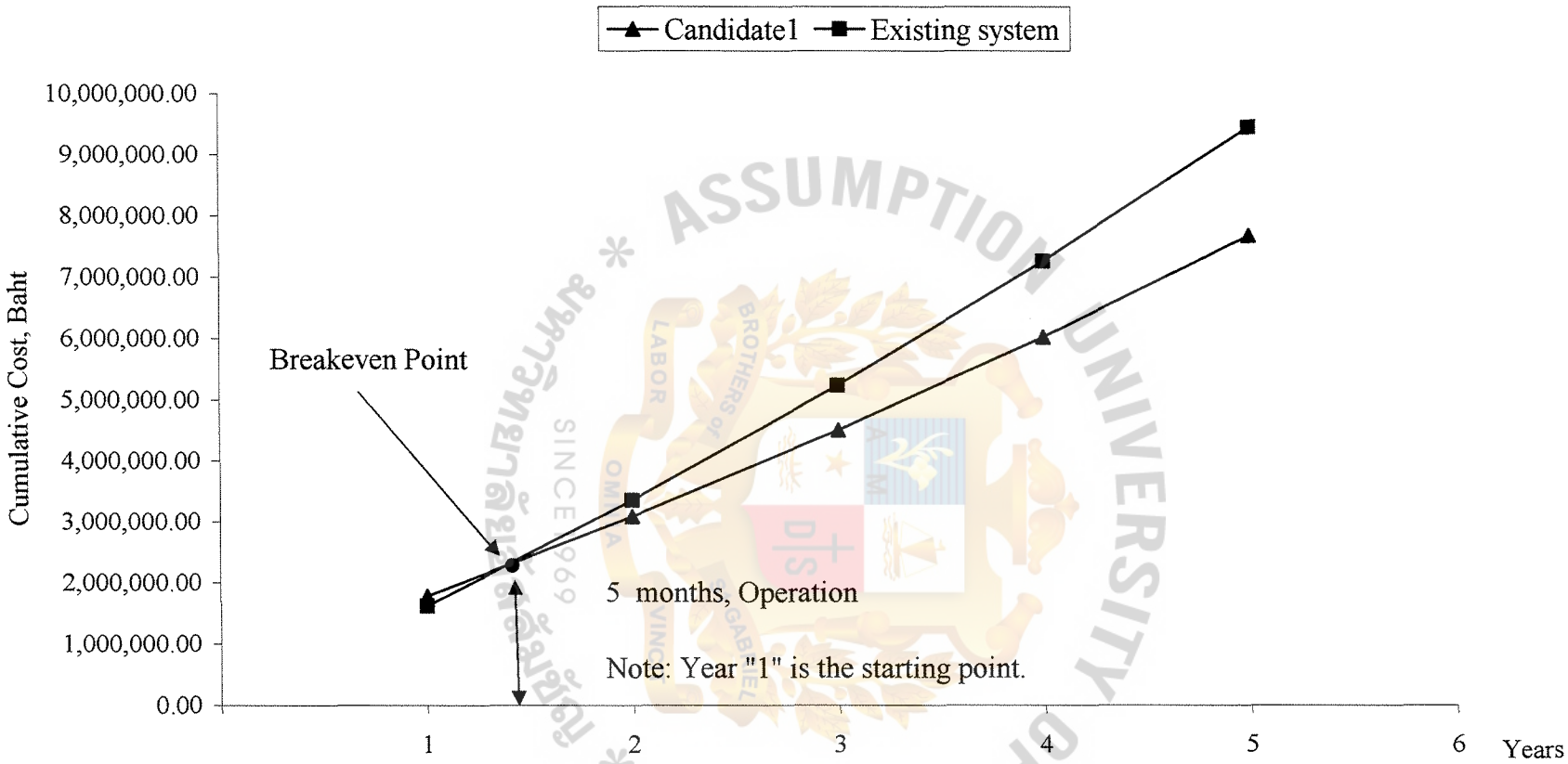

Figure 3.3. Cost Comparison between Existing System and Cadidate System 1.

Table 3.13. Payback Analysis for Candidate System 2, Baht.

Cost Items	Years						
	0	1	2	3	4	5	6
Development Cost	-573,500.00	-	-	-	-	-	-
Operation & maintenance cost	-	-1,190,500.00	-1,285,740.00	-1,388,599.20	-1,499,687.14	-1,619,662.11	-1,749,235.08
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62	0.56
Time-adjusted costs (adjusted to present value)	-573,500.00	-1,083,355.00	-1,067,164.20	-1,041,449.40	-1,019,787.25	-1,004,190.51	-979,571.64
Cumulative time-adjusted costs over lifetime	-573,500.00	-1,656,855.00	-2,724,019.20	-3,765,468.60	-4,785,255.85	-5,789,446.36	-6,769,018.00
Existing System Operation Cost	0.00	1,613,000.00	1,742,040.00	1,881,403.20	2,031,915.46	2,194,468.69	2,370,026.19
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62	0.56
Time-adjusted benefits (current of present value)	0.00	1,467,830.00	1,445,893.20	1,411,052.40	1,381,702.51	1,360,570.59	1,327,214.67
Cumulative time-adjusted benefits over lifetime	0.00	1,467,830.00	2,913,723.20	4,324,775.60	5,706,478.11	7,067,048.70	8,394,263.36
Cumulative lifetime time-adjusted cost + benefits	-573,500.00	-189,025.00	189,704.00	559,307.00	921,222.26	1,277,602.34	1,625,245.36
The Payback Period is approximately 1 year 5 months.							
Lifetime ROI = (Estimated lifetime benefits - Estimated lifetime costs) / Estimated lifetime costs = 0.24*100 = 24%							

Table 3.14. Net Present Value Analysis for Candidate System 2, Baht.

Cost Items	Years						
	0	1	2	3	4	5	6
Development Cost	-573,500.00						
Operation & maintenance cost		-1,190,500.00	-1,285,740.00	-1,388,599.20	-1,499,687.14	-1,619,662.11	-1,749,235.08
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62	0.56
Present value of annual costs	-573,500.00	-1,083,355.00	-1,067,164.20	-1,041,449.40	-1,019,787.25	-1,004,190.51	-979,571.64
Total present value of lifetime costs	-	-	-	-	-	-	-6,769,018.00
Existing System Operation Cost	0.00	1,613,000.00	1,742,040.00	1,881,403.20	2,031,915.46	2,194,468.69	2,370,026.19
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62	0.56
Present value of annual benefits	0.00	1,467,830.00	1,445,893.20	1,411,052.40	1,381,702.51	1,360,570.59	1,327,214.67
Total present value of lifetime benefits	-	-	-	-	-	-	8,394,263.36
NET PRESENT VALUE OF THIS ALTERNATIVE							**1,625,245.36**
The Net Present Value of this candidate system is 1,625,245.36							

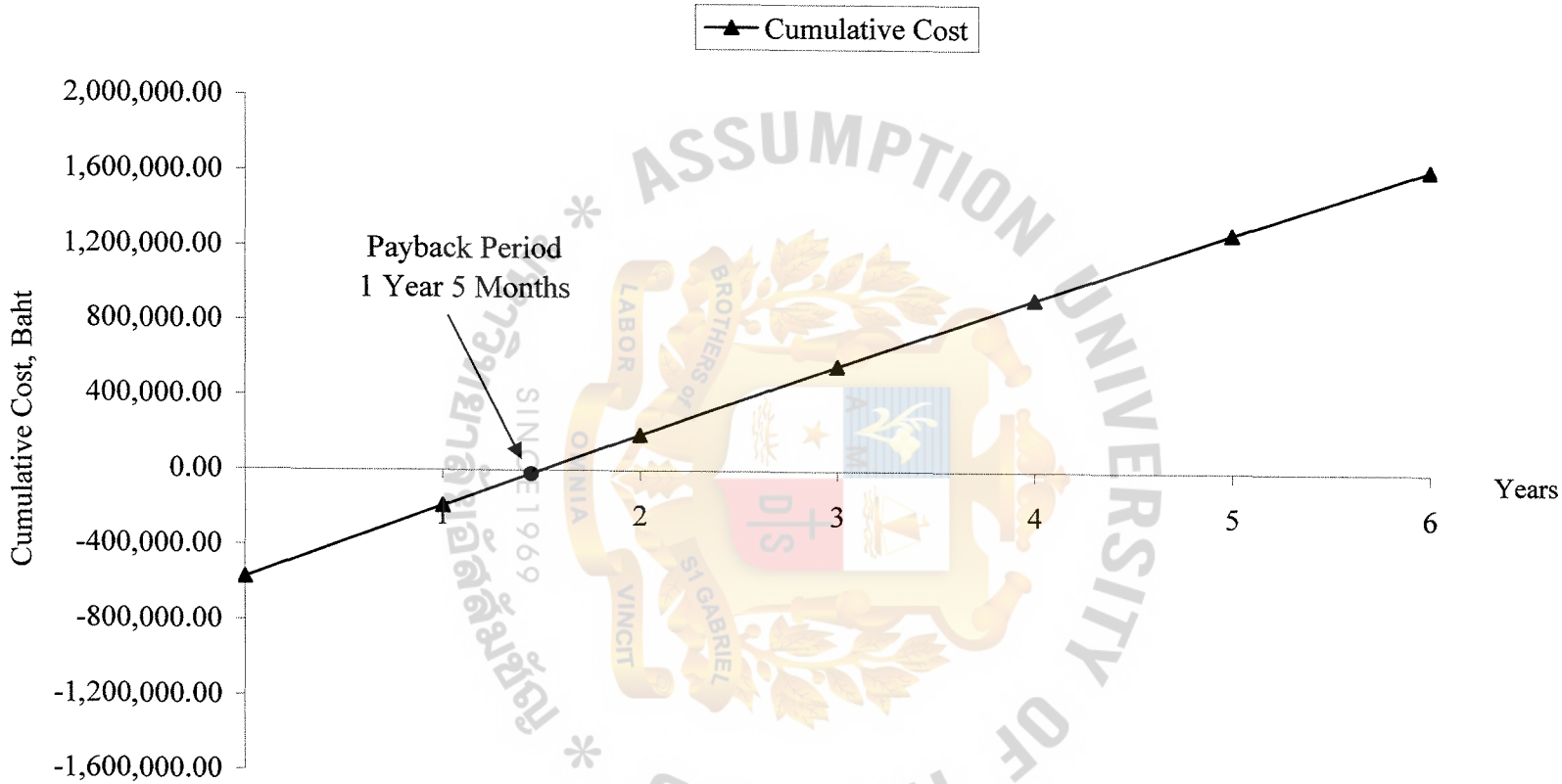

Figure 3.4. Payback Analysis for Cadidate System 2.

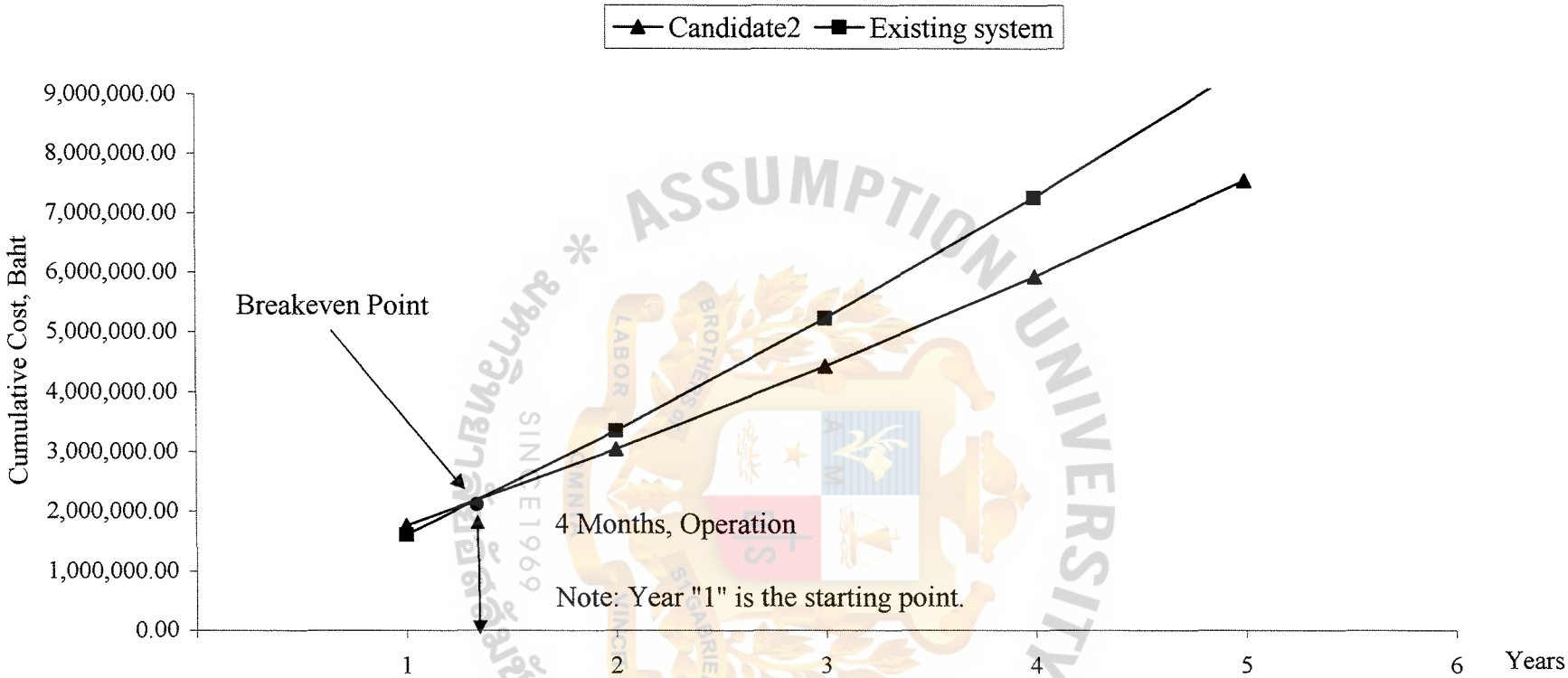

Figure3.5. Cost Comparison between Existing System and Cadidate System 2.

Table 3.15. Payback Analysis for Candidate System 3, Baht.

Cost Items	Years						
	0	1	2	3	4	5	6
Development Cost	-520,500.00	-	-	-	-	-	-
Operation & maintenance cost	-	-1,190,500.00	-1,285,740.00	-1,388,599.20	-1,499,687.14	-1,619,662.11	-1,749,235.08
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62	0.56
Time-adjusted costs (adjusted to present value)	-520,500.00	-1,083,355.00	-1,067,164.20	-1,041,449.40	-1,019,787.25	-1,004,190.51	-979,571.64
Cumulative time-adjusted costs over lifetime	-520,500.00	-1,603,855.00	-2,671,019.20	-3,712,468.60	-4,732,255.85	-5,736,446.36	-6,716,018.00
Existing System Operation Cost	0.00	1,613,000.00	1,742,040.00	1,881,403.20	2,031,915.46	2,194,468.69	2,370,026.19
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62	0.56
Time-adjusted benefits (current of present value)	0.00	1,467,830.00	1,445,893.20	1,411,052.40	1,381,702.51	1,360,570.59	1,327,214.67
Cumulative time-adjusted benefits over lifetime	0.00	1,467,830.00	2,913,723.20	4,324,775.60	5,706,478.11	7,067,048.70	8,394,263.36
Cumulative lifetime time-adjusted cost + benefits	-520,500.00	-136,025.00	242,704.00	612,307.00	974,222.26	1,330,602.34	1,678,245.36
The Payback Period is approximately 1 year 3 months.							
Lifetime ROI = (Estimated lifetime benefits - Estimated lifetime costs) / Estimated lifetime costs = 0.25*100 = 25%							

Table 3.16. Net Present Value Analysis for Candidate System 3, Baht.

Cost Items	Years						
	0	1	2	3	4	5	6
Development Cost	-520,500.00	-	-	-	-	-	-
Operation & maintenance cost	-	-1,190,500.00	-1,285,740.00	-1,388,599.20	-1,499,687.14	-1,619,662.11	-1,749,235.08
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62	0.56
Present value of annual costs	-520,500.00	-1,083,355.00	-1,067,164.20	-1,041,449.40	-1,019,787.25	-1,004,190.51	-979,571.64
Total present value of lifetime costs	-	-	-	-	-	-	-6,716,018.00
Existing System Operation Cost	0.00	1,613,000.00	1,742,040.00	1,881,403.20	2,031,915.46	2,194,468.69	2,370,026.19
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62	0.56
Present value of annual benefits	0.00	1,467,830.00	1,445,893.20	1,411,052.40	1,381,702.51	1,360,570.59	1,327,214.67
Total present value of lifetime benefits	-	-	-	-	-	-	8,394,263.36
NET PRESENT VALUE OF THIS ALTERNATIVE							**1,678,245.36**
The Net Present Value of this candidate system is 1,693,857.76							

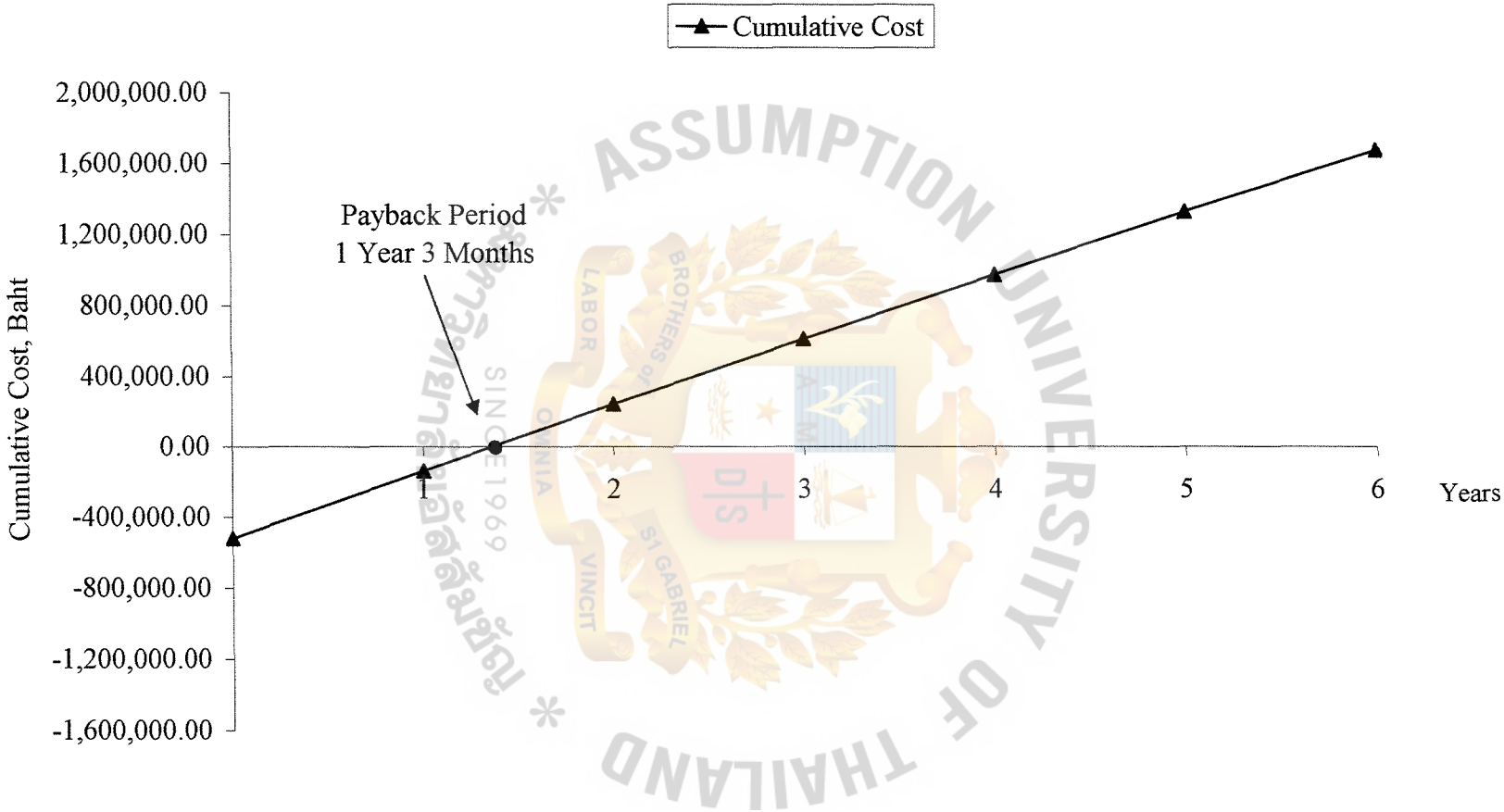

Figure 3.6. Payback Analysis for Cadidate System 3.

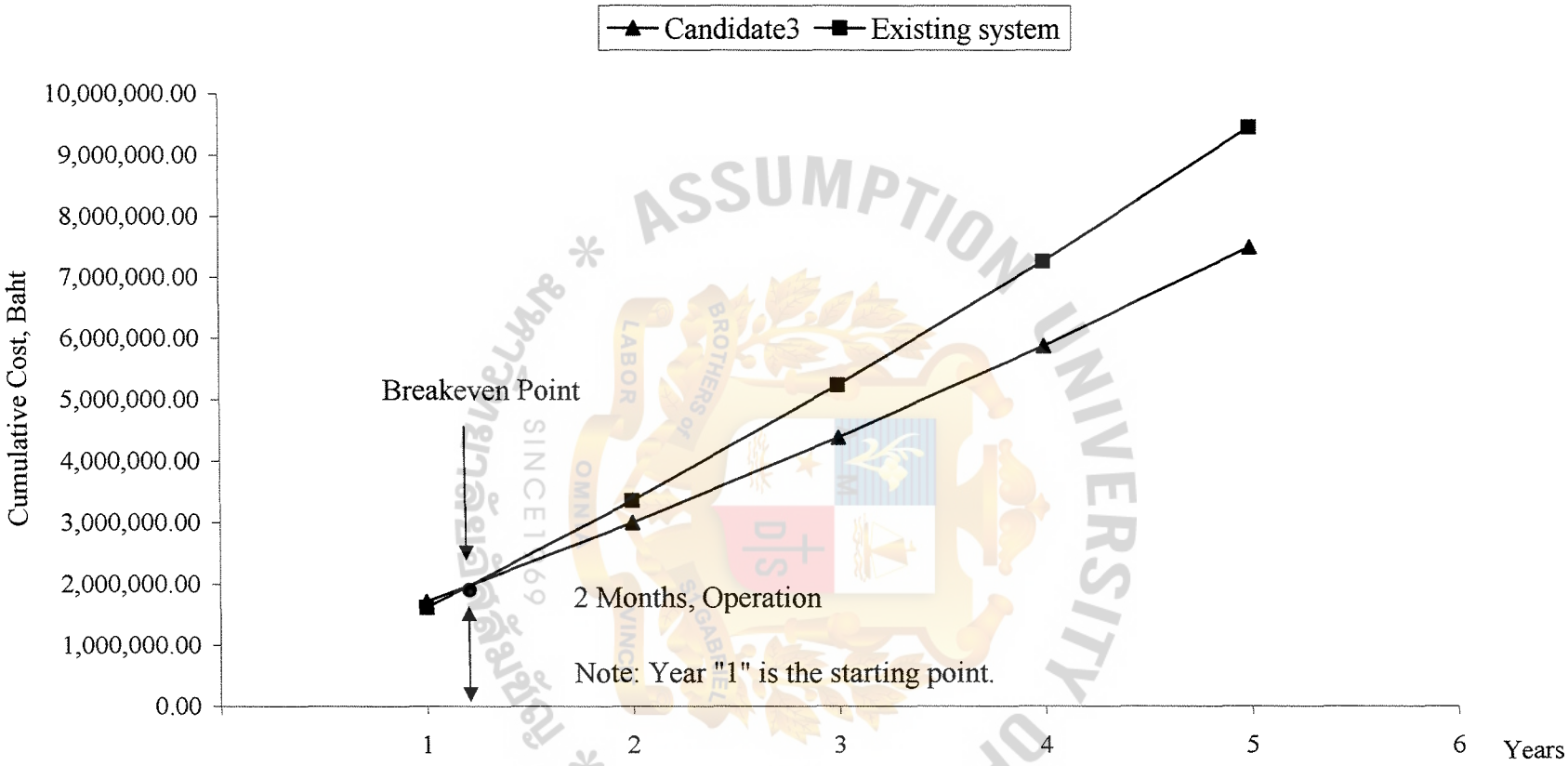

Figure 3.7. Cost Comparison between Existing System and Cadidate System 3.

IV. PROJECT IMPLEMENTATION

4.1 Overview of Project Implementation

Once a system is designed, its implementation should naturally follow. Perhaps the most important factor leading to a successful system application lies with the training and educating of personnel in the system environment. The best-designed system may fail if the users are unfamiliar or unable to properly operate it. The system should be tested to verify its feasibility, accuracy, and reliability. Should any problems arise, the system may require conversion and therefore a flexible system design is preferred. An ongoing maintenance and auditing of the system components serves to provide continual feedback on the status of successful implementation and operation of the system.

This part describes the construction and implementation phases of system development. These two phases construct and deliver the final the recruitment service information system into operation. System construction is the development, installation and testing of recruitment service system components. System implementation is the delivery of that system into production (meaning day-to-day operation).

4.2 The Construction Phase

The purpose of the construction phase is to develop and test a functional system that fulfills business and design requirements and to implement the interfaces between the new system and existing production systems. The construction phase consists of four tasks as follows:

(1) Build and Test Networks

The purpose of this task is to build and test new computer networks, in here is the Local Area Network (LAN) as shown in Figure 3.14. (The Proposed Recruitment Service Hardware Configuration). In many cases, if

the new application is built around existing network as this project, which the existing network is already the Local Area Network, this task will be skipped. But we do not skip this task because the new application for the recruitment service information system calls for a new method and modified network so the network must be implemented before building and testing database and writing or installing computer program that will use this network.

(2) Build and Test Databases

The purpose of this task is to build and populate the initial database and to tune the database performance, add security controls and provide for backup and recovery. The primary input is the database schema specified during system design and final product is an unpopulated data structure for the new database. Revised database schema and test data details are also produced during this task and placed in the project repository for future reference.

(3) Write and Test New Program

This task involves clarifying business requirements to be implemented by the program, the program design, integration requirements and program documentation. The primary input is the technical design statement, plan for programming and test data developed during system design. The principal deliverables are the new program and reusable software components that are placed in the software library. This task also results in program documentation. The final program documentation is placed in the project repository for future reference. There are three levels of testing performed on the new program as follows:

(a) Stub testing is the test performed on individual modules of a program.

(b) Unit or program testing is a test whereby all the modules that have been coded and stub tested are tested as integrated unit.

(c) System testing ensures that application programs written in isolation work properly when they are integrated into the total system.

4.3 The Implementation Phase

The purpose of the implementation phase is to smoothly convert from the existing system to the new system. Thus, the implementation phase delivers the production system to operation. The functional system from the construction phase is the key input to the implementation phase. The system implementation consists of the following tasks:

(1) Conduct System Test

The primary input to this task is the program comprising the new system to make sure that everything works together properly. The system test is done using the system test data. As with previous tests that were performed, the system test results in required modifications to programs, thus, once again prompting the return to a construction phase task. This iteration would continue until a successful system test was experienced.

(2) Prepare Conversion Plan

The conversion plan is developed using the design specifications for the new system. This task is triggered by the completion of a system test. The principal deliverable is the conversion plan that will identify database to be installed, end-used training and documentation that need to be developed, and strategy for converting from the existing system to the new system.

The conversion plan may include one of the strategies: abrupt cut-over, parallel conversion, location conversion and staged conversion. The existing recruitment service system is the paper work, which the staff does not have a lot of knowledge and experience about the new operating system and database management system. The abrupt cut-over is not suitable because if the end-user is not familiar with the new system, the end-user may reject the system and the major problem will not be uncovered until the system has been operated for at least one business period. Thus, the appropriate conversion plan should be a parallel conversion which the existing system is operated at the same period. This ensures that all major problems in the new system have been solved before the existing system is discarded.

The conversion plan also typically includes a systems acceptance test, which is the final opportunity for end-users, management and information systems operations management to accept or reject the system. The system acceptance test is performed by the end-users using the real data over an extended period. The system acceptance test consists of three levels as follows:

(a) Verification testing runs the system in a simulated environment using simulated data.

(b) Validation testing runs the system in a live environment using real data.

(c) Audit testing certifies that the system is free of errors and is ready to be placed into operation.

(3) Install Databases

The purpose of this task is to populate the new system database with existing data from the existing system. The principal deliverable of this task is the restructured existing data that has been populated in the databases for the new recruitment service information system.

(4) Train Users

Converting to the new system necessitates that the system users be trained and provide with documentation (user manuals) that guide them through using the new system. The end-users must be trained to use equipment and to follow the procedures required of the new system. The principal deliverable of this task is user training and documentation. Every possible situation and its proper procedure must be documented.

(5) Convert to New System

The key input to this task is the conversion plan that was created in the implementation phase task. The principal deliverable is the operational system that is placed into production business. This task also involves a system audit. The system owner (company) and system user (administration officer) will provide the valuable feedback pertaining to the actual use of the new system. The system users are the source of the majority of the feedback used to measure the system's acceptance. Regardless, the feedback will be used to help benchmark the new system project down to the road.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

In this paper, the recruitment service of Bisco Placement Co. Ltd., is a case study. The existing recruitment service system of this company is a paper work. The purpose of this project is to develop the existing recruitment service system into the new computerized system, which is more effective and well designed. The new computerized system provides a lot of tangible and intangible benefit, in terms of data accuracy, efficiency and control to the company. In order to develop the proposed system, the company has to invest some money to support the changes in both software and hardware. Although, the initial cost is high from the cost and benefit analysis as shown in this paper, by charting the cumulative lifetime time-adjusted Costs + Benefits, we can estimate that the break-even point will occur approximately 1.4 years after the proposed system begins operating. The payback period for the investment of the company in this proposed system will lapse within 2.10 years, after that accrued benefits will overtake accrued and continuing costs.

The proposed system will be able to solve the previous enumerated problems and improve the sequence of the recruitment service workflow for input, data processing and output including feedback process. Authorized user is able to access data, which is more accurate, no redundancy and consistent and also able to operate with the system effectively and efficiently. The proposed system can reduce a lot of time for processing some works such as applications, worker registration, testing, certification and generating reports such as statistical report, worker status report, any daily reports. Table 5.1 shows the estimate time spent on each process of the proposed system compared with the existing system.

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

Process	Existing System	Proposed System
Check worker Availability Process	5 mins.	2 mins.
Application Process	8 mins	4 mins.
Registration Process	12 mins.	5 mins.
Testing Process	10 mins.	5 mins.
Certification Process	15 mins.	8 mins.

(1) Check Worker Availability Process

The proposed system is able to record worker information e.g. available workers or worker qualifications in database. It is also easy for the administration staff to retrieve the information, and give the information to the prospective client within a short time or immediately.

(2) Application Process

The proposed system is able to record application information in database. It is convenient and takes a short time to retrieve and modify the application information for each worker.

(3) Registration Process

The proposed system is able to record the information from quota registration into database of the system. It is also convenient and takes a short time to retrieve and modify the registration information so the worker does not waste a lot of time for the process of registration.

(4) Testing Process

From the database of the proposed system, when workers check in for testing, the administration staff is able to create new worker profile, retrieve

existing worker profile and testing information immediately, so the testing process is faster.

(5) Certification Process

Similar to the testing process, the certification process of the workers will also be faster.

On completion, from the performance and ability of the new system, it is clear that the company is able to achieve the business solutions such as increase services to the workers and clients, increase their revenue, reducing time and cost.

5.2 Recommendations

The factors that affect the performance of the proposed system are as follows:

(1) User and owner requirement is the most important for the system development. The requirement should be gathered with the appropriate techniques so that the result of applying the new system will boost the group's productivity.

(2) Using a problem-solving approach to build the system. The development should be based on understanding the problem, identifying and selecting the best candidate, designing, observing and evaluating the solution's impact, and refine accordingly.

(3) Establishing the phases and activities that serve the role in the problem-solving process.

(4) Establishing the standard for both information systems, and the process used to develop the proposed system.

(5) Justifying system as capital investments by analyzing the cost-effective and the risk management.

(6) Do not be afraid to cancel or revise scope. We should cancel the project if it is no longer feasible. The reevaluation and adjustment is needed for the costs and schedule if the project is increased. Reducing the scope if the budget and schedule are frozen and not sufficient to cover all project objectives.

(7) Dividing a larger problem (system) into more easily managed pieces (subsystem) so that it can complement communication and project management by allowing different pieces of the system delegated to different stakeholders.

(8) Designing the system for growth and change to avoid the long-term problems due to inevitable decay of system over time as entropy.

APPENDIX A

DATABASE DESIGN

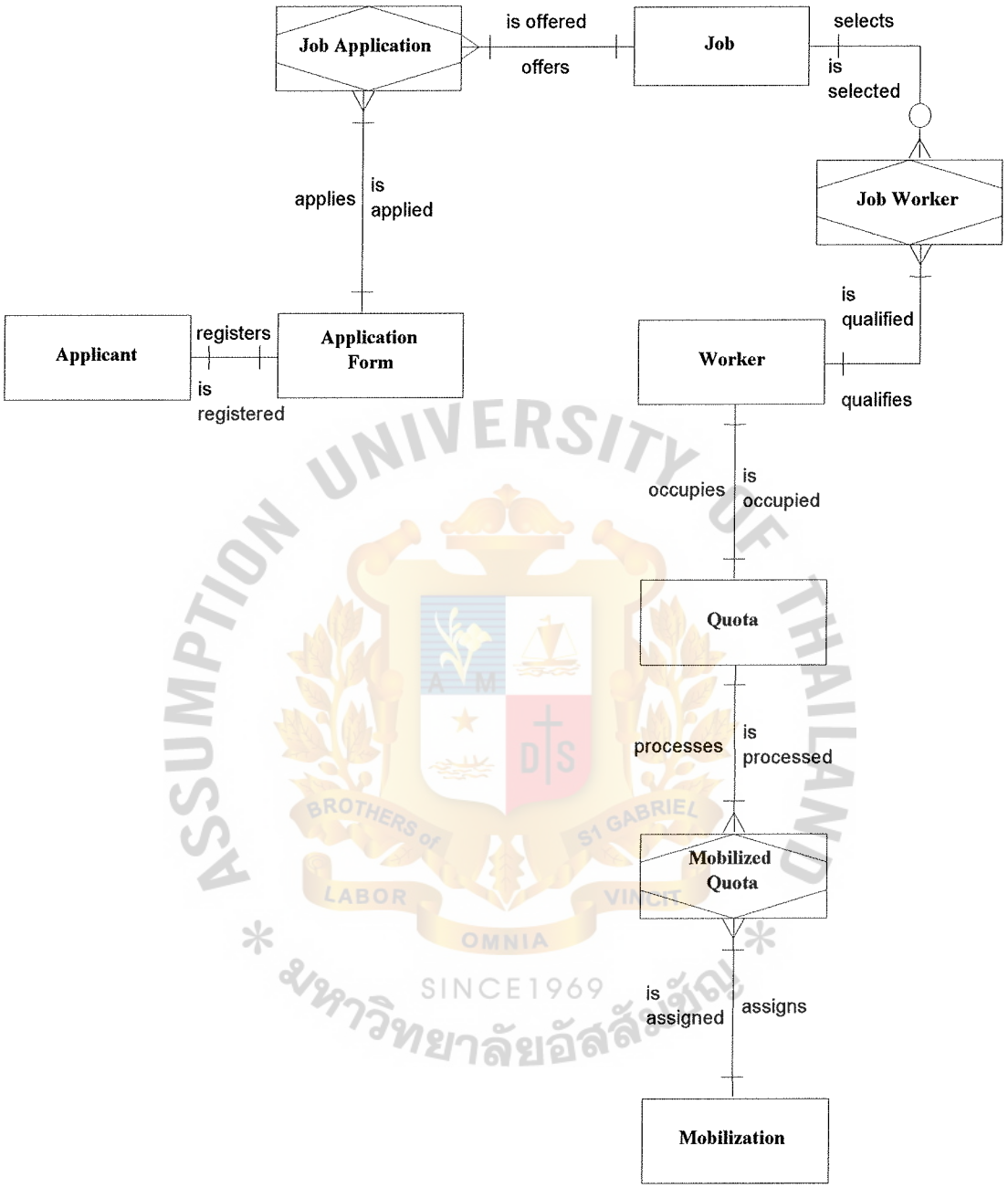

Figure A.1. The Recruitment Service Information Context Data Model.

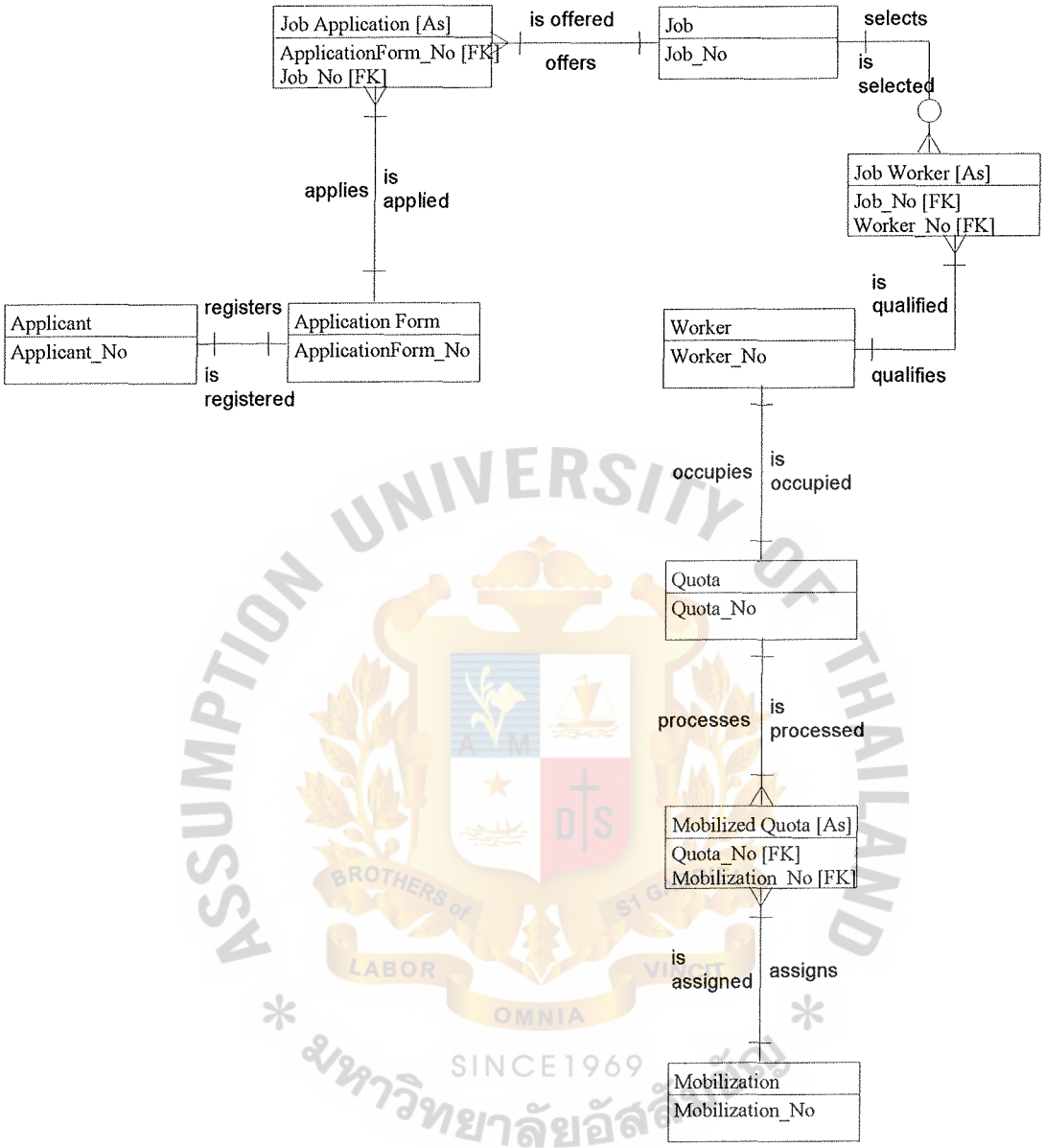

Figure A.2. The Recruitment Service Information Key-based Data Model.

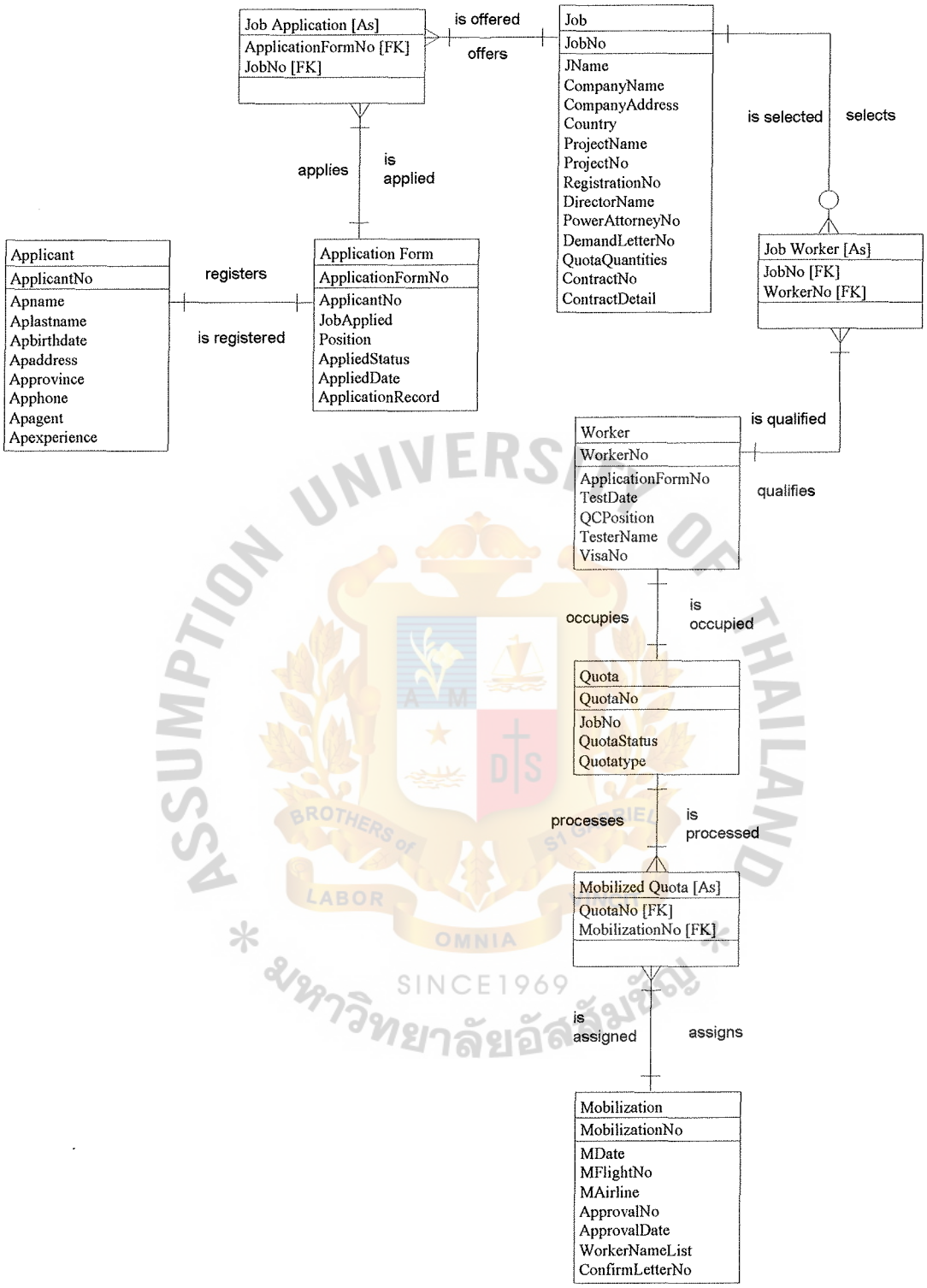

Figure A.3. The Recruitment Service Information Fully Attributed Data Model.

APPENDIX B

DATA FLOW DIAGRAM

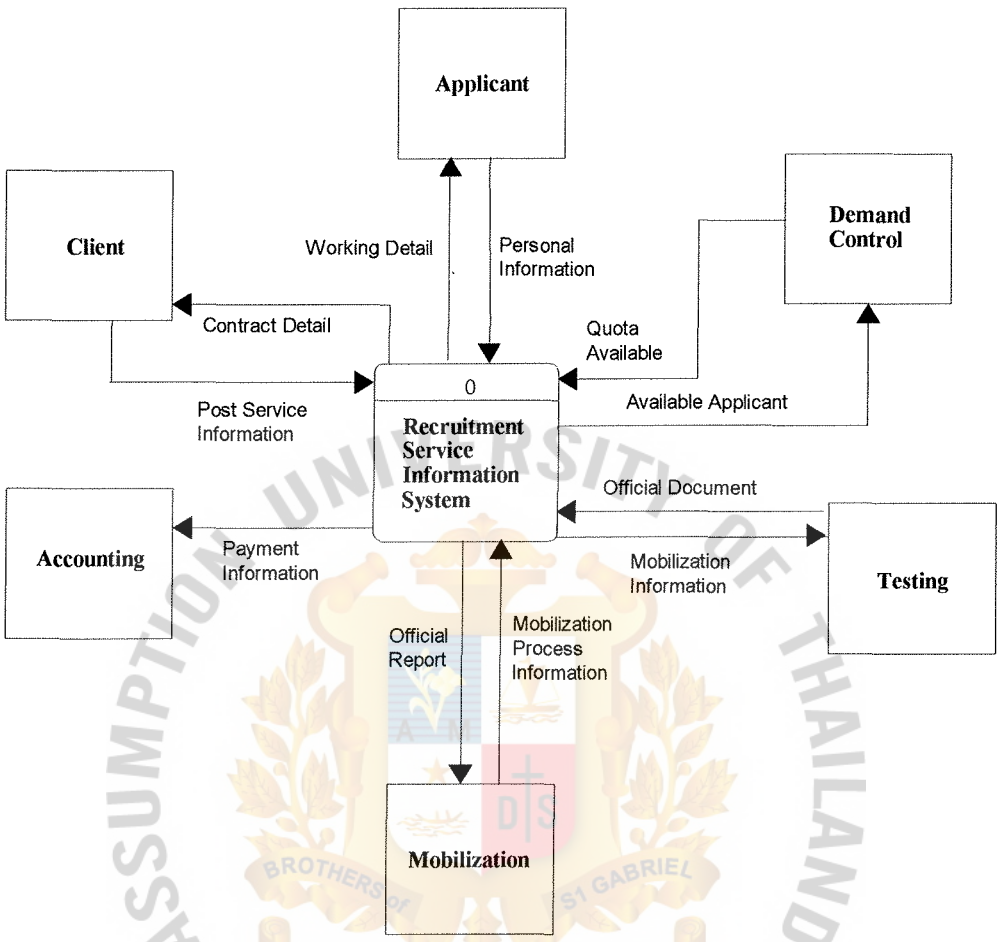

Figure B.1. The Recruitment Service Information Context Data Flow Diagram.

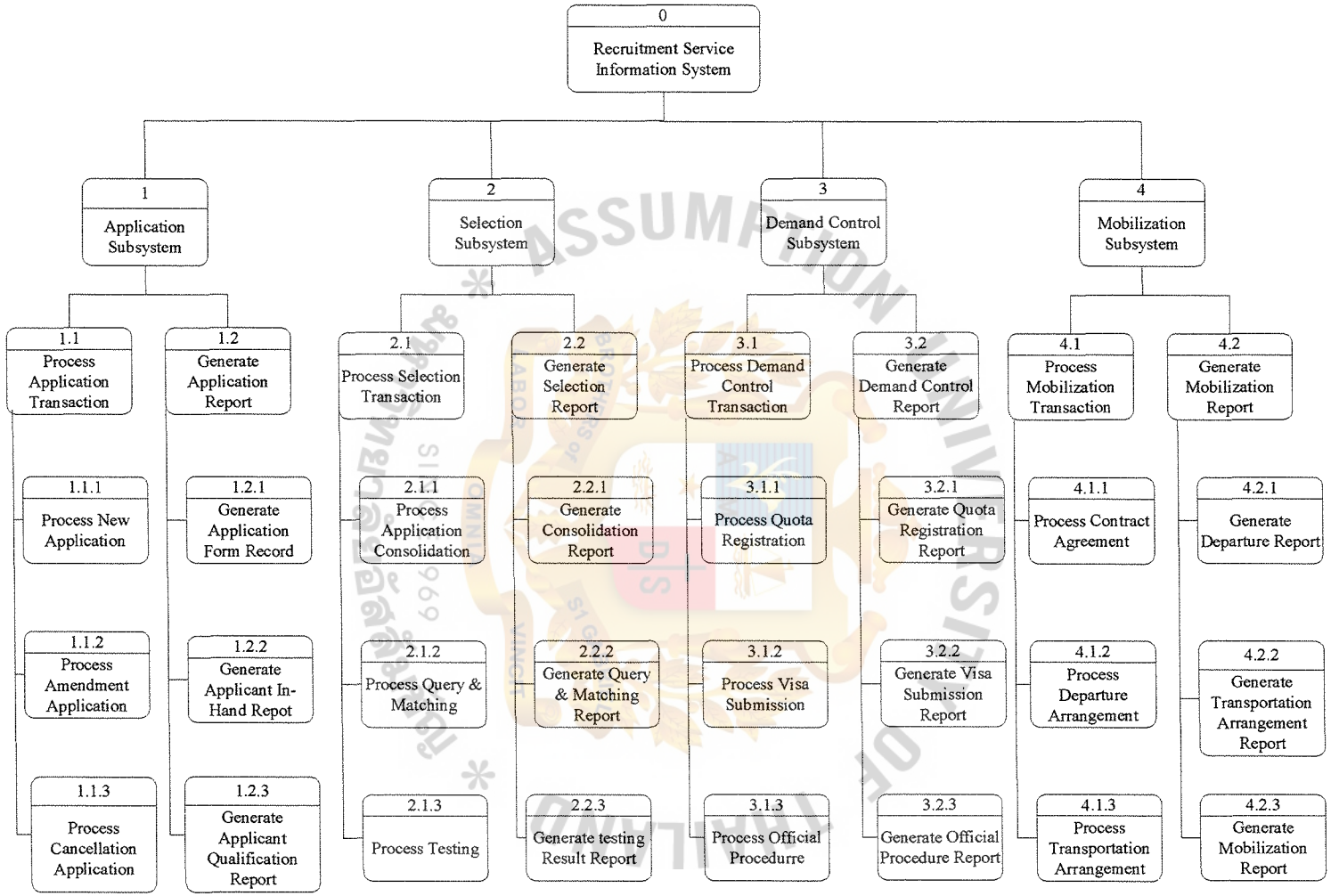

Figure B.2. Composition Diagram.

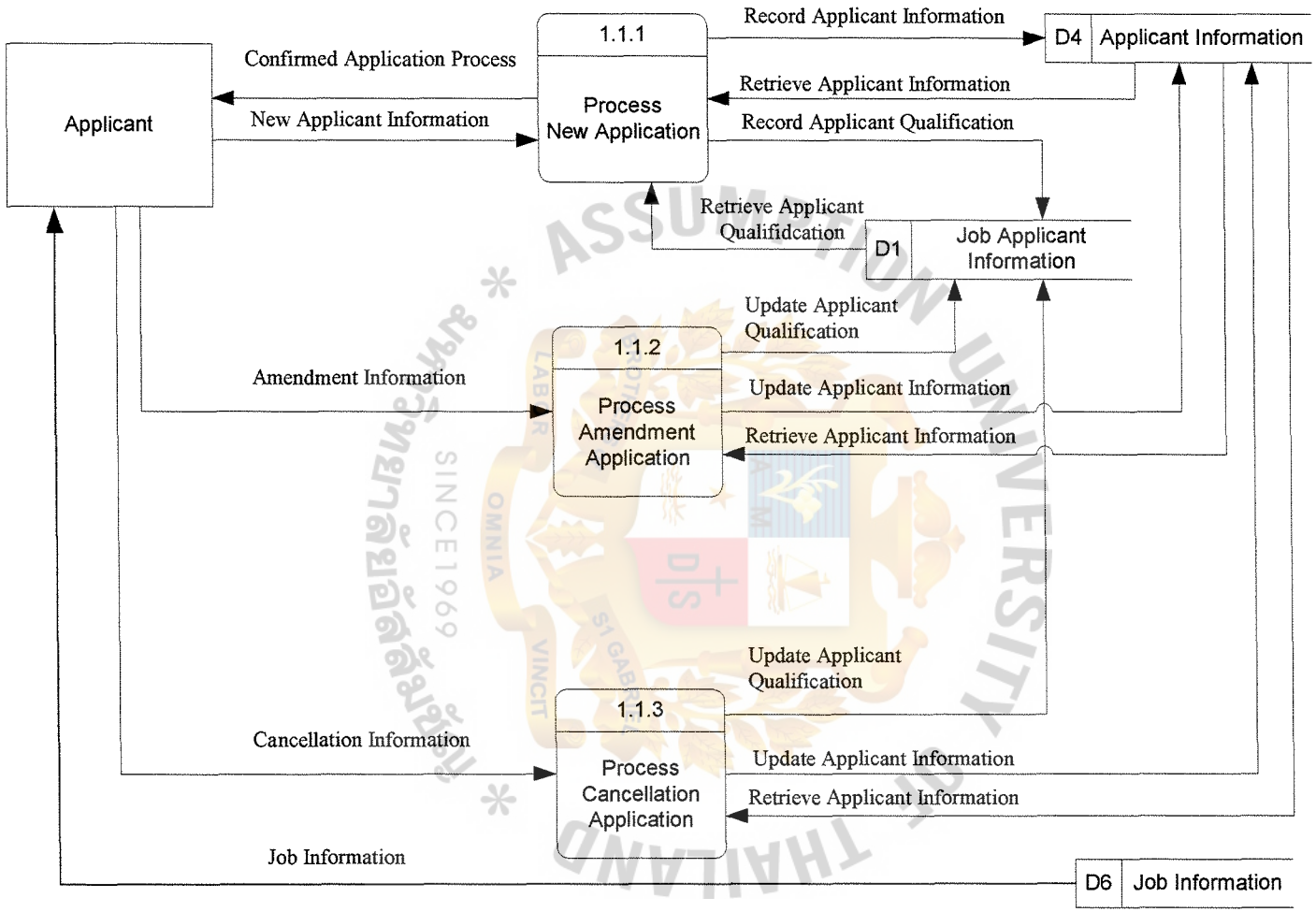

Figure B.3. The Event Diagram of Application System.

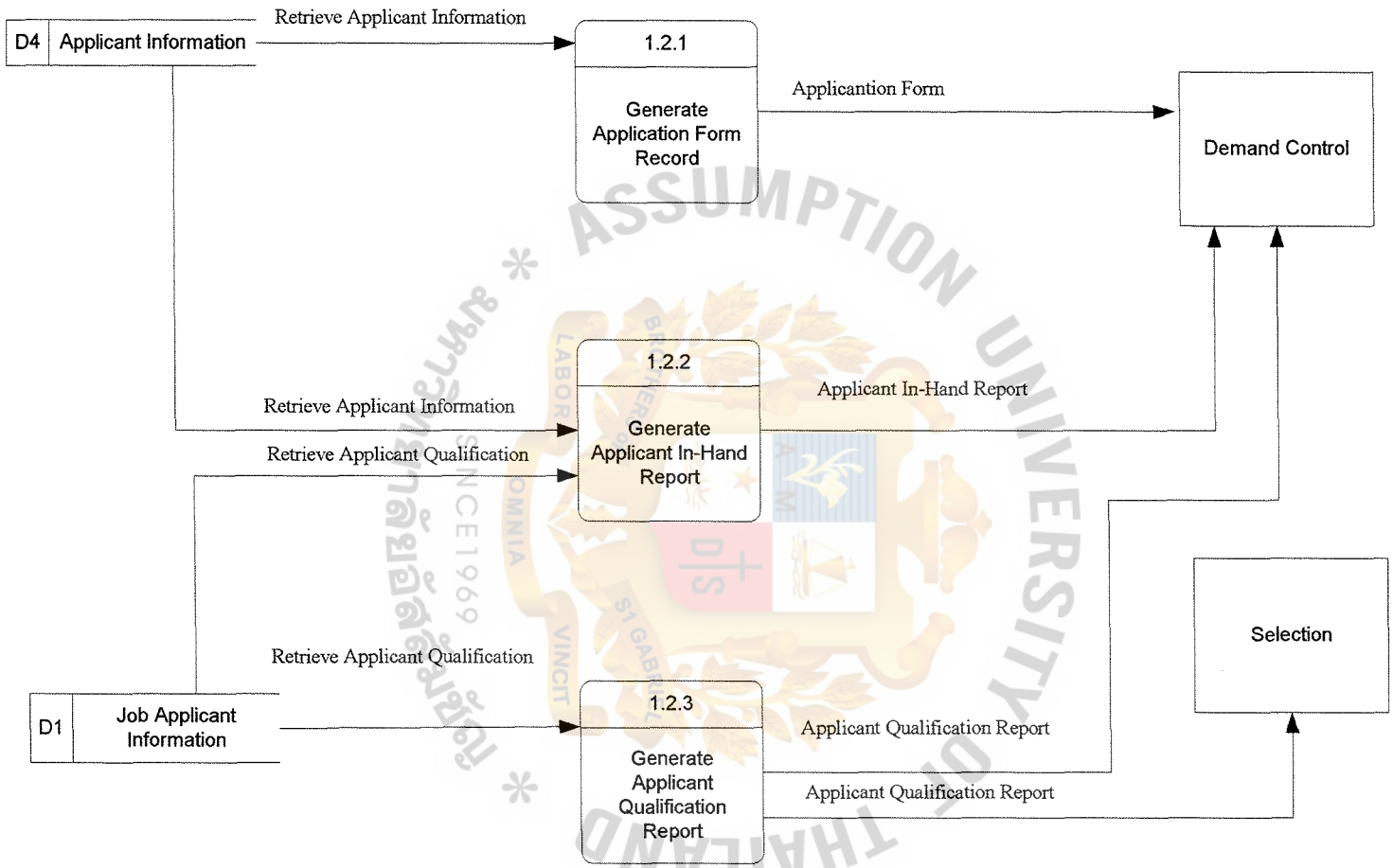

Figure B.4. The Even Diagram of Application Subsystem (Continued).

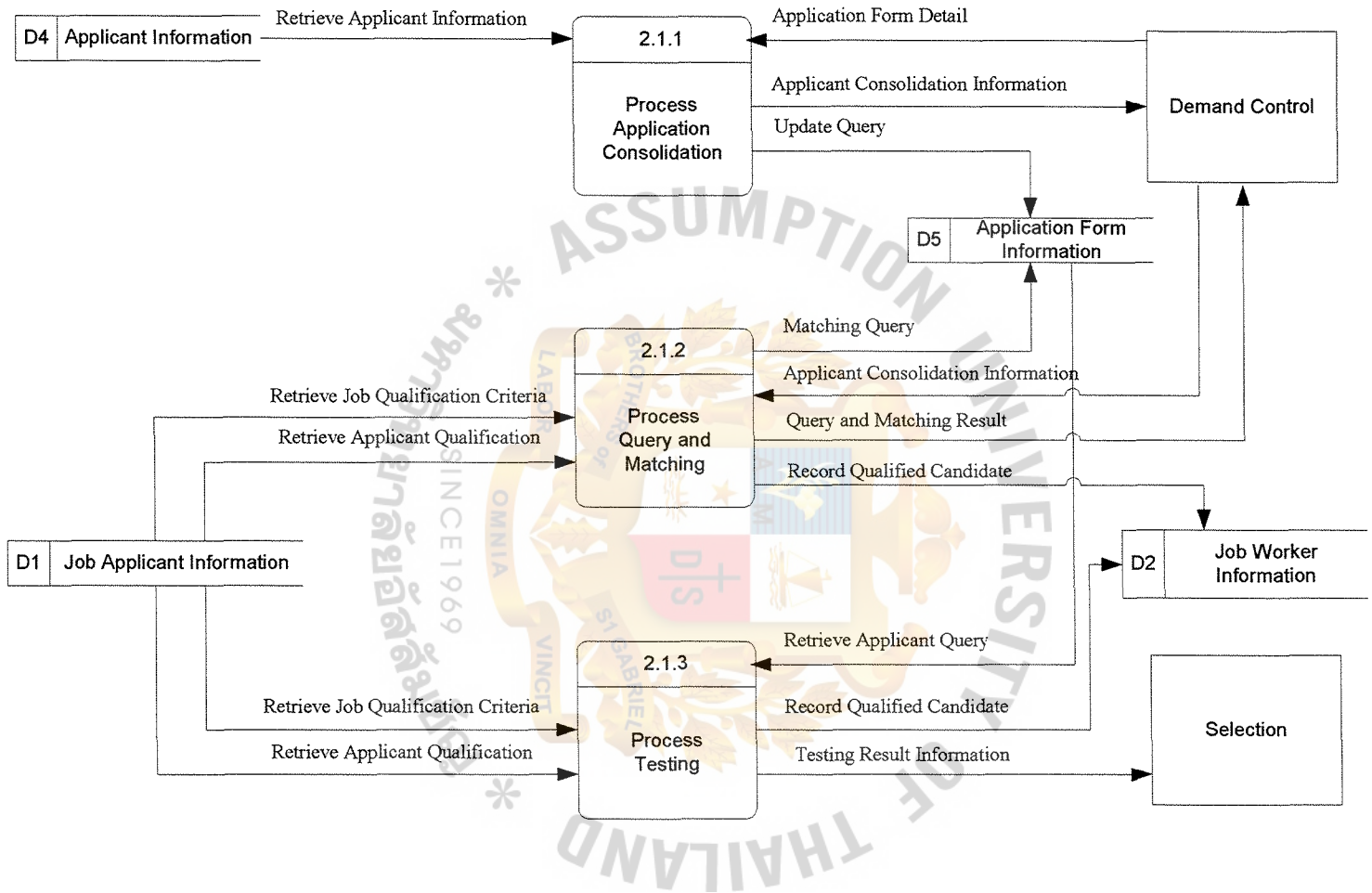

Figure B.5. The Event Diagram of Selection Subsystem.

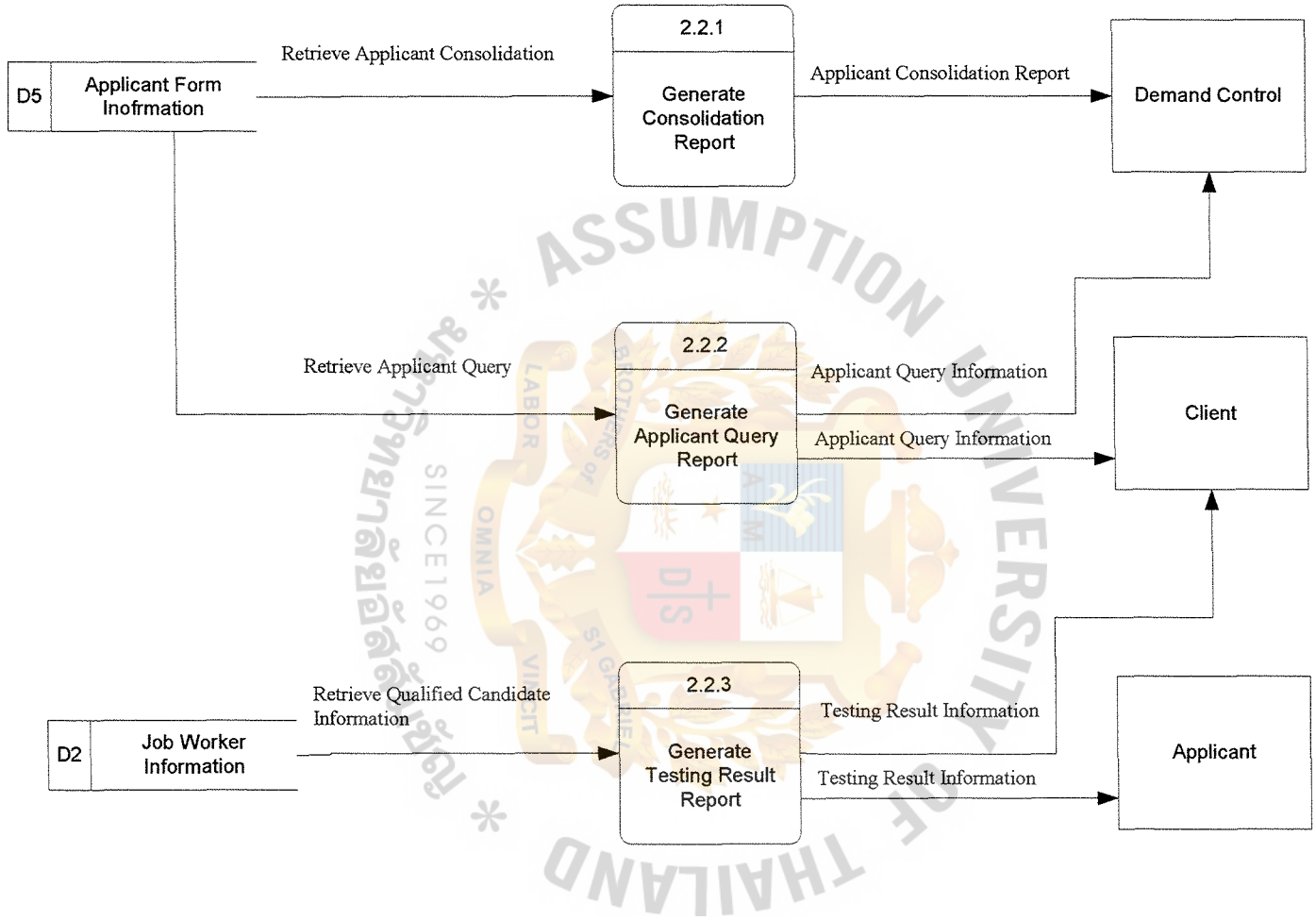

Figure B.6. The Event Diagram of Selection Subsystem (Continued).

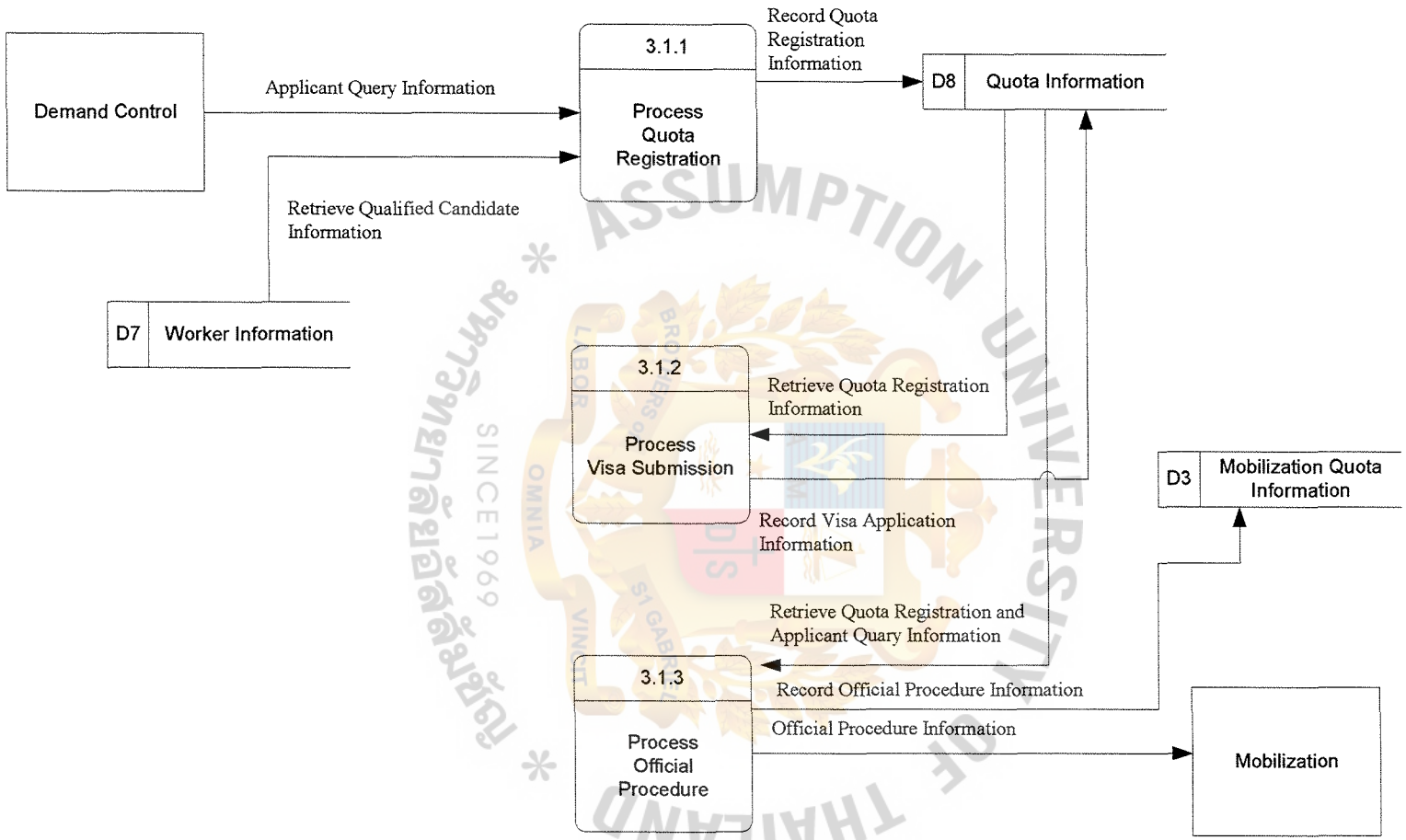

Figure B.7. The Event Diagram of Demand Control Subsystem.

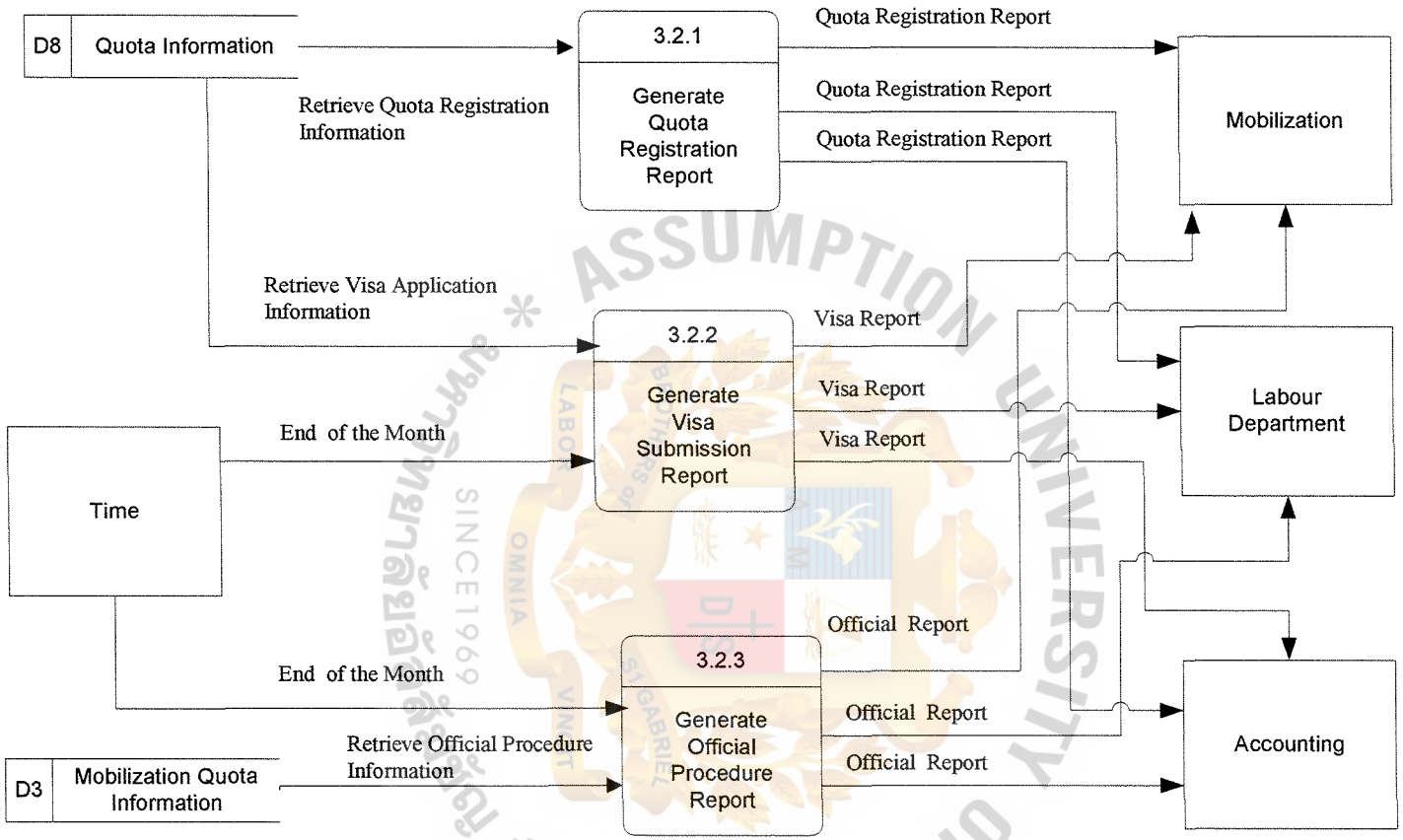

Figure B.8. The Event Diagram of Demand Control Subsystem (Continued).

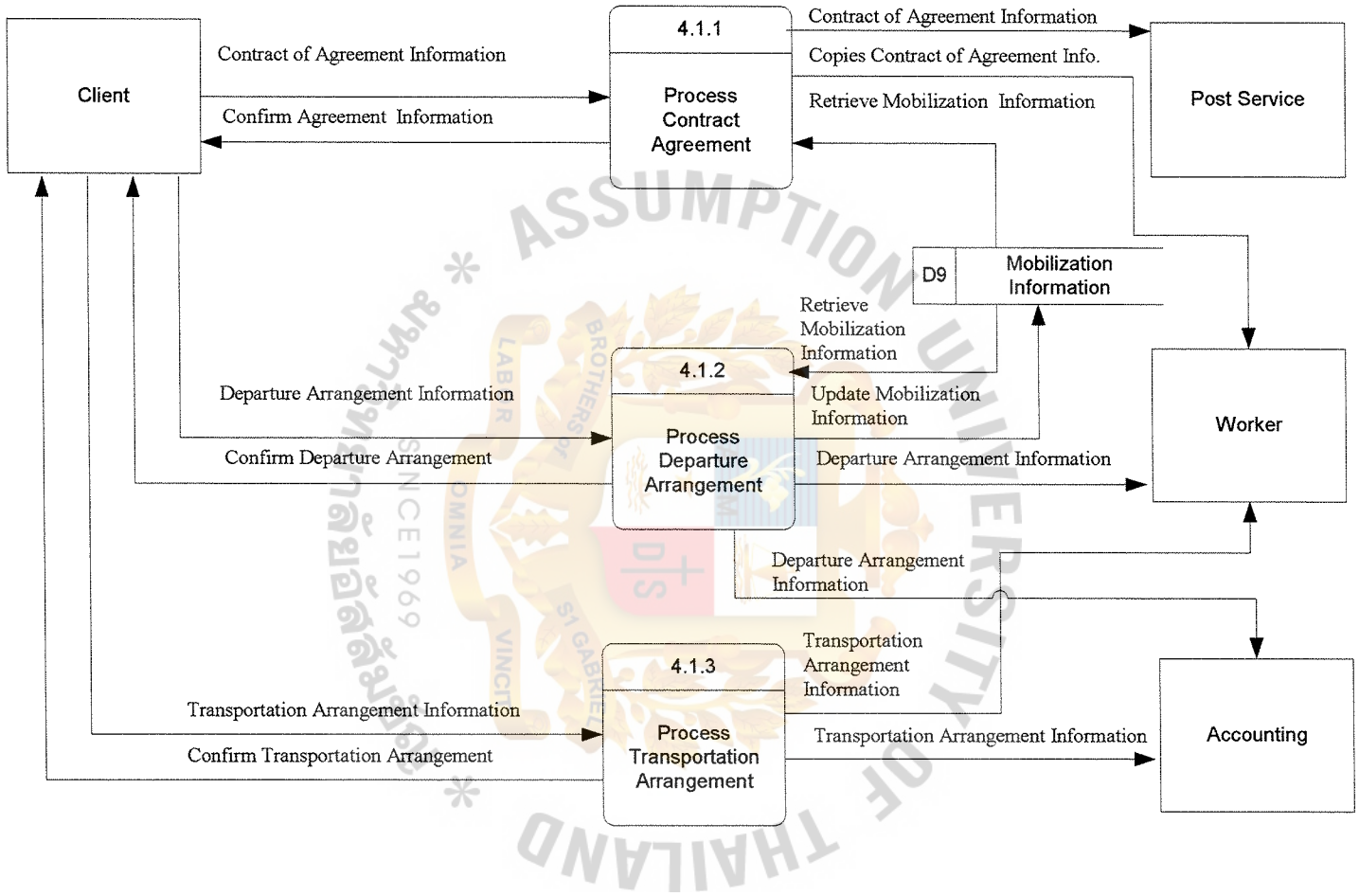

Figure B.9. The Event Diagram of Mobilization Subsystem.

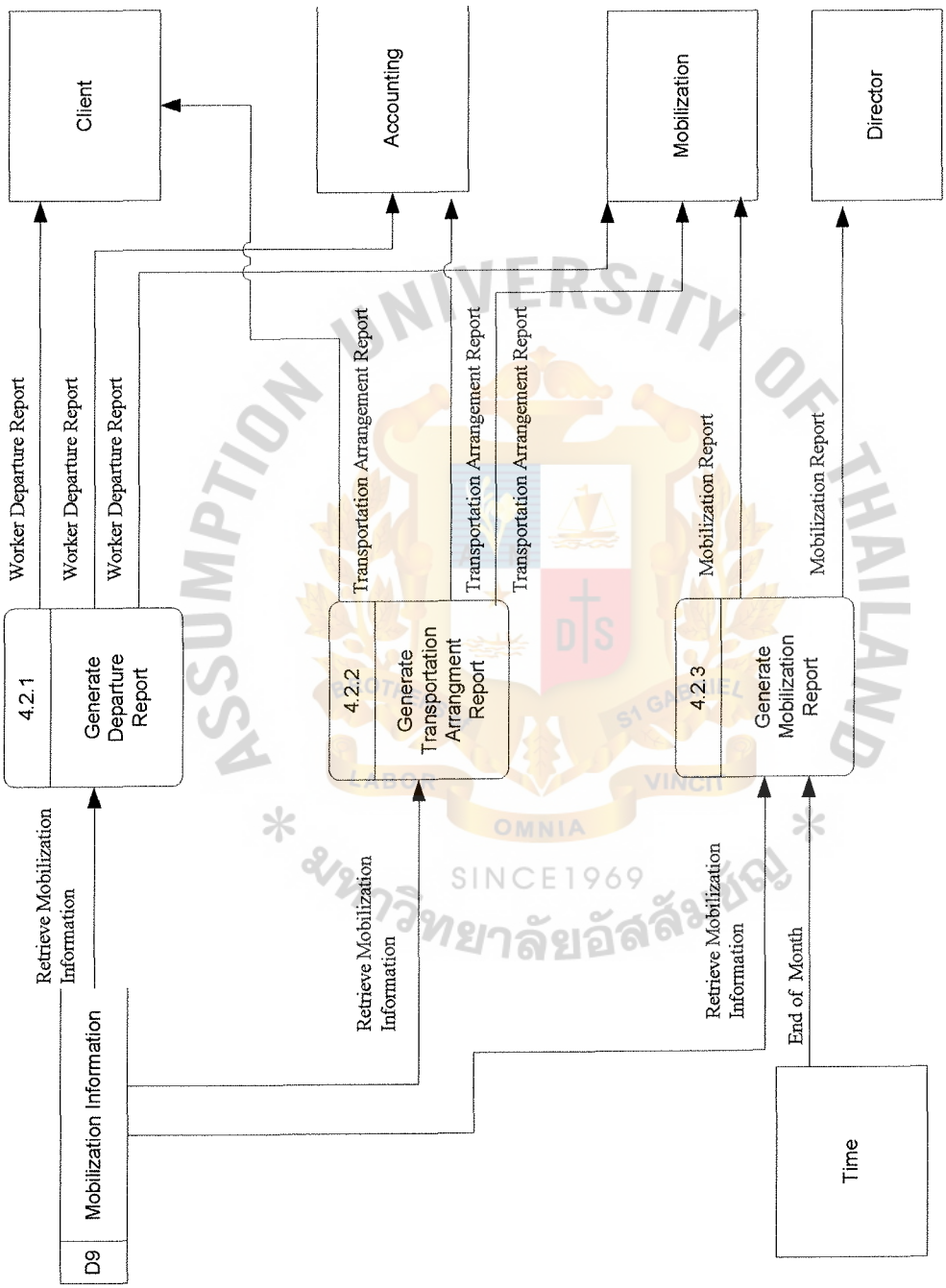

Figure B.10. The Event Diagram of Mobilization Subsystem (Continued).

APPENDIX C

SCREEN DESIGN

Figure C.1. User Password Verification.

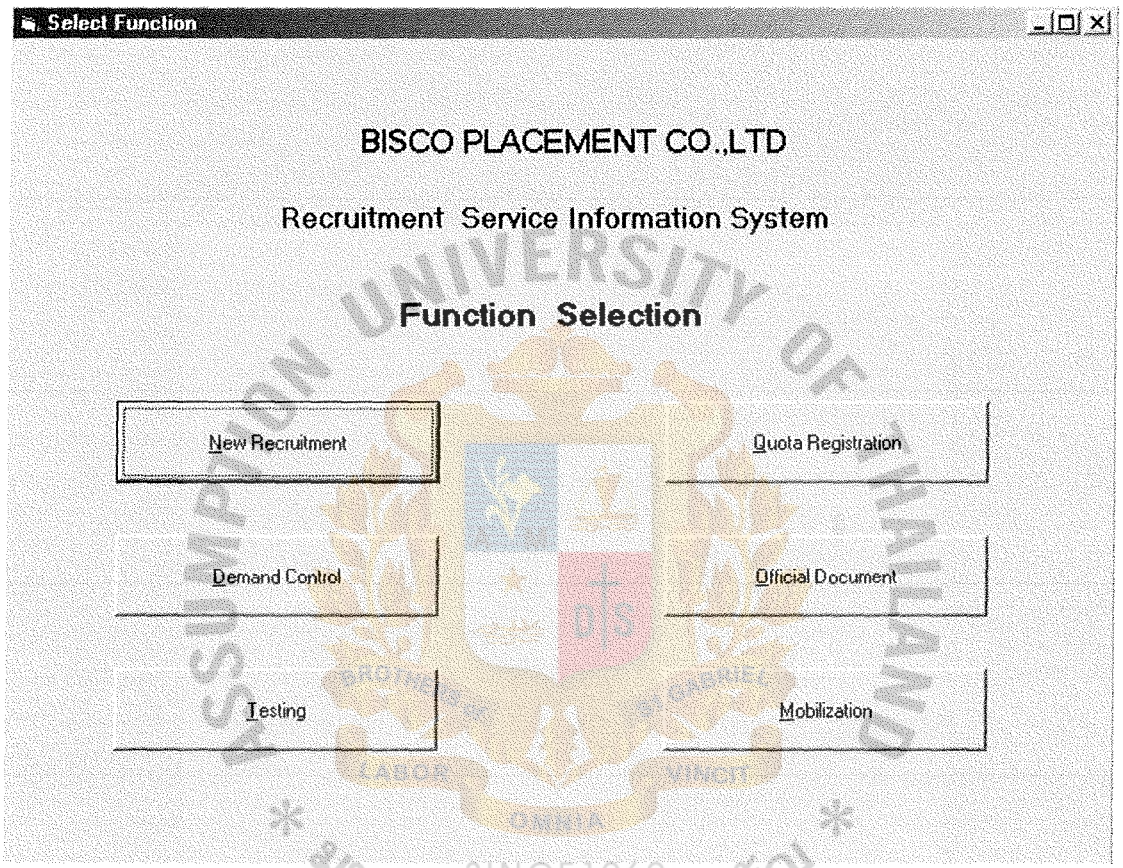

Figure C.2. Function Selection.

Figure C.3. Process Selection.

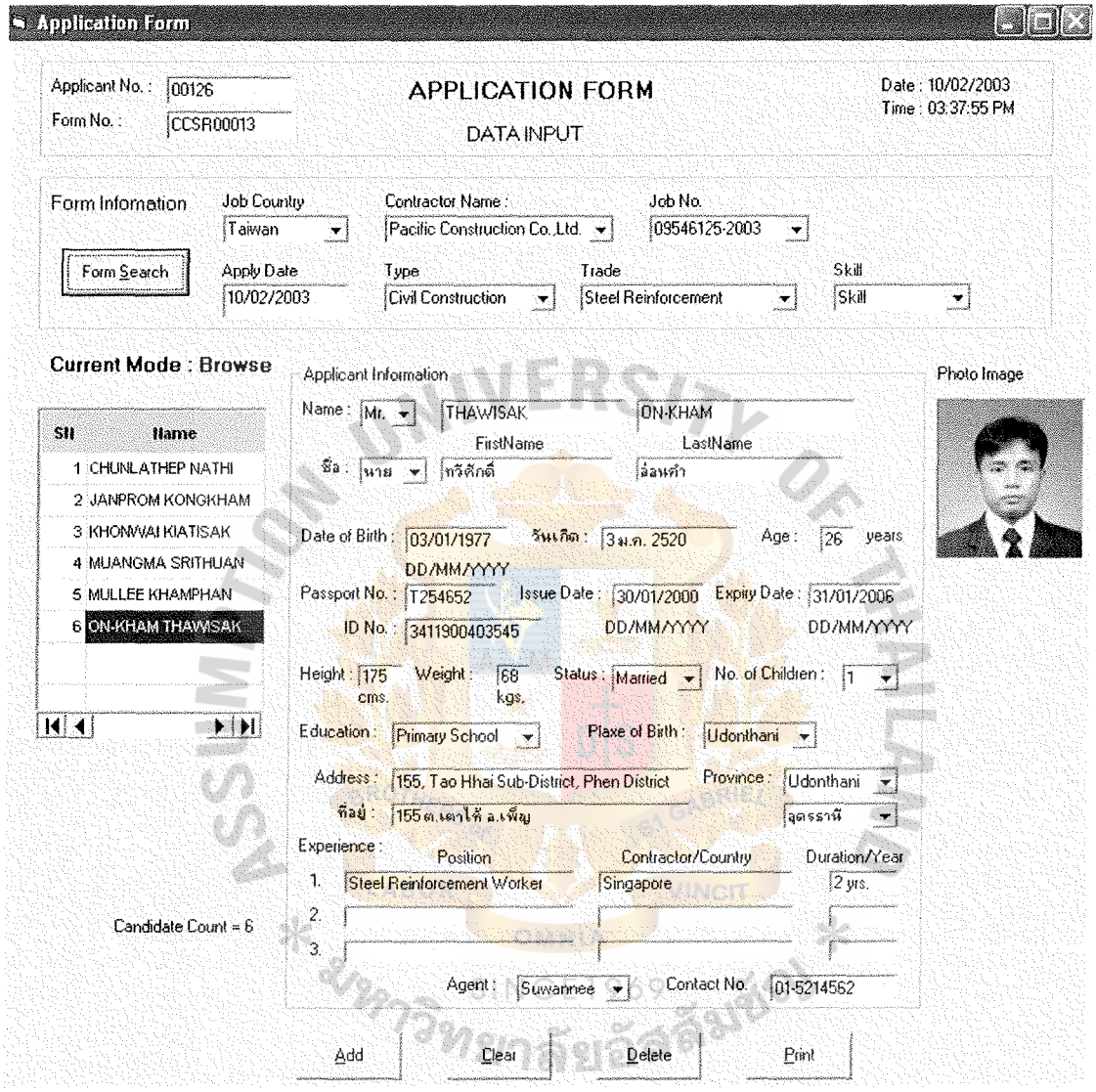

Figure C.4. Application Form.

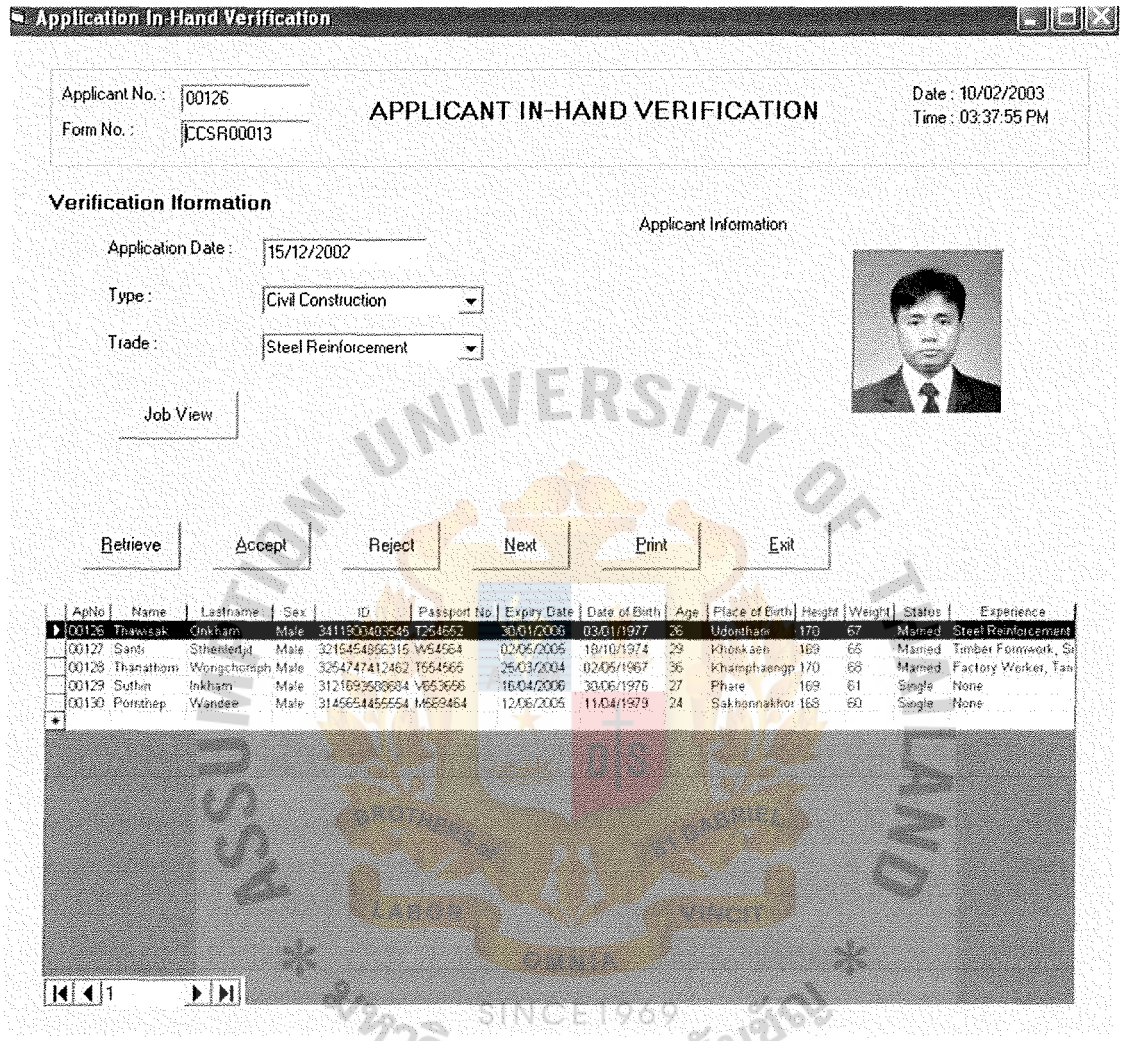

Figure C.5. Applicant In-Hand Verification.

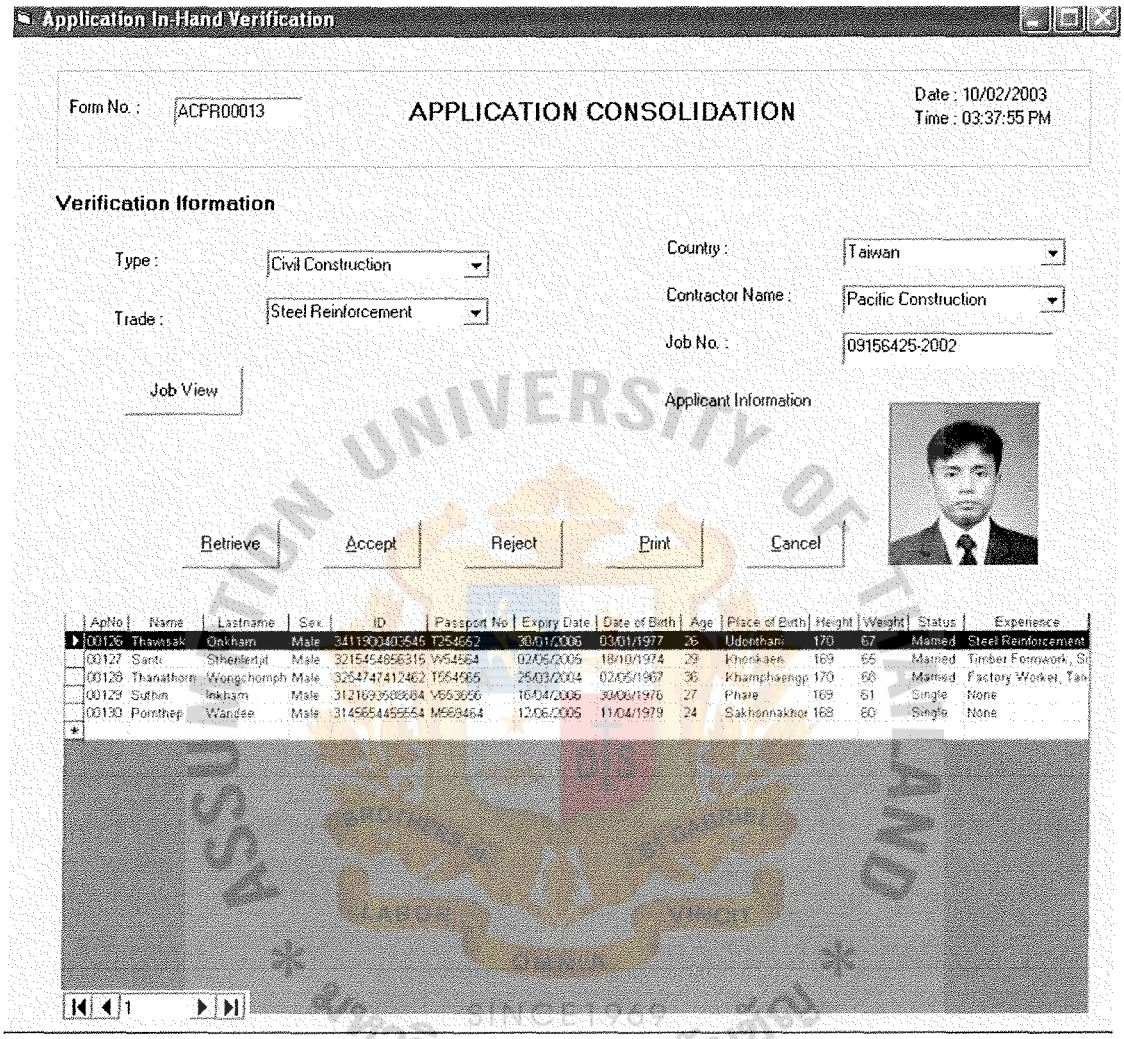

Figure C.6. Applicant Consolidation.

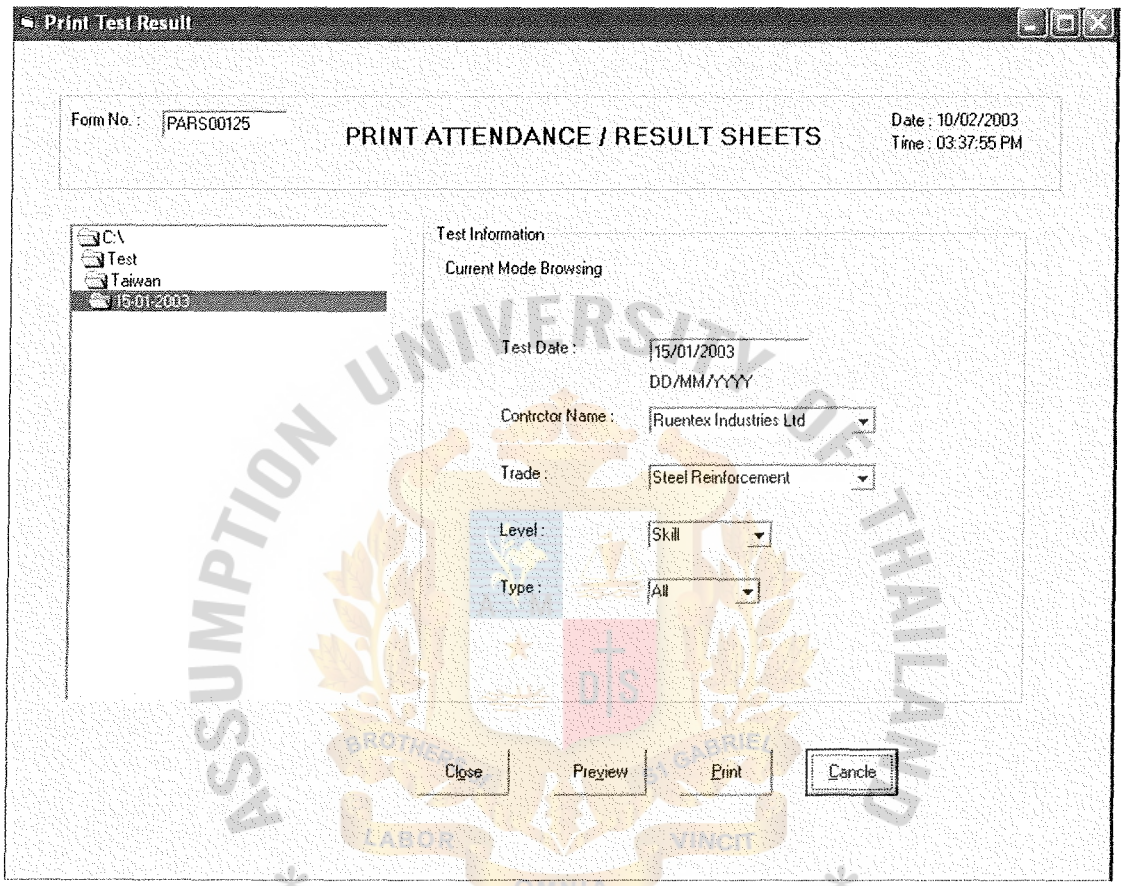

Figure C.7. Testing Result Report.

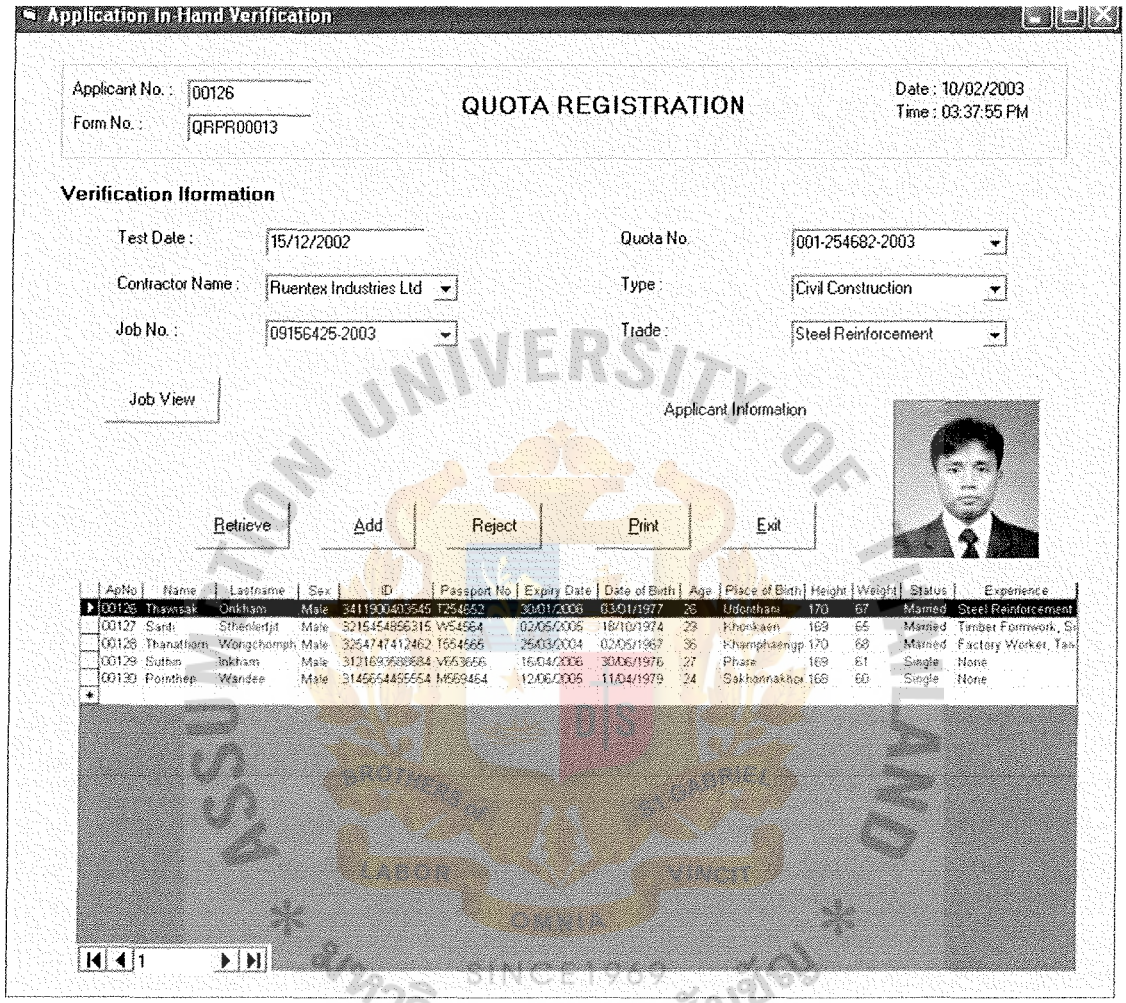

Figure C.8. Quota Registration.

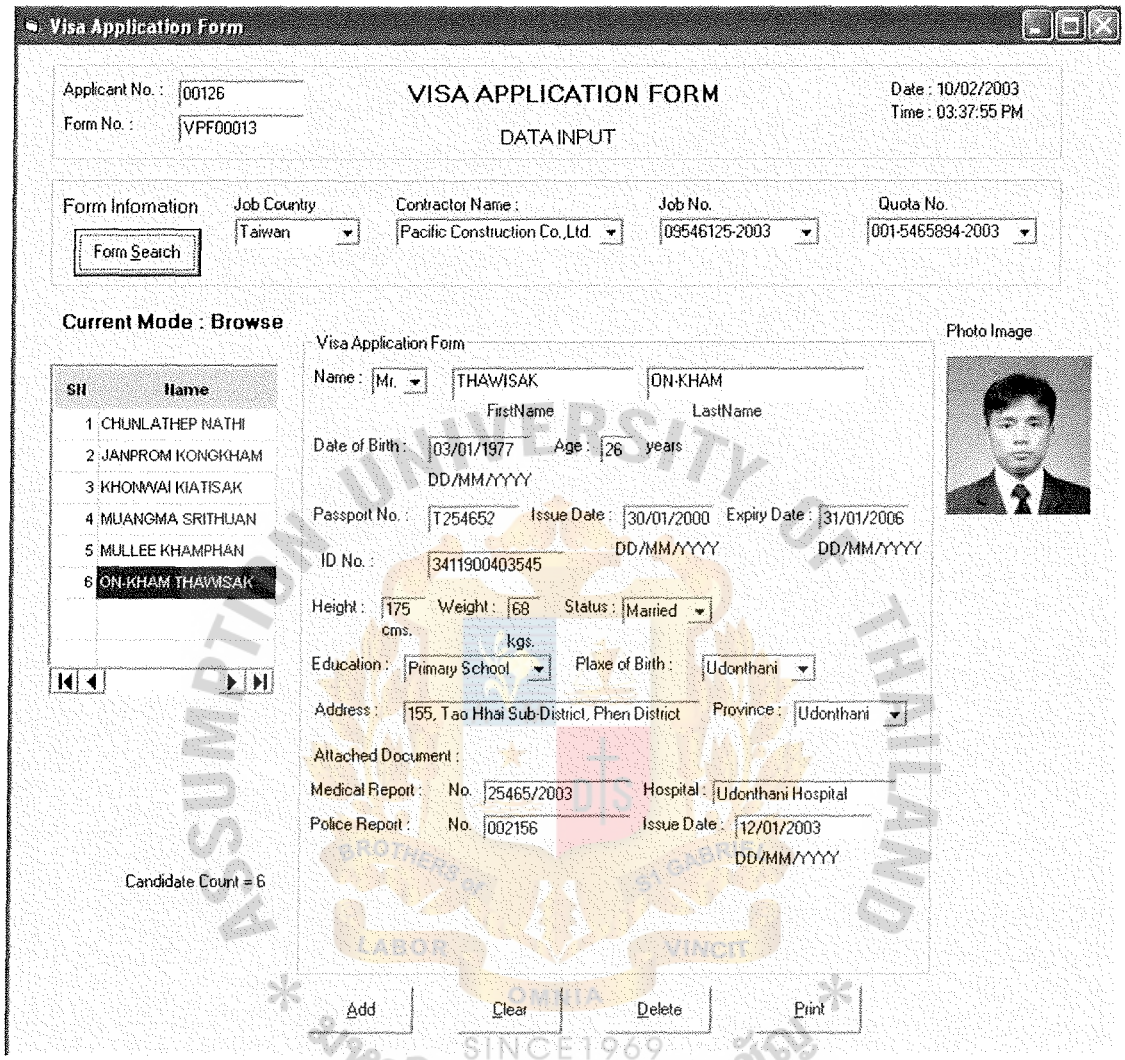

Figure C.9. Visa Application.

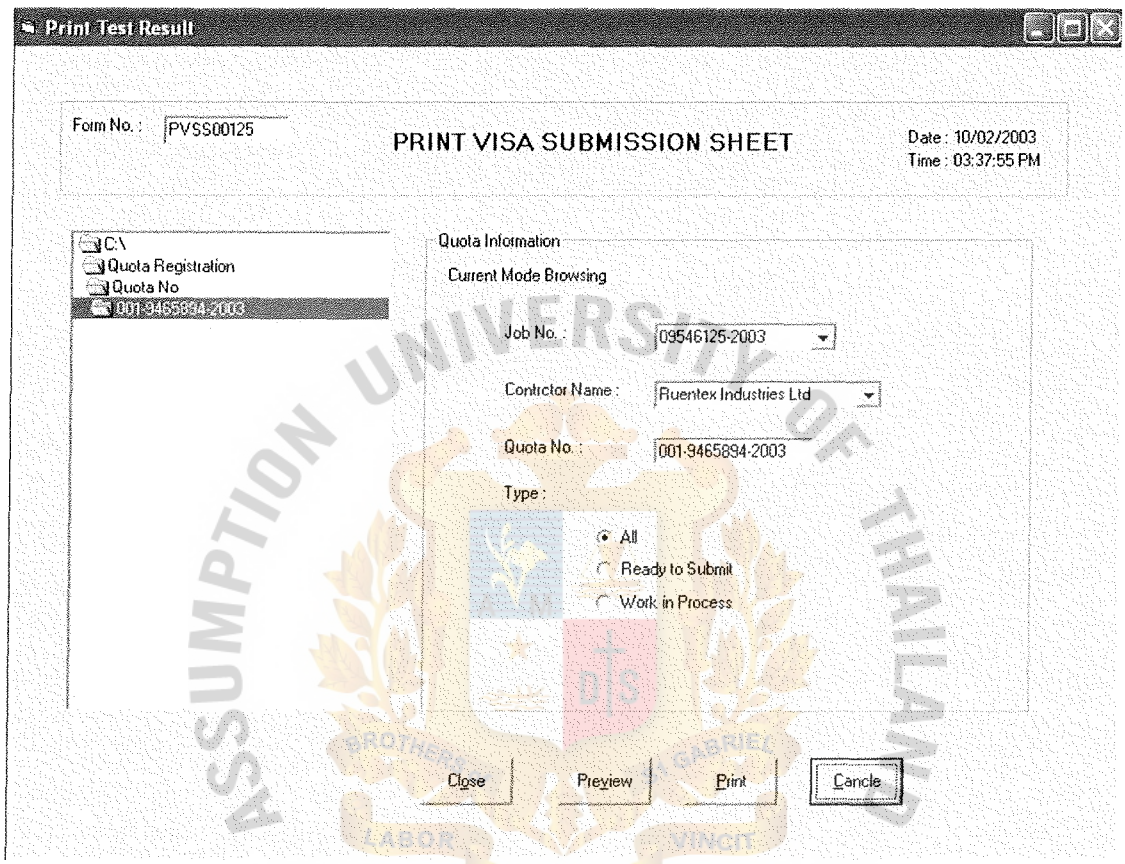

Figure C.10. Visa Submission Report.

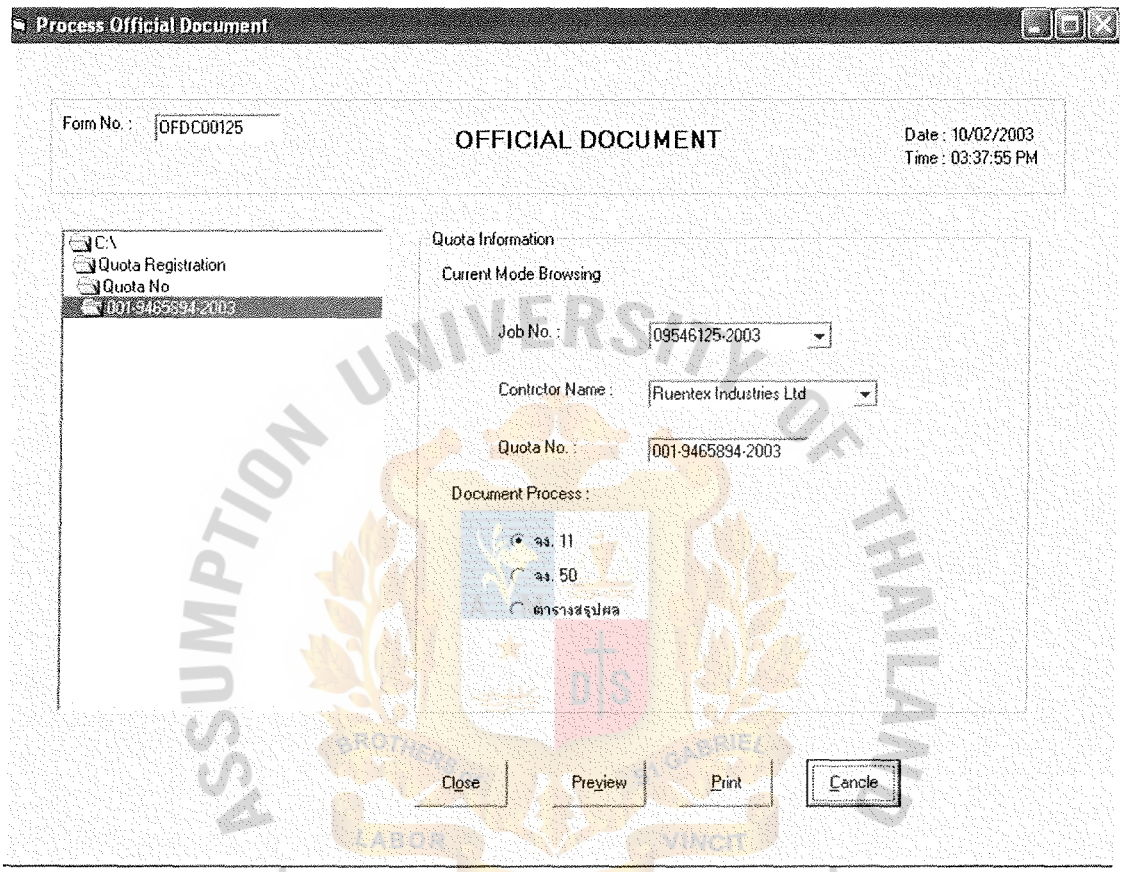

Figure C.11. Official Documents Process.

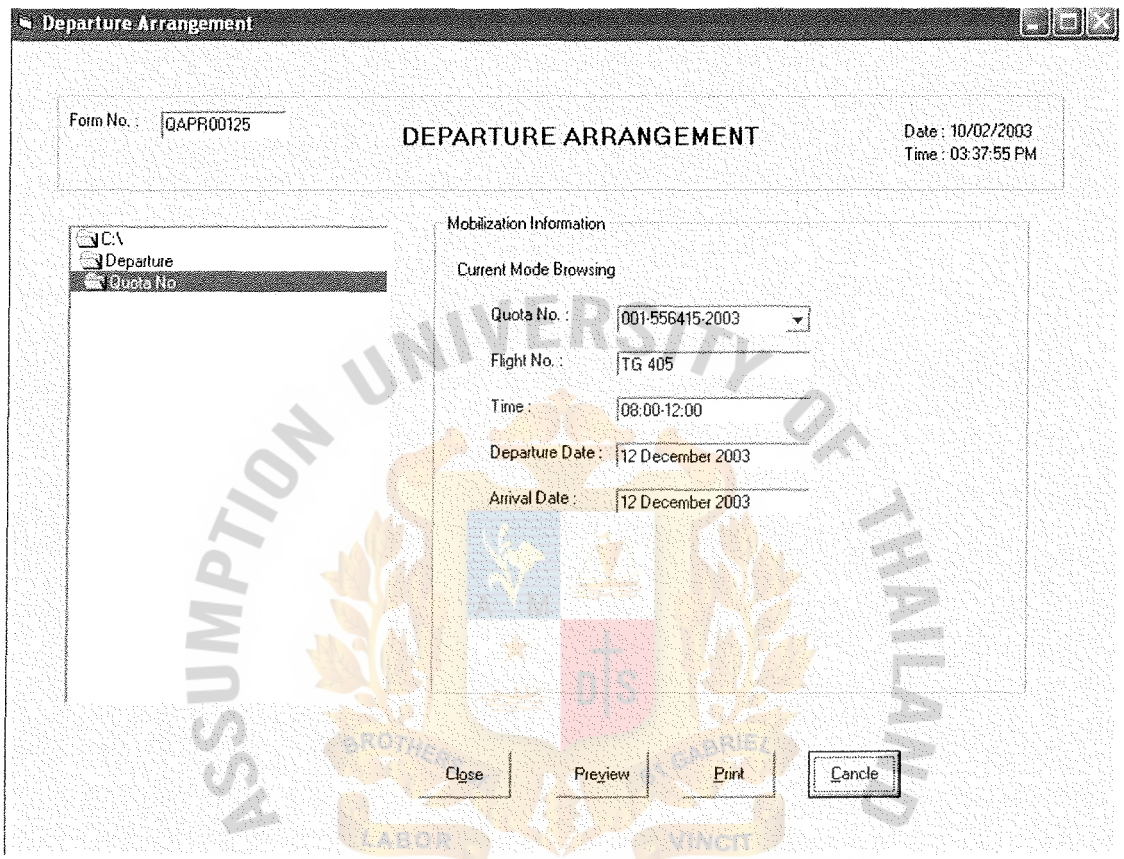

Figure C.12. Departure Report.

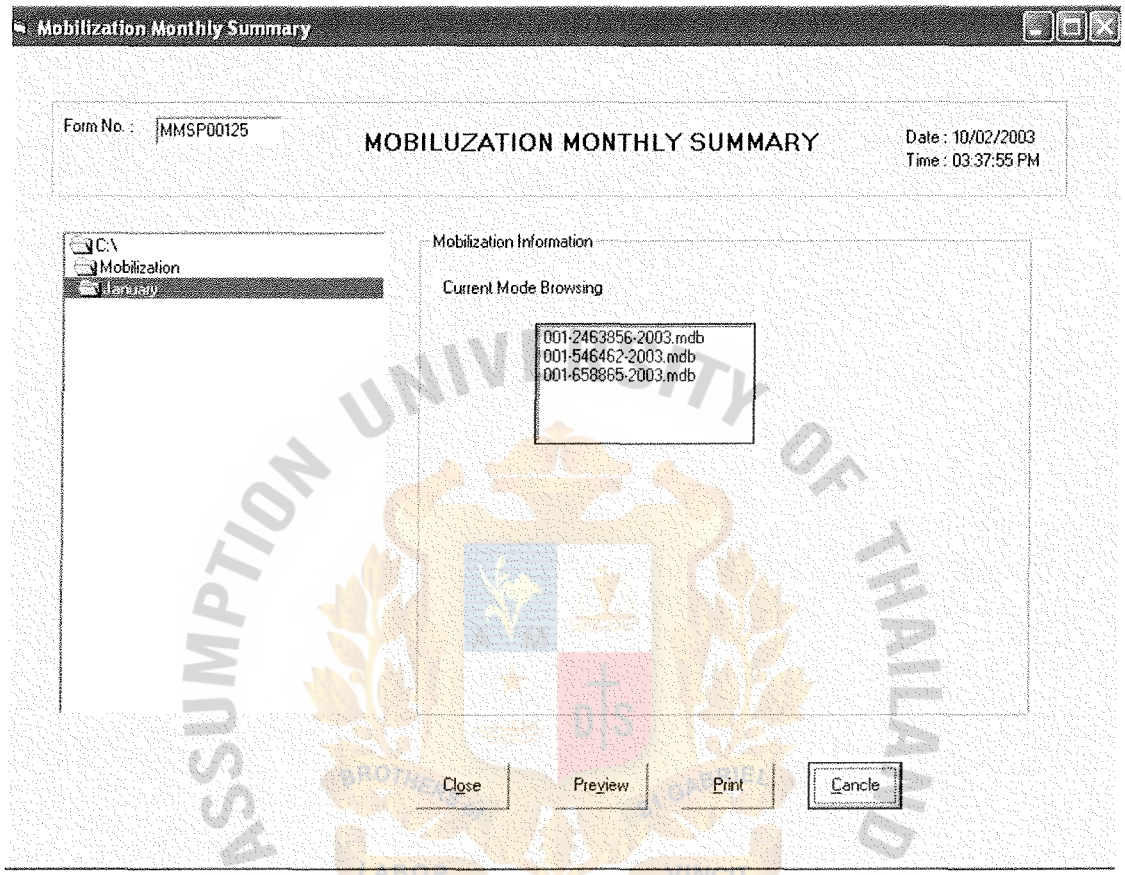

Figure C.13. Mobilization Report.

APPENDIX D

REPORT DESIGN

BISCO PLACEMENT CO.,LTD

Application Form / Personel Data

Contractor name : Ruentex Industries Ltd

Position : Steel Reinforcement Worker

Apply Date:

Name : Thawisak (*Family name*) Onkham (Name) Sex : Male

Date of Birth : 31-Jan-55 Age : 44 yrs. Place of Birth : Udonthani

ID No: 3411900403545

Passport No. : V 304509 Issue : 18-Feb-98 Expire : 17-Feb-03

Hight : 160 Cms. Weight : 53 Kg.

Marital Status : Married No. of Children 1 child/children

Education : Primary School

Background Experiences :

Overseas :

Position	Contractor's name/ Country	Year
Steel Reinforcement	Singapore	1

Permanent Address : 155, Tao-Hai Sub-district, Phen District
Udonthani Province

Figure D.1. Applicant Form.

BISCO PLACEMENT CO.,LTD

APPLICANT IN-HAND VERIFICATION

Job Type : Civil Construction

Apllo	Name	Lastname	Sex	ID	Passport II	Expiry Date	Date of Birth	Age	Place of Birth	Height	Weight	Status	Experience
00129	Suthin	Inkham	Male	3121693588684	V653656	16/04/2006	30/06/1976	27	Phare	169	61	Single	None
00130	Pornthep	Wandee	Male	3145654455554	M569464	12/06/2005	11/04/1979	24	Sakhonnakhon	168	60	Single	None
00127	Santi	Sthenlertjit	Male	3215454856315	W54564	02/05/2005	18/10/1974	29	Khonkaen	169	65	Married	Formwork,
00128	Thanathorn	Wongchomphoo	Male	3254747412462	T554565	25/03/2004	02/05/1967	36	Khamphaengphet	170	68	Married	Worker,
00126	Thawisak	Onkham	Male	3411900403545	T254652	30/01/2006	03/01/1977	26	Udonthani	170	67	Married	Reinforcem

Figure D.2. Applicant In-Hand Report.

BISCO PLACEMENT CO.,LTD
APPLICANT IN-HAND VERIFICATION

Job Type : Civil Construction
Trade : Steel Reinforcement

No.	ApNo.	Name	Lastname	Age	Trade	Agent	Apply Date
1	25	Nathi	Chunlathep	33	SR	Suwannee	5-Dec-2002
2	125	Kongkham	Janprom	29	SR	Suwannee	5-Dec-2002
3	34	Wichai	Kengkham	28	SR	Suwannee	5-Dec-2002
4	528	Khamchaisri	Thongkhun	27	SR	Suthep	12-Dec-2002
5	521	Kiatisak	Khonwai	24	SR	Suthep	12-Dec-2002
6	123	Srithuan	Muangma	33	SR	Suthep	12-Dec-2002
7	542	Somjit	Muangmoon	43	SR	Suthep	12-Dec-2002
8	111	Khamphan	Mulee	22	SR	Vorapong	20-Dec-2002
9	424	Suwit	Samphantha	31	SR	Vorapong	20-Dec-2002
10	244	Chana	Sidahua	22	SR	Vorapong	20-Dec-2002

Figure D.3. Applicant Qualification Report.

BISCO PLACEMENT CO.,LTD

APPLICANT CONSOLIDATION

Job Type : Civil Construction
Trade : Steel Reinforcement

Country : Taiwan
Employer : Ruentex Industries Ltd.
Job No. 09156425-2003

No.	ApNo	fname	Lastname	Sex	ID	Passport ID	Expiry Date	Date of Birth	Age	Place of Birth	Height	Weight	Status	Experience
1	00129	Suthin	Inkham	Male	3121693588684	V653656	16/04/2006	30/06/1976	27	Phare	169	61	Single	None
2	00130	Pornthep	Wandee	Male	3145654455554	M569464	12/06/2005	11/04/1979	24	Sakhonnakhon	168	60	Single	None
3	00127	Santi	Sthenlertjit	Male	3215454856315	W54564	02/05/2005	18/10/1974	29	Khonkaen	169	65	Married	Formwork,
4	00128	Thansthorn	Wongchomphoo	Male	3254747412462	T554565	25/03/2004	02/05/1967	36	Khamphaengphet	170	68	Married	Worker,
5	00126	Thawisak	Onkham	Male	3411900403545	T254652	30/01/2006	03/01/1977	26	Udonthani	170	67	Married	Reinforcem

Figure D.4. Consolidation Report.

BISCO PLACEMENT CO.,LTD
ATTENDANCE/RESULT SHEET

Test Date : 14-Dec-2002
Trade : Steel Reinforcement
Employer : Ruentex Industries Ltd.

Apno.	Name	Lastname	Passport No.	Date of Birth	Age	Level		Trade	Result	
						Skill	Unskill		Pass	Fail
126	PanYa	Daengseeon	K414999	4-Apr-1975	25	Skill		SR	Pass	
127	Sanan	Jiamjit	K426846	8-Oct-1960	40	Skill		SR	Pass	
128	Saksit	Karapan	K653658	11-Feb-1982	18	Skill		SR	Pass	
129	Prajuab	Muangmai	H646425	20-Jul-1978	22	Skill		SR	Pass	
130	Santi	Namkaew	G546423	8-Dec-1973	26	Skill		SR	Pass	
131	Keacha	Phujumnong	M548643	6-Dec-1963	36	Skill		SR	Pass	
132	Surasak	Sakkhieo	P564656	31-May-1971	29	Skill		SR	Pass	

Figure D.5. Test Result Report.

แบบ จง. 11

บัญชีรายชื่อคนหางานไปทำงานในต่างประเทศ

แผ่นที่ 1 ในจำนวน 2 แผ่น

หนังสืออนุญาตเลขที่ ....

ออกให้เมื่อ .... สิ้นอายุเมื่อ ....

ขออนุญาตจัดส่งตามหนังสืออนุญาตที่ รง.3 / 11541 ลงวันที่ 5 กันยายน 2544

ประเภทผู้จัดส่งไปทำงาน	สถานที่ทำงานในต่างประเทศ
(x) บริษัทจัดหางานยี่สิบ จำกัด ใบอนุญาตเลขที่ ก. 512/2539 (x) ที่ตั้งสำนักงานเลขที่ 727 ซอย อ่อนนุช 39 ถนน สุขุมวิท 77 แขวงสวนหลวง, เขต สวนหลวง กรุงเทพ ฯ กรมการจัดหางาน	ชื่อนายจ้างต่างประเทศ (นายจ้าง/คนงาน) SAMSUNG CORPORATION ที่อยู่ 83 CLEMENCEAU AVENUE #09-01 UE SQUARE Singapore 239920 Tel : 65-2352194 โครงการหน่วยงานตั้งอยู่ที่เมือง PULAU SERAYA SINGAPORE ประเภทอุตสาหกรรม ก่อสร้าง

ลำดับที่	ชื่อตัว - ชื่อสกุล	วัน-เดือน-ปี	ที่อยู่ในประเทศไทย	ตำแหน่งงานก่อนเดินทาง	วุฒิการศึกษา	หนังสือเดินทาง เลขที่	หนังสือเดินทาง วันที่ออก	วันเดินทาง	ตำแหน่งงานที่ไปทำงาน	อัตราค่าจ้าง เหรียญสิงคโปร์/วัน	ระยะเวลาการทำงาน ปี	ระยะเวลาการทำงาน เดือน	อัตราการส่งเงินเข้ากองทุน	รายละเอียดการเรียกเก็บเงินเข้ากองทุน หมายเลขบัตรสมาชิกกองทุน	วันเดินทาง	หมายเหตุ
1	นาย วีระพล มีสิงห์ MR.WEERAPHON MEESING 3 6504 00557 64 8	- - 2504	107 หมู่ที่ 6 ต. หนองกุลา อ. บางระกำ จ. พิษณุโลก	รับจ้าง	ป.6	J 450915	24-Jul-01	[illegible]	ช่างประกอบ[illegible] ([illegible])	25	1	-	400.-			
2	นาย อนุชา นาคเจริญ MR.ANUCHA NAKCHAROEN 3 7698 00020 26 6	19 มี.ค. 2514	56/1 หมู่ที่ 6 ต. ละหาร อ. ละหาร จ. [illegible]	"	ป.6	L 457672	31-May-01	"	"	25	1	-	400.-			
3	นาย ไสว รื่นโพธิ์กลาง MR.SAWAI RUENPHOKLANG 3 3015 00432 80 8	01 พ.ค. 2520	137 หมู่ที่ 6 ต.นิคมสร้างตนเอง อ. พิมาย จ. นครราชสีมา	"	ป.6	T 402551	11-Sep-01	"	"	25	1	-	400.-			
4	นาย เฉียม ศาลีลาด MR.CHIAM SALEELAD 3 3605 00623 04 1	03 พ.ค. 2503	40 หมู่ที่ 13 ต. หนองบัว อ. หนองบัวแดง จ. ชัยภูมิ	"	ป.6	A 455113	25-Jun-99	"	"	25	1	-	400.-			
5	นาย จักรกฤษณ์ สนโสม MR.JAKKRIT SONSOM 5 3106 00063 53 2	05 มี.ค. 2510	3 หมู่ที่ 5 ต. ละหานทราย อ. ละหานทราย จ. บุรีรัมย์	"	ป.6	C 432491	31-Jan-00	"	"	25	1	-	400.-			

แผ่นที่ 2

Figure D.6. Worker Name List (Official Document).

บัญชีรายชื่อและที่อยู่คนหางานที่รับสมัครไว้ จ.ง.50

ตาม ◯ หนังสืออนุญาตให้ประกาศรับสมัครคนหางานเป็นการล่วงหน้า ◯ หนังสืออนุญาตให้รับสมัครคนหางาน ◯ หนังสืออนุญาตให้ใช้สาระระยะ ณ สารับสมัครคนหางาน

ตามหนังสืออนุญาตที่ จ.ต.2/ ลงวันที่

หนังสืออนุมัติการจ้างงานของคณะกรรมการแรงงานไต้หวัน(หลวน)เลขที่ 0453660 ลงวันที่ 7 มกราคม 2545

หนังสือแสดงความต้องการลงวันที่ 13 สิงหาคม 2545

ชื่อบริษัทจัดหางานมิสโก จำกัด

โดยนายประวิทย์ สมจิตร

เป็นผู้รับอนุญาตจัดหางานเพื่อไปทำงานในต่างประเทศ ใบอนุญาตจัดหางาน เลขที่ ต. 512/ 2530

ลำดับที่	ชื่อตัว - ชื่อสกุล (ระบุ นาย/นาง/นางสาว)	ที่อยู่ปัจจุบันของคนหางาน	ตำแหน่งงานที่รับสมัคร	ประเทศ	หมายเหตุ
1	นางสาว ทองรู้ ไสนโสก MISS.THONGRU SONSOK 3 4017 00955 07 2	69 หมู่ที่ 8 ต. โพนเพ็ก อ. มัญจาคีรี จ. ขอนแก่น	คนงานควบคุมเครื่องผลิตชิ้นส่วน(หญิง)	ไต้หวัน	

หมายเหตุ [illegible]

จำนวนคนหางานที่รับสมัครไว้ทั้งหมด 1 คน ชาย 0 คน หญิง 1 คน

(ลายมือชื่อ)................................ ผู้รับอนุญาตจัดหางาน

(นายประวิทย์ สมจิตร)

วันที่ 25 เดือน กันยายน พ.ศ. 2545

Figure D.7. Worker Name List and Address (Official Document).

BISCO PLACEMENT CO.,LTD

VISA APPLICATION

Contractor name : **Ruentex Industries Ltd**

Position : **Steel Reinforcement Worker**

Apply Date:

Name : Thawisak *(Family name)* Onkham (Name) Sex : **Male**

Date of Birth : **31-Jan-55** Age : **44** yrs. Place of Birth : **Udonthani**

ID No: **3411900403545**

Passport No. : **V 304509** Issue : **18-Feb-98** Expire : **17-Feb-03**

Hight : **160** Cms. Weight : **53** Kg.

Marital Status : **Married** No. of Children **1** child/children

Education : **Primary School**

Permanent Address : **155, Tao-Hai Sub-district, Phen District**
Udonthani Province

Figure D.8. Visa Application Form.

BISCO PLACEMENT CO.,LTD
VISA SUBMISSION

Job No. : 0954261-2003 Quota No. 001-9465894-2003
Employer : Ruentex Industries Ltd.

No.	ApNo.	Name	Lastname	Age	Trade	Test Date	Submit Date
1	25	Nathi	Chunlathep	33	SR	6-Jan-2003	5-Dec-2002
2	125	Kongkham	Janprom	29	SR	6-Jan-2003	5-Dec-2002
3	34	Wichai	Kengkham	28	SR	6-Jan-2003	5-Dec-2002
4	528	Khamchaisri	Thongkhun	27	SR	6-Jan-2003	12-Dec-2002
5	521	Kiatisak	Khonwai	24	SR	6-Jan-2003	12-Dec-2002
6	123	Srithuan	Muangma	33	SR	6-Jan-2003	12-Dec-2002
7	542	Somjit	Muangmoon	43	SR	6-Jan-2003	12-Dec-2002
8	111	Khamphan	Mulee	22	SR	6-Jan-2003	20-Dec-2002
9	424	Suwit	Samphantha	31	SR	6-Jan-2003	20-Dec-2002
10	244	Chana	Sidahua	22	SR	6-Jan-2003	20-Dec-2002

Figure D.9. Visa Submission Report.

แบบรายงานเกี่ยวกับการจัดหางานให้คนหางานเพื่อไปทำงานในต่างประเทศ ประจำเดือน สิงหาคม 2545

บริษัทจัดหางาน บัลโก จำกัด โดย นายประวิทย์ สมจิตร แผ่นที่ 1 จำนวน 29 แผ่น

เป็นผู้รับอนุญาตจัดหางานเพื่อไปทำงานในต่างประเทศ ใบอนุญาตจัดหางาน เลขที่ ส.512 / 2530

ลำดับที่	ชื่อ - นามสกุล	อายุ	ที่อยู่ปัจจุบัน ของคนหางาน	โฉนด เลขที่	การจัดส่งไปทำงานในต่างประเทศ					เลขที่หนังสือเดินทาง	วัน-เดือน-ปี ที่ออกจากประเทศไทย	การเดินทาง		
					วันที่ทำสัญญาจ้างหางาน	ชื่อบริษัทนายจ้าง	สำหน่งที่ไปทำงาน	ประเทศ	ระยะเวลาการจ้าง			เที่ยวบิน	ETD	ETA
1	นาย ชูศิลป์ คำหงษา	30	160 หมู่ที่ 13 ต. เขาไทย	45-8-1046-1	30/08/45	RUENTEX	[illegible]	Taiwan	2 ปี	X 493023	02/09/45	TG 405	8:00	12:00
	3 4406 01246 97 8		อ. บ้านดุง จ. อุดรธานี			INDUSTRIES LTD								
2	นาย ภัทรพงษ์ คำหอม	26	198 หมู่ที่ 4 ต. โพนสูง	"	"	"	"	Taiwan	2 ปี	X 492941	02/09/45	"	"	"
	3 4111 00400 30 4		อ. บ้านดุง จ. อุดรธานี											
3	นาย นคร คำมูล	34	204 หมู่ที่ 7 ต. โป่งน้ำร้อน	"	"	"	"	Taiwan	2 ปี	X 492441	02/09/45	"	"	"
	3 5402 00429 83 3		อ. คลองลาน จ. กำแพงเพชร											
4	นาย อาสิล ไรอินลา	21	20/1 หมู่ที่ 4 ต. โป่งน้ำร้อน	"	"	"	"	Taiwan	2 ปี	X 492447	02/09/45	"	"	"
	3 6203 00034 08 2		อ. คลองลาน จ. กำแพงเพชร											
5	นาย องอาจ จันทร์อ่อน	34	45 หมู่ที่ 2 ต. พังงู	"	"	"	"	Taiwan	2 ปี	X 492943	02/09/45	"	"	"
	3 4106 01160 00 3		อ. หนองหาน จ. อุดรธานี											
6	นาย วิชาพงศ์ ละนางอย	33	28 หมู่ที่ 4 ต. โป่งน้ำร้อน	"	"	"	"	Taiwan	2 ปี	H 488870	02/09/45	"	"	"
	3 6203 00033 93 1		อ. คลองลาน จ. กำแพงเพชร											
7	นาย ปัฐวี ศรีบุญเรือง	34	82 หมู่ที่ 7 ต. ละแวง	"	"	"	"	Taiwan	2 ปี	X 492939	02/09/45	"	"	"
	3 4107 00192 40 0		อ. หนองหาน จ. อุดรธานี											
8	นาย จิต ปินไธสง	30	672/14 ซ.ลุมพินี	"	"	"	"	Taiwan	2 ปี	X 499976	02/09/45	"	"	"
	5 5206 00018 95 1		แขวงดินแดง เขตดินแดง กรุงเทพฯ											
9	นาย อลิศักดิ์ วงษ์พันธ์	30	179 หมู่ที่ 9 ต. ลิงงาม	45-8/1540-1	04/05/45	"	"	Taiwan	2 ปี	N 453226	05/09/45	TG 405	8:00	12:00
	3 6203 00070 23 2		อ. คลองลาน จ. กำแพงเพชร											

รวมคนหางานทั้งหมด 100 คน ชาย 24 คน หญิง 16 คน

Figure D.10. Mobilization Report.

APPENDIX E

STRUCTURE CHART

STRUCTURE CHART

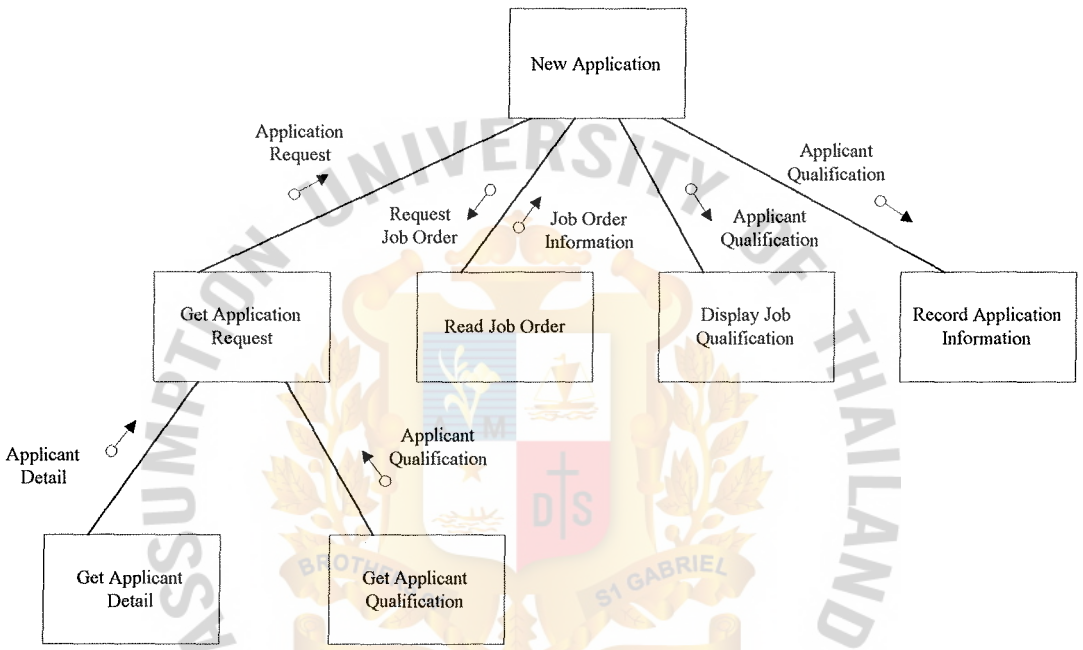

Figure E.1. Structure Chart of Process New Application.

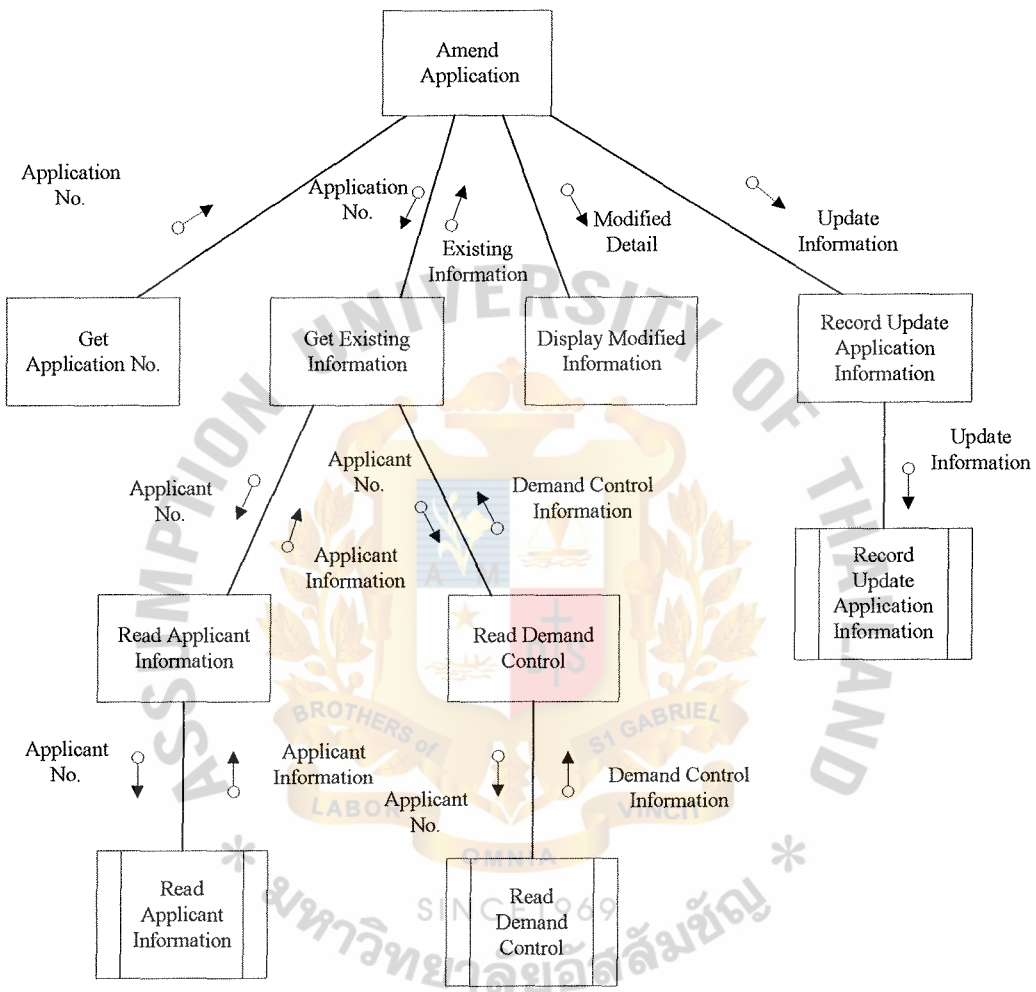

Figure E.2. Structure Chart of Process Amendment Application.

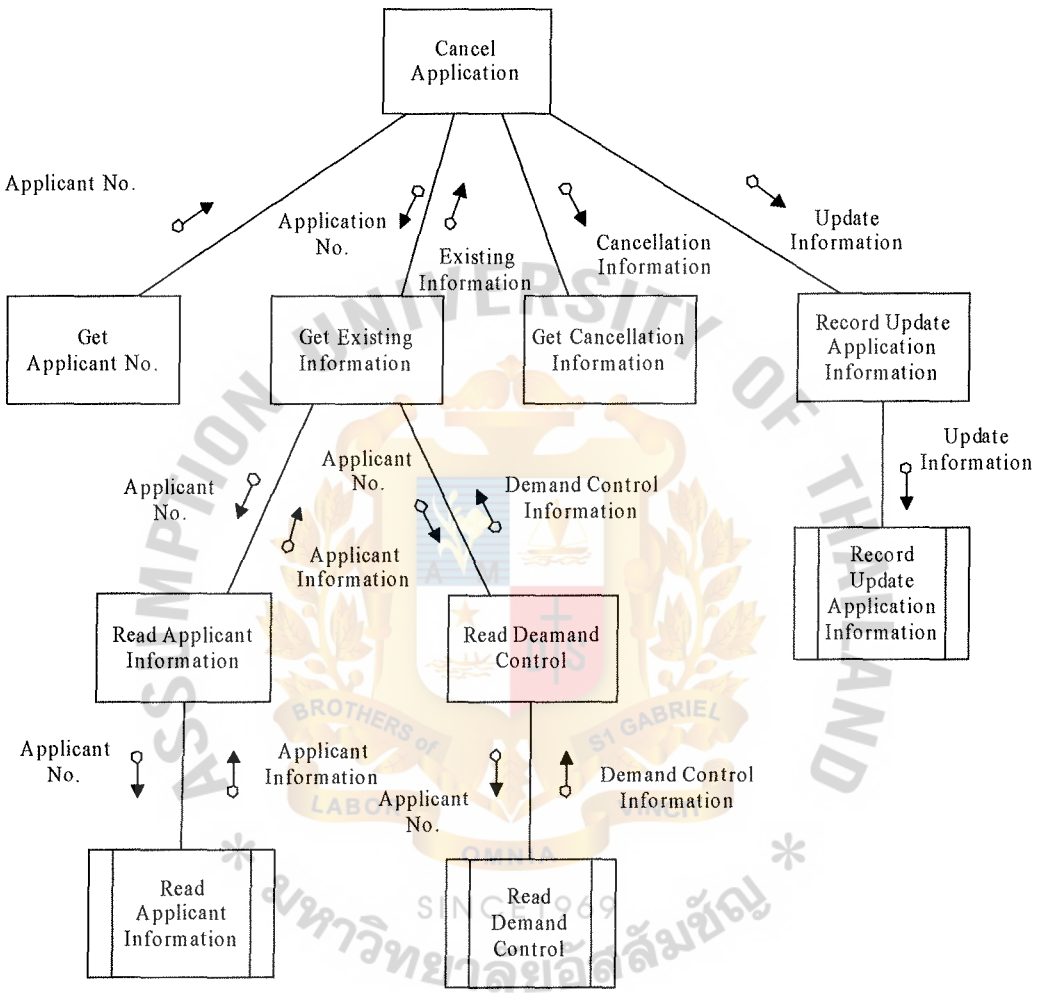

Figure E.3. Structure Chart of Process Cancellation Application.

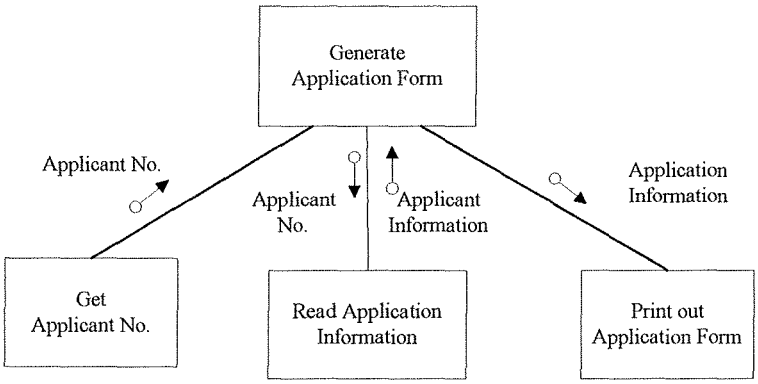

Figure E.4. Structure Chart of Generate Application Form.

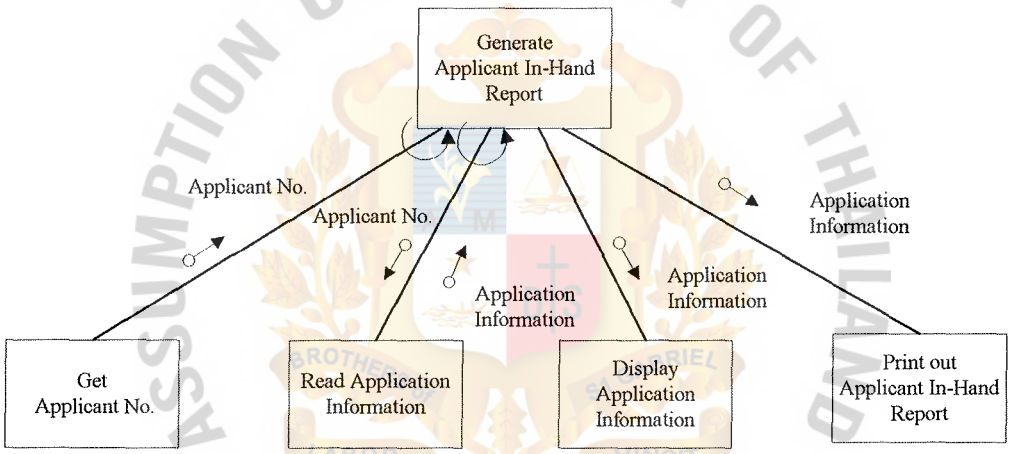

Figure E.5. Structure Chart of. Generate Applicant In-Hand Report.

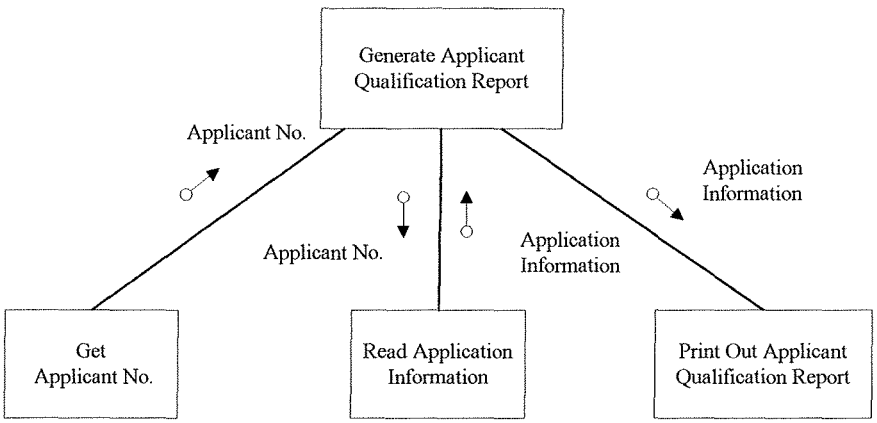

Figure E.6. Structure Chart of Generate Application Qualification Report.

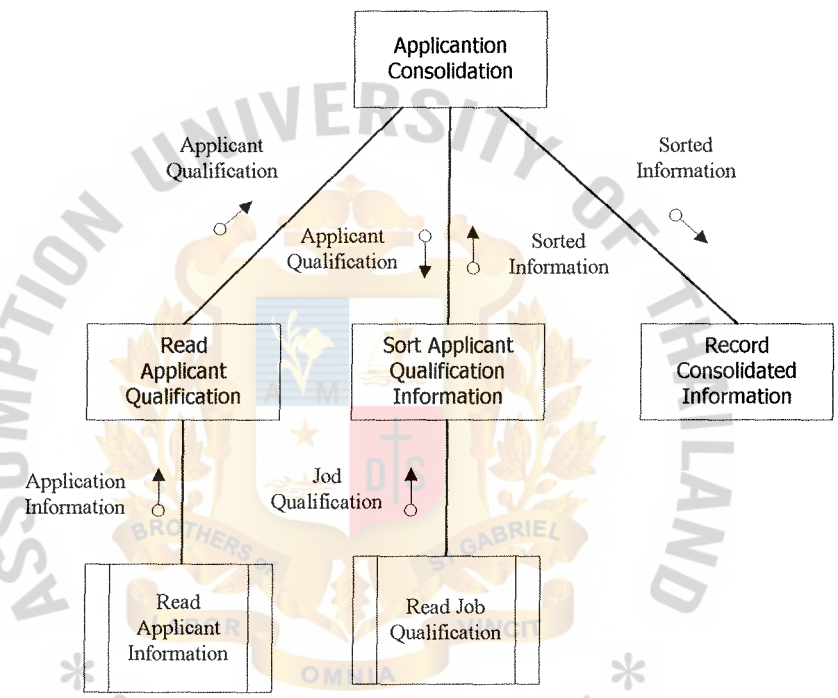

Figure E.7. Structure Chart of Process Application Consolidation.

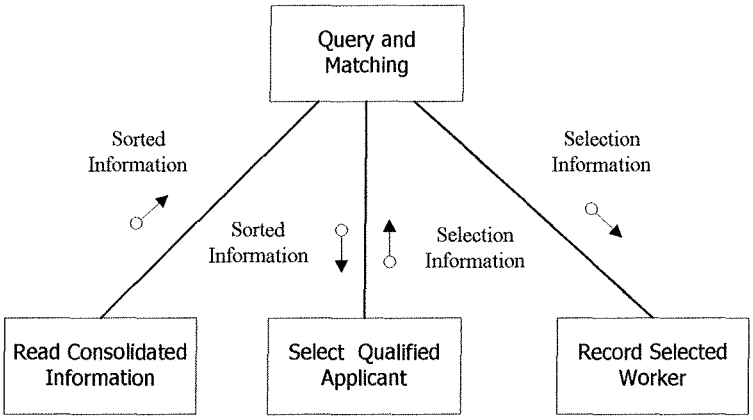

Figure E.8. Structure Chart of Process Query and Matching.

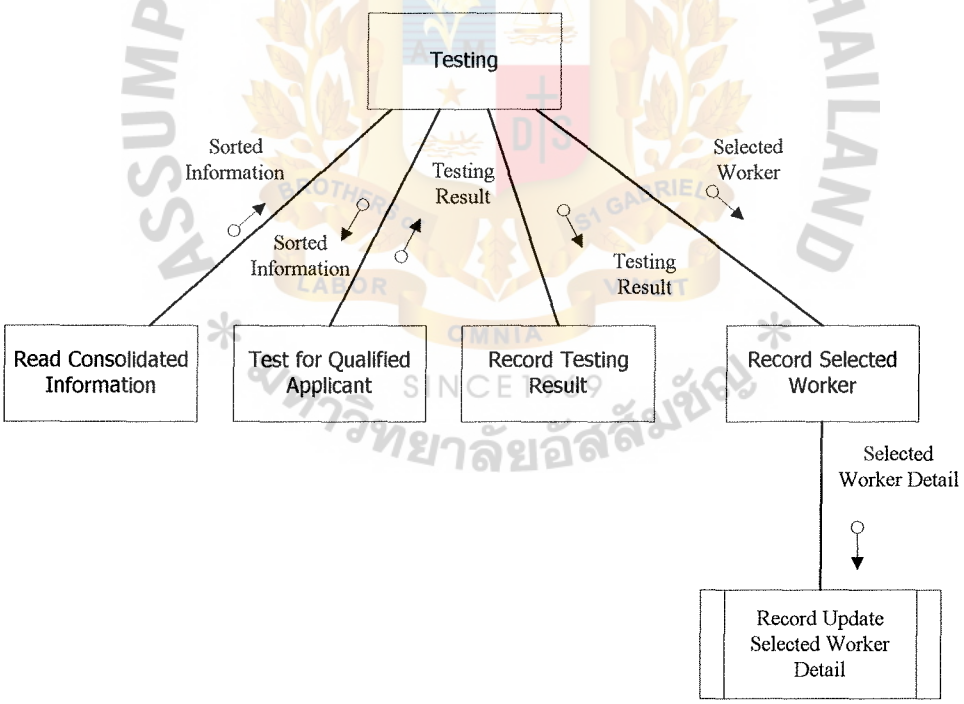

Figure E.9. Structure Chart of Process Testing.

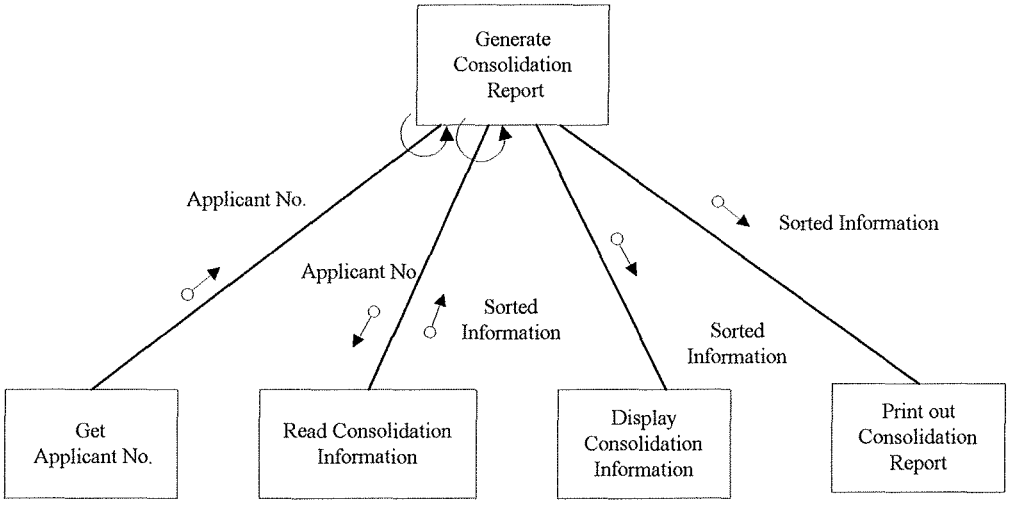

Figure E.10. Structure Chart of Generate Consolidate Report.

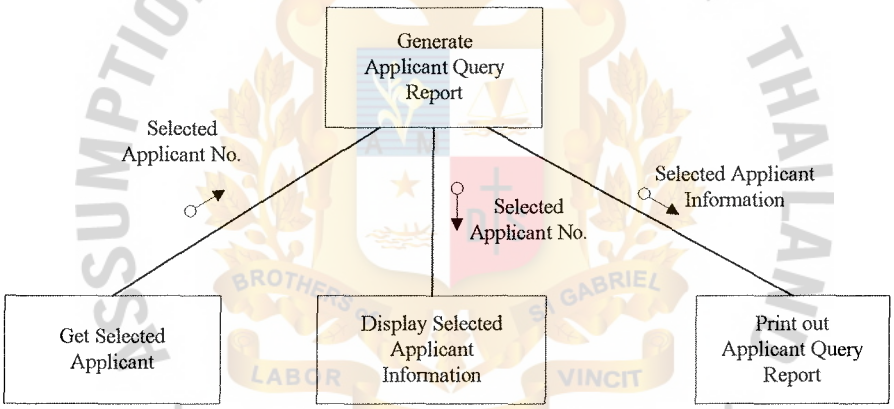

Figure E.11. Structure Chart of Generate Application Query Report.

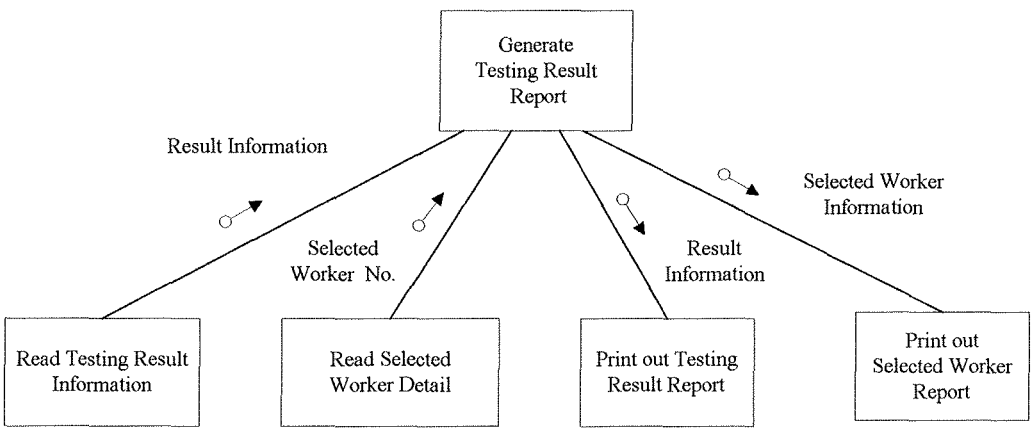

Figure E.12. Structure Chart of Generate Testing Result Report.

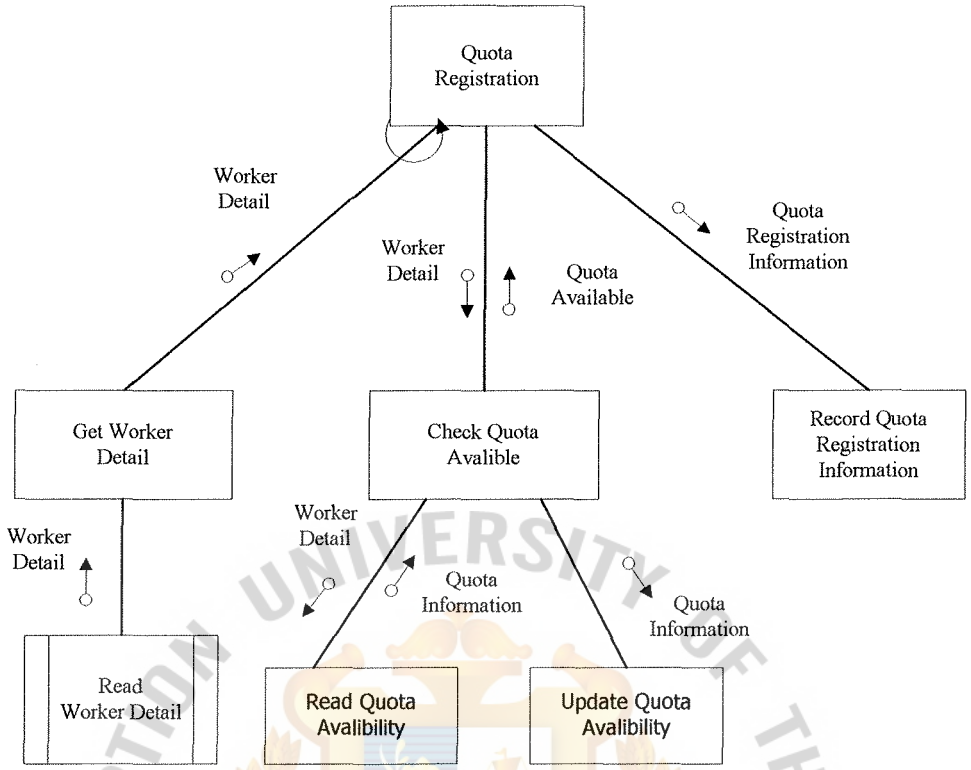

Figure E.13. Structure Chart of Process Quota Registration.

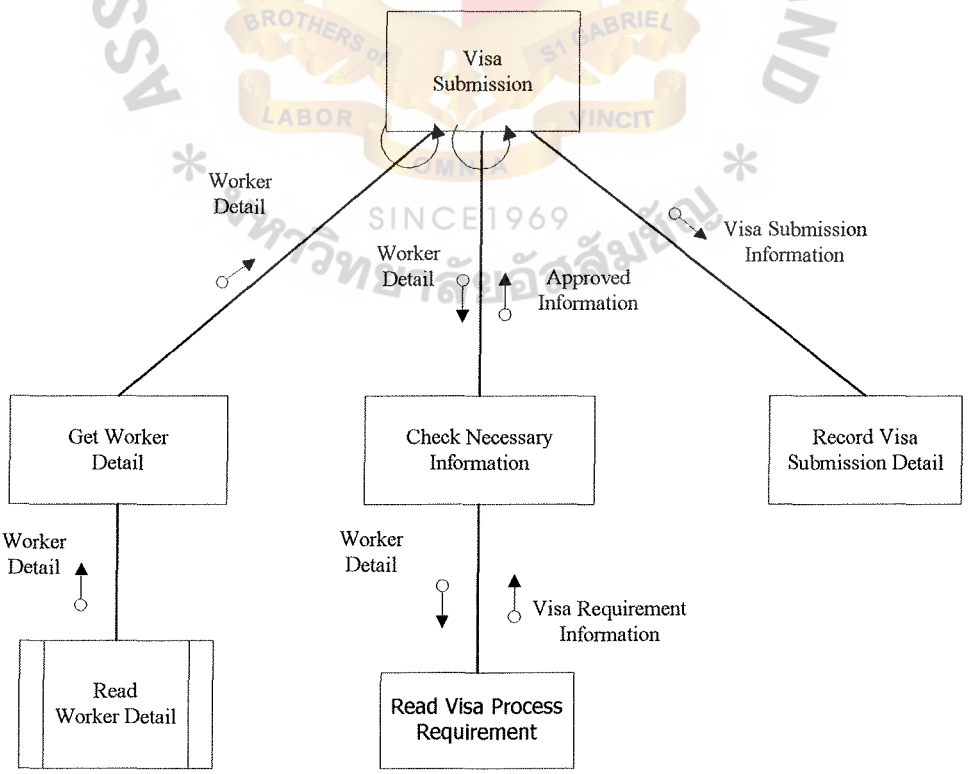

Figure E.14. Structure Chart of Process Visa Submission.

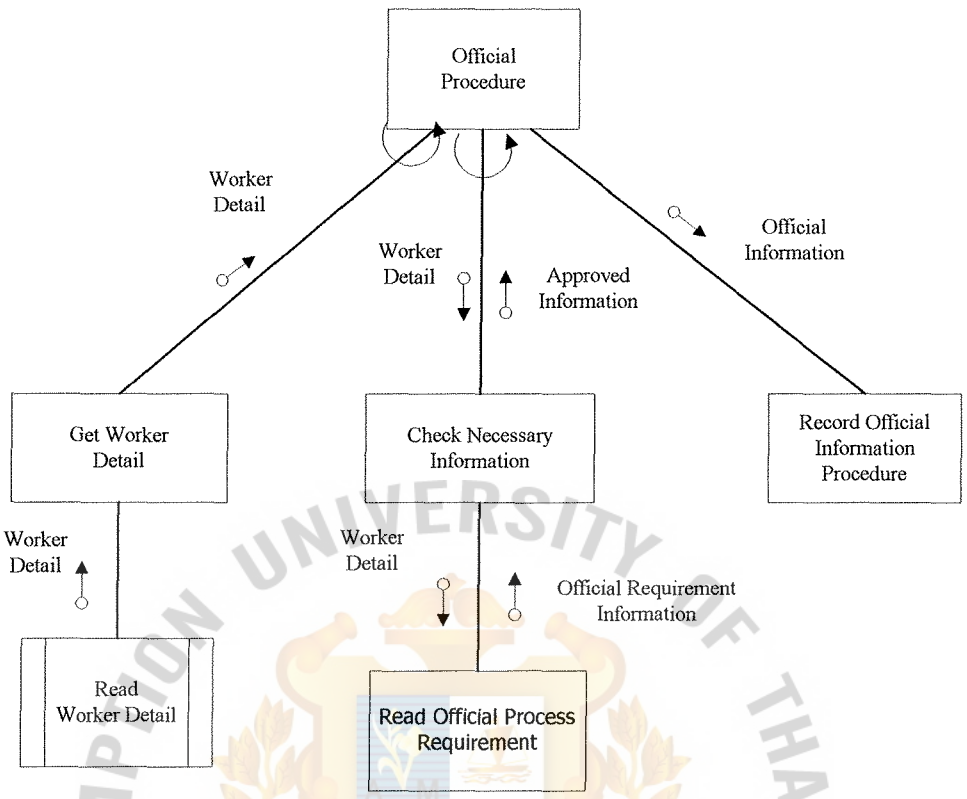

Figure E.15. Structure Chart of Process Official Procedure.

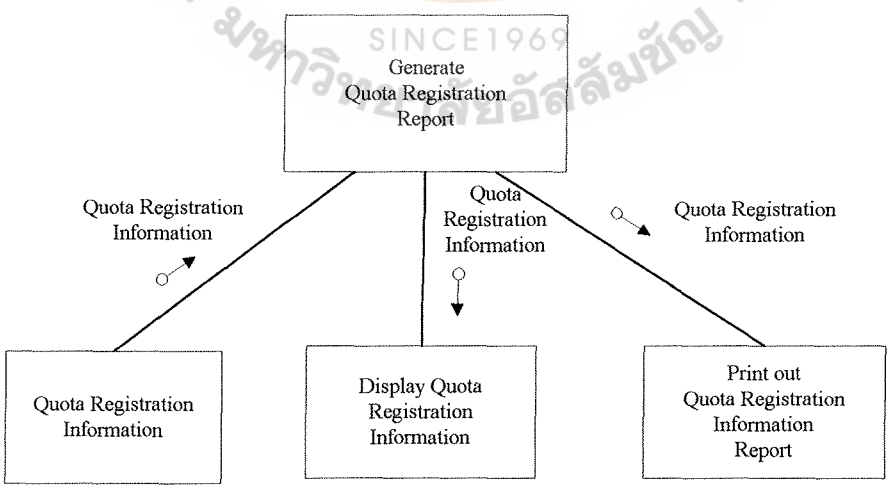

Figure E.16. Structure Chart of Generate Quota Registration Report.

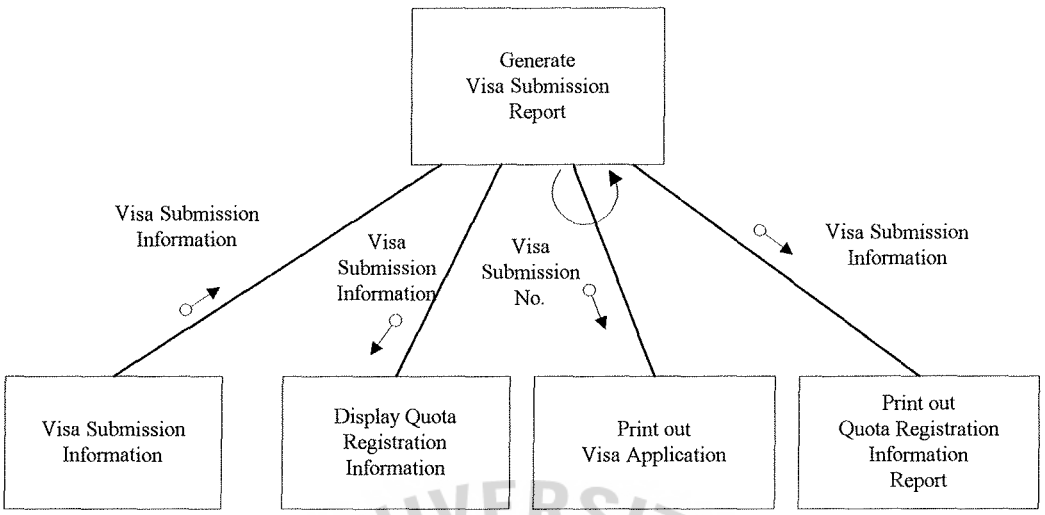

Figure E.17. Structure Chart of Generate Visa Submission Report.

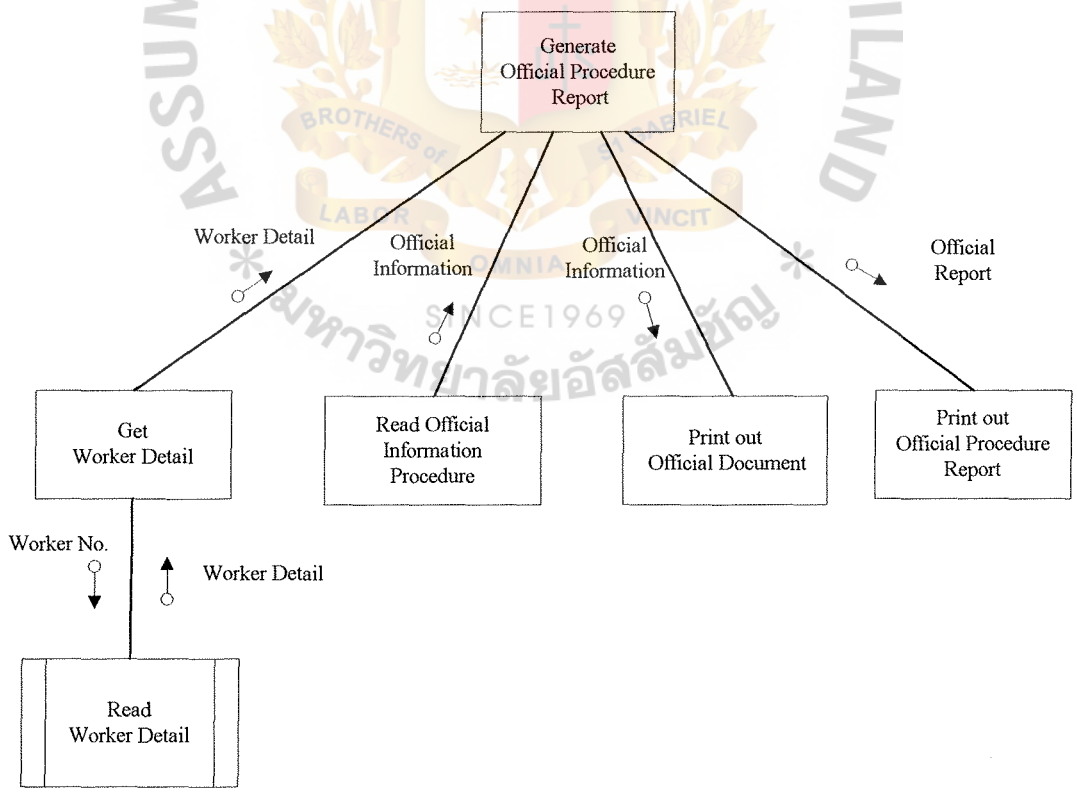

Figure E.18. Structure Chart of Generate Official Report.

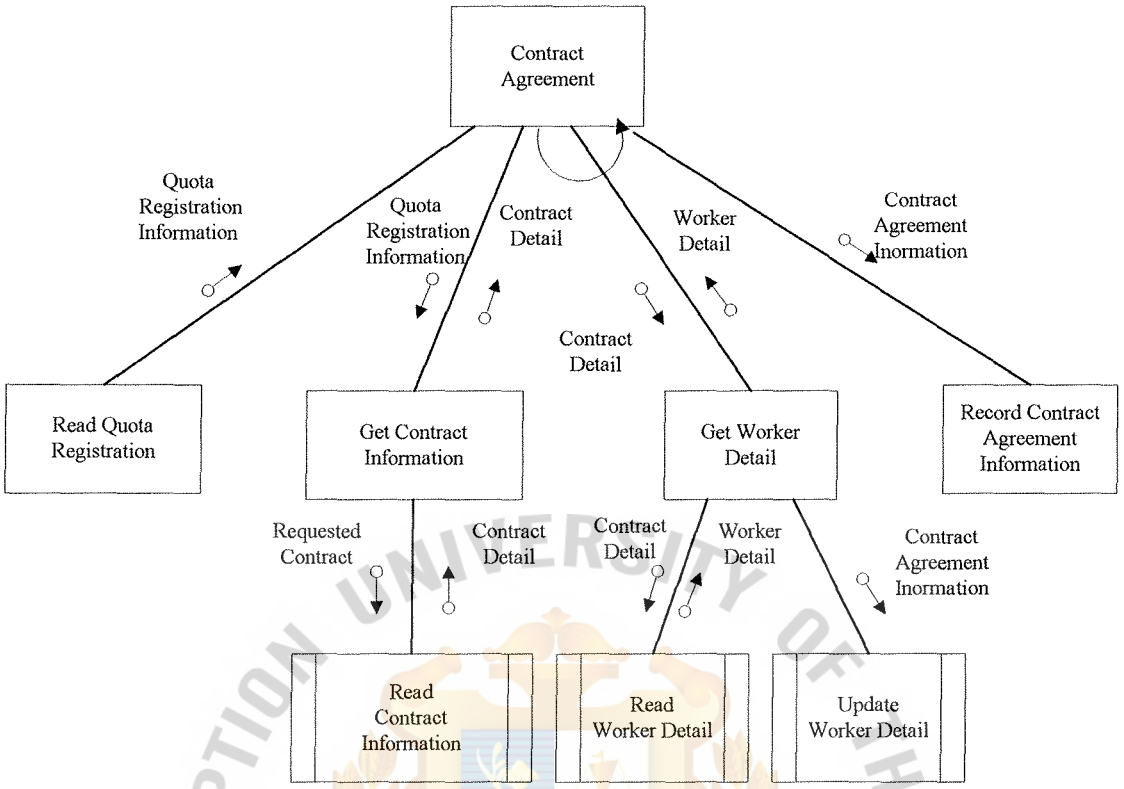

Figure E.19. Structure Chart of Process Contract Agreement.

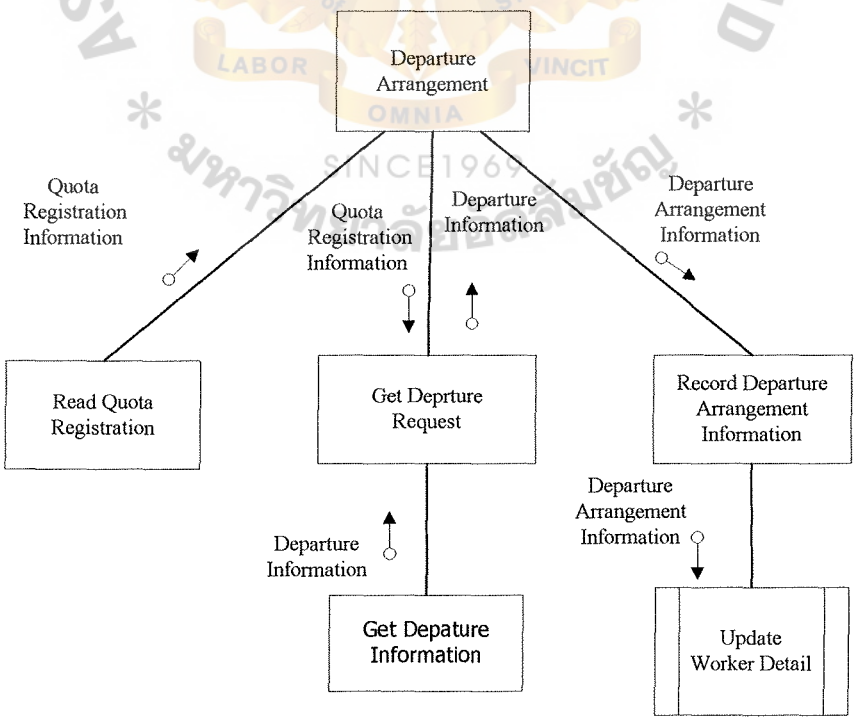

Figure E.20. Structure Chart of Process Departure Arrangement.

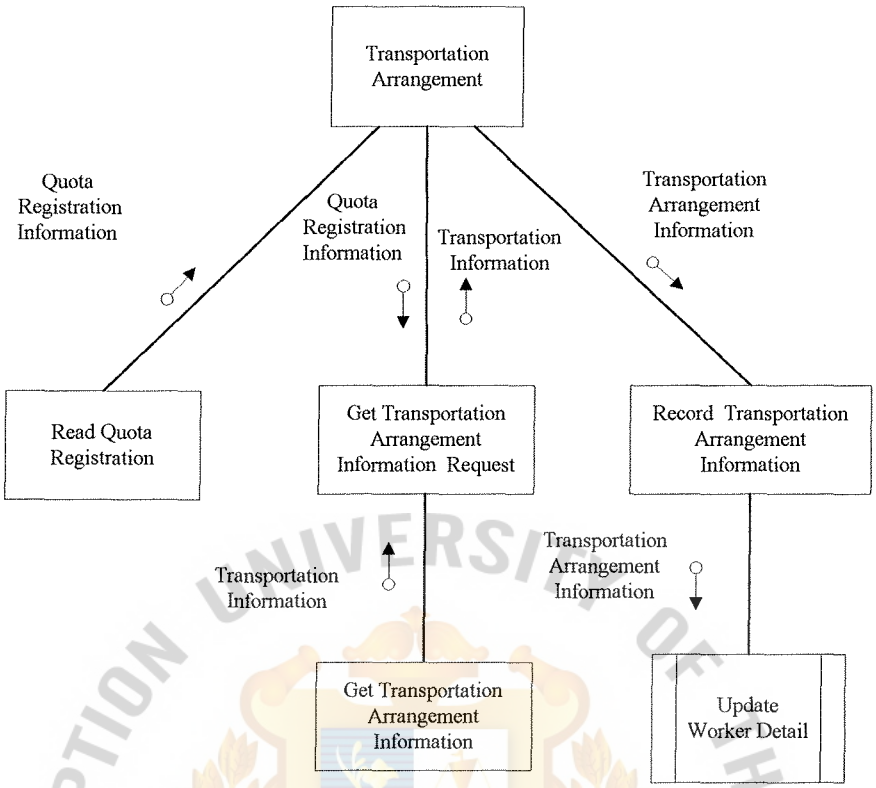

Figure E.21. Structure Chart of Process Transportation Arrangement.

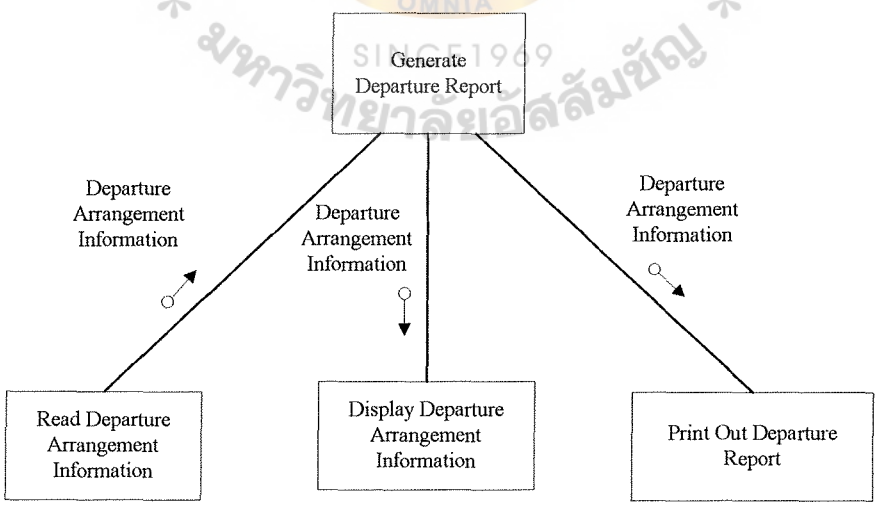

Figure E.22. Structure Chart of Generate Departure Report.

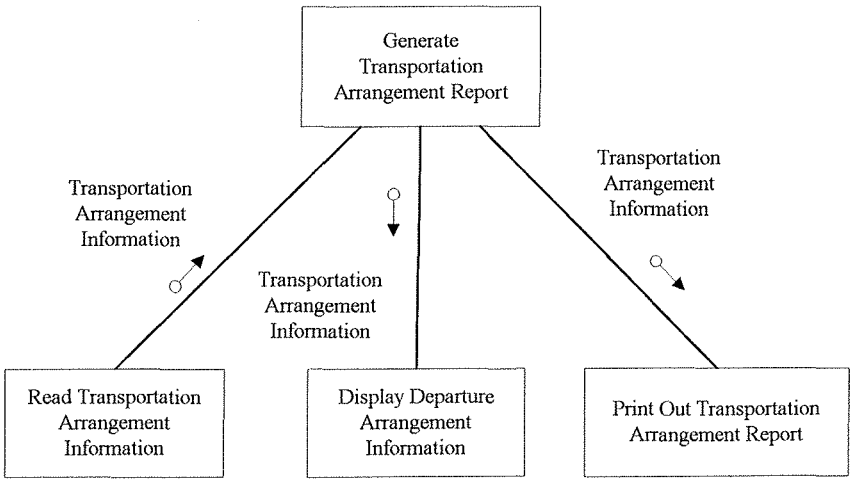

Figure E.23. Structure Chart of Generate Transportation Arrangement Report.

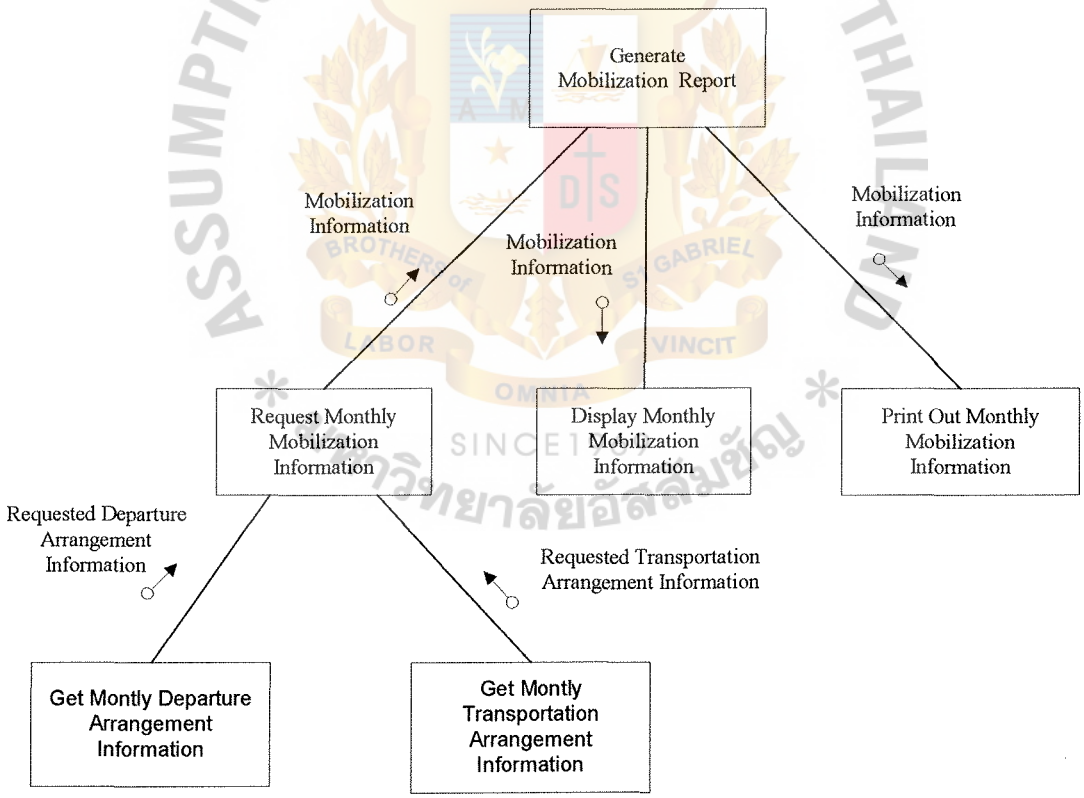

Figure E.24. Structure Chart of Generate Mobilization Report.

APPENDIX F

PROCESS SPECIFICATION

PROCESS SPECIFICATION

Table F.1. Process Specification of Process 1.1.1.

Items	Description
Process Name:	Process New Application
Data In:	New Applicant Information
Data Out:	Applicant Information Confirmed Application Information Application Form
Process:	(1) Receive job applied requested (2) Get applicant information (3) Read job order (4) Display job qualification (5) Record application information in data store
Attachment:	(1) Applicant (2) Data Store D1 (3) Data Store D4

Table F.2. Process Specification of Process 1.1.2.

Items	Description
Process Name:	Process Amendment Application
Data In:	Amendment Application Request Application Information Applicant Information
Data Out:	Updated Application Information
Process:	(1) Receive amendment reservation detail (2) Retrieve existing applicant and application information from data store (3) Modify existing application information (4) Display modified application information (5) Record updated application information into data store
Attachment:	(1) Applicant (2) Data Store D1 (3) Data Store D4

Table F.3. Process Specification of Process 1.1.3.

Items	Description
Process Name:	Process Cancellation Application
Data In:	Cancellation Application Request Application Information Applicant Information
Data Out:	Updated Application Information
Process:	(1) Receive cancellation application detail (2) Retrieve existing guest and application information from data store (3) Cancel existing application information (4) Record updated application information into data store
Attachment:	(1) Applicant (2) Data Store D1 (3) Data Store D4

Table F.4. Process Specification of Process 1.2.1.

Items	Description
Process Name:	Generate Application Form Record
Data In:	Application Information
Data Out:	Application Card
Process:	(1) Get application number (2) Retrieve application information (3) Generate application card (1) Print out application card
Attachment:	(1) Demand Control

Table F.5. Process Specification of Process 1.2.2.

Items	Description
Process Name:	Generate Applicant In-Hand Report
Data In:	Application Information Job Information
Data Out:	Applicant In-Hand Report
Process:	(1) Receive request for applicant information report (2) Get applicant number (3) Retrieve application information (4) Display application information (5) Generate applicant in-hand report (6) Print out applicant in-hand report
Attachment:	(1) Demand Control (2) Selection

Table F.6. Process Specification of Process 1.2.3.

Items	Description
Process Name:	Generate Applicant Qualification Report
Data In:	Applicant number Applicant qualification
Data Out:	Application qualification Report
Process:	(4) Get application number (5) Retrieve applicant qualification (6) Generate applicant qualification report (7) Print out applicant qualification report
Attachment:	(3) Demand Control (4) Selection

Table F.7. Process Specification of Process 2.1.1.

Items	Description
Process Name:	Process Application Consolidation
Data In:	Applicant in-hand information requested Job qualification information
Data Out:	Application Consolidate Information
Process:	(1) Receive request consolidated application form demand control (2) Sort applicant qualification information (3) Retrieve consolidated application information (4) Record consolidated application information
Attachment:	(1) Demand Control (2) Data Store D5

Table F.8. Process Specification of Process 2.1.2.

Items	Description
Process Name:	Process Query and Matching
Data In:	Application number Application Information Job number Job qualification
Data Out:	Applicant-Job Query and Matching Information
Process:	(1) Retrieve job qualification criteria from data store (2) Retrieve applicant qualification from data store (3) Match applicant and job qualification (4) Record query and matching information
Attachment:	(1) Demand Control (2) Data Store D2 (3) Data Store D5

Table F.9. Process Specification of Process 2.1.3.

Items	Description
Process Name:	Process Testing
Data In:	Job Information Applicant query information
Data Out:	Testing Result Information
Process:	(1) Retrieve applicant query information (2) Get application number (3) Retrieve job information (4) Display testing result (5) Record testing result (6) Record selected worker in data store
Attachment:	(1) Selection (2) Data Store D2 (3) Data Store D5

Table F.10. Process Specification of Process 2.2.1.

Items	Description
Process Name:	Generate Consolidate Report
Data In:	Applicant Consolidation Information
Data Out:	Consolidation Report
Process:	(1) Retrieve applicant consolidation information from application form data store (2) Display applicant consolidation information (3) Generate consolidation report (4) Print out consolidation report
Attachment:	(1) Demand Control

Table F.11. Process Specification of Process 2.2.2.

Items	Description
Process Name:	Generate Applicant Query Report
Data In:	Applicant-Job Query and Matching Information
Data Out:	Applicant Query Report
Process:	(1) Retrieve applicant-job query and matching information from application form data store (2) Display applicant query information (3) Generate applicant query (4) Print out applicant query
Attachment:	(1) Demand Control (2) Client

Table F.12. Process Specification of Process 2.2.3.

Items	Description
Process Name:	Generate Testing Result Report
Data In:	Testing Result Information Selected applicant number
Data Out:	Testing Result Report
Process:	(1) Retrieve testing result information (2) Get selected applicant number (3) Generate testing result report (4) Print out testing result report
Attachment:	(1) Client (2) Applicant

Table F.13. Process Specification of Process 3.1.1

Items	Description
Process Name:	Process Quota Registration
Data In:	Worker number Quota number
Data Out:	Quota Register Information
Process:	(1) Receive worker number (2) Check quota available (3) Retrieve quota available from data store (4) Update worker and quota registered (5) Display quota registration information
Attachment:	(1) Data Store D8

Table F.14. Process Specification of Process 3.1.2.

Items	Description
Process Name:	Process Visa Submission
Data In:	Worker number Job number Quota number
Data Out:	Visa submission information
Process:	(1) Retrieve worker, job and quota number form data store (2) Format visa submission information (3) Display visa submission information (4) Record visa submission information
Attachment:	(1) Data Store D8

Table F.15. Process Specification of Process 3.1.3.

Items	Description
Process Name:	Process Official Procedure
Data In:	Worker number Job number Quota number
Data Out:	Official Procedure Information
Process:	(1) Retrieve worker, job and quota number form data store (2) Format official procedure information (3) Display official procedure information (4) Record official procedure information
Attachment:	(1) Mobilization (2) Data Store D3

Table F.16. Process Specification of Process 3.2.1.

Items	Description
Process Name:	Generate Quota Registration Report
Data In:	Quota Registration Information
Data Out:	Quota Registration Report
Process:	(1) Retrieve quota registration information from data store (2) Display quota registration information (3) Generate quota registration report (4) Print out quota registration report
Attachment:	(1) Mobilization (2) Labor Department (3) Accounting

Table F.17. Process Specification of Process 3.2.2.

Items	Description
Process Name:	Generate Visa Submission Report
Data In:	Visa Submission Information
Data Out:	Visa Submission Report Visa Application Form
Process:	(1) Retrieve visa submission information from data store (2) Retrieve worker number (3) Display visa submission information (4) Generate visa submission report (5) Print out visa submission report (6) Print out visa application Form
Attachment:	(1) Mobilization (2) Labor Department (3) Accounting

Table F.18. Process Specification of Process 3.2.3.

Items	Description
Process Name:	Generate Official Procedure Report
Data In:	Official Procedure Information
Data Out:	Official Procedure Report Official Document
Process:	(1) Retrieve official procedure information from data store (2) Retrieve worker number (3) Display official procedure information (4) Generate official procedure report (5) Print out official procedure report (6) Print out official document
Attachment:	(1) Mobilization (2) Labor Department (3) Accounting

Table F.19. Process Specification of Process 4.1.1.

Items	Description
Process Name:	Process Contract Agreement
Data In:	Contract Agreement Information Quota Information Worker Information
Data Out:	Contract of Agreement Information
Process:	(1) Receive contract agreement information from client. (2) Retrieve requested quota registration (3) Format contract agreement information (4) Record contract agreement information
Attachment:	(1) Post Service (2) Worker (3) Data Store D9

Table F.20. Process Specification of Process 4.1.2.

Items	Description
Process Name:	Process Departure Arrangement
Data In:	Departure Information Quota Registration
Data Out:	Departure Arrangement Information
Process:	(1) Receive departure information from client (2) Retrieve requested quota registration (3) Assign departure arrangement information (4) Record departure arrangement information
Attachment:	(1) Worker (2) Data Store 9

Table F.21. Process Specification of Process 4.1.3.

Items	Description
Process Name:	Process Transportation Arrangement
Data In:	Transportation Arrangement Departure Information
Data Out:	Transportation Arrangement Information
Process:	(1) Receive transportation arrangement information (2) Retrieve requested departure information (3) Assign transportation arrangement information (4) Record updated arrangement information
Attachment:	(1) Worker (2) Accounting

Table F.22. Process Specification of Process 4.2.1.

Items	Description
Process Name:	Generate Departure Report
Data In:	Departure Arrangement Information
Data Out:	Departure Report
Process:	(1) Retrieve departure arrangement information (2) Display departure arrangement information (3) Generate departure arrangement information report (4) Print out departure arrangement information report
Attachment:	(1) Client (2) Accounting (3) Mobilization

Table F.23. Process Specification of Process 4.2.2.

Items	Description
Process Name:	Generate Transportation Arrangement Report
Data In:	Transportation Arrangement Information
Data Out:	Transportation Arrangement Report
Process:	(1) Retrieve transportation arrangement information (2) Display transportation arrangement information (3) Generate transportation arrangement information report (4) Print out transportation arrangement information report
Attachment:	(1) Client (2) Accounting (3) Mobilization

Table F.24. Process Specification of Process 4.2.3.

Items	Description
Process Name:	Generate Mobilization Report
Data In:	Mobilization Information
Data Out:	Mobilization Report
Process:	(1) Retrieve mobilization information (2) Display mobilization information (3) Generate mobilization information report (4) Print out mobilization information report
Attachment:	(1) Client (2) Accounting (3) Mobilization (4) Director

APPENDIX G

DATA DICTIONARY

DATA DICTIONARY

Detailed Listing -- Alphabetically
All Entries -- Entity Relationship

Apaddress Data Element
Applicant::Apaddress
Description:
Address of applicant
Data element attributes
Storage Type: Char
Length: 50
Null Type: NotNull
Location:
Entity --> Applicant
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

Apagent Data Element
Applicant::Apagent
Description:
The agent name who bring the applicant
Data element attributes
Storage Type: Char
Length: 7
Null Type: NotNull
Location:
Entity --> Applicant
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

Apbirthdate Data Element
Applicant::Apbirthdate
Description:
Date of birth of applicant
Data element attributes
Storage Type: Date
Null Type: NotNull
Location:
Entity --> Applicant
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

Apexperience Data Element
Applicant::Apexperience
Description:
The work experience of applicant
Data element attributes
Storage Type: Char
Length: 200
Null Type: Null

Location:
Entity --> Applicant
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

Aplastname Data Element
Applicant::Aplastname
Description:
Lastname of applicant
Data element attributes
Storage Type: Char
Length: 15
Null Type: NotNull
Location:
Entity --> Applicant
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

Apname Data Element
Applicant::Apname
Description:
Name of applicant
Data element attributes
Storage Type: Char
Length: 10
Null Type: NotNull
Location:
Entity --> Applicant
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

Apphone Data Element
Applicant::Apphone
Description:
contact number of applicant
Data element attributes
Storage Type: Integer 4
Null Type: Null
Location:
Entity --> Applicant
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

Applicant Entity
Description:
The worker who walk in directly or agent provided to apply for the job.
Composition:
ApplicantNo : Char
Apname : Char
Aplastname : Char
Apbirthdate : Date
Apaddress : Char
Approvince : Char

Apphone : Integer 4
Apagent : Char
Apexperience : Char
Primary Key:
Index Name: Generated by VAW
Column(s): ApplicantNo [ASC]
Location:
Fully
Attached relationships on Fully:
registers MIN: 1 MAX: 1
Application Form
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

ApplicantNo Data Element
Applicant::ApplicantNo
Description:
The code for applicant
Data element attributes
Storage Type: Char
Length: 10
Null Type: NotNull
Location:
Entity --> Applicant
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

ApplicantNo Data Element
Application Form::ApplicantNo
Description:
The code for applicant
Data element attributes
Storage Type: Char
Length: 10
Null Type: NotNull
Location:
Entity --> Application Form
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

Application Form Entity
Description:
A form generated for keep the applicant necessary information for recruitment process.
Composition:
ApplicationFormNo : Char
ApplicantNo : Char
JobApplied : Char
Position : Char
AppliedStatus : Char
AppliedDate : Date
ApplicationRecord : Char

Primary Key:
Index Name: Generated by VAW
Column(s): ApplicationFormNo [ASC]
Foreign Key(s):
Applicant 'registers' Application Form
ApplicantNo -> ApplicantNo
On Delete Restrict
On Update Restrict
On Insert of Child Row Restrict
Location:
Fully
Attached relationships on Fully:
is registered MIN: 1 MAX: 1
Applicant
applies MIN: 1 MAX: many
Job Application
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

ApplicationFormNo Data Element
Application Form::ApplicationFormNo
Description:
The code for applicantion form
Data element attributes
Storage Type: Char
Length: 12
Null Type: NotNull
Location:
Entity --> Application Form
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

ApplicationFormNo Data Element
Job Application::ApplicationFormNo
Alias:
FK
Data element attributes
Storage Type: Undefined
Location:
Associative Entity --> Job Application
Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

ApplicationFormNo Data Element
Worker::ApplicationFormNo
Description:
Code for application form
Data element attributes
Storage Type: Char
Length: 12
Null Type: NotNull
Location:

Entity --> Worker
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

ApplicationRecord Data Element
Application Form::ApplicationRecord
Description:
The record of appling for the jod of the applicant
Data element attributes
Storage Type: Char
Length: 20
Null Type: Null
Location:
Entity --> Application Form
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

AppliedDate Data Element
Application Form::AppliedDate
Description:
The Date of apply for the job
Data element attributes
Storage Type: Date
Null Type: NotNull
Location:
Entity --> Application Form
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

AppliedStatus Data Element
Application Form::AppliedStatus
Description:
The applied status for applicant
Data element attributes
Storage Type: Char
Length: 20
Null Type: Null
Location:
Entity --> Application Form
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

---

applies Relationship
Attached Objects:
Application Form
applies MIN: 1 MAX: many
Job Application
[is applied] MIN: 1 MAX: 1
Foreign Key(s):
Application Form 'applies' Job Application
ApplicationFormNo -> ApplicationFormNo
On Delete Restrict
On Update Restrict

On Insert of Child Row Restrict

Location:

Fully

Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

ApprovalDate Data Element

Mobilization::ApprovalDate

Description:

Date of government approval for mobilization

Data element attributes

Storage Type: Date

Null Type: NotNull

Location:

Entity --> Mobilization

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

ApprovalNo Data Element

Mobilization::ApprovalNo

Description:

Code from government for mobilization

Data element attributes

Storage Type: Char

Length: 10

Null Type: NotNull

Location:

Entity --> Mobilization

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

Approvince Data Element

Applicant::Approvince

Description:

The provice where applicant live

Data element attributes

Storage Type: Char

Length: 15

Null Type: NotNull

Location:

Entity --> Applicant

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

---

assigns Relationship

Attached Objects:

Mobilized Quota

assigns MIN: 1 MAX: 1

Mobilization

[is assigned] MIN: 1 MAX: many

Foreign Key(s):

Mobilization 'is assigned' Mobilized Quota

MobilizationNo -> MobilizationNo

On Delete Restrict
On Update Restrict
On Insert of Child Row Restrict

Location:

Fully

Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

CompanyAddress Data Element

Job::CompanyAddress

Description:

Address of the company which request for the worker

Data element attributes

Storage Type: Char

Length: 50

Null Type: NotNull

Location:

Entity --> Job

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

CompanyName Data Element

Job::CompanyName

Description:

Name of the company which request for the worker

Data element attributes

Storage Type: Char

Length: 20

Null Type: NotNull

Location:

Entity --> Job

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

ConfirmLetterNo Data Element

Mobilization::ConfirmLetterNo

Description:

Code for departure confirmed letter from the client

Data element attributes

Storage Type: Char

Length: 10

Null Type: Null

Location:

Entity --> Mobilization

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

ContractDetail Data Element

Job::ContractDetail

Description:

The detail of contract of agreement

Data element attributes

Storage Type: Char

Length: 200
Null Type: NotNull
Location:
Entity --> Job
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

ContractNo Data Element
Job::ContractNo
Description:
Code for the contrct of agreement for the project of the company which request for the worker
Data element attributes
Storage Type: Char
Length: 10
Null Type: NotNull
Location:
Entity --> Job
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

Country Data Element
Job::Country
Description:
Country of the company which request for the worker
Data element attributes
Storage Type: Char
Length: 10
Null Type: NotNull
Location:
Entity --> Job
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

DemandLetterNo Data Element
Job::DemandLetterNo
Description:
Code from government for demand letter for the company which request for the worker
Data element attributes
Storage Type: Char
Length: 10
Null Type: NotNull
Location:
Entity --> Job
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

DirectorName Data Element
Job::DirectorName
Description:
Name of the director of the company which request for the worker
Data element attributes

Storage Type: Char
Length: 10
Null Type: NotNull
Location:
Entity --> Job
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

---

is applied Relationship
Attached Objects:
Job Application
is applied MIN: 1 MAX: 1
Application Form
[applies] MIN: 1 MAX: many
Foreign Key(s):
Application Form 'applies' Job Application
ApplicationFormNo -> ApplicationFormNo
On Delete Restrict
On Update Restrict
On Insert of Child Row Restrict
Location:
Fully
Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

---

is assigned Relationship
Attached Objects:
Mobilization
is assigned MIN: 1 MAX: many
Mobilized Quota
[assigns] MIN: 1 MAX: 1
Foreign Key(s):
Mobilization 'is assigned' Mobilized Quota
MobilizationNo -> MobilizationNo
On Delete Restrict
On Update Restrict
On Insert of Child Row Restrict
Location:
Fully
Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

---

is occupied Relationship
Attached Objects:
Worker
is occupied MIN: 1 MAX: 1
Quota
[occupies] MIN: 1 MAX: 1
Foreign Key(s):
Worker 'is occupied' Quota
WorkerNo -> WorkerNo
On Delete Restrict

On Update Restrict
On Insert of Child Row Restrict

Location:
Fully

Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

---

is offered Relationship

Attached Objects:
Job Application
is offered MIN: 1 MAX: 1
Job
[offers] MIN: 1 MAX: many

Foreign Key(s):
Job 'offers' Job Application
JobNo -> JobNo
On Delete Restrict
On Update Restrict
On Insert of Child Row Restrict

Location:
Fully

Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

---

is processed Relationship

Attached Objects:
Quota
is processed MIN: 1 MAX: many
Mobilized Quota
[processes] MIN: 1 MAX: 1

Foreign Key(s):
Quota 'is processed' Mobilized Quota
QuotaNo -> QuotaNo
On Delete Restrict
On Update Restrict
On Insert of Child Row Restrict

Location:
Fully

Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

---

is qualified Relationship

Attached Objects:
Worker
is qualified MIN: 1 MAX: many
Job Worker
[qualifies] MIN: 1 MAX: 1

Foreign Key(s):
Worker 'is qualified' Job Worker
WorkerNo -> WorkerNo
On Delete Restrict
On Update Restrict

On Insert of Child Row Restrict

Location:

Fully

Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

---

is registered Relationship

Attached Objects:

Application Form

is registered MIN: 1 MAX: 1

Applicant

[registers] MIN: 1 MAX: 1

Foreign Key(s):

Applicant 'registers' Application Form

ApplicantNo -> ApplicantNo

On Delete Restrict

On Update Restrict

On Insert of Child Row Restrict

Location:

Fully

Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

---

is selected Relationship

Attached Objects:

Job Worker

is selected MIN: 1 MAX: 1

Job

[selects] MIN: 0 MAX: many

Foreign Key(s):

Job 'selects' Job Worker

JobNo -> JobNo

On Delete Restrict

On Update Restrict

On Insert of Child Row Restrict

Location:

Fully

Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

JName Data Element

Job::JName

Description:

Name of the job

Data element attributes

Storage Type: Char

Length: 50

Null Type: NotNull

Location:

Entity --> Job

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

Job Entity

Description:

A worker demand requested from the client, which is approved to recruit oversea workers by the government

Composition:

JobNo : Char
JName : Char
CompanyName : Char
CompanyAddress : Char
Country : Char
ProjectName : Char
ProjectNo : Char
RegistrationNo : Char
DirectorName : Char
PowerAttorneyNo : Char
DemandLetterNo : Char
QuotaQuantities : Integer 4
ContractNo : Char
ContractDetail : Char

Primary Key:

Index Name: Generated by VAW
Column(s): JobNo [ASC]

Location:

Fully

Attached relationships on Fully:

offers MIN: 1 MAX: many
Job Application
selects MIN: 0 MAX: many
Job Worker

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

Job Application Associative Entity

Composition:

ApplicationFormNo : Undefined
JobNo : Undefined

Primary Key:

Index Name: Generated by VAW
Column(s): ApplicationFormNo [ASC]
JobNo [ASC]

Foreign Key(s):

Application Form 'applies' Job Application
ApplicationFormNo -> ApplicationFormNo
On Delete Restrict
On Update Restrict
On Insert of Child Row Restrict
Job 'offers' Job Application
JobNo -> JobNo
On Delete Restrict
On Update Restrict

On Insert of Child Row Restrict

Location:

Fully

Attached relationships on Fully:

is applied MIN: 1 MAX: 1

Application Form

is offered MIN: 1 MAX: 1

Job

Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

Job Worker Associative Entity

Composition:

JobNo : Undefined

WorkerNo : Undefined

Primary Key:

Index Name: Generated by VAW

Column(s): JobNo [ASC]

WorkerNo [ASC]

Foreign Key(s):

Job 'selects' Job Worker

JobNo -> JobNo

On Delete Restrict

On Update Restrict

On Insert of Child Row Restrict

Worker 'is qualified' Job Worker

WorkerNo -> WorkerNo

On Delete Restrict

On Update Restrict

On Insert of Child Row Restrict

Location:

Fully

Attached relationships on Fully:

is selected

MIN: 1 MAX: 1

Job

qualifies MIN: 1 MAX: 1

Worker

Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

JobApplied Data Element

Application Form::JobApplied

Description:

The job which applicant apply

Data element attributes

Storage Type: Char

Length: 50

Null Type: NotNull

Location:

Entity --> Application Form

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

JobNo Data Element

Job::JobNo

Description:

The code for the job

Data element attributes

Storage Type: Char

Length: 12

Null Type: NotNull

Location:

Entity --> Job

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

JobNo Data Element

Job Application::JobNo

Data element attributes

Storage Type: Undefined

Location:

Associative Entity --> Job Application

Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

JobNo Data Element

Job Worker::JobNo

Data element attributes

Storage Type: Undefined

Location:

Associative Entity --> Job Worker

Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

JobNo Data Element

Quota::JobNo

Description:

Code of the job

Data element attributes

Storage Type: Char

Length: 10

Null Type: NotNull

Location:

Entity --> Quota

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

MAirline Data Element

Mobilization::MAirline

Description:

Name of the airline which worker depart

Data element attributes

Storage Type: Char

Length: 7

Null Type: Null

Location:

Entity --> Mobilization

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

MDate Data Element

Mobilization::MDate

Description:

Date of mobilization

Data element attributes

Storage Type: Date

Null Type: NotNull

Location:

Entity --> Mobilization

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

MFlightNo Data Element

Mobilization::MFlightNo

Description:

Departure flight number for the mobilization

Data element attributes

Storage Type: Char

Length: 5

Null Type: Null

Location:

Entity --> Mobilization

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

Mobilization Entity

Description:

A process event which the company provided service to the worker to go work in oversea

Composition:

MobilizationNo : Char

MDate : Date

MFlightNo : Cha

MAirline : Char

ApprovalNo : Char

ApprovalDate : Date

WorkerNameList : Char

ConfirmLetterNo : Char

Primary Key:

Index Name: Generated by VAW

Column(s): MobilizationNo [ASC]

Location:

Fully

Attached relationships on Fully:

is assigned MIN: 1 MAX: many

Mobilized Quota

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

MobilizationNo Data Element

Mobilization::MobilizationNo

Description:

Code for mobilization process

Data element attributes

Storage Type: Char

Length: 10

Null Type: NotNull

Location:

Entity --> Mobilization

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

MobilizationNo Data Element

Mobilized Quota::MobilizationNo

Data element attributes

Storage Type: Undefined

Location:

Associative Entity --> Mobilized Quota

Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

Mobilized Quota Associative Entity

Composition:

QuotaNo : Undefined

MobilizationNo : Undefined

Primary Key:

Index Name: Generated by VAW

Column(s): MobilizationNo [ASC]

QuotaNo [ASC]

Foreign Key(s):

Quota 'is processed' Mobilized Quota

QuotaNo -> QuotaNo

On Delete Restrict

On Update Restrict

On Insert of Child Row Restrict

Mobilization 'is assigned' Mobilized Quota

MobilizationNo -> MobilizationNo

On Delete Restrict

On Update Restrict

On Insert of Child Row Restrict

Location:

Fully

Attached relationships on Fully:

processes MIN: 1 MAX: 1

Quota

assigns MIN: 1 MAX: 1

Mobilization

Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

---

occupies Relationship

Attached Objects:

Quota
occupies MIN: 1 MAX: 1

Worker
[is occupied] MIN: 1 MAX: 1

Foreign Key(s):

Worker 'is occupied' Quota
WorkerNo -> WorkerNo
On Delete Restrict
On Update Restrict
On Insert of Child Row Restrict

Location:

Fully

Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

---

offers Relationship

Attached Objects:

Job
offers MIN: 1 MAX: many

Job Application
[is offered] MIN: 1 MAX: 1

Foreign Key(s):

Job 'offers' Job Application
JobNo -> JobNo
On Delete Restrict
On Update Restrict
On Insert of Child Row Restrict

Location:

Fully

Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

Position Data Element

Application Form::Position

Description:

The position which applicant apply

Data element attributes

Storage Type: Char
Length: 20
Null Type: Null

Location:

Entity --> Application Form

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

PowerAttorneyNo Data Element

Job::PowerAttorneyNo

Description:

Code from government for power atorney for the company which request for the worker

Data element attributes
Storage Type: Char
Length: 10
Null Type: NotNull
Location:
Entity --> Job
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003
processes Relationship
Attached Objects:
Mobilized Quota
processes MIN: 1 MAX: 1
Quota
[is processed] MIN: 1 MAX: many
Foreign Key(s):
Quota 'is processed' Mobilized Quota
QuotaNo -> QuotaNo
On Delete Restrict
On Update Restrict
On Insert of Child Row Restrict
Location:
Fully
Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

ProjectName Data Element
Job::ProjectName
Description:
Name of the project of the company which request for the worker
Data element attributes
Storage Type: Char
Length: 12
Null Type: NotNull
Location:
Entity --> Job
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

ProjectNo Data Element
Job::ProjectNo
Description:
Code for the project for the company which request for the worker
Data element attributes
Storage Type: Char
Length: 10
Null Type: NotNull
Location:
Entity --> Job
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

QCPosition Data Element
Worker::QCPosition

Description:
The position which the worker passed the test
Data element attributes
Storage Type: Char
Length: 10
Null Type: NotNull
Location:
Entity --> Worker
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

---

qualifies Relationship
Attached Objects:
Job Worker
qualifies MIN: 1 MAX: 1
Worker
[is qualified] MIN: 1 MAX: many
Foreign Key(s):
Worker 'is qualified' Job Worker
WorkerNo -> WorkerNo
On Delete Restrict
On Update Restrict
On Insert of Child Row Restrict
Location:
Fully
Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

Quota Entity
Description:
A specific job unit which use to specify group of workers to go work in each job
Composition:
WorkerNo : Char
QuotaNo : Char
JobNo : Char
QuotaStatus : Char
Quotatype : Char
Primary Key:
Index Name: Generated by VAW
Column(s): QuotaNo [ASC]
Foreign Key(s):
Worker 'is occupied' Quota
WorkerNo -> WorkerNo
On Delete Restrict
On Update Restrict
On Insert of Child Row Restrict
Location:
Fully
Attached relationships on Fully:
occupies MIN: 1 MAX: 1

Worker
is processed MIN: 1 MAX: many
Mobilized Quota

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

QuotaNo Data Element
Mobilized Quota::QuotaNo
Data element attributes
Storage Type: Undefined
Location:
Associative Entity --> Mobilized Quota
Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

QuotaNo Data Element
Quota::QuotaNo
Description:
Code of job quota
Data element attributes
Storage Type: Char
Length: 10
Null Type: NotNull
Location:
Entity --> Quota
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

QuotaQuantities Data Element
Job::QuotaQuantities
Description:
The quantities of quota of the company which request for the worker
Data element attributes
Storage Type: Integer 4
Null Type: NotNull
Location:
Entity --> Job
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

QuotaStatus Data Element
Quota::QuotaStatus
Description:
The availibility status of the quota
Data element attributes
Storage Type: Char
Length: 10
Null Type: Null
Location:
Entity --> Quota
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

Quotatype Data Element

Quota::Quotatype
Description:
Type of quota
Data element attributes
Storage Type: Char
Length: 15
Null Type: NotNull
Location:
Entity --> Quota
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

---

registers Relationship
Attached Objects:
Applicant
registers MIN: 1 MAX: 1
Application Form
[is registered] MIN: 1 MAX: 1
Foreign Key(s):
Applicant 'registers' Application Form
ApplicantNo -> ApplicantNo
On Delete Restrict
On Update Restrict
On Insert of Child Row Restrict
Location:
Fully
Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

RegistrationNo Data Element
Job::RegistrationNo
Description:
Code from government for the project which the company which request for the worker
Data element attributes
Storage Type: Char
Length: 10
Null Type: NotNull
Location:
Entity --> Job
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

---

selects Relationship
Attached Objects:
Job
selects MIN: 0 MAX: many
Job Worker
[is selected] MIN: 1 MAX: 1
Foreign Key(s):
Job 'selects' Job Worker
JobNo -> JobNo

On Delete Restrict
On Update Restrict
On Insert of Child Row Restrict
Location:
Fully
Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

TestDate Data Element
Worker::TestDate
Description:
The date of testing
Data element attributes
Storage Type: Date
Null Type: NotNull
Location:
Entity --> Worker
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

TesterName Data Element
Worker::TesterName
Description:
Name of the tester
Data element attributes
Storage Type: Char
Length: 10
Null Type: NotNull
Location:
Entity --> Worker
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

VisaNo Data Element
Worker::VisaNo
Description:
Code for Visa applied
Data element attributes
Storage Type: Char
Length: 10
Null Type: Null
Location:
Entity --> Worker
Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

Worker Entity
Description:
The qualified applicant who is selected from the client or passes the test
Composition:
WorkerNo : Char
ApplicationFormNo : Char

TestDate : Date
QCPosition : Char
TesterName : Char
VisaNo : Char

Primary Key:
Index Name: Generated by VAW
Column(s): WorkerNo [ASC]

Location:
Fully

Attached relationships on Fully:
is occupied MIN: 1 MAX: 1
Quota
is qualified MIN: 1 MAX: many
Job Worker

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

WorkerNameList Data Element
Mobilization::WorkerNameList

Description:
List of the group of workers who are mobilized in each process

Data element attributes
Storage Type: Char
Length: 50
Null Type: NotNull

Location:
Entity --> Mobilization

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

WorkerNo Data Element
Job Worker::WorkerNo

Data element attributes
Storage Type: Undefined

Location:
Associative Entity --> Job Worker

Date Last Altered: 3/2/2003 *Date Created:* 3/2/2003

WorkerNo Data Element
Worker::WorkerNo

Description:
Code for the worker

Data element attributes
Storage Type: Char
Length: 10
Null Type: NotNull

Location:
Entity --> Worker
Entity --> Quota

Date Last Altered: 26/2/2003 *Date Created:* 3/2/2003

APPENDIX H

STRUCTURE OF DATABASE TABLE

STRUCTURE OF DATABASE TABLE

Table H.1. Structure of Job Applicant Table: Data Store D1.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	ApplicantFormNo	Char(12)	Y	Y				Foreign Key
2	JobNo	Char(12)	Y	Y				Foreign Key

Table H.2. Structure of Job Worker Table: Data Store D2.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	JobNo	Char(12)	Y	Y				Foreign Key
2	WorkerNo	Char(12)	Y	Y				Foreign Key

Table H.3. Structure of Job Mobilization Quota: Data Store D3.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	QuotaNo	Char(12)	Y	Y				Foreign Key
2	MobilizationNo	Char(12)	Y	Y				Foreign Key

Table H.4. Structure of Applicant Table: Data Store D4.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	ApplicantNo	Char(10)	Y	Y		Application Form		Primary Key
2	Apname	Char(10)						Attribute
3	Aplastname	Char(15)						Attribute
4	Apbirthdate	Date						Attribute
5	Apaddress	Char(50)						Attribute
6	Approvince	Char(15)						Attribute
7	Apphone	Integer			Y			Attribute
8	Appagent	Char(7)						Attribute
9	Apexperience	Char(200)			Y			Attribute

Table H.5. Structure of Application Form Table: Data Store D5.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	ApplicationFormNo	Char(12)	Y	Y		Job Applicant		Primary Key
2	JobApplied	Char(50)						Attribute
3	Position	Char(20)						Attribute
4	AppliedStatus	Char(20)						Attribute
4	AppliedDate	Date						Attribute
4	ApplcationRecord	Char(20)			Y			Attribute

Table H.6. Structure of Job Table: Data Store D6.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	JobNo	Char(12)	Y	Y		Job Application Job Worker		Primary Key
2	Jname	Char(50)			Y			Attribute
3	CompamyName	Char(20)						Attribute
4	CompanyAddress	Char(50)						Attribute
5	Country	Char(10)						Attribute
6	ProjectName	Char (12)			Y			Attribute
7	ProjectNo.	Char(10)			Y			Attribute
8	RegistrationNo.	Char(10)						Attribute
9	DirectorName	Char(10)			Y			Attribute
10	PowerAttorneyNo	Char(10)						Attribute
11	DemandLetterNo	Char(10)						Attribute
12	QuotaQuantities	Integer						Attribute
13	ContractNo	Char(10)						Attribute
14	ContractDetail	Char(200)						Attribute

Table H.7. Structure of Worker Table: Data Store D7.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	WorkerNo	Char(10)	Y	Y		Job Worker		Primary Key
2	ApplicationFormNo	Char(20)	Y	Y				Foreign Key
3	TestDate	Date						Attribute
4	QCposition	Char(10)						Attribute
4	TesterName	Char(10)						Attribute
4	VisaNo	Char(10)						Attribute

Table H.8. Structure of QuotaTable: Data Store D8.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	QuotaNo	Char(10)	Y	Y		Mobilized Quota		Primary Key
2	JobNo	Char(10)	Y	Y				Foreign Key
3	QuotaStatus	Char(10)						Attribute
4	Quotatype	Char(15)						Attribute

Table H.9. Structure of Mobilization Table: Data Store D9.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	MobilizationNo	Char(10)	Y	Y		Mobilized Quota		Primary Key
2	MDate	Date					> Departure Date	Attribute
3	MFlightNo.	Char(5)						Attribute
4	MAirline	Char(7)						Attribute
4	ApprovalNo	Char(10)						Attribute
4	ApprovalDate	Date						Attribute
4	WorkerNameList	Char(50)						Attribute
4	ConfirmLetterNo	Char(10)						Attribute

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