An Integrated Order Processing Information System of Pakorn Construction Materials Co., Ltd.

by

Mr. Pakorn Preechawuthidech

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

Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science
in Computer Infromation System
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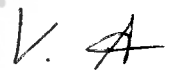
Academic Year July 2000

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

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ABSTRACT

Obviously, the business world has undergone a technological revolution. The availability of low cost, sophisticated microcomputers has allowed even the smallest businesses to automate their record keeping processes. In the past, every record such as general ledgers, customer and vendor files and payroll reports all had to be prepared by hand, however, companies can now purchase relatively inexpensive hardware and develop a computerized system which will accomplish all these tasks and many more.

The accounting process, which is both labor and data intensive, was a logical choice for computerization. Many steps in the accounting cycle are repetitive and time consuming. Often, the information from a single transaction will be recorded two or more times within the same accounting systems. Computer processing of these same transactions reduces the need for repeated manual entries and at the same time ensures that accuracy is maintained. In addition, with the need for information to be timely and complete, computers facilitate processing large volumes of data in the shortest possible time.

Over the past several years, accounting software has been developed for small and medium size businesses with all features previously available only to large companies using mainframe computers. Now small businesses with only a desktop system and off-the-shelf software can process data and generate professional looking reports.

As the business population becomes more computer literate and begins to understand and utilize the full capacities of these systems, the impact on accounting, data processing and management will be profound. The need to manually process accounting information will be soon obsolete. Those involved with accounting will need

to be prepared to work in an automated environment where the recording in traditional journals and ledgers will be vastly different from manual systems.

To propose the Integrated Accounting System of Pakorn Construction Materials Co., Ltd. is one of the examples to develop a manual accounting system to be a computerized accounting system which its transaction processing systems are described to provide a context for discussion of decision support. To produce the information for decision-makers in the company nowadays basically needs the Management Information System to perform the two major roles in managerial decision making, First, it identifies situations requiring management action. For example, a cost report with a larger variance might simulate management to investigate any business tasks and make a correction. Second, by reducing uncertainty, accounting information provides a basic for choosing among alternative actions. For example, accounting information is often used as a basic for setting prices and determining credit policies.

ACKNOWLEDGEMENTS

So many people have helped the writer to write this project that he is no longer totally sure of his claim to be his advisors.

Assoc.Prof.Dr. Suphamit Chittayasothorn who first taught him in database system and has the meticulous intention to his helps of analysis and comment on developing the system. He is also deeply indebted to Dr. Ouen Pin-ngern who taught him to deeply understand how to analyze and develop a computerized information system. He is no less grateful to the other lecturers in the class who guided him, such as Prof.Dr. Srisakdi Charmonman, Air Marshal Dr. Chulit Meesajjee, and other lecturers in the classes that he does not mention here.

Finally, his thanks to all of his classmates who are grouped and help each other to succeed on the Master's Degree of Science in Computer Information Systems.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

I. INTRODUCTION

1.1 Background of the Project

There have been a number of calls for significant changes in working with business information in any organization. The traditional business transaction or manual-processing model in a small company is then presented and the problems with traditional manual business transactions, such as accounting, sales, purchasing are noted. The traditional view of accounting, which is the main function for every business, and to process with double-entry model of accounting date contrasted with a more modern view of accounting called the database approach to accounting. The accounting is presented and diversity in their information needs is discussed to serve the customers. To process data and transactions with information, we need to plan, control, operate with real-time reporting and flexible views of the database are easily supported to our businesses.

The various roles that future accounting professionals can play in a small business are discussed. Owners, Sales Managers, Purchasing Managers, accountants and related managers can either serve as information professionals within the company, an auditors capable of dealing with database oriented information systems, or as consultants involved in design and development of information systems to a wide ranging clientele.

Because the existing system of the company, Pakorn Construction Materials Co., Ltd. is currently operated with a manual system, which creates many problems in controlling the document flows and brings to unreliable, inaccurate and inadequate information. So, the management level needs time and effort to closely investigation on every transaction to ensure that the company's accounting is properly operated and

1

efficient information on the existing system and lack of simultaneous information can affect on the growth and expansion of the organization.

However, to implement and replace the entire accounting system to be computerized in a small business is costly and still not necessary to invest their money to develop it. The purpose of the project is to introduce the Managing Director and other managers the use of computers to be efficient management and the provision of decision-making system by the Information Technology with reasonable budget. Thus, it is recommended to begin with Order Processing Information System, which is a subsystem of the Accounting Information System, to support the company's clients. The project is organized step-by-step from analyzing the business functions, find out the current problems on both daily, periodical and project management, providing a plan of investment on computing devices and design of computerized system used for sales transactions.

1.2 Objective of the Project

A manual accounting system requires the users to enter data by hand. The accounting cycle begins when a business transaction occurs. The transaction is entered into a journal. If the business is large enough, special journals, such as sales journals, purchase journals, cash receipts journals, cash payments journals, and inventory journals are used to work more efficiently. This merely involves copying components of the previously entered transaction into another document. In addition, if the general ledger account has a supporting ledger (e.g., accounts receivable or payable), an additional posting to those ledgers is also required. At the end of a period, adjustments are entered, ledgers are totaled, trial balances and financial statements prepared, all involving separate steps with the user reproducing basically the same information.

In a computerized environment, the managers must still be knowledgeable of accounting and financial principles. Accounting system uses the same debit and credit procedures that are used in a manual accounting; using debits to increase asset account balance and credits to increase liability ad capital account balances. The concepts of the journalizing, posting, and preparing financial statements are retained. The basic accounting equation (Asset = Liabilities + Owner's Equity) is certainly in place. However, the user need only enter information once; all the repetitive processing is done automatically by the system form posting to the ledgers to preparing the updated reports.

The major advantage of a computerized accounting system over a manually prepared system is the concept of 'Integration'. Integration is the process by which the system immediately updates related parts of the system based upon the information in each transaction. In an Integrated Order Processing Information System, transactions recorded in any journal are automatically recorded in all related (integrated) ledger accounts and reports. For example, assume there is a sale to a customer on credit. Once the information is entered into the sales journal, the system will immediately post the appropriate changes to the general ledger, the account receivable subsidiary ledger, the inventory ledger and so forth.

All in all, the objectives of the Integrated Order Processing Information System of Pakorn Construction Materials Co., Ltd. are as follows:

(a)   To design a new computerized Order Processing Information System and further provide the plan for entire Accounting System with database design to keep the entire information properly.

(b)   To analyze the existing problems and user requirements conforming to the policies of the company.

3

(c)   To study the existing accounting system of the company.

(d)   To setup the manual day-to-day transactions into the Integrated Order Processing System to be able to process all transactions without difficulty.

(e)   To provide reports in many ranges from basic Order Entry / Sales statements to elaborate management information reports. The Order Entry / Sales reports are as current as the last transactions entered. Therefore, reports can be produced at anytime and will provide the most up-to-date pending orders, balances and calculations.

1.3   Scope of the Project

In terms of the system, it is designed for small businesses. The system will maintain the Order Entry / Sales transactions to be integrated with general ledger, accounts payable, accounts receivable and inventory information. This utilizes a ledger-journal format for maintaining and updating records where the ledger stores historical data that is updated by related journals as transactions occur. For example, the Accounts Receivable or Receivable Ledger contains all customer historical data, such as, name, address, sales, receipts and open balances. Transactions affecting receivables are entered in the related Sales and Receipts Journals. Each group consisting of a ledger and its related journals is referred to as a 'module'. Modules reflect the separation of duties inherent in the accounting process. For example, sales collections, purchases and payments are usually separated within a company's accounting department. Computerized accounting systems are designed to support these separate activities. Table 1.1 illustrates the relationship of ledgers and journals for each module of entire accounting system of the business functions.

Table 1.1. Modules of Ledgers and Journals of Entire Accounting Transactions.

Module	Ledgers and Journals		
	Ledger	Related Journals	Purpose
General	General	General Bank Reconciliation	• Maintain General Ledger account balances • Make General Journal entries • Prepare Bank Reconciliation
Payables	Payables	Purchases Payments	• Maintain vendor records • Record all acquisitions and vendor payment
Receivables	Receivables	Sales Receipts	• Maintain customer records • Record all sales and collection of receivables
Inventory	Inventory	Transfers Adjustments	• Maintain inventory records • Record inventory transfers and adjustments

The text presents an integrated accounting system, which demonstrates the scope and principles common to all computerized accounting systems through the modules of Generals, Payables, Receivables and Inventory with their purposes. However, this project is planned for the use of computer information system and partly designed for the accounts receivable business transactions, such as sales and collection between the business firm and its clients.

1.4 Deliverables

To recommend an Integrated Accounting System for the Pakorn Construction Materials Co., Ltd., its deliverables of the project are:

(1) An overview of the computerized system, including a description of the planned interface with the Integrated Accounting System.

(2) Suggested procedures and budget to be followed in completing the system.

(3) Suggested On-line processing that users can obtain current financial information at any time required.

(4) Reducing the time to produce financial reports by using the system.

(5) With Graphic User Interface (GUI.) on its screen design, the system will be easily operated with a user-friendly system.

(6) Gathering Better controls and higher performance on relational database on information management.

(7) Maintainability which refers to the completeness of documentation and the degree of modularity.

1.5 Project Plan

The project was planned as shown in Figure 1.1. The plan was separated into 3 sections. First, System Analysis section, which investigates how the current business transactions are being operated and what users' requirements are. Second, System Design section, which researches on the proper system to be recommended and involves on the design of its function to be easily used. Third, this section shows the plan of time requirement for system implementation.

6

No.	Task Name	May				June				July				August		
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
I.	Analysis of the Existing System																
1	Define the Objective and Scope																
2	Survey Problems and Opportunities																
3	Plan the Project																
4	Analyze Business Process																
5	Analyze Problems and Opportunities																
6	Outline Business Requirements																
II.	Analysis and Design of the Proposed System																
7	Cost and Benefit Analysis																
8	Data Flow Diagram Design																
9	Program Design																
10	Database Design																
11	Interface Design																
12	Report Design																

Figure 1.1.   Gantt Chart for System Development.

7

No.	Task Name	May				June				July				August			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
III.	Implementation of the Proposed System																
13	Construct the Database									▮	▮						
14	Coding										▮	▮					
15	Testing											▮	▮				
16	Hardware Installation								▮								
17	Software Installation													▮			
18	Train Users														▮		
19	Conversion															▮	▮
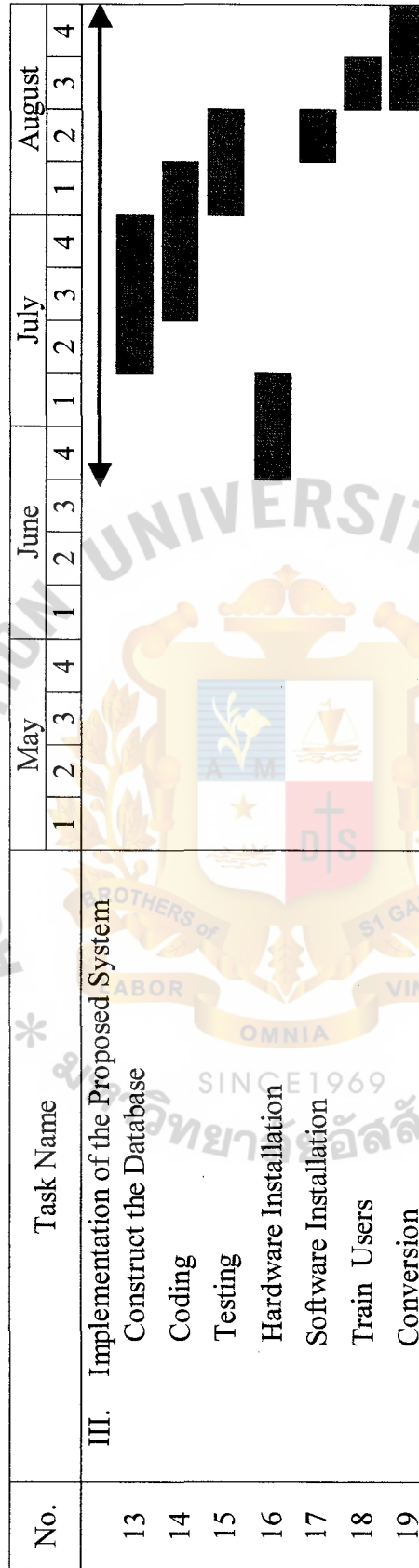
Figure 1.2. Gantt Chart for System Development (Continued).

8

II. THE EXISTING SYSTEM

2.1 Background of the Organization

The Integrated Order Processing Information System of this project is recommended to the company, Pakorn Construction Materials Co., Ltd., which is a small-to- medium sized company. Its merchandise are building construction materials, such as Cement, Steel, Roofing materials, Gypsum Board, Panel Boards, Sanitary wares and fittings, Flooring materials, including hand tools and hardware.

As one of the Siam Cement Group's agents and who buy some materials from other building materials vendors, the products supplied to the market are about 10,000 stock keeping units and supplies to about 200 credit and cash customers. The main target group is the sub-dealers, project contractors, and house-owners who select and buy materials by themselves.

The company is located in Sungai Kolok city, which its market area covers Narathiwat Province and nearby area. The company currently owns an office in the down town of the city and 3 warehouses named A, B, and C located about 3, 3, and 5 kilometer from the office respectively.
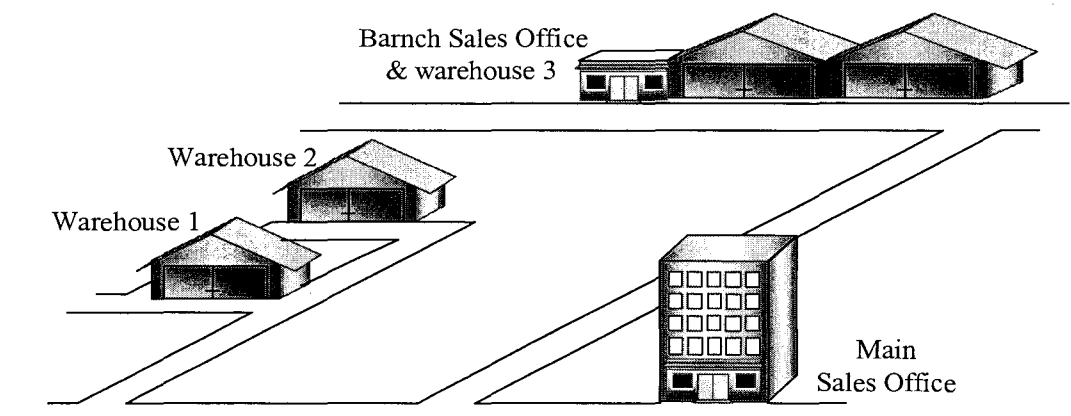
Figure 2.1. The Location of the Office and Its Warehouses.

Recently, the company has planned to expand from a family business to a systematic control organization because the scope and selling area are expanded. Thus, the company could not work everything manually for every transaction. The Figure 2.2 shows the existing organization chart of the company.
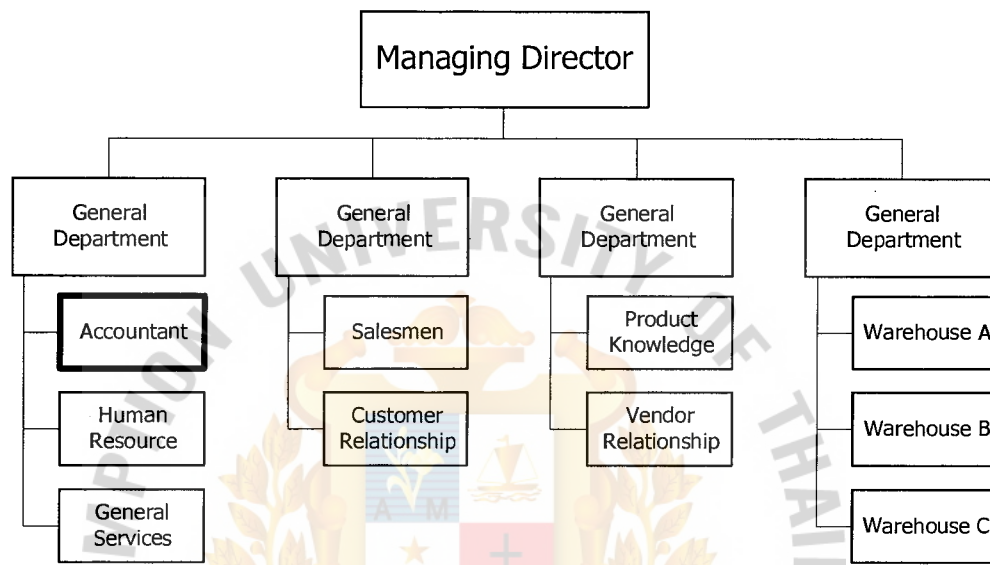
Figure 2.2. Organization Chart of Pakorn Construction Materials Co., Ltd.

2.2 Existing Business Functions

The existing Accounting System, including Order Processing System is currently based on manual procedures, which takes time and difficult to analyze any business transactions. There is an accountant working for the company and, as a family business, the system and employees are totally controlled by the owner, the Managing Director. However, the Managing Director and the steering committee have a vision to develop the business function as a medium-term plan to be able to compete with others.

Nowadays, the company engages in activities, such as hiring employees, purchasing products, managing inventory, selling products and collecting cash from

customers, and these activities are called transactions. The transaction processing is the process where the transaction-related data are collected and stored.

The company consists of four major transactions, which each manager will be in charge and has the following responsibilities:

(1)   General Department. Its responsibilities are:

    (a)   To achieve the company's mission and objective.

    (b)   To get the customer's order from Sales and Marketing Department.

    (c)   To check the product quantity available in each warehouses with the Warehouse Department.

    (d)   To prepare and issue the product requisition to the Warehouse Department.

    (e)   To prepare and issue sales order, tax invoice, official receipt, invoice and purchase order.

    (f)   To record all financial and accounting transactions.

    (g)   To prepare the financial statement reports to management level.

    (h)   To collect the payment of sales and prepare payment to creditors.

    (i)   To deposit checks and cash receivables to bank every day.

    (j)   To generate all necessary reports to management level.

    (k)   To service and support all functions of the company.

(2)   Sales and Marketing Department. Its responsibilities are:

    (a)   To achieve the company's mission and objective.

    (b)   To design the marketing strategy and marketing plan.

    (c)   To set price and promotion of the company's product.

    (d)   To check the product quantity in each warehouses with the Warehouse Department.

11

(e)   To follow up the marketing strategy and marketing plan of the Sales and Marketing Manager.

(f)   To take care of the customers, get their orders provide all product knowledge to customers.

(g)   To get the invoice from the General Department and to send them to the customers.

(h)   To collect the payment from the customers to the Accountant of General Department and deliver the official receipts back to the customers.

(3)   Purchasing Department. Its responsibilities are:

    (a)   To achieve the company's mission and objective.

    (b)   To order products and deliver the purchase order to the suppliers.

    (c)   To check the product quantity in each warehouses with the Warehouse Department.

    (d)   To gather the product information from vendors and provide it for the Managing Director and all departments.

    (e)   To look for new products available to suit the market and according to the customers' requisition.

    (f)   To inform the remittance needed for each vendor to the General Manager.

(4)   Warehouse Department. Its responsibilities are:

    (a)   To achieve the company's mission and objective.

    (b)   To get the product requisition from the Sales and Marketing Department by the approval of their manager.

    (c)   To prepare the product delivery to customers.

12

(d) To control, manage the inventory and prepare the inventory reports to the Managing Director and related managers.

(e) To check the quality of products and response to the Purchasing Manager.

2.3 Current Problems and Areas of Improvement

By interviewing the management level, General Manager and her staff in the department and by observation, the company has some problems about the existing system as following:

The existing system is a manual system, which is currently noted and filled in each journal by hand. It takes more time and is at a higher cost to operate. Furthermore, there is work overloaded in the General Department, particular for the accountant, because the working processes are so complex and duplicated. This may cause a lack of effective control within the department and subsequently to the Managing Director's decision making for all business functions.

The company has no database system to support the use of the computerized system. Some department has a desktop computer but is only used for the word processing and spreadsheet. Moreover, the data are mostly kept in the form of books and there is no database system to be the center for all transactions. Hence, it is inadequate for users' needs in linkage of entire departments' information.

Currently, Management level cannot obtain sufficient information and updated reports from the subordinates because the reports have to be summarized both daily and monthly for financial control and marketing plan. Furthermore, it is timely and costly to generate the reports, which the information might be provided inaccurately.

Furthermore, the information of the customers, products, suppliers, staffs and entire business transactions is not stored and kept in a proper system. The existing

13

system keeps information on the writing books of each department, which can be lost, stolen without backup information. Hence, the details of the information are sometimes duplicated, left blank, unknown and need more books to keep them. This leads to the requirement of more space keeping the books and other accounting documents. It is also difficult to search any document or business issue, particularly the old customer information and documents.

Recently, the policy of the company, which has been planned by the Managing Director, is pointed to the customer-driven and the their satisfaction to buy products from the company. Undoubtedly, to record all the customers' information such as their data, pending order, back order, time to deliver, amount of credit, frequency of buying and even the category of its customer group, is always mistaken and some of information might be lost. Many complaints from its customers are not yet received, but the company must have a controlled procedure to drive the business transaction accuracy and shortage in time provided. At least, the expected procedure must provide sufficient information to analyze the up-to-date business transactions.

2.4 The Existing System

The existing system of business transactions consists of six major transactions, which are performed by the Sales and Marketing Department and related functions in other department, according to the new policy to support the customer satisfaction and provide sufficient information to the company managers. By the interview and observation, the transactions currently are;

(1) Process Sales Order: The main function of this process is recording of sales order from customers. The sales staffs, by the control of Sales and Marketing Manager, will verify the order by checking whether the order is cash sales order or credit sales order. After that the staff will prepare and

14

issue the product requisition to the Warehouse Department for preparing the product shipment to customers. The accounting staff record cash account for cash sales orders, issuing tax invoice, and official receipt for cash customers. All accounting transactions are recorded in journal ledger. In this process, cash sales order will be sent to the next process.

(2)   Update Cash Customer Information: This process updates the cash customer information including adding new customers information and modifying the existing cash customer information. The detail of customer information consists of customer name, address, types of product sold, price in each cash sales order, and so forth.

(3)   Process Credit Sales Order: This process gets the credit sales order from the first process. The accounting staff will record accounting receivable account for credit customer and issue tax invoice to customers. All accounting transactions are recorded in journal ledger.

(4)   Issue Invoice: At the end of each month, the accounting staff must issue an invoice by summarizing the total account receivable of each customer manually and sales staff will send it to customers for requesting payment.

(5)   Cash Collection Process: After receiving payment from the credit customer, the accounting staff must issue an official receipt to credit customer and record the payment in a journal ledger.

(6)   Update Credit Customer Information: This process updates the credit customer information including adding new customer information and modifying the existing credit customer information. The details of customer information consists of customer name, address, type of product sold and price in each credit sales order.

15

The Figure 2.3 depicts the whole existing system in the form of context level data flow diagram and Figure 2.4 is subsequently broken down to each existing business and present the data flow diagram in each process. The figures show clearly that each business transaction operate with its own record. So, some of data might be duplicated and some of shared data cannot be used at the same time. Even the company has expanded its supplying areas, product range and supporting to more customers recently, the work procedure has never changed to be able to process efficiently and more staffs are needed to employ.

So, for the manual business function to be operated with a computerized information system, the reorganization of the whole function is advised. However, the company has plenty of ways to change. One of the ways to propose a new system is to implement phase by phase of the entire Accounting Information System, such as order entry or sales because, according to the company's policy, the system is directly cooperated with its customers. Throughout the proposed computerized information system, the essential of Accounting Information System will be acknowledged and subsequently an Order Processing Information System will be analyzes and designed to be suitable to the business function. Strategically, this can ensure the management level that the investment of a computerized information system is highly returned in budget, highly efficient in use and highly effective in satisfying the customers.
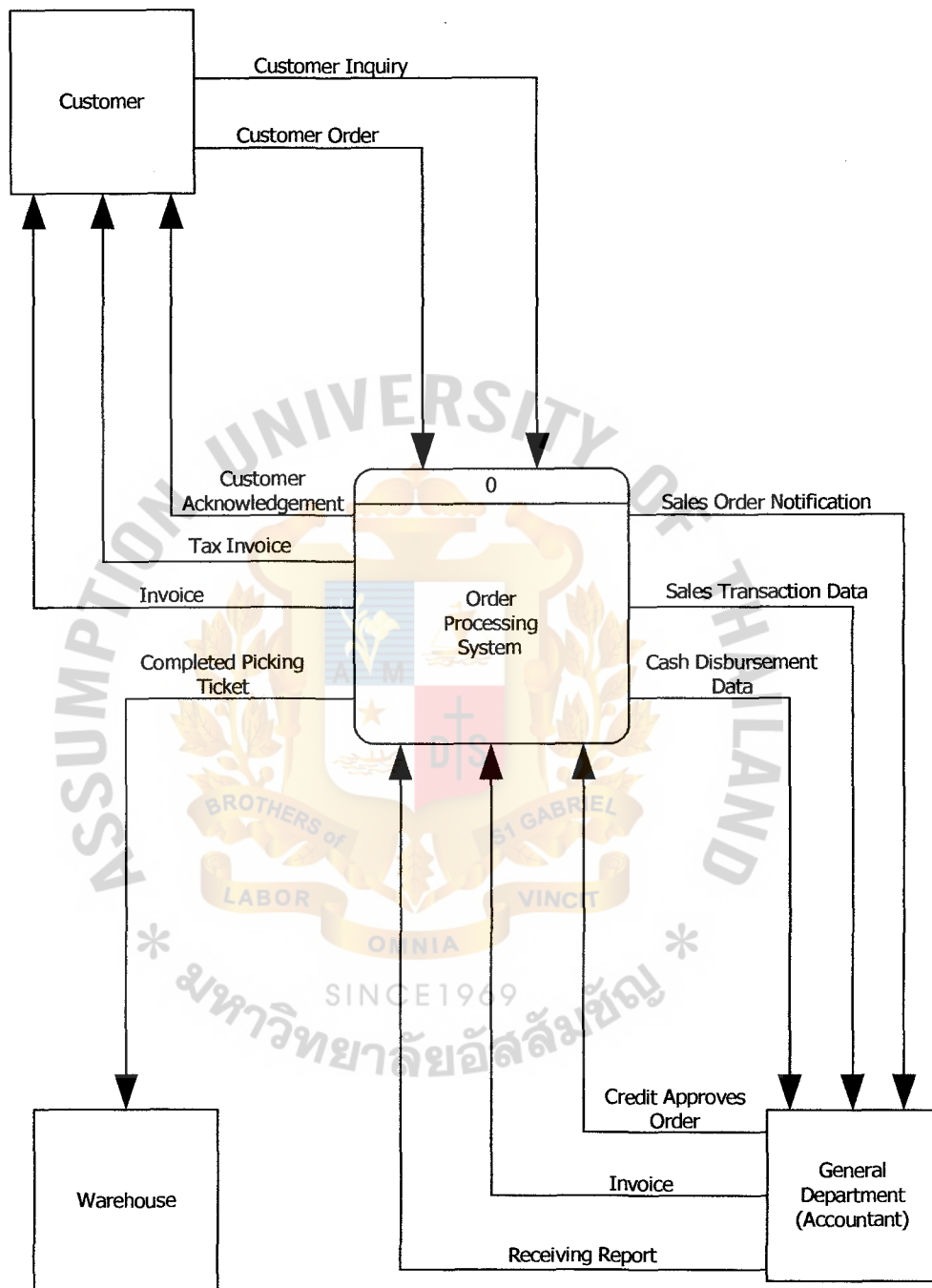
Figure 2.3.   The Context Level Data Flow Diagram of the Existing Order
                Processing System.

17
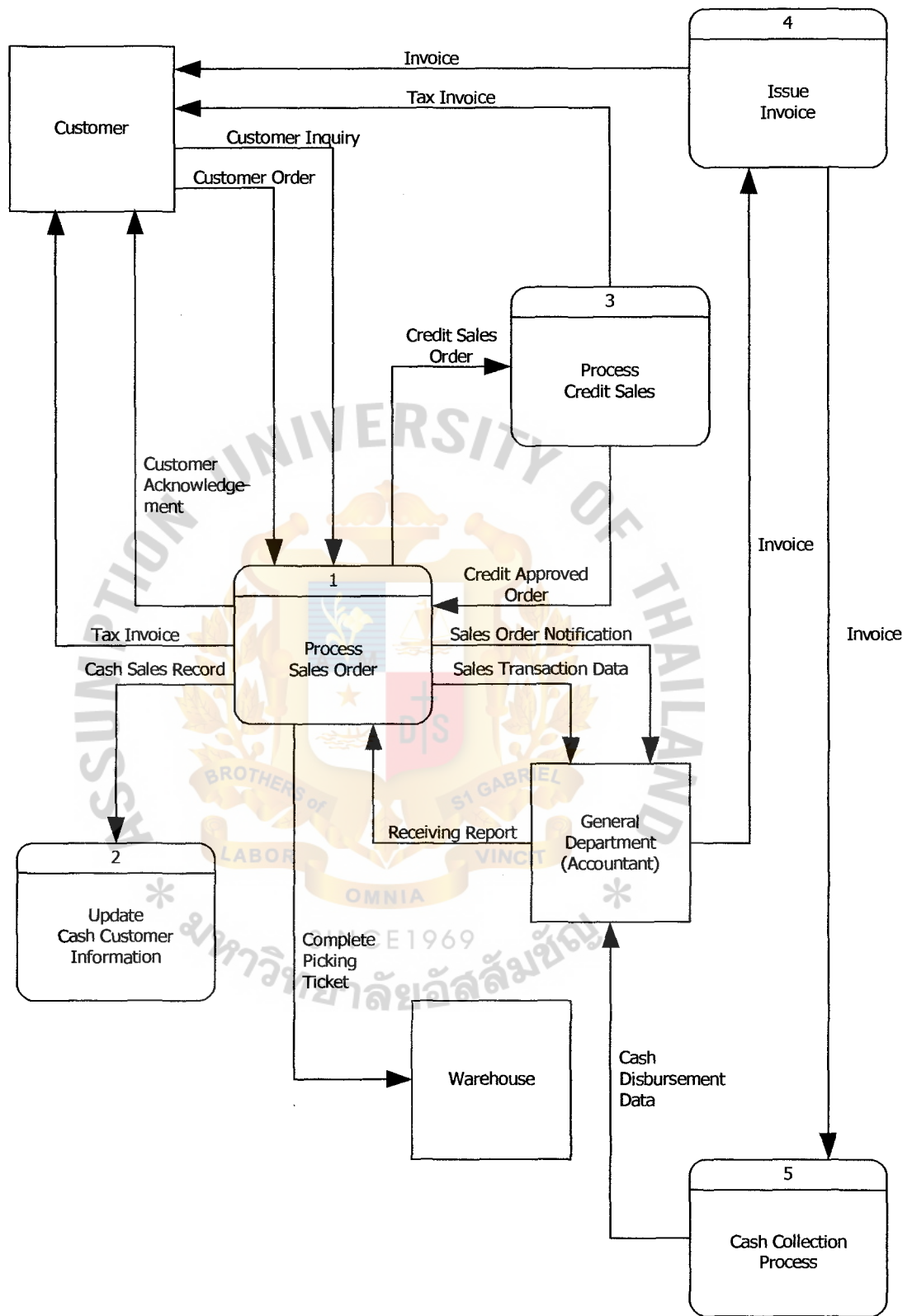
Figure 2.4.   Level 0 Data Flow Disgram of Existing Order Processing System.

18

III. THE PROPOSED SYSTEM

As described as regards the new system was recommended to the company, a proposed information system must serve two important functions within the organization. First, the information system mirrors and monitors actions in the operation system by processing, recording, and reporting operational transactions. For example, the information system processes customer order; records sales to customers by updating dales, accounts receivable, and inventory records; and produces invoices and sales transaction summaries. This transaction-based, operations-oriented is depicted by the horizontal information flows shown along the bottom of Figure 3.1 as follows;
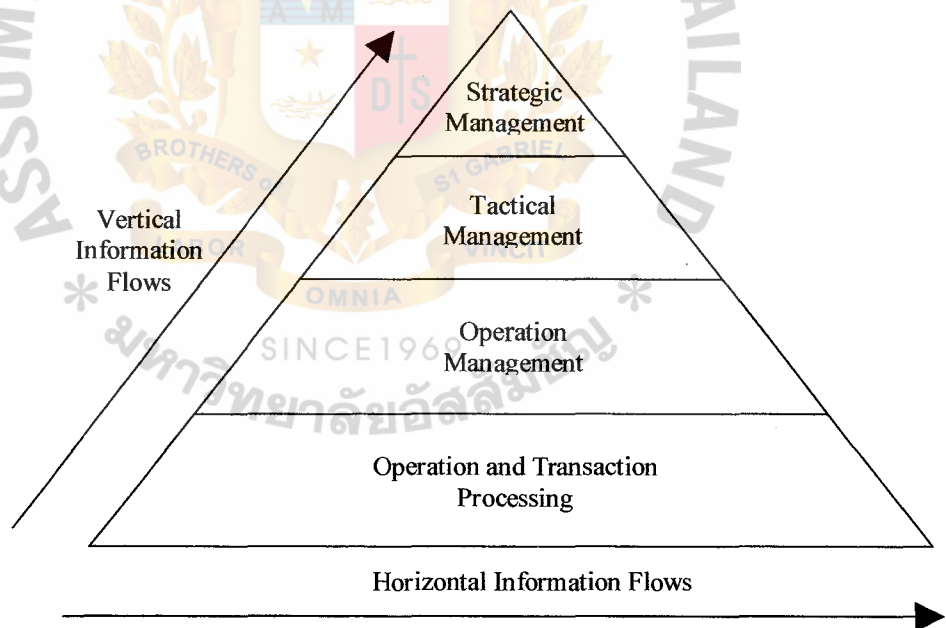
Figure 3.1.   Information System Output Flow and Users.

The vertical information flows highlight the second major function of the information system, to support managerial activities, including management decision

19

making. For example, the information system may produce sales report that help marketing managers to allocate advertising funds to particular product lines or sales territories.

The purpose of the new information system is to process transactions related t the purchase and sale of merchandise, to store information about the transactions, and to produce certain outputs related to the transactions.

As the company is also a type of the service firm rather than merchandise, it is an organization that sells services to its customer as well. The service firm revenue cycle comprises all activities in the billing, accounts receivable, accounts payable, cash and credit receipts, and inventory system. The service firm also must record other transactions, such as the purchase of materials used in the performance of service engagements and payroll disbursements. These activities are not proposed here because they differ little from similar activities in the real business of the company and investment in these systems are not relevant comparing with selling products and services to the customer and controlling of cash collection.

The entire systems, which are recommended for the company, are related to its customers, vendors, and carrier receive data from and send data to the information system, where as the bank, the general ledger system, and the warehouse system only receive data from the main system. The main system here is Accounting Information System, which is divided into four major components. The Figure 3.2 depicts the functional decomposition of the Accounting Information System, which represents the four major systems recommended to Pakorn Construction Materials Co., Ltd., the company to be able to operate the computerized system efficiently and effectively in use.
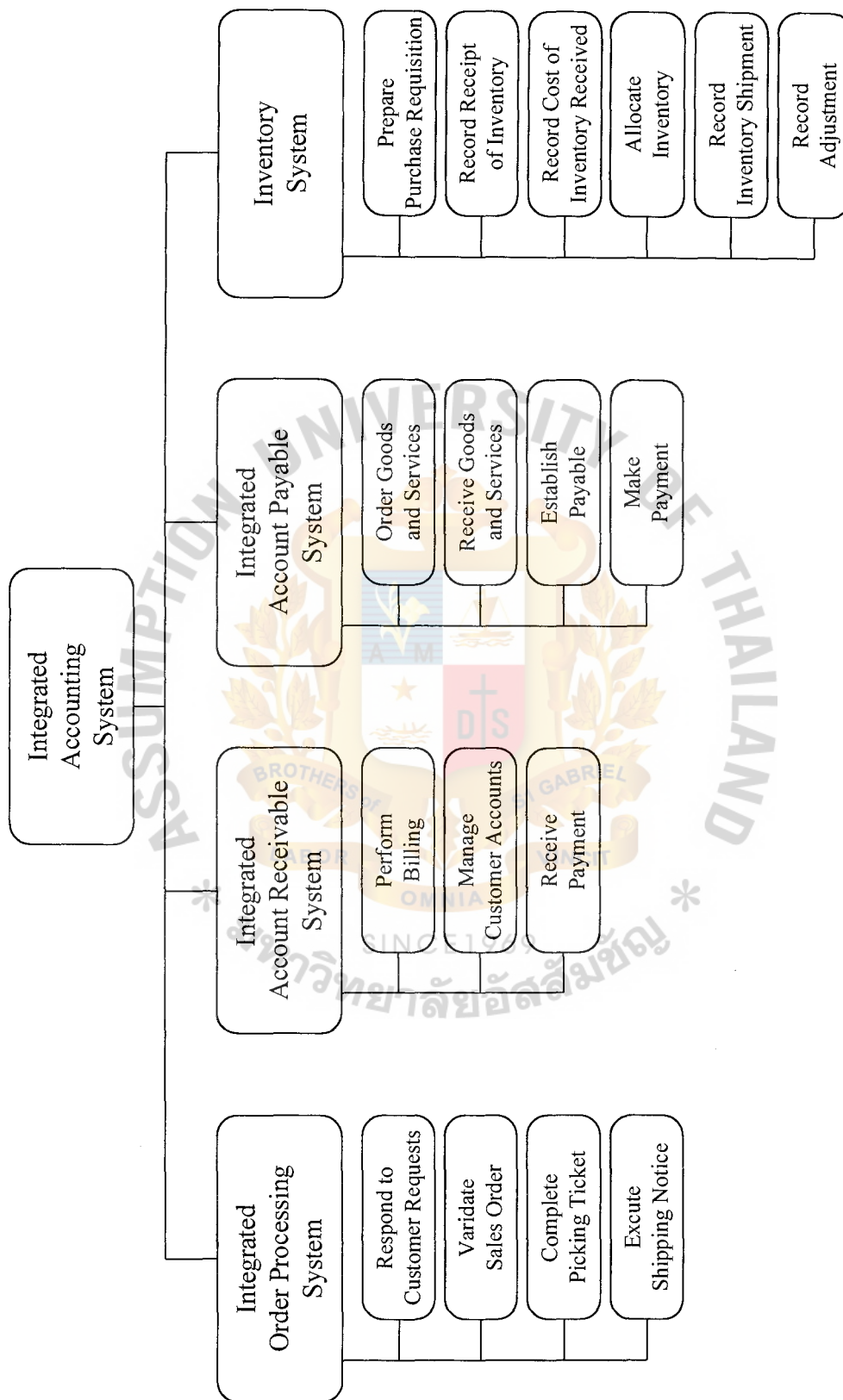
Figure 3.2. Functional Decomposition Diagram of Integrated Accounting System of Pakorn Construction Materials Co., Ltd.

21
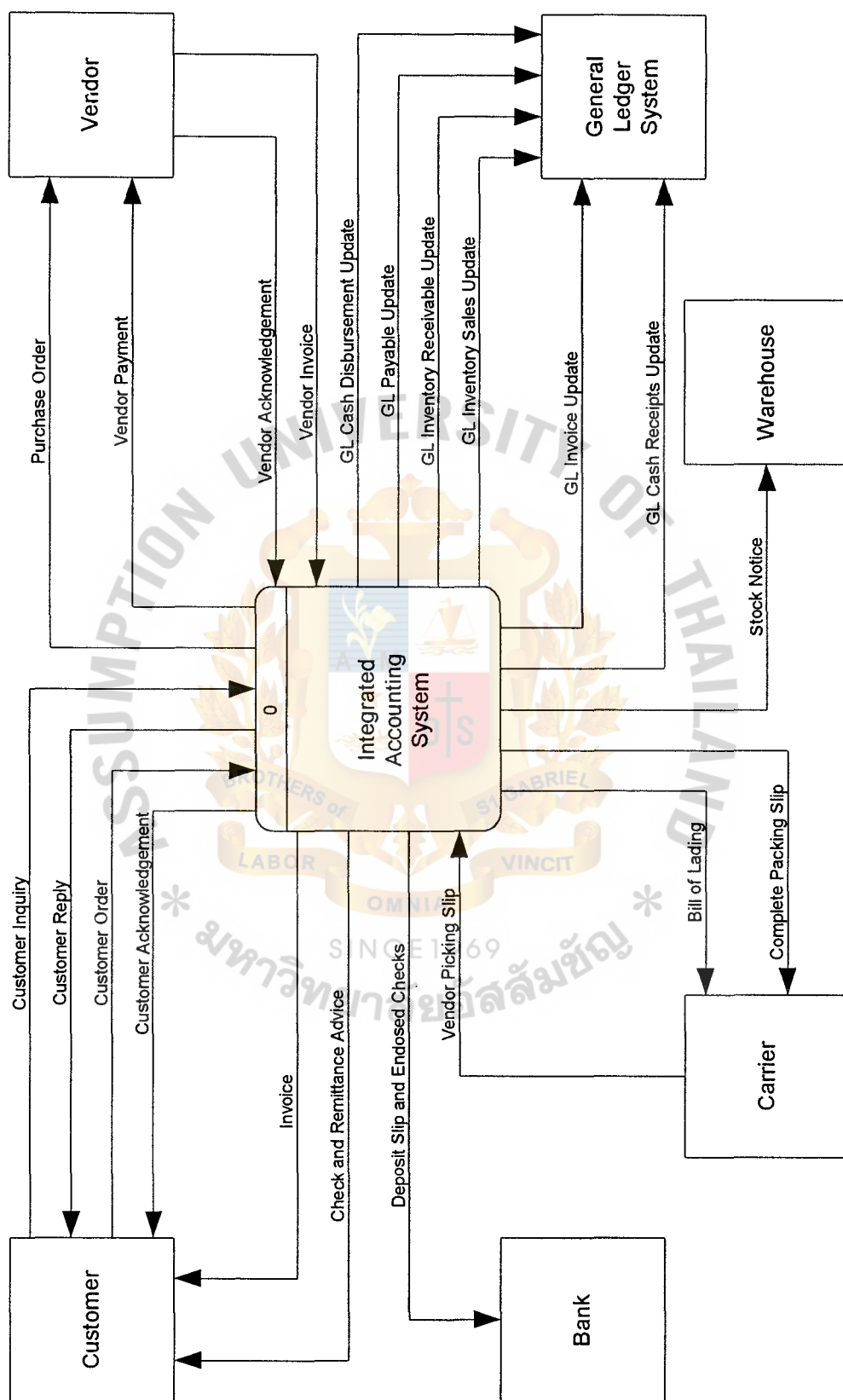
Figure 3.3. Context Level Data Flow Diagram of Integrated Accounting System of Pakorn Construction Materials Co., Ltd.

22
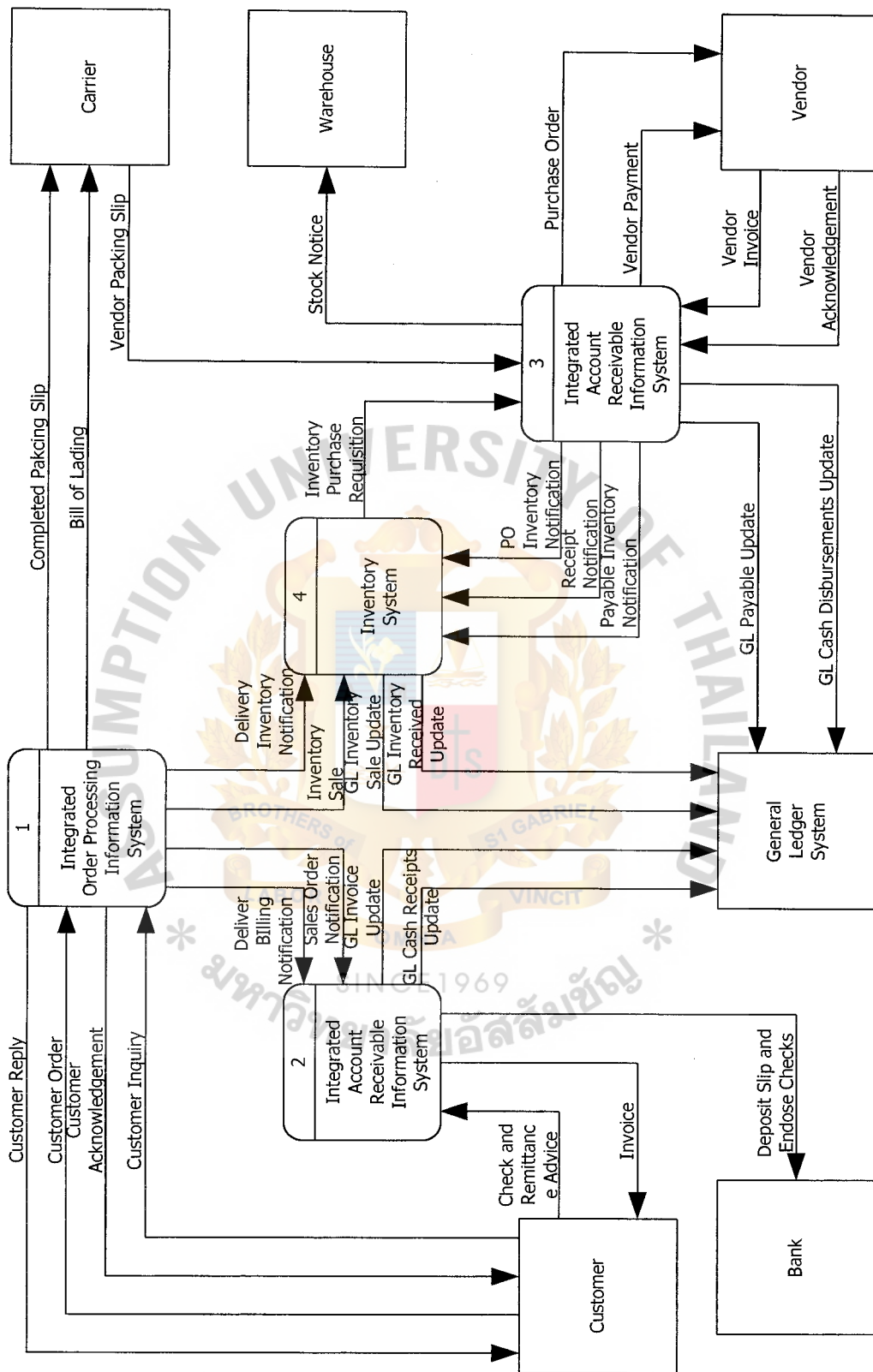
Figure 3.4. Level 0 Data Flow Diagram of Integrated Accounting System of Pakorn Construction Materials Co., Ltd.

23

Moreover, it is noticed that the entire systems are related to each other in data flows and the share of information and database. Thus, the entire system is integrated to each other.

Thus, the system should be entitled "Integrated Accounting System". All of the data flows shown in Figure 3.3 are the context level data flow diagram of the Integrated Accounting System and continued with Figure 3.4 the level 0 data flow diagram of the entire integrated system, which contained within the Integrated Accounting System.

The brief description of each of the system is described in the following paragraphs with its level 2 data flow diagrams presented in the part of Appendix A.

(1) Integrated Order Processing Information System

The Integrated Order Processing (IOP) information system receives the customer order, prepares a sales order, and acknowledgement the customer order. The inventory system is also notified that the goods have been sold (inventory sale). The system then sends the merchandise to the customer via carrier (as depicted by the complete packing slip and bill of lading data flows). The system notifies the billing system when the sales order is prepared (sales order notification) and when the order is delivered (delivery's billing notification).

(2) Integrated Accounts Receivable Information System

Upon the notification that the goods have been delivered (delivery's billing notification), the Integrated Accounts Receivable (IAR) information system prepares and sends an invoice to the customer and notifies the general ledger of the sale (GL invoice update). Later, upon receipt of the customer payment (check and remittance advice) the IAR information system deposits cash in the bank (deposit slip and check), records the

payment in the customer's subsidiary ledger account, and notifies the general ledger (GL cash receipts update).

(3)   Integrated Accounts Payable Information System

In response to a request from the inventory system (inventory's purchase requisition), the Integrate Accounts Payable (IAP) information system prepares and sends a purchase order to the vendor and notifies the inventory system that a purchase has been made (PO inventory notification). The vendor acknowledges the order. When the merchandise is received (vendor packing slip), the system sends the merchandise to the warehouse (stock notice) and notifies the inventory system (receipt notification). When the vendor invoice is received, the system records the payable, notifies the inventory the cost of the merchandise (payable inventory notification), and notifies the general ledger system that it has created a payable (GL payable update). Finally, at the appropriate time, the IAP information system makes a payment to the vendor and notifies the general ledger system that a payable has been reduced and the cash has been sent to the vendor (GL cash disbursement update).

(4)   Inventory System

When merchandise is sold (inventory sale), the inventory system calculates the cost of goods sold and notifies the general ledger system (GL inventory sale update). The inventory system sends purchase requests to the IAP information system and these requests are acknowledged (PO inventory notification). When the IAP information system notifies the inventory system that the goods have been received (receipt notification), the inventory records. When the IAP information system notifies the inventory

system that the vendor invoice has been received and processed (payable inventory notification), the inventory system calculates the cost of the new merchandise, updates the cost data contained in the inventory records, and notifies the general ledger system (GL inventory received update).

As described before that to invest the big amount of budget in a computerized system and the use of it are not easily to be ensured by the management level, particularly for the owner of a company in the far apart area from the capital of Thailand. Thus, this project will specify in the Integrated Order Processing (IOP) information system conforming to its policy to drive its business strategies to the customer satisfactions. Hence, the design on the following system will deeply analyze the system specification, system design, hardware and software requirement, security and control, and cost/ benefit analysis.

3.1 System Specifications

Concerning the important relationship in the company, that exists between the accountant and strategic plans of the organization and the information system. First, to interview the owner (Managing Director), General Manager, and accountant is needed in the development of the plans. One function for the accountant in this process is to analyze the financial structure of the organization and its competitors to determine relative strengths and weaknesses. For example, information about the mix of mixed and variable costs and the proportion of short- and long-term debt to total equity may indicate relative advantages of one firm over another. Also, the accountant could assist in the design of the reporting system established to monitor the plans. For example, the accountant can establish some of the financial performance indicators.

Second, the owner and related managers should approve the plans. The strategic plan will make a significant impact on the accounting information system. For example,

the organization of strategic plan could include plans for new business operation and the information systems strategic plan would address the technology requirement for those new operations. And, any changes in operations or technology would mean changes in transaction processing, control, and so forth.

Through the system specifications conforming to the user requirement, the transactions must be processed in an immediate processing mode instead of a periodical-processing mode. Several reasons are noteworthy.

First, immediate input offers greater timeliness, flexibility, and simplicity. Timeliness is achieved because transactions generally are captured and validated as they arise, and errors can be corrected immediately by the operating persons. Flexibility is attained because transactions can be captured easily wherever they arise, using a variety of input devices and media. Simplicity is achieved because transactions need not be transcribed onto business forms before processing.

Second, the move to the file-update step of processing in online immediate processing mode can be captured. Every related file is updated concurrently with data entry. Consequently, they are up-to-date and readily available to answer inquires. Whereas the period method requires complex processing sequences and rigid computer run schedules.

Thus, the advantages of the immediate online mode are needed to respond to all transactions submitted to relate files simultaneously and the other business function can retrieve the most update files to further process.

However, to design a system that is suitable for the company, user requirement should be specified in the form of input all data and output reports to solve all existing problems occurred and tailor to the needs. This was prepared by interviewing the Managing Director and every managers of the company. (Also, by having a meeting

27

with staff of the Sales and Marketing Department and other related departments, particularly the accountant, the proposed system should be designed to get as much information as possible to analyze the business tasks). The user requirement is separated into two major parts:

3.1.1 Input Requirement

It indicates the information required by the users, which must be included in the system. The system input must be identified with the relevant information, an accounting periods, chart of accounts, tax authorities, and other accounting preferences to use with the system. The input requirement is described as follows:

(a) Customer Information Form is used to update or track Customer Information. A unique customer ID for a customer is typed to proceed to fill out demographic information for that customer. Beginning Invoices & Beginning Receipts may be used to record any open invoices or unapplied receipts that occurred prior to setting up this customer. Payment Terms are used to indicate the precise "ground rules" of the sale to your customers, which the company can use them to reward customers who pay early or on-time.

(b) Vendor Information Form allows you to track demographic and financial information for each Vendor you do business with. A unique ID for this Vendor is typed to complete his demographic information. Beginning Invoices & Beginning Payments may be used to record any open invoices or unapplied payments that occurred prior to setting up the vendor.

(c) Inventory Card is the heart of your business. It is what the company sells either goods or services. The Inventory Card or Item Card allows you to

store and maintain complex information on your items in a logical and accessible way. A unique Item ID for your each inventory item is typed.

(d)   Purchase Transaction Screen. A Purchase or Purchase Order is a request for items or services from a vendor. All purchasing, including Purchase Orders, Receiving, Vouchers and Credit Memos is done through the Purchase Transactions screen.

(e)   Receiving Transaction Screen. A receiving acknowledges the receipt of items requested through a Purchase Order and also use for a receiving without a PO to update quantities of Inventory On Hand.

(f)   Return Merchandise Transaction Screen. Used to return merchandise to a vendor and relieve inventory. It can be credited to the vendor account like a credit memo or posted like cash return and immediately debit your cash account.

(g)   Order Entry Screen. The screen should allow to create two kinds of documents, Quotes and Orders. Use a Quote as a kind of estimate to show the customer. When the customer commits to making the purchase, then you can convert that quote into an Order. It comprises of two sections; header to select from your established list of Customers, Delivery Addresses, Shipping Methods, etc. and detail section where can select the items your customer has ordered, quantities, etc. Any merchandise that is not shipped can be backordered. A backorder would be necessary to fill the Ship Quantities that the company specified and the backorder can be created or cancelled.

(h)   Sales Transaction Screen. It centralizes your key sales functions; Sales Invoice, Return, Sales Memo, and Credit Memo. Sales Invoice will

automatically fills in billing and Delivery information based on the customer information on the Customer Information. A return allows you to credit a customer's account when merchandise is returned as unwanted or defective. A Sales Memo allows you to bill a Customer without listing any items. A Credit Memo is used to credit a customer's account when in lieu of returning unwanted merchandise, the customer is willing to accept a reduction in the invoiced price.

(i)   Cash Receipts Screen. It is a payment from a customer that does not involve an on the spot transfer of goods or services. In other words, a customer who has previously received merchandise from you on terms sends in his or her payment. Receiving a payment will remind you a little of making a sale and a little of paying an invoice.

(j)   Quantity Adjustment Screen. From time to time the company may have to update your inventory to reflect miscounted items, theft, breakage, or other non-sales reduction in Inventory. Also in the moving of merchandises from a warehouse to another warehouse, use the Inventory Adjustment form to make these changes.

3.1.2 Output Requirement

It is the output information required by the users for generating reports to support management level.

(a)   Aged Receivable Detail. It shows transaction detail of all money to be received from Customers in an aged format.

(b)   Customer List Detail. It shows Customer Card information for each Customer.

(c)   Customer List Summary. It creates a most useful Customer Information report.

(d)   Customer Sales. It creates totals by Customer of all payments received report..

(e)   Invoice Margin by Customer. It creates a report of the margin (price over cost) sorted by Customer.

(f)   Invoice Margin by Item. It creates a report of margin sorted by inventory item.

(g)   Invoice Register. It shows the detail of all invoices written.

(h)   Quote Register. It shows the detail of all Quotes in the system.

(i)   Sales History. It runs Aged Receivables prior to Sales History to update the Data with complete Sales detail for each Customer.

(j)   Sales Tax Report. It presents the applicable tax for each transaction.

(k)   Deliver to List. It presents all delivery addresses for each customer.

(l)   Tax Authorities. It presents all Tax authorities (individual taxes) currently available to Tax Groups.

(m)   Tax Groups Detail. It presents Tax Authorities in the Tax Groups.

(n)   Tax Groups Summary. It presents total Tax on each Tax Group.

(o)   Backorder. It displays Sales items on Backorder (Inventory that needs to be Purchased).

(p)   Cash Receipts Journal. It creates a detailed Cash Receipts Report.

3.2   System Design

3.2.1 Logical Data Flow Diagrams

Using data flow diagrams, this section provides a logical view of the Integrated Order Processing Information System. The proposed system is presented by using the
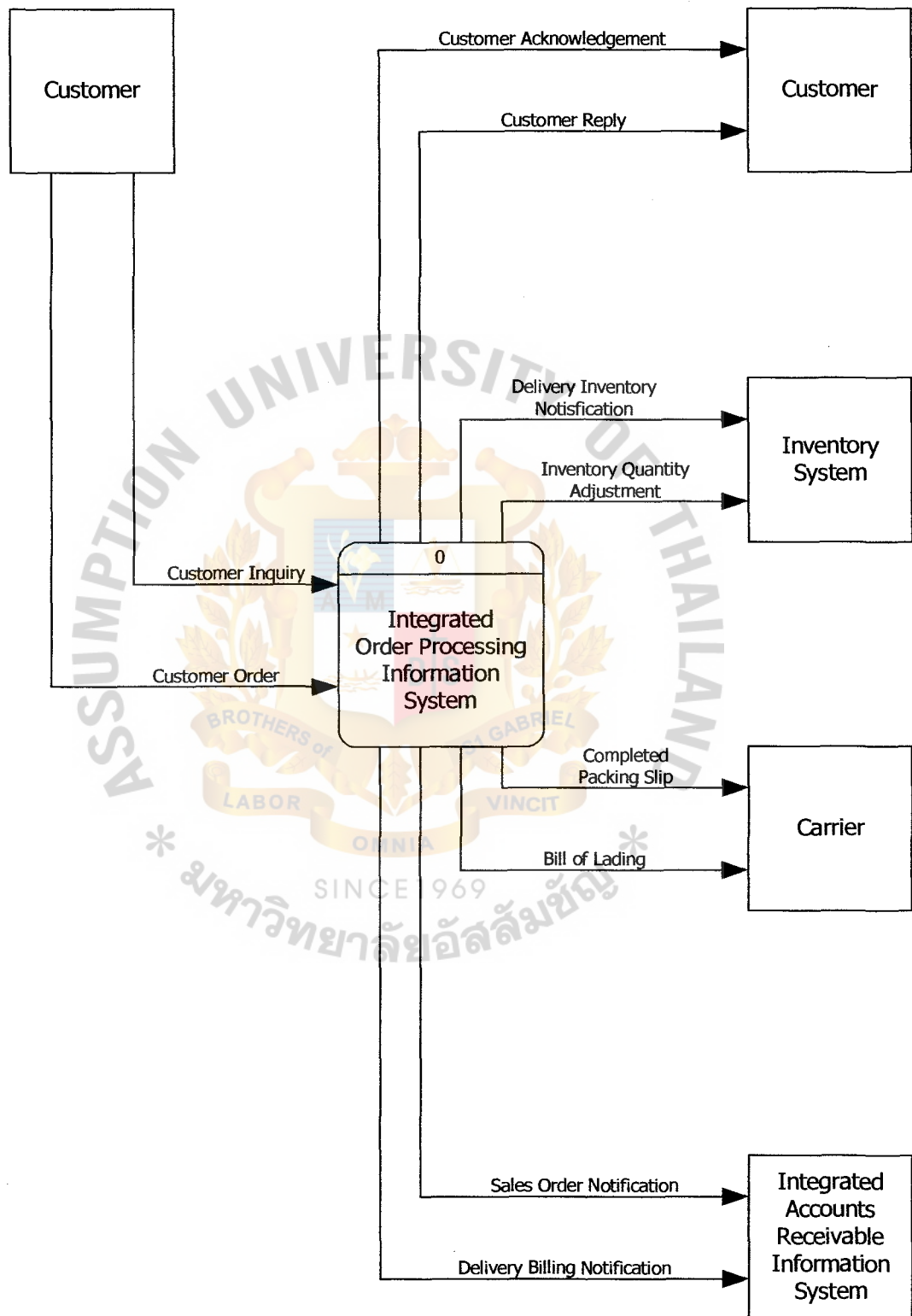
Figure 3.5.   Context Level Data Flow Diagram of Integrated Order Processing
Information System.

data flow diagrams as a tool that allows us to picture a system as a network of functional processes, connected to one another by pipelines and holding tanks of data. So, it provides views to be more understandable of the functions of entire system.

Figure 3.5 portrays the Integrated Order Processing (IOP) Information System in the form of a context diagram. Recall that a context diagram defines our areas of interest. Although it presents an abstract view of the system, it serves the purpose of delineating the domain of our study. In the figure, two inputs entering the system and eight outputs emerging are observed. Also, notice the entities in the relevant environment with which the IOP information system interacts. Some of these entities reside outside the organization (customer and carrier), whereas some are internal to the organization but external to the IOP information system (Inventory System, Carrier, and Integrated Accounts Receivable Information System).

Figure 3.6 presents a level 0 diagram of the Integrate Order Processing Information System. In examining the figure, observe that the inputs and outputs are identical to those presented in Figure 3.5. As you recall, this balancing of inputs and outputs is an important convention to observe when constructing a set of data flow diagrams. The single bubble of the system in Figure 3.5 has been divided into four bubbles in Figure 3.6, one for each of the four major processes performed by the IOP information system. Additional data flows connecting the newly partitioned bubbles appear, as do the files used to store various sets of data. The database design of the system will subsequently conform to the Figure 3.6.

Each of the four processes shown in Figure 3.6 will now be decomposed or exploded into lower-level diagrams. Figure 3.7 decomposes bubble 1.0 of the Figure 3.6.
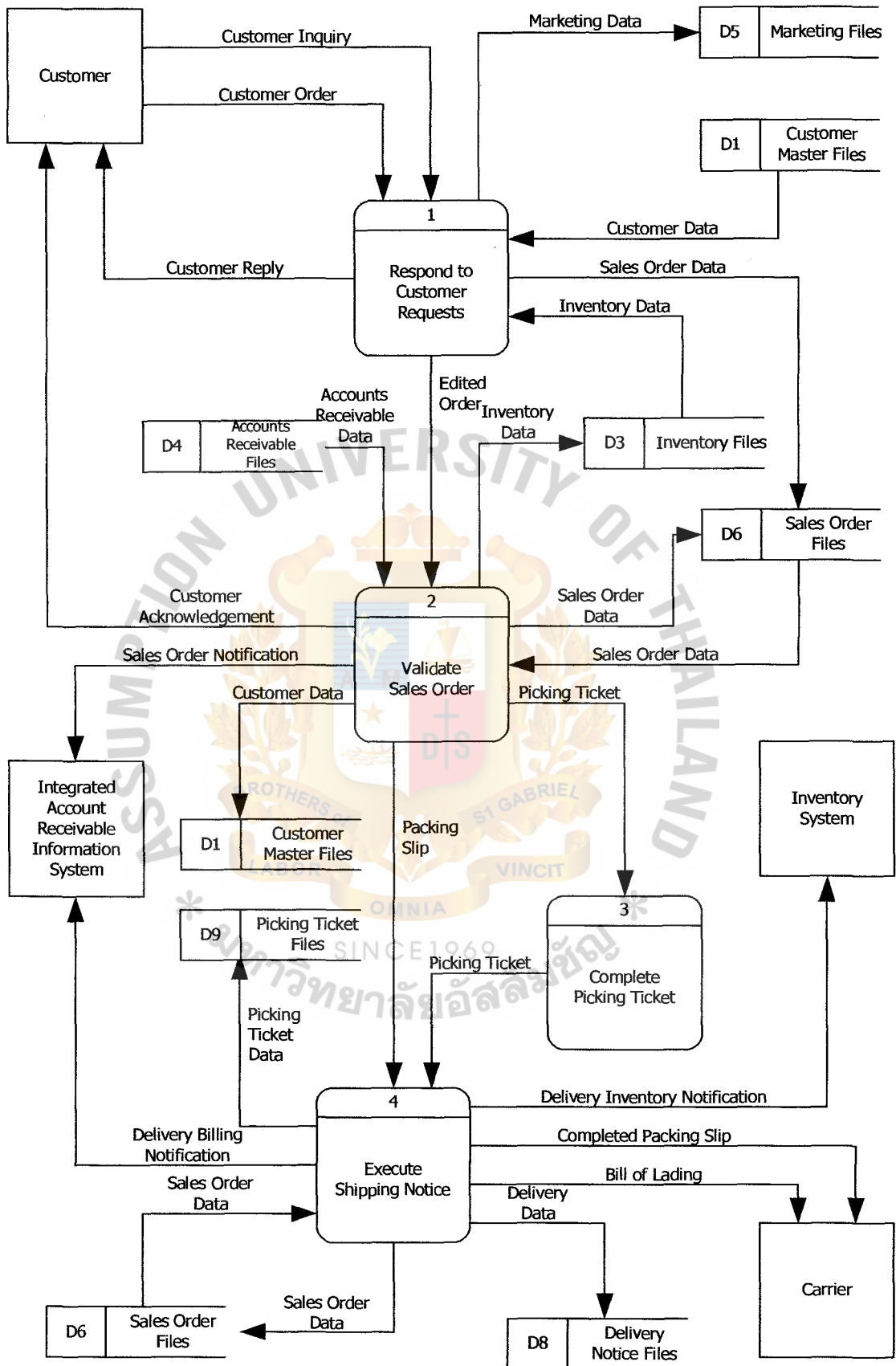
Figure 3.6.   Level 0 Data Flow Diagram of Integrated Order Processing
Information System.
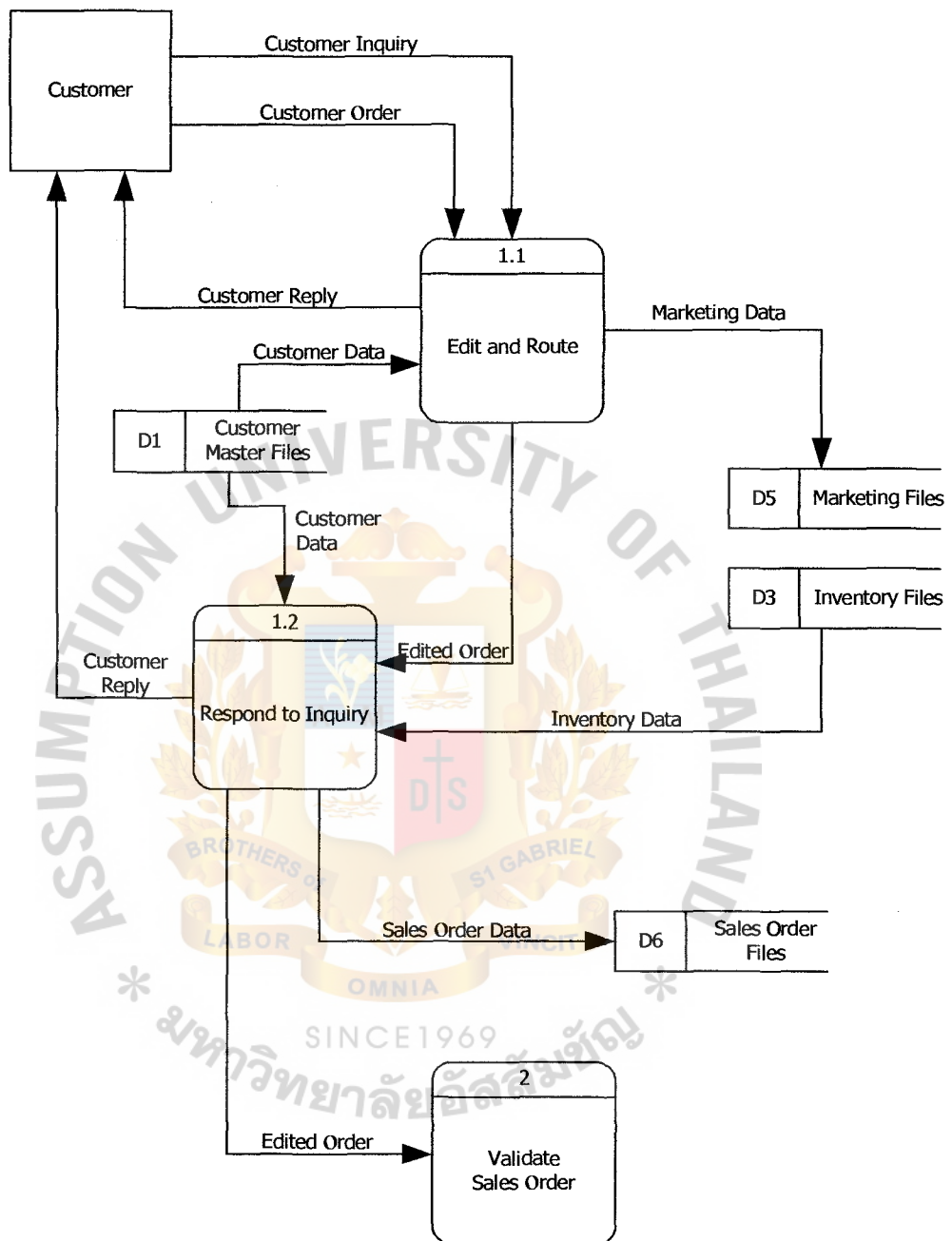
Figure 3.7.   Level 1 Data Flow Diagram of Integrated Order Processing
              Information System (Respond to Customer Request).

First, notice that process 1.1 receives two types of customer requests; namely, customer inquiries and customer orders. It acts as a traffic director, routing customer inquiries to process 1.2 and customer orders to process 2.0. As depicted by the reject data flow, process 1.1 also rejects requests for products or services not sold by the company, and it rejects incomplete orders. Thus, only the edited order and inquiries are passed on for subsequent processing.

As a final observation about process 1.1, note that it updates the marketing file. This file stores a variety of data, some of which may not be transaction-oriented. Thus, general inquiries made by customers, even though not resulting in transactions, may be stored in the marketing files.

Process 1.2 receives an edited inquiry from process 1.1 and sends a customer reply. To illustrate how process 1.2 might work, the following examples show as described below.

First, a customer may contact a sales representative by telephone inquiring about the status of a recent order. To respond to the query, the sales representative might consult the sales order file to ascertain the sales order number, the description of goods ordered, the data the order was placed, or the order's delivery status.

Alternatively, a new customer may contact a sales representative inquiring about price of a particular product. In this situation, the sales representative might consult the inventory file to determine the price of a given product. While the salesperson has the prospective customer on the telephone, she may attempt to gather as mush data about the customer as possible (such as name, address, telephone number, contact person, etc.) and add this data to the marketing file.

Figure 3.8 explodes bubbles 2.0 of Figure 3.2. An edited order from process 1.1 in Figure 3.7 is the trigger or causes the process to begin the process 2.1. The process is to
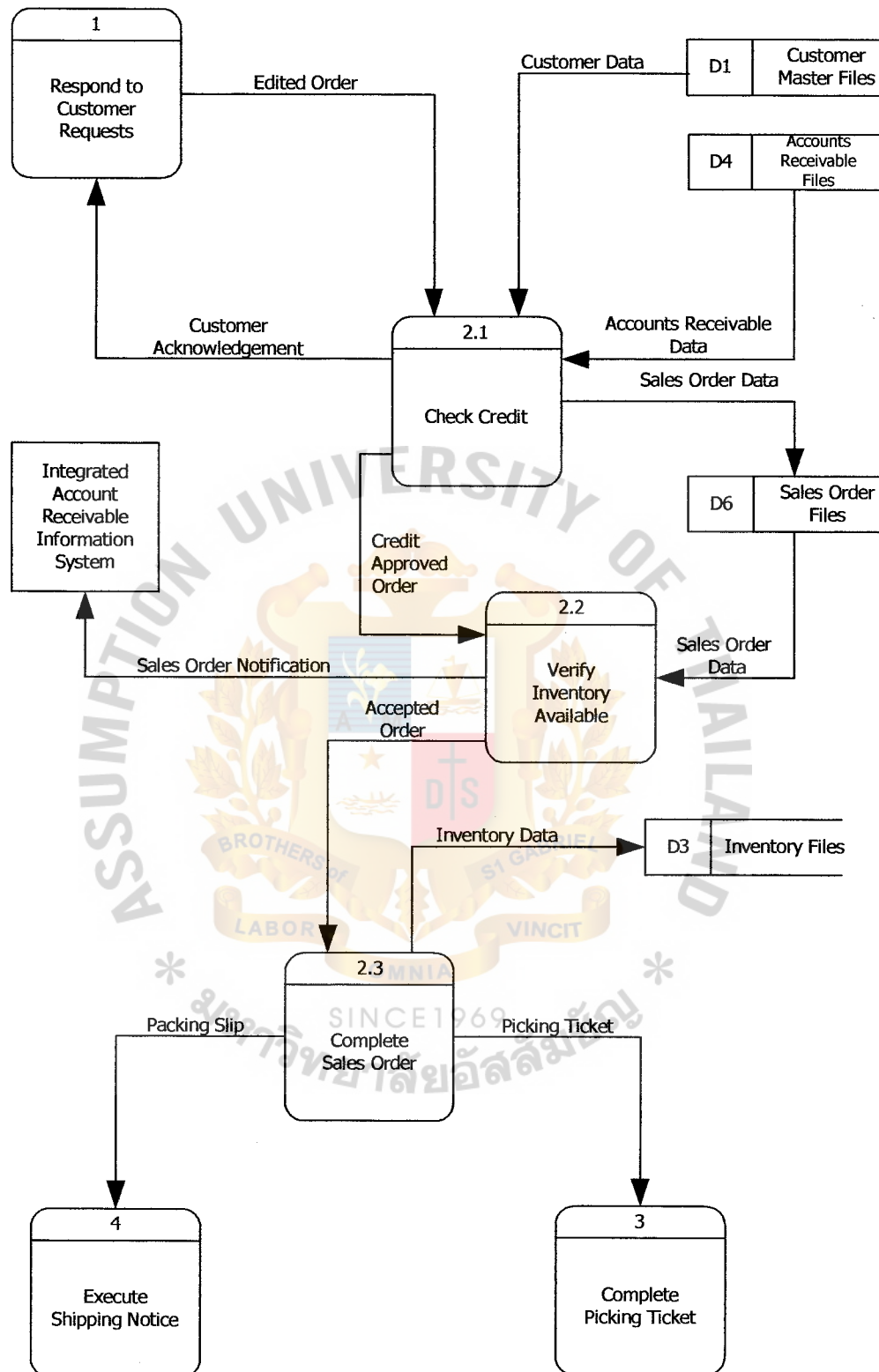
Figure 3.8.   Level 1 Data Flow Diagram of Integrated Order Processing
Information System (Validate Sales Order).

validate a customer order. First, process 2.1 establishes the customer's existence and then approves credit. These steps are described more fully in the later section. In some cases, another aspect of validating the order could ensure that the company wants to deliver the ordered goods to this particular customer. For instance, the company may reject as order because the company does not want goods to be marketed through a discount store.

After the credit is checked, process 2.2 verifies the availability of requested inventory by consulting the inventory file. If there is a sufficient level of inventory on hand to satisfy the request, the order is forwarded for further processing, as depicted by the data flow "Accepted order". Conversely, if a customer orders goods that are not in stock, process 2.2 runs a special back order routine. This routine determines the inventory requirement necessary to satisfy the order and then sends the back order request to the purchasing department. This activity is depicted by the "Back order" data flow, which in reality is a specific type of exception routine (for example; a specific type of reject stub). Once the goods have been received, the order would then be routinely processed. If the customer refuses to accept a back order, then the transaction will be terminated, and the order will be rejected, as shown by the "Reject" data flow.

Subsequently, the system will complete a sales order by the following steps. First, process 2.3 receives accepted orders from process 2.2. It then completes the order by adding price data, which is ascertained from the inventory file. Then, process 2.3 performs the following activities simultaneously.

(1)   Notifies the inventory system to the completed sales order. This activity is depicted by the data flow "Inventory allocation". Committing the inventory to the customer who ordered it prevents selling the same inventory to two or more customers.

(2) Updates the sales order file to indicate that a completed sales order has been created.

(3) Disseminates the sales order.

The physical means used to disseminate the order may vary from using a multipart sales order form to using electronic images appearing on various computer terminals or in a record of a computer file. Regardless of the physical form used, the company generally expects the dissemination to include the following data flows:

(1) A picking ticket authorizes the warehouse to pick the goods from the shelf and send them to deliver. The picking ticket identifies the goods to be picked and usually indicates the warehouse location.

(2) A packing slip is attached to the outside of a package and identifies the customer and the contents of the package.

(3) A customer acknowledgement is sent to the customer to notify him of his order's acceptance and to inform him of expected delivery date.

(4) A sales order notification is sent to the billing function in general department to notify them of a pending delivery.

Figure 3.9, a lower-level view of bubble 3.0 of Figure 3.6 describes activities that normally take place in a warehouse. Warehouse personnel receive a picking ticket, locate the goods, take the goods off the shelf (for example; pick the goods), and match the goods with the picking ticket.

The reject stub coming from bubble 3.1 indicates at least two situations that might occur at this point. First, the goods pulled from the shelf might not be those indicated on the picking ticket (for example; goods have been placed in the wrong warehouse location). Second, sufficient goods may not exist to satisfy the quantity requested. The second situation may arise when goods have been misplaced or when the actual physical
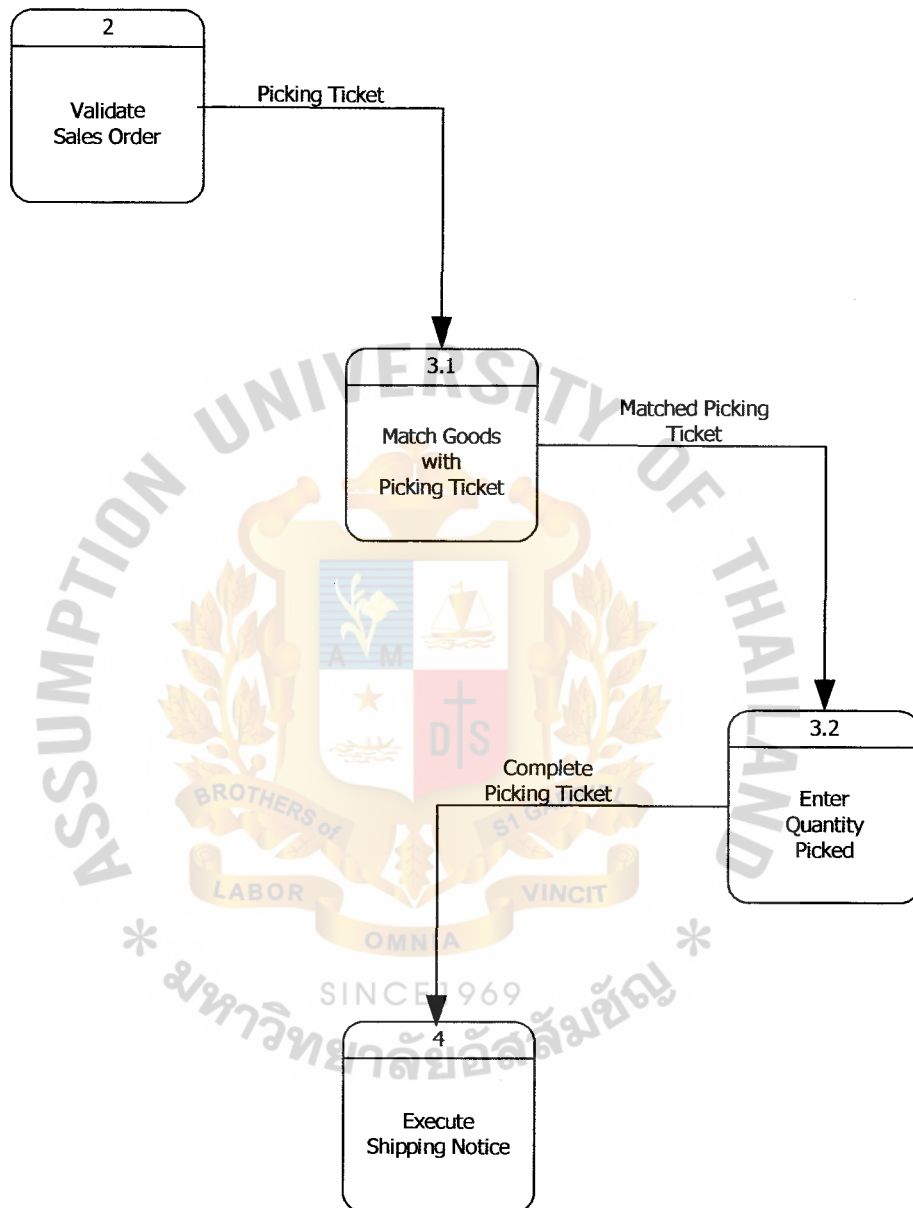
Figure 3.9. Level 1 Data Flow Diagram of Integrated Order Processing
Information System (Complete Picking Ticket).

balance does not agree with the perpetual inventory balance indicated on the inventory file. These predicaments must be resolved and a back order may be initiated to order the missing goods for the customer.

In process 3.2, warehouse personnel write the quantities picked on the picking ticket and forward the picking ticket (along with the goods) to the delivery staff.

Figure 3.10, a lower-level view of bubble 4.0 in Figure 3.6, describes activities that normally take place with delivery staff. The figure tells that process 2.3 of Figure 3.4 and the completed picking ticket from process 3.2 of Figure 3.9. Process 4.1 matches the details of the data flows, looking for consistency between them. If the details agree, the completed picking ticket is filed, and the matched sales order is forwarded to process 4.2. If the details of the data flows do not agree, process 4.1 rejects the order and initiates procedures for resolving any discrepancies.

When process 4.2 receives a matched sales order from process 4.1, it produces and disseminates the shipping notice. The process also updates the delivery notice file and sales order file. The disseminate is generally expected to include the following data flows: delivery inventory notification (to notify billing to begin the billing process), delivery bills, and completed packing slip. The delivery bill is particularly important document because it represents a contract between the deliver party and the carrier in which the carrier agrees to transport the goods to the delivery persons' customer. The carrier's signature on the bill of lading, and/ or the customer's signature on some other form of receipt, substantiates the delivery.

3.2.2 Logical File Descriptions

Figure 3.6 shows that the Integrated Order Processing (IOP) information system employs the following seven files:

(1)   Marketing file
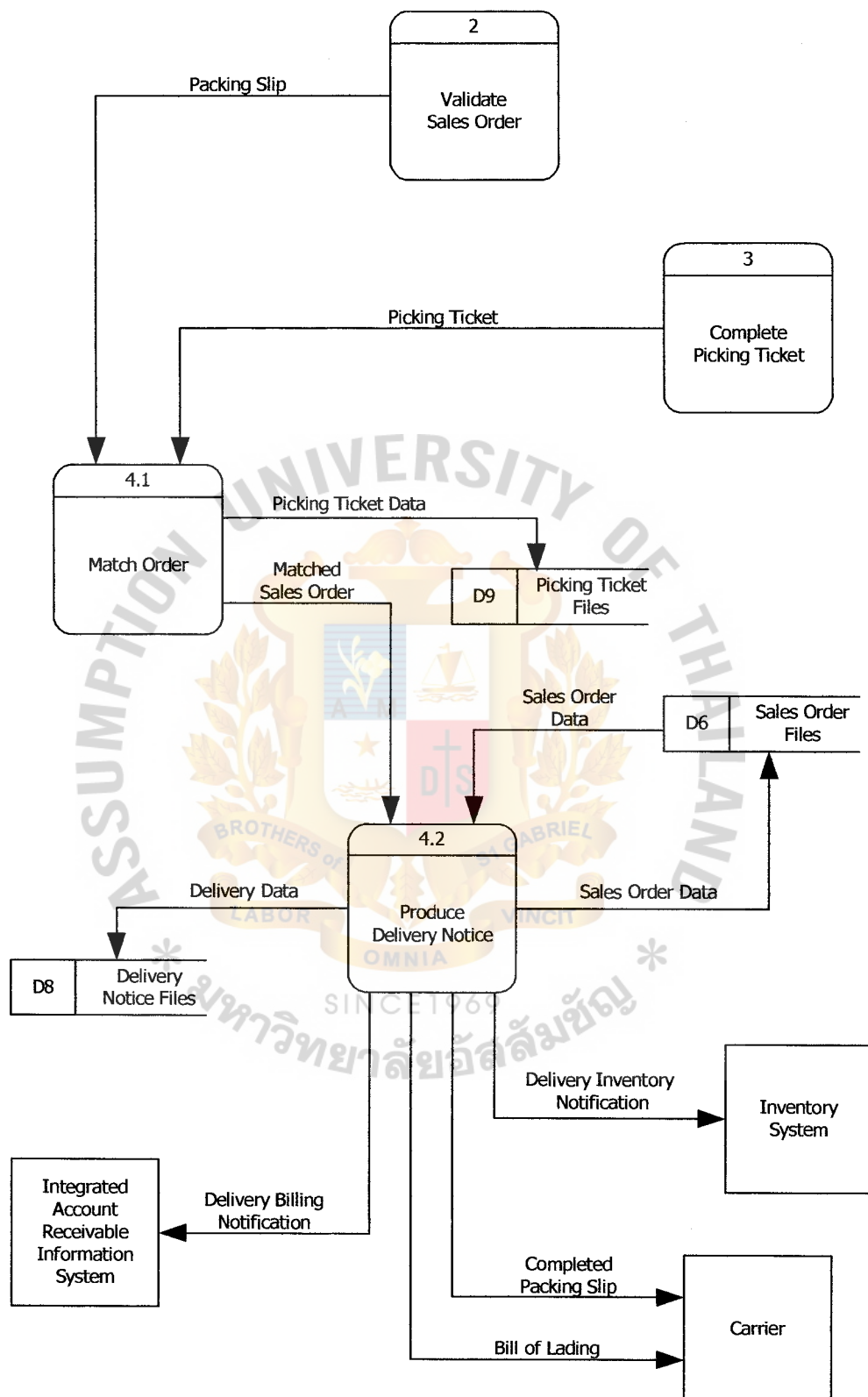
Figure 3.10.   Level 1 Data Flow Diagram of Integrated Order Processing
Information System (Execute Shipping Notice).

(2)   Customer file

(3)   Inventory file

(4)   Accounts receivable file

(5)   Sales order file

(6)   Completed picking ticket file

(7)   Delivery notice file

As the Integrated Order Processing Information System has the responsibility for performing file maintenance and file updates on these files, the purpose and contents of each of these five files are discussed as follows:

In the preceding section, the marketing file is recommended to be the repository of a variety of sales-oriented data, some of which results from transactions (for example; processed sales orders) and some of which originates from activities that do not culminate in completed transactions, such as customer inquiries. The marketing file also houses information from the marketing information system. Typically, this data could include items discussed in business environment, such as economic forecasts, census reports, responses to marketing research questionnaires, customer buying habits, customer demographics, and the like.

3.2.3 Data Dictionary Entry

A unique code number assigned to each record usually indexes each file. Table 3.1 presents a logical description of a customer file. The file contains data that identify the particular characteristics of each customer, such as name, address, telephone number, and so forth. It also stores various credit data. In some systems, account balances and aging details are stored this type of data in an accounts receivable file. Although customer records may be altered directly, proper control techniques require

that al such file changes, such as file maintenance, be documented and approved and that a report of all files changes be printed periodically.

Table 3.1.   Example of Customer File Data Dictionary Entry.

Customer File

   Customer record.........................the file consists of one or more of these

                                records

   Customer number.........................used to identify the customer

   Customer identification

      Customer name........................name of customer to be billed

      Customer address.....................address to which bill is sent

      Customer deliver-to-name.............if different from billing name

      Customer deliver-to address.........if different from billing address

   Customer information

      Customer limit.......................determined by company committee

      Customer last revised................date of last file maintenance activity

      Credit terms.........................determined by company committee

Each related file of the system is designed and presented in the Appendix F attached in the last section of this project. Each of file will show you the records contain various data elements, typically those that appear on the designed data flow diagrams.

3.2.4 Data Structure

To design the data structure, it is recommended that data as it would be stored in a file(s)with the same data when it is stored in a database, with emphasis on the relational

44

VENDOR

VEND Id (Primary Key)
VEND Name
VEND Inactive YN
VEND Address
· Address
· City
· Province
· Postal Code
· Country etc.
VEND Contact
VEND Type
VEND TAX Id
VEND Buying Term
VEND First Contact
VEND Last Revised

PURCHASED PRODUCT
ITEM

PUR ITEM Number (Primary Key)
VEND Id
· INV ITEM Number
PUR ITEM Quantity
PUR ITEM Units
PUR ITEM Ordered Date
PUR ITEM Received Date
VEND Id
INV ITEM Number

SALES ORDER PRODUCT
ITEM

SALES PROD Number (Primary Key)
· SALES ORD Number
INV ITEM Number
INV SALES ITEM Quantity
INV SALES Item Units

INVENTORY

INV ITEM Number (Primary Key)
INV ITEM Inactive YN
INV ITEM Description
INV ITEM Category
INV ITEM Qty On Hand
INV ITEM Qty On Order
INV ITEM Unit
INV ITEM Reorder Level
INV ITEM Avg Cost
INV ITEM Last Cost
INV ITEM Standard Cost
INV ITEM Pricing Method
INV ITEM Note
VEND Id

STOCK PICK PRODUCT
ITEM

STCK PICK ITEM Number (Primary K)
· STCK PICK Number
INV ITEM Number
STCK PICK ITEM Quantity
STCK PICK ITEM Units

SALES ORDER

SALES ORD Number (Primary Key)
SALES ORD Date
SALES ORD Item Id
SALES ORD Qty
SALES ORD Units
CUST Id
CUST Contact
CUST PO Number
CUST PO Date

STOCK PICKING

STCK PICK Number (Primary Key)
STCK PICK Date
STCK PICK Name
SALES ORD Number

CUSTOMER

CUST Id (Primary Key)
CUST Name
CUST Inactive YN
CUST Address
· Address
· City
· Province
· Postal Code
· Country etc.
CUST Contact
CUST Credit Limit
CUST TAX Id
CUST First Contact
CUST Last Revised

SALES INVOICE

SALES INV NUnber (Primary Key)
SALES INV Datre
SALES INV Discount%
SALES INV Tax
SALES INV Tax Rate
SALES INV Description
SALES INV Item Cost
SALES INV Unit Price
SALES INV Item Total
CUST Id
DLVR Number

DELIVERY

DLVR Number (Primary Key)
DLVR Date
DLVR Vehicle Type
DLVR Verhicle Number
CUST Id
STCK PICK Number

**

Note**: Assumes that all products are picked on a single picking ticket and delivered as a single delivery (for example; 1-to-1 relationship between stock picking and deliverey). In other environment, several picking ticket might be combined to make one shipment (for example; Many-to-1) or one picking ticket might be divided into multiple delivery (for example; 1-to-Manay).

Figure 3.11.   Entity Relationship of the Integrated Order Processing Information System.

database model. In this section, the relational tables for the data will be depicted to prior mention about customer file, sales order file, completed picking ticket, and delivery notice file. The details of the each database in relational database model will be presented in the Appendix D Database Design attached in the further section of this project.

To do so, the Entity Relationship (E-R) Diagram of the system is shown in the Figure 3.11 Entity Relationship Diagram for the Integrated Order Processing Information System. Moreover, the relational tables of the system are further developed, which is also appeared in the Appendix D Database Design. Furthermore, the Integrated Order Processing Information System's processes, inputs, outputs and files are summarized in the form of Process Specification, which are presented in the Appendix E Process Specification.

3.3 Hardware and Software Requirement

In the system design session, the need for discussion in system requirement has to be minimal in budget and the system function has to work properly in online immediate processing mode.

3.3.1 Alternative Candidate Solutions

During the system selection phase, to identify the possible system and analyze relevant solutions are recommended to best suit and are optimize in budget and usage. To compare the alternative solution, candidate system matrix will show the comparison to find out the best appropriate among each criteria of possible solution and the characteristic of each candidate is further evaluated and identified with feasibility checkpoints in the system development.

By considering the selected solution, the matrix provides the overview characteristics concerning the portion of computerized systems, benefits, servers and

workstations, software tools needed, application software, method of data processing, output devices and implications, and storage devices and implications. These are the priority of the implementation of the system design.

Each characteristic should be clearly defined as described below;

(a) Portion of system computerized. Brief descriptions of that portion of the system that would be computerized in this candidate.

(b) Benefits. Brief description of the business benefits that would be realized for this candidate.

(c) Servers and Workstations. A description of the servers and workstations needed to support these candidates.

(d) Software tools needed. Software tools needed to design and build the candidate. For examples; database management system, emulators, operating systems, languages, and so forth. Not generally applicable if applications software packages are to be purchased.

(e) Application software. A description of the software to be purchased, built, accessed or some combination of these techniques.

(f) Method of data processing. Generally some combination of online, batch, deferred batch, remote batch, and real-time.

(g) Output devices and implications. A description of output devices that would be used, special output requirements (for examples; network, preprinted form, and so forth),and output considerations (for examples; timing constraints).

(h) Input devices and implications. A description of input methods to be used, input devices (for examples; keyboard, mouse, and so forth), special input

requirements (for example; new or revised forms from which data would be input), and input considerations (for example; timing of actual inputs).

(i) Storage devices and implications. Brief description of what data would be stored, and what data should be.

Table 3.2.   Candidate System Matrix.

Characteristics	Candidate 1	Candidate 2	Candidate 3
Portion of System Computerized	Custom solution helps facilitate customer service and sales operations in relation to order fulfillment	Package software solution would be purchased to customize sales functions, warehouse operations and produce MIS report	Same as candidate 2
Benefits	Fully support user required business processes and provide more interactive response to the customers	This solution can be easily and quickly implemented because it is a purchase solution	Same as candidate 2
Servers and Workstations	Technically architecture designates Pentium Celeron 500 MHz. (client), Windows NT class server and MS Windows NT 5.0	Pentium II 550 MHz with RAM 120 MB. And secondary cache 512 KB (server) and Pentium Celeron 500 MHz. (Clients)	Same as candidate 2

Table 3.2.   Candidate System Matrix (Continued).

Characteristics	Candidate 1	Candidate 2	Candidate 3
Software Tools Needed	MS Windows NT 5.0 as O/S (server), MS Windows 98 SE as O/S (clients), MS Visual Basic 6.0 Application Development as Application Program	MS Windows 98 as O/S, and MS Access 6.0 Application Development as Application Program	MS Windows NT 5.0 as O/S (server), MS Windows 98 SE as O/S (clients), Adobe GoLIve! (web development tool), Active Server Pages, and MS Internet Explorer 5.5.
Method of Data Processing	Online Client/Server and real-time updating	Same as candidate 1	Same as candidate 1
Application Software	Custom Solution	Package Solution	Custom Solution
Output Devices and Implications	(1) HP Laser Jet Printer (2) OKI Dot Matrix Printer	Same as candidate 1	Same as candidate 1
Input Devices and Implications	Keyboard & mouse	Same as candidate 1	Same as candidate 1
Storage Devices and Implications	MS SQL Server DBMS with 50 GB arrayed capability	Same as candidate 1	Same as candidate 1

After understanding the business and all possible users' requirements, the above three possible candidate solutions for further discussion are created. To compare the

49

difference of each candidate solution in terms of portion of system computerized, benefits, servers and workstations required, software tools needed, application software, method of data processing, input/output devices and storage devices and their implications are stated.

In the first candidate solution, we designate Pentium Celeron 500 MHz. computers as the clients, connected together by Windows NT 5.0 that serves online access throughout the company's LAN system. This would help salesperson processes order transactions faster and more convenient.

In the second candidate solution, we dictate all computer hardware devices with Windows 98 SE as O/S on both server and clients sides, and use MS Access'97 as the application software devices that provides easy-to-create report writing and integration.

In the third candidate solution, we also apply the same computer hardware devices as the candidate 2 but we use the web browser software, which is run on Windows in the form of web database. This solution is needed to develop in-house by a specialist or employ web developer to maintain it.

3.3.2 Application Architecture

The candidate solution is selected for the Integrated Order Processing Information System to design all solutions used on a Client/Server system is needed to be clarified by the use of application architecture in the term of network architecture, database architecture, interface architecture and processing architecture. The selection and evaluation of application architecture is described as follows;

(1) The Network Architecture

In the information system's database, software, and interfaces are distributed across a network of clients and server that communicate and cooperate to achieve system objectives as follows:

50

(a)   Local Area Network (LAN) is designed to allow resources to be shared and communicate between each workstation or personal computer and the server (two-tiered Client/Server). This LAN, which is set up in one building of the company, links a work group of task-related computers, for example, accounting PCs to selling system's PCs.

(b)   The system is used a LAN, which is base on a Bus Topology to share resources such as hardware (e.g., a printer), software (e.g., an application program), or data of each division. By installing the system with bus topology, its backbone cable can be easily add another PCs in the system. However, the bus topology itself does not ensure the transmission medium is accessed and used in a fair way of connection. Thus, by the use of a control (permission) token, the data are transmitted in a way of controlled access to a defined set of rules understood and adhered to by all personal computers or workstation connected to the medium. This is technically called Token Bus. The token bus (IEEE 802.4) combines the physical configuration of Ethernet (a bus topology) and the collision-free (predictable delay) feature of token ring.

(2)   Database Architecture

The database system can be based on a number of different approaches, including in particular the relational approach. It can be thought of as a computerized record-keeping system and structure of stored files. A given stored file in Import and Export Information System can be physically implemented in storage in the following way:

51

(a) By using Database Server controlled by Microsoft SQL can reduce the traffic congestion in network system. The MS SQL is a database management system (DBMS), which is the software to handles requests form the users to retrieve, update, or delete existing data in the database, or to add new data to the database.

(b) The relational model is used to represent the relational approach, which is the dominant trend in the marketplace today. The relational approach is easily the most important (and this state of affairs is not likely to change in foreseeable future). In a relational system, the user sees the data as a table, and the operations available to the user for dealing with the data standard language for dealing with relational system. Moreover, SQL, which is used in relational approach, is the standard language for dealing with relational system in Microsoft SQL program.

(c) Database system can be also be conveniently thought of as consisting of a server (the DBMS itself) and a set of clients (the applications). Client and server can and often will run on separate machines, thus providing one simple kind of distributed processing. In general, each server can serve many clients, and each client can be behave as if it were dealing with a single server on a single machine, regardless of the actual physical state of affairs—then we have a true distributed database system.

(3) Interface Architecture

The interface architecture technology integrates the system with multiple architecture interacting in real time. Furthermore, the design should

be such the system can operate with or without special hardware needed for displaying the information with no change in the application software. Even more important, the application should require absolutely no change to operate with a variety of hardware interfaces. The system is recommended to implement the interface architecture as follows:

(a)   The application is designed to operate with any users in graphical interface, which is easily understood. The interface communicates with the application from the hardware and allows the application to support a large number of users in Graphical User Interface (GUI) approach.

(b)   The application software used in the system is Microsoft's Window 98, which has established the standard for a majority if GUI application. This approach builds on, enhances centralized computing application, and get users with a friendly and familiar interface with distributed presentation.

(c)   The On-line Processing system provides for a conversational dialogue between the users and computers. Business transactions and inquiries of Import and Export Information System are often best processed with simultaneously online methods. They permit greater human interaction in decision making, even if the data arrive in natural batches.

(4)   Process Architecture

        The process architecture of an application is defined in terms of the software languages and tools that will be used to develop the business logic

and application programs. We implement the process architecture in centralized computing and distributed presentation as recommended below:

(a)   The system application programs consist of Software Development Environments (SDEs) for two-tiered client/server programming languages. We use Microsoft's Visual Basic 6.0 or Microsoft's Access 97 or Active Server Pages to provide rapid application development (RAD) for quickly building the graphic user interface (GUI) that will be replied and executed on all of the client PCs.

(b)   The MS Visual Basic, MS Access and Active Server Pages automatic connect with SQL commands and generates SQL codes for the above GUI and associated system events (such as mouse-click), and subsidiary displays the result of the users' requirement.

However, as consideration on the user friendly and the support on application software help desks, the Managing Director and Managers made their decision on using the second solution. We use Microsoft's Access 97, which is not expensive and can process all business data of the company.
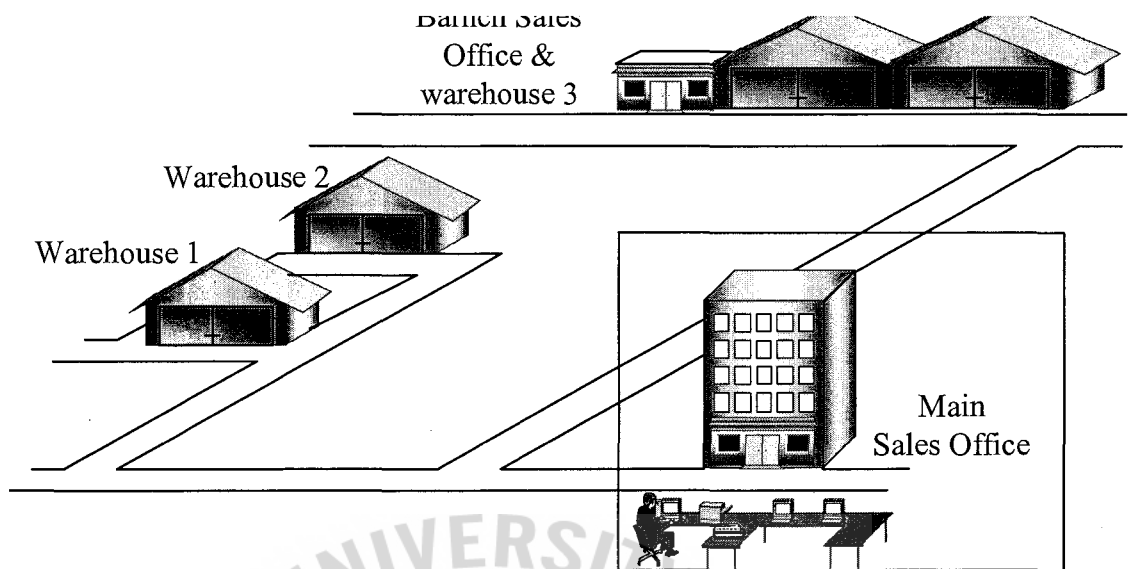
Figure 3.12. Location of the proposed system.

3.3.3 Details of Hardware Requirement

The system is an online processing system with two-tiered Client/Server based on

LAN topology, the hardware requirement will be shown as below:

(1)   Server

    (a)   Pentium III 550 MHz or higher   1 set

    (b)   Memory 128 MB SDRAM PC133

    (c)   Harddisk 20 GB

    (d)   Monitor 15"

    (e)   CD-Read/Write Drive 4X or higher

    (f)   Input devices: Keyboard and mouse

    (g)   Floppy Disk Drive for 3.5" 1.44 MB

    (h)   Casing with 230 Watts Poer Supply

    (i)   Eternet Card transferred rate 10/100 Mbps

(2) Clients

    (a) Pentium Celeron 600 MHz or higher   2 sets

    (b) Memory 64 MB SDRAM PC133

    (c) Harddisk 8.4 GB

    (d) Monitor 15"

    (e) Input devices: Keyboard and mouse

    (f) Floppy Disk Drive for 3.5" 1.44 MB

    (g) Casing with 230 Watts Poer Supply

    (h) Eternet Card transferred rate 10/100 Mbps

(3) Connecting Devices and others

    (a) HUB transferred rate 10 Mbps   1 set

    (b) LAN cable wire   100 Meters

    (c) UPS 1000 VA (for 3 sets + printer)   1 set

    (d) Laser Printer 600 x 600 dpi.   1 set

    (e) Dot Matrix Printer   1 set
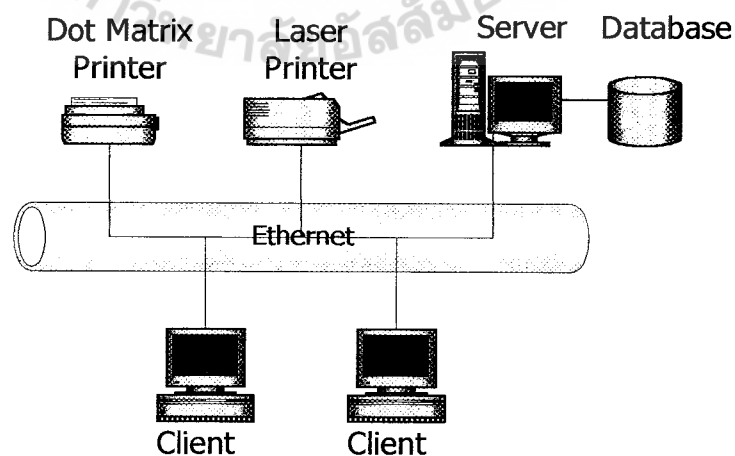
Figure 3.13.   Design of Hardware Devices and Network Topology.

3.3.4 Details of Software Requirement

The software used in the system is divided into Operating System (O/S) software and Application software. The recommendation of software selection is conforming to the solution two of the alternative solution to be the best appropriate solution in the section 3.3 Cost/ Benefit Analysis.

    (1)   Server

        (a)   O/S software: Microsoft Windows NT 5.0 Thai Edition

        (b)   DBMS: Microsoft SQL Server 7.0

        (c)   Application software: Microsoft Office 97 Thai Edition

    (2)   Client

        (a)   O/S software: Microsoft Windows 98 SE Thai Edition

        (b)   Application software: Microsoft Office 97 Thai Edition

3.4   Security and Control

By the control, the access of unauthorized persons may cause problems. In addition, the data security and data integrity are more seriously controlled. It is important to separate people who might collude. Thus, the system development project team must be separated from the operating departments. Moreover, no one in the system development project team should have the custody of assets or should be able to authorize transactions, initiate master file changes, or reconcile output control. Also, to the extent possible, programmers and accountants should be separated, as a combination of the two skills could be disastrous for internal control.

Furthermore, it is important to limit the scope of individual programmers. Programmers and system analysts should not be allowed to use programs they wrote or designed, and they should not be allowed to operate the computer.

57

General controls are designed to ensure that information processing takes place in a reasonably controlled and consistent environment. These controls have an impact on the effectiveness of the application controls and processing functions that involve the use of the accounting information system. These can be separated into several categories in the proposed system.

(1)   Systems development and maintenance controls.

These controls are to ensure that the new system and system changes are properly authorized, tested, and approved for release. Normally, the representative of the each department user, particularly the accounting staff should participate in the development and also should be involved in the decision making. The detail control is presented in Table 3.3.

Table 3.3.   System Development and Maintenance Controls.

SYSTEM DEVELOPMENT AND MAINTENANCE CONTROLS
(a)   Authorization of the new system and changes
(b)   System development life cycle methodology
(c)   Written specifications
(d)   User, internal auditor, external auditor participation
(e)   Formal testing and approval
(f)   Steering committee

(2)   System document controls

The Integrated Order Processing Information System should be documented adequately to provide a basis for effective operation, use, audit, and possible future system enhancement. So, the project implementers have to prepare the system document for later use. It is a good evidence that management takes seriously on the need for adequate documentation. These controls mitigate the risks that personnel are not properly trained, the system does not meet the need of organization and users. The resources are also used effectively. The control details are shown in Table 3.4.

Table 3.4.   System Documentation Controls.

SYSTEM DOCUMENTATION CONTROLS
(a)   Preparation standards
(b)   Approval standards
(c)   Maintenance standards
(d)   Dissemination standards

(3)   Database controls

The information within the database must be restricted to prevent unauthorized changes from occurring and to prevent unauthorized access to confidential information. Most database management systems have their own security subsystem to divide the level of authorization for each user.

The database administrator (DBA) should specifies which users should access to appropriate data and operations to perform their tasks.

Input controls deal with the authorization, capture, entry, and verification of input data. In this section, the data and file maintenance are also covered.

With the function of authorization controls, the authority is delegated to users at different levels by upper management. Specific authorization applies to one and only one transaction and is granted on a case-by-case basis.

Table 3.5.   Database Controls.

DATABASE CONTROLS
(a) User authorization
(b) Allowable user functions
(c) Creation of audit trail
(d) Logical views
(e) Data encryption

(4)   Input controls

Data should be verified to provide an appropriate data entry. To input the data into the file, the program should take action with the data entry on editing or error checking. Some common types of editing checks are

60

validate data type, field length, combination of fields, completeness of data, account number or code, and reasonable numeric amounts.

Table 3.6.   Input Controls.

INPUT CONTROLS
(a)   Authorization controls
• General authorization
• Specific authorization
• Authorization codes
(b)   Data capture controls
• Source documents
• Electronic data capture
• Redundant storage devices
(c)   Data entry controls
• Screen input prompts
• Screen menus
(d)   Data verification controls
• Valid data type
• Valid field length
• Valid combination of fields
• Completeness of data
• Valid account number or code
• Reasonableness of number amounts

(5) Processing controls

The purpose of processing controls is that there is no transaction processed more than once and all processing is accurate and complete. Written procedure should guide the staff to process in the same transaction. Moreover, it should be prepared for each step in manual processing operation and made it available for all relevant staff.

Documents with number ID, such as invoice, order, check, and so forth, should be assigned to keep track of each different transaction separately and to ensure that all authorized transactions are processed once and only one.

Redundant checking processing is an advantage in a real-time system in which the system should be operated to avoid the duplication of data and ambiguous information.

Table 3.7.   Processing Controls.

PROCESSING CONTROLS
(a)   Written procedures
(b)   Unique number of each document assigned
(c)   Visual checking
(d)   Document audits
(e)   Avoid redundant processing

(6) File controls

File controls are used to protect stored data from unauthorized access, improper processing, illegal modification, data loss and damage. The custody of files should be assigned the unique code and stored in a proper location that is free from fire, flood, or any physical hazards.

The responsibility of file maintenance should be arranged to ensure that the correct file is used in processing operation in a proper manner used. In the real-time or online processing, the before and after properties of records should be maintained. The complicated data structure and utility programs should be assigned as a routine task to verify the integrity of index files, pointers, and other linkages.

File backup controls should be performed and copied periodically to be able to recover it if any unexpected damage occurs. The backup must be stored in a safe place. The frequency of backup operation depends on the period of time required on the use of files.

Table 3.8.   File Backup Controls.

FILE BACKUP CONTROLS
(a)   File custody controls • Secure location • Authorized data processing • Logging procedures for checkout • Assigned responsibility for maintenance (b)   File processing controls

Table 3.8.   File Backup Controls (Continued).

FILE BACKUP CONTROLS
• File identification controls
• Machine-readable file directory
• Before and after record images
• Verification of integrity of index files, pointers, and other linkage
(c)   File backup controls
• Secure off-site location
• Scheduled backup

(7)   Output controls

Output controls are designed to ensure that output from the system is accurate and provided in a proper form used. Printed output produced by a computer should bear header and trailer pages. The header page indicates the data of processing, unique number of record, and the title of the output. The trailer page shows the end-of-report symbol on end line to be noticed. The number of page and total pages should be indicated to avoid confusion of the report order.

Table 3.9.   Output Controls.

OUTPUT CONTROLS
(a)   Completeness and accuracy controls

Table 3.9.   Output Controls (Continued).

OUTPUT CONTROLS
• Header and trailer indication (b)   Output security controls • Minimum number of copies • Authorized procedures for disposal of excess output Privacy of terminals

3.5   Cost/Benefit Analysis

One of the important criteria of system development and implementation is the comparison of costs between the existing system and a proposed system. It is to evaluate that how much different on cost, benefit and the worthiness of using the new system. A comparison is made on any aspects such as investment, operating cost, benefit of both tangible and intangible, and so forth.

3.5.1 Cost Analysis

To invest in the new system, the cost of the new system will include the cost of system development (analysis, design, and implementation), cost of hardware and software used, operation cost (foe examples: labor cost, maintenance cost, and so forth), and other related expenses. Thus, the hardware devices and software costs will be estimated before comparison and break-even analysis.

(1)   Hardware cost

Table 3.10.   The Hardware Specification.

Hardware	Specifications	Quantity Pc(s)	Total amount Baht
Case	Case ATX model	3	3,600
Mother Board	ASUS P3V4X ATX Board VIA ChipSet Slot-1	3	12,000
CPU	Intel Pentium III 550 MHz Slot-1 (server)	1	9,500
	Intel Celeron 433 MHz Slot-1 (clients)	2	5,600
Memory	Hitachi SDRAM-133MHz 128 MB (server)	1	4,250
	Hitachi SDRAM-133MHz 64 MB (clients)	2	4,400
Harddisk	Seagate Barracuda 20.5 GB 7200 rpm (server)	1	6,900
	Seagate Barracuda 10 GB 7200 rpm (clients)	2	10,600
Floppy Drive	1.44 MB	3	1,500
CD-RW Drive	HP CD-Writer Plus 8250I (server)	1	8,700
Mouse	Standard Mouse	3	900
Keyboard	Standard Keyboard 104 keys	3	750
Display Card	S3 Savage4 RAM 16 MB AGP 2x	3	5,550
Display	Monitor CTX 1555 15"	3	14,700
Printer	HP Laser Jet 1100, 600x600 dpi	1	15,700
	Epson LQ-670 Dot Matrix	1	15,900
Eternet Card	D-Link 10/100 Base	3	2,400
LAN cable wire	Standard 100 Meters	1	5,000
HUB	SureCOM 8 port 10 Base	1	1,300
UPS	Leonics OA2, 1000VA	1	8,400
Total			137,650

(2) Software cost

Table 3.11. The Software Specifications.

Software	Specification	No. of license	Price (Baht)
Operating System	Microsoft Windows NT 5.0	1	10,000
	Microsoft Windows 98 SE	2	16,000
Application Software	Microsoft Office 97	3	21,000
Programming Tool	Microsoft SQL Server 7.0	1	12,000
Virus Protection Software	McAfee Virus Scan	3	5,550
Total			64,550

(3) Costs of the Existing System

Table 3.12. The Existing System Cost Analysis.

Cost items	Years				
	1	2	3	4	5
Fixed Cost					
Type writer 2 units@7,000	14,000	-	-	-	-
Calculator 3 units@700	2,100	-	-	-	-
Total Fixed Cost (Baht)	16,100	-	-	-	-
Operating Cost					
Staff:					
Clerk 3 persons@9,000	27,000	28,350	29,768	31,256	32,819
Total Annual Salary Cost (Baht)	324,000	340,200	357,216	375,072	393,828

67

Table 3.12.   The Existing System Cost Analysis (Continued).

Cost items	Years				
	1	2	3	4	5
Office Supplies & Miscellaneous Cost:					
Stationary Per Annual	5,000	5,250	5,513	5,788	6,078
Paper Per Annual	10,000	10,500	11,025	11,576	12,155
Miscellaneous Per Annual	5,000	5,250	5,513	5,788	6,078
Total Annual Office Supplies & Miscellaneous Cost	20,000	21,000	22,051	23,152	24,311
Utility Cost	5,000	5,250	5,513	5,788	6,078
Total Annual Operating Cost (Baht)	349,000	366,450	384,780	404,012	424,217
Total Existing System Cost (Baht)	365,100	366,450	384,780	404,012	424,217

Table 3.13.   Five Years Accumulated Existing System Cost.

Year	Total Existing System Cost (Baht)	Accumulated Cost (Baht)
1	365,100	365,100
2	366,450	731,550
3	384,780	1,116,330
4	404,012	1,520,342
5	424,217	1,944,559
Total	1,944,559	

(4)   Costs of the Proposed System

68

Table 3.14.   The Proposed System Cost Analysis.

Cost items	Years				
	1	2	3	4	5
<u>Fixed Cost</u>					
Total Hardware Cost (Baht)	27,530	27,530	27,530	27,530	27,530
Total Maintenance Cost (Baht)	-	-	-	20,220	14,154
Total Software Cost (Baht)	12,910	12,910	12,910	12,910	12,910
<u>Implementation Cost:</u>					
Coding and Testing Cost (Baht)	50,000	-	-	-	-
Training Cost	20,000	-	-	-	-
Set up Cost	15,000	-	-	-	-
Total Implementation Cost (Baht)	85,000	-	-	-	-
Total Office Equipment Cost (Baht)	20,000	-	-	-	-
Total Fixed Cost (Baht)	230,440	40,440	40,440	60,660	54,594
<u>Operating Cost</u> <u>People-Ware Cost:</u>					
Clerk 2 persons@10,000	20,000	21,000	22,050	23,153	24,310
Total Annual Salary Cost (Baht)	240,000	252,000	264,600	277,836	291,720
<u>Office Supplies & Miscellaneous Cost:</u>					
Stationary Per Annual	4,000	4,100	4,203	4,308	4,415
Paper Per Annual	7,500	7,875	8,269	8,682	9,116
Miscellaneous Per Annual	10,000	10,500	11,025	11,576	12,155
Total Annual Office Supplies & Miscellaneous Cost	21,500	22,475	23,496	24,566	25,687
<u>Utility Cost</u>	10,000	10,500	11,025	11,576	12,155
Total Annual Operating Cost (Baht)	272,000	285,600	299,880	314,880	330,616
Total Proposed System Cost (Baht)	335,000	262,500	275,625	289,406	303,877

Table 3.15.   Five Years Accumulated Proposed System Cost.

Year	Total Proposed System Cost (Baht)	Accumulated Cost (Baht)
1	335,000	335,000
2	262,500	597,500
3	275,625	873,125
4	289,406	1,162,531
5	303,877	1,466,408
Total	1,466,408	

(5)   The Comparison of the Costs between the Existing System and the Proposed

System.

Table 3.16.   The Comparison of the System Costs.

Year	Accumulated Existing System Cost (Baht)	Accumulated Proposed System Cost (Baht)
1	365,100	491,440
2	731,550	805,830
3	1,116,330	1,133,815
4	1,520,342	1,496,292
5	1,944,559	1,867,687
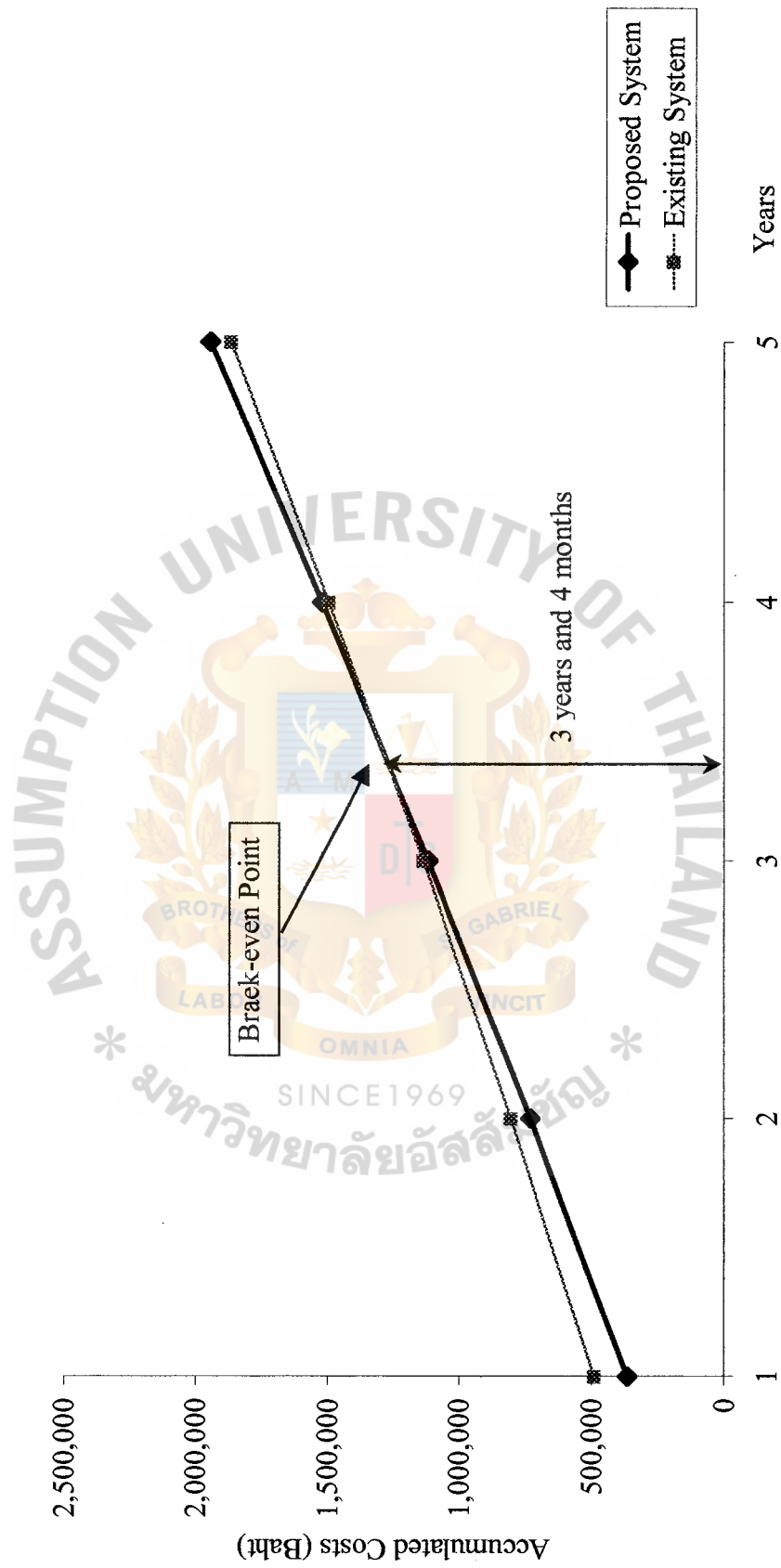
Figure 3.14. Break-Even Chart for the System.

71

(6) Comparison and break-even Analysis

Figure 3.14 depicts the comparison of the existing system and proposed system in the form of line graph. The intersection of the lines shows the break-even point of the proposed of a new system at the third year after implementation. It clearly describes that the company has gained the benefit of using this system and the return on investment is reasonable. The next section will be discussed in detail.

3.5.2 Benefit Analysis

(1) Tangible benefits

Cost reduction is the main benefit of the proposed system. The resource utilization will be more efficient.

Staff salary that can be saved $= ((9,000*3)-(10,000*2))*12$

$= 84,000$ Baht/year

(2) Intangible Benefits

(a) The manipulated information is more accurate than that of the existing system.

(b) The format of output is more formal than that of the existing system.

(c) It is easier and quicker to search for the required information.

(d) It is easier and quicker to produce the reports.

3.5.3 Payback Analysis

Table 3.17.   Cost and Benefit Analysis..

Cost items	Years				
	1	2	3	4	5
Total Cost Invested for the Proposed System (Baht)	230,440	40,440	40,440	60,660	54,594
Accumulated Cost Invested for the Proposed System (Baht)	230,440	270,880	331,320	371,980	426,574
Total Benefit from the Proposed System (Baht)	84,000	88,200	92,610	97,241	102,103
Accumulated Benefit form the Proposed System (Baht)	84,000	172,200	264,810	362,051	464,154

Table 3.18.   The Comparison of the Accumulated Cost Invested for the Proposed System and Accumulated Benefit from the Proposed System.

Year	Accumulated Cost (Baht)	Accumulated Benefit (Baht)	Accumulated (Benefit-Cost) (Baht)
1	230,440	84,000	-146,440
2	270,880	172,200	-98,680
3	331,320	264,810	-66,510
4	371,980	362,051	9,929
5	426,574	464,154	37,580

Calculation

(1)   Since the accumulated (benefit-cost) is negative in year 3 and is positive in year 4, payback period is between year 3 and year 4.

73
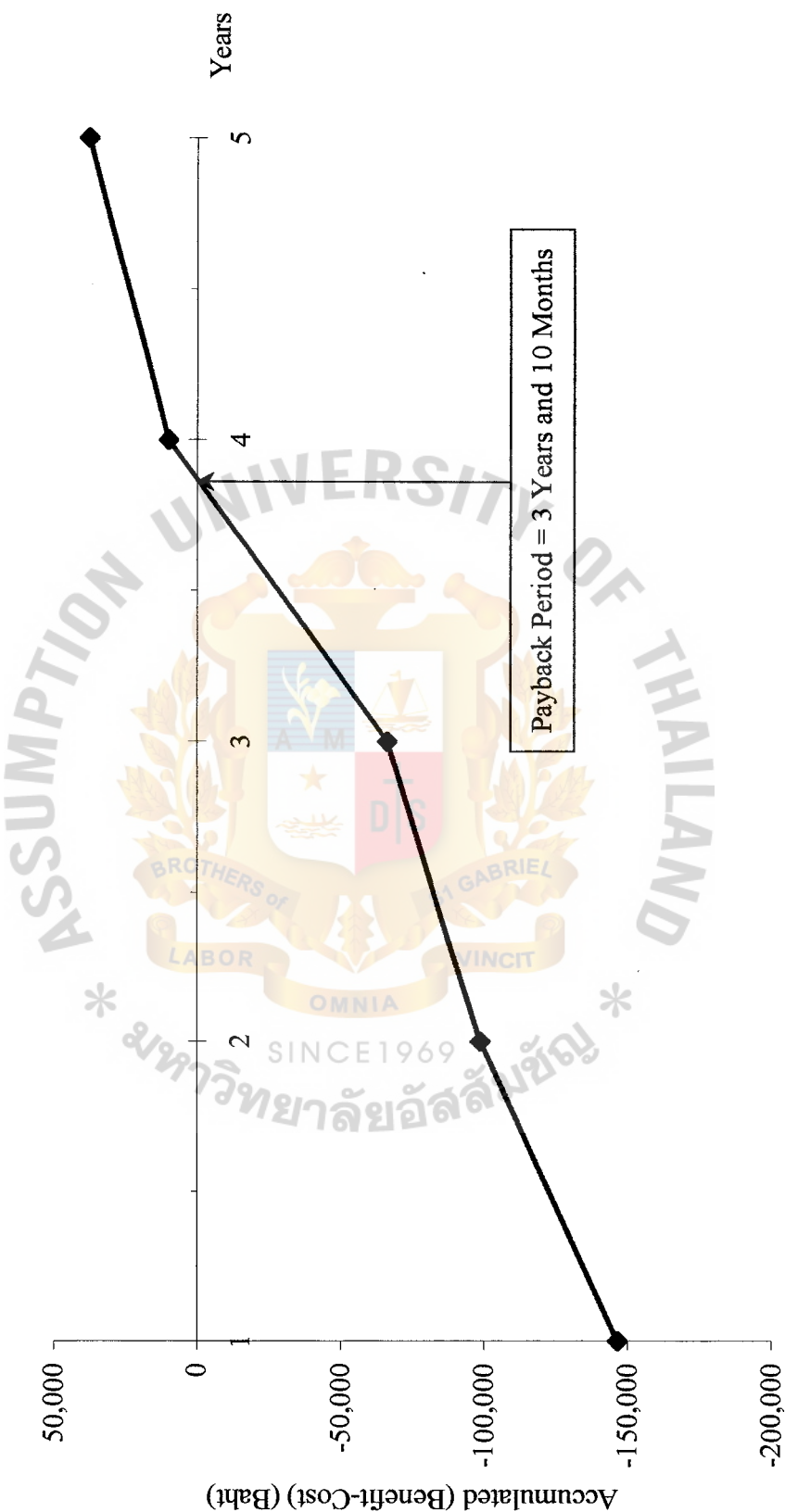
Figure 3.15.   Payback Period Chart of the System.

(2) The difference between the accumulated (benefit-cost) of year 3 and year 4 is 76,439 Baht, so we can find the number of the months after year 3 that is the payback point as follows:

66,510 / 76,439 = 0.87 (about 3 months and 10 months)

(3) So the payback period is 3 years and 10 months.

IV. PROJECT IMPLEMENTATION

4.1   Overview of Project Implementation

After the completion of the analysis and design of the proposed system, some staff of the company can participate in systems development on prior sections. A staff or an accountant can further become a system specialist and could be the development team member who completes the system design, or could be the system programmer who codes the computer programs. As a consultant, the staff could be called in to complete the design, help prepare the contracts, or help plan, conduct, and evaluate the system implementation, particularly when the Integrated Order Processing Information System is being implemented. The staff could be the project team leader and have control over the final design, testing, and acceptance of the new system. As a member of the implementation team, the staff could help design system inputs and outputs or specify testing criteria. Whether or not the staff is a team member, he might be a system user, and thus would be trained in the use of the new system. Finally, the internal auditor would evaluate conversion plans and conversion test results and would review systems development documentation for completeness and conformity to organization standards.

As the definition, system implementation is a set of procedures performed to complete the design contained in the approved system design document and to test, install, and being to use the new or revised information system. The implementation goals are as follows:

(a)   Complete, as necessary, the design contained in the approved system design document. For example, the detailed contents of new or revised documents, computer screens, and files must be laid out and created.

(b) Write, test, and document the programs and procedure required by the approved systems design document.

(c) Ensure, by completing the preparation of user manual and other documentation and by educating and training personnel, that the organization's personnel can operate the new system properly.

(d) Determine, by thoroughly testing the system, that the system satisfies the users' requirement.

(e) Ensure a correct conversion by planning, controlling, and conducting an orderly installation of the new system.

The implementation plan is necessary to achieve the system implementation goal stated above. The approach to implementation could be a parallel approach, which provides the most control of both the old and the new system that operate together for a time. This provides more control because the old system is not abandoned until users are satisfied that the new system adequately replaces the old.

The system implementation ends with the operation of the new or revised system and with the submission of the project complementation activities and provides document for operating the new system and for conducting the post-implementation review and systems maintenance.

4.2 Test System

Beyond testing program modules, the entire system is tested to determin that it meets the requirements established by the user and that it can be used and operated to the satisfaction of both users and system operators. Testing is carried out by the system developers, by the developers and users together, and finally by the users. The more closely the test can simulate a production environment (for examples; people, machine,

77

data, input, and so forth), the more representative the test will be and the more conclusive the results will be. Each test consists of the following steps:

(a) Specify test conditions.

(b) Review test conditions (such as walkthrough)

(c) Create test data.

(d) Execute tests.

(e) Evaluate results.

Several types or levels of tests are usually completed before a system can be implemented. From the users' point of view, the system test, the acceptance test, and the operations test are the most important to determine whether the system and equipment are satisfactory.

4.3 Conversion

After all the previous design steps have been completed and signed off, the organization must carefully convert to the new system,. Conversion includes converting the files, converting the processes, and completing the documentation. Controls must be in place to ensure the accurate, complete, and authorized conversion of the files and programs.

As the existing files are mapped into the new system, it has to ensure that the files are converted accurately.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The Management Information System (MIS) can play an important role in the development of the strategic plan and in monitoring ongoing operations in the company to measure attainment of the business plan. The Integrated Order Processing Information System is also a MIS that is a type of today business basis to operate order entry and sales system whether the business involves in buying or selling merchandise or services.

It is mentioned before that this system will not be relevant to the business if the system has been analyzed and designed improperly, and the investment in the system implementation will worth nothing to the business strategy. Whether the system is meant to the business or users, the information system should be considered by the use of decision-making tools at a real-time processing.

As a designer of a subsystem of Accounting Information System, it has been obvious that the accountant brings to bear his knowledge of accounting principles, auditing principles, information system techniques, and system development methods. On the other hand, the designed system brings to bear him back to easier operate in a real world business environment.

Furthermore, this project is designed and implemented on a through understanding of both business and the company in which it operates basis. As the business grows and engages in different activities, the Integrated Order Processing Information System is one of the business strategies to achieve its goals in better decision making with information, systematic working with controlled environment,

79

assessment criterion on the system operations, improving an up-to-date information system, and so forth.

With confidence and expectation of success, the project management is used to control the overall tasks to complete within the time frame, limited budget and limited resources. In addition, to answer the goals of this project, it fulfills the entire task achievement and depicts a turnkey system-developing model. However, the project is needed to continue with the development life cycle as the business always keeps changing and participating that users may have other requirements to help them with a better solution to compete with others under the company's policy.

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

Process	Existing System	Proposed System
Respond to Customer Requests	35 mins.	10 mins.
Validate Sales Order	25 mins.	10 mins.
Complete Picking Ticket	10 mins.	5 mins.
Execute Delivery Notice	20 mins.	10 mins.
Total	1 hr. 30 mins.	35 mins.

5.2 Recommendations

The project author believes that the Accounting Information System will play a major role in the future accounting practice and environment, or even in nowadays business environment. It operates the entire functions in the organization as a central system. Thus, the need to understand the business transaction clearly, which he calls 'function' and the skill to develop the system, which he calls 'design' is always the

principle of system implementation. Neither a function expert nor a system designer can work alone, but instead, the studying of system analysis and design bridges the gap between both parties. As the system is being recommended, designing an Integrated Order Processing provides additional 'value-added' services to the clients and also for the business entrepreneur.

In closing, he would recommend to recall the entire Accounting Information System as shown on Appendix A, which is realized that only to understand the order entry and sales processes is not the end. So further study on the fields of the system is needed because only subsystem of the whole system might not utilize the use of business sophisticated methodology. Lastly, it must be stated that the proposed system does not help the users get rid of tedious tasks, but it provides the effectiveness and efficiency in its performance.

APPENDIX   A

DESIGN OF INTEGRATED ACCOUNTING SYSTEM

Accounting is defined as a system that records, measures, summarizes and communicates financial information about a business. It is based on the equation:

Asset = Liabilities + Owner's Equity

An asset is a resource owned by the business, expected to benefit future operations. Examples of assets are cash, receivable accounts, inventory, supplies, prepaid expenses, land, building, equipment, motor vehicles, etc. Some of these will be future defined later.

A liability is a debt or obligation. This debt or obligation are payable in cash or by services. Examples of liabilities are notes payable, accounts payable, interest payable, salaries payable, unearned fees, etc.

Owner's equity is the ownership of the assets after all the debts are paid; it is sometimes referred to as the residual assets minus liabilities. Owner's equity increases by owner's investment in the company and by profit; owner's equity decreases by owner's withdrawal from the company or by a loss. Examples of owner's equity are capital (original investment plus profit or less loss) and drawings (the owner's withdrawals from the business).

Each type of asset, liability, and owner's equity is referred to as an account. In a computerized environment, the accounting clerk or accountant must still be knowledgeable of accounting principles. However, the major advantage of a computerized accounting system over a manually prepared system is the concept of 'Integration'. Integration is the process by which the system immediately update related parts of the system based upon the information in each transaction. In an Integrated Accounting System, transactions recorded in any journal are automatically recorded in all related (integrated) ledger accounts and reports. For example, assume there is a sale to a customer on credit. Once the information is entered into the sales journal, the

system will immediately post the appropriate changes to the general ledger, the account receivable subsidiary ledger, and the inventory ledger.

The journals in a computerized accounting system include the general journal and the special journals of bank reconciliation, purchases, cash payments, sales, cash receipts, and inventory. The ledgers include the general ledger and the supporting ledgers of accounts payable, accounts receivable, and inventory. The general ledger serves the purpose of capturing all account activity generated by the other ledgers. The reports include the trial balance, financial statements, and a variety of management reports.

The design of Integrated Accounting System contains the accounting records to process general ledger transactions, accounts payable, accounts receivable, and inventory. The interface should display the main page to access all ledgers, journals, and reports according to the table A1 summary of ledgers, buttons, and journals for each module.

Table A.1.   Summary of Ledgers, Buttons, and Journals for Each Module.

MODULE	General	Payables	Receivables	Inventory
LEDGER	General	Payables	Receivables	Inventory
LEDGER BUTTON	Accounts	Vendors	Customers	Inventory
JOURNALS	General Bank Rec.	Purchases Payments	Sales Receipts	Transfer Adjustment

The table above shows the group of ledgers and their related journals. Under each module heading are three transactions. The first transaction under each heading is the ledger transaction. The ledgers are the general ledger (Account), payable ledger (vendor), receivables ledger (customer), Inventory ledger (Inventory). Below the ledger transaction are the sub-functions the represent the journals for each module. The journals are the general ledger, bank reconciliation journal, purchase journal, payments journal, sales journal, receipts journal, transfer journal, and adjustment journal, which are lined up under the related ledger. Each of these ledgers and journals will present in full in the following data flow diagrams. The data flow diagrams will be presented each module in the Integrated Accounting System as follows:

(1) Integrated Order Processing (IOP) Information System represents the transaction of order entry, and sales related to other transactions.

(2) Integrate Accounts Receivable (IAR) Information System represents the transaction of billing, accounts receivable, and cash receipts related with other transactions.

(3) Integrated Accounts Payable (IAP) Information System represents the transaction of purchasing, accounts payable, and cash disbursements related with other transactions.

(4) Inventory System represents the transaction of inventory related with other transactions.
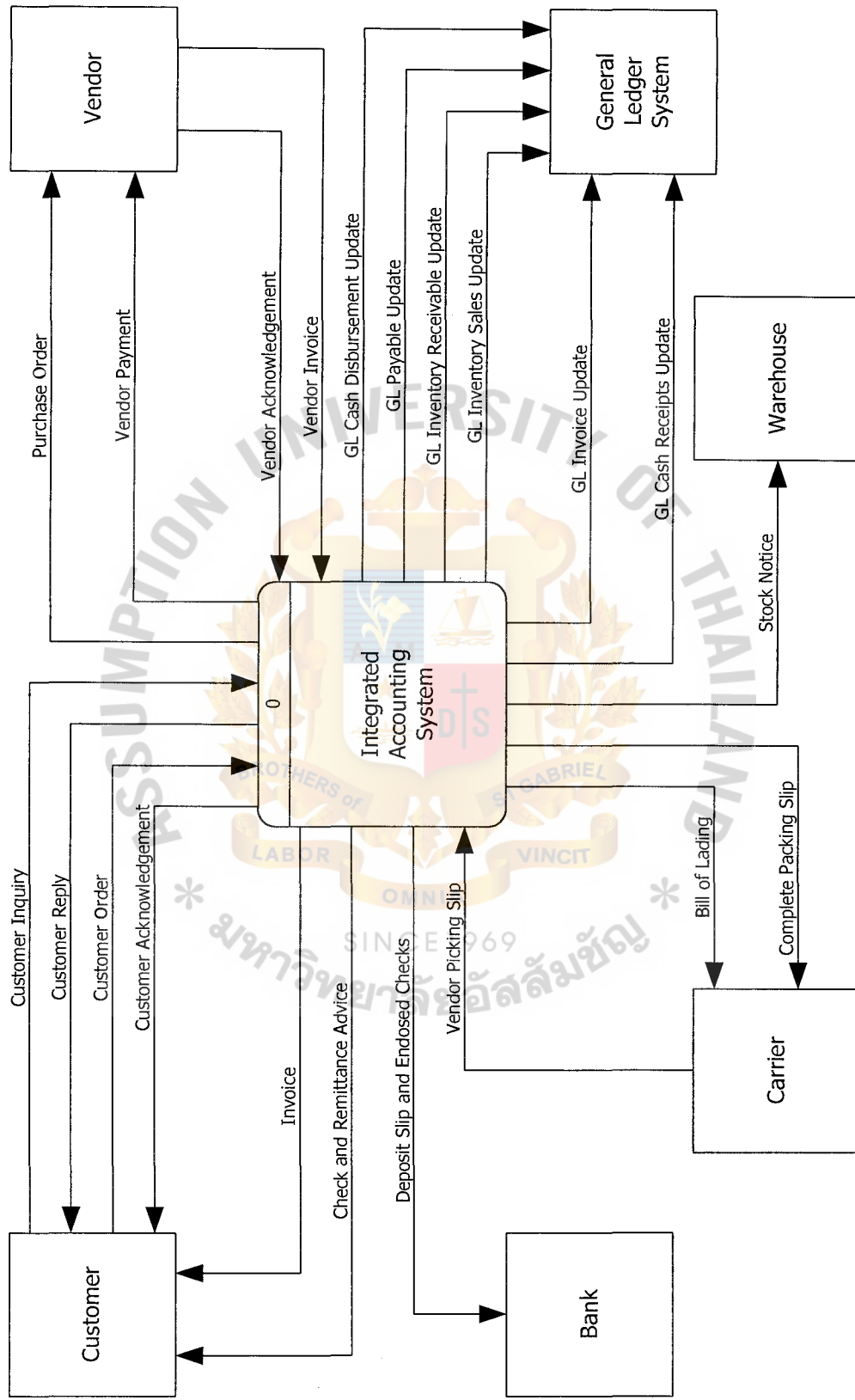
Figure A.1. Context Level Data Flow Diagram of Integrated Accounting System of Pakorn Construction Materials Co., Ltd.
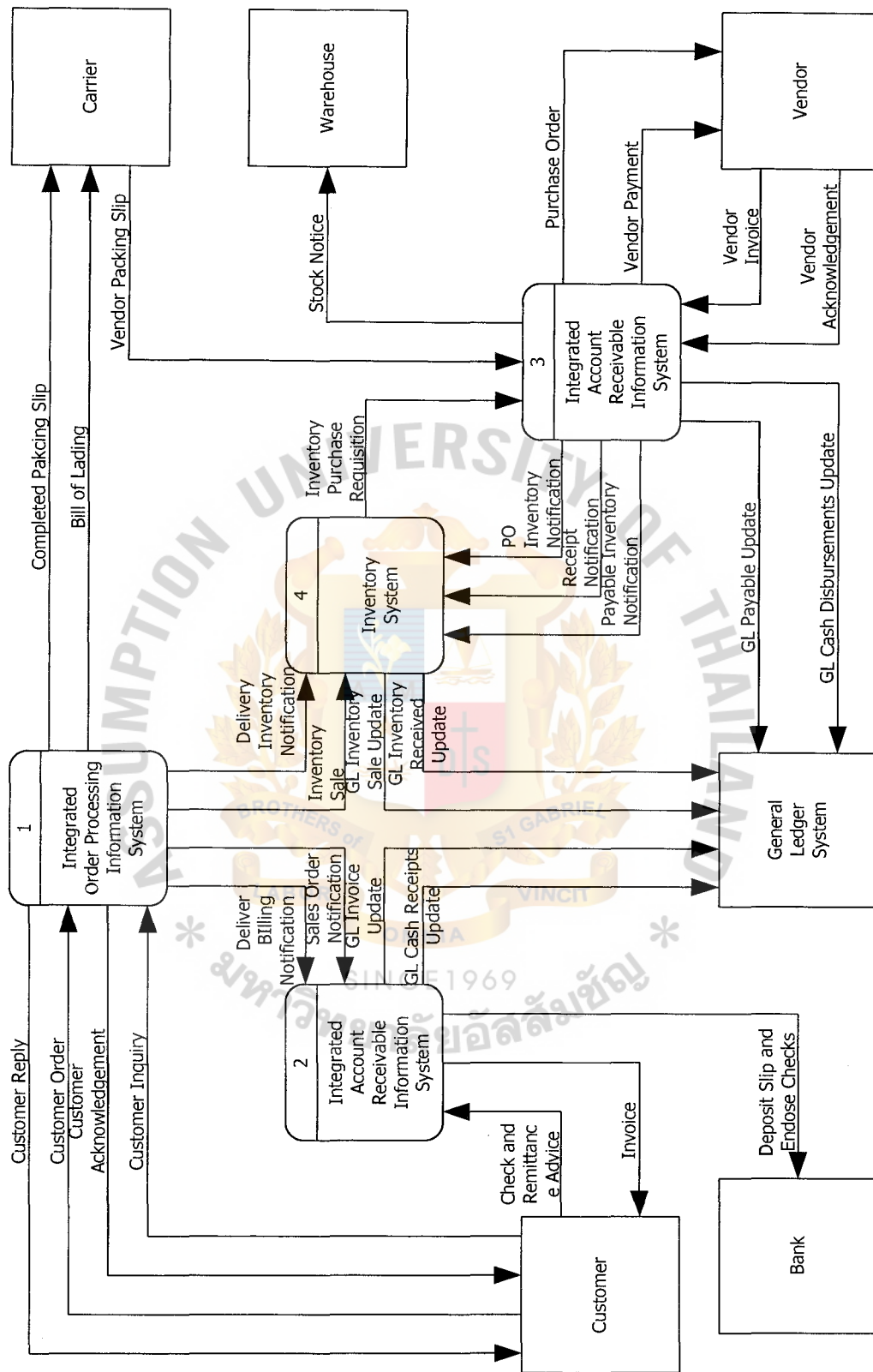
Figure A.2. Level 0 Data Flow Diagram of Integrated Accounting System of Pakorn Construction Materials Co., Ltd.

86
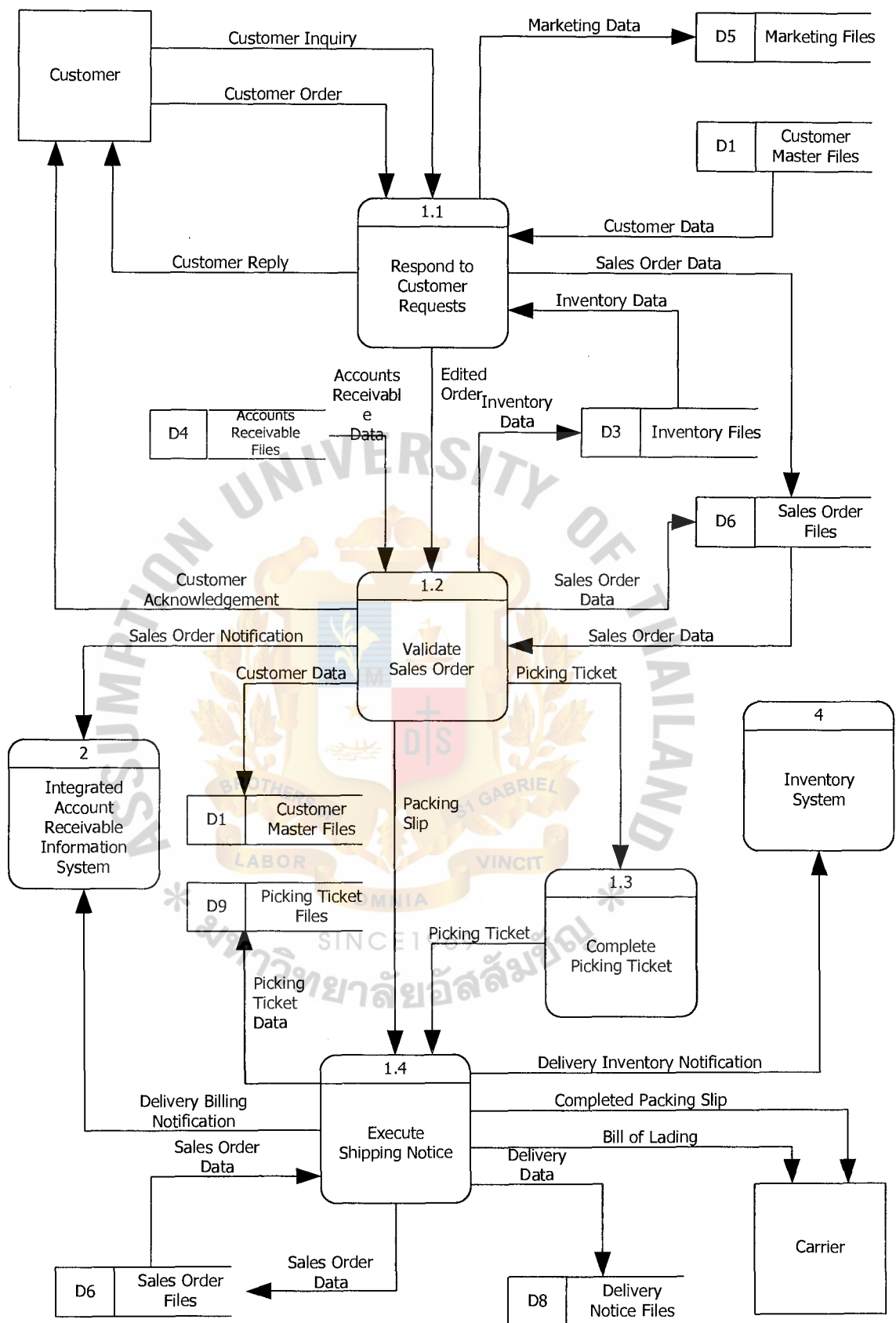
Figure A.3. Level 1 Data Flow Diagram of Integrated Accounting System of Pakorn Construction Materials Co., Ltd. (The Integrated Order Processing Information System).
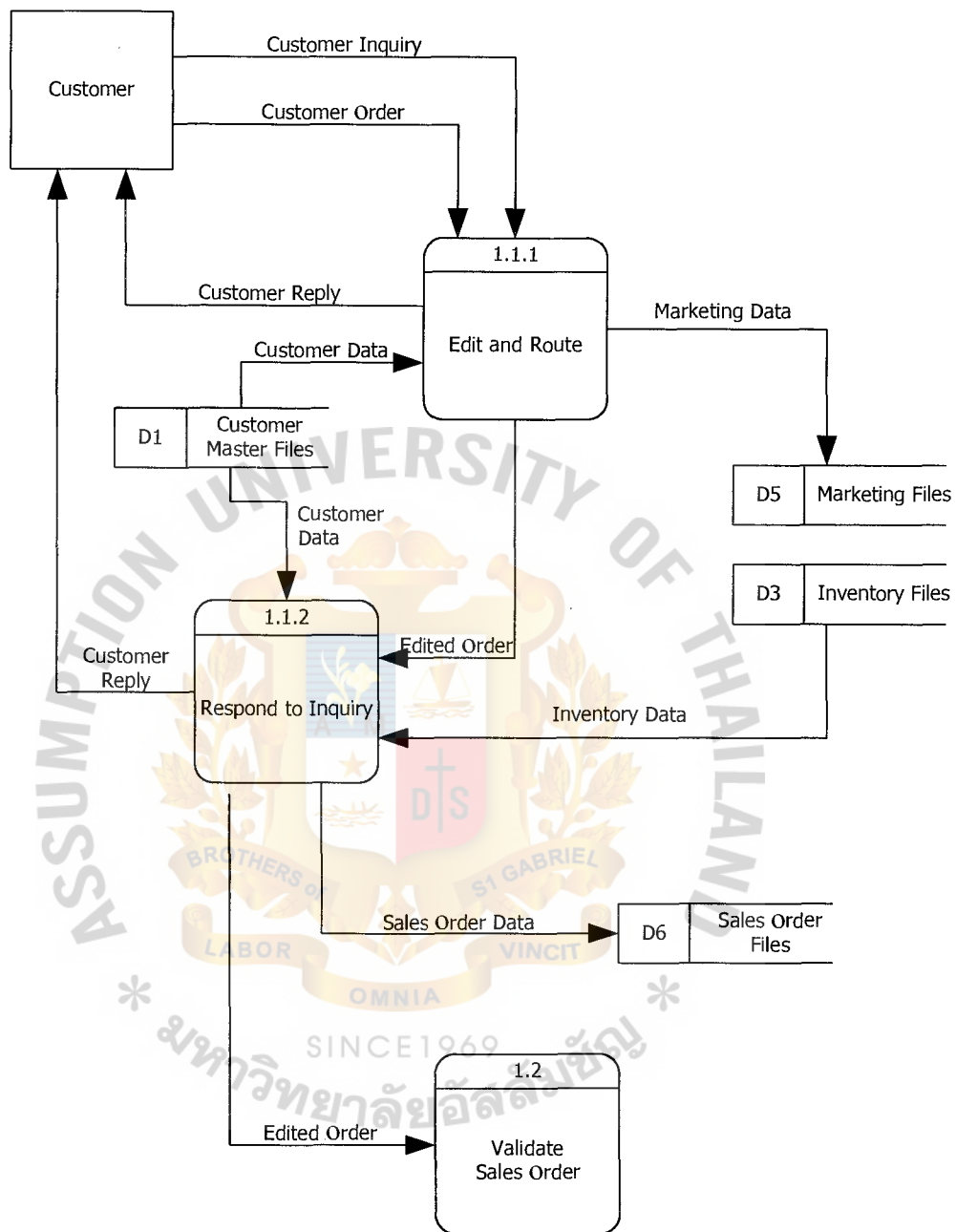
Figure A.4. Level 2 Data Flow Diagram of Integrated Accounting System of
Pakorn Construction Materials Co., Ltd. (Respond to Customer
Request).
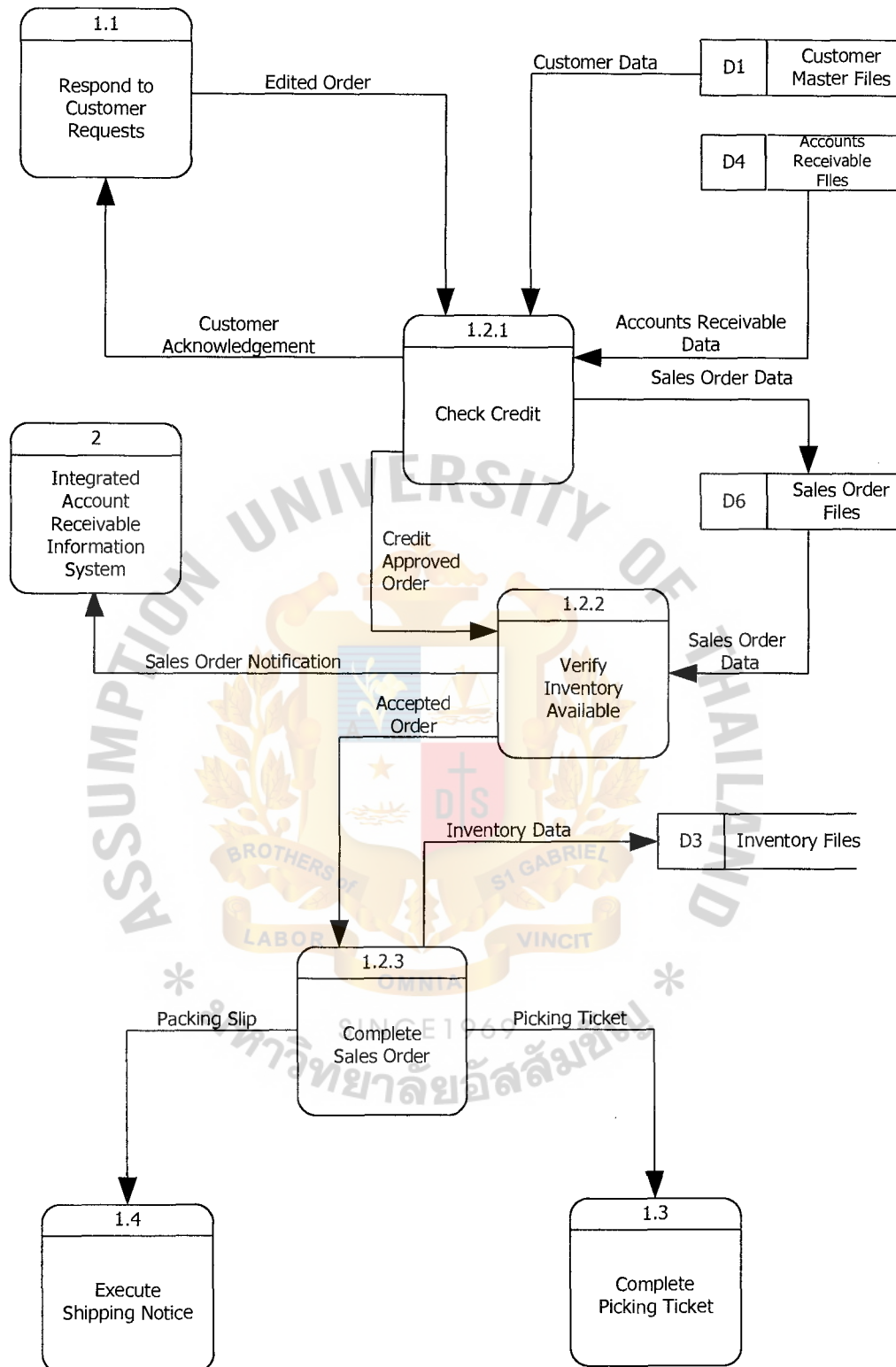
Figure A.5.   Level 2 Data Flow Diagram of Integrated Accounting System of
Pakorn Construction Materials Co., Ltd. (Validate Sales Order).
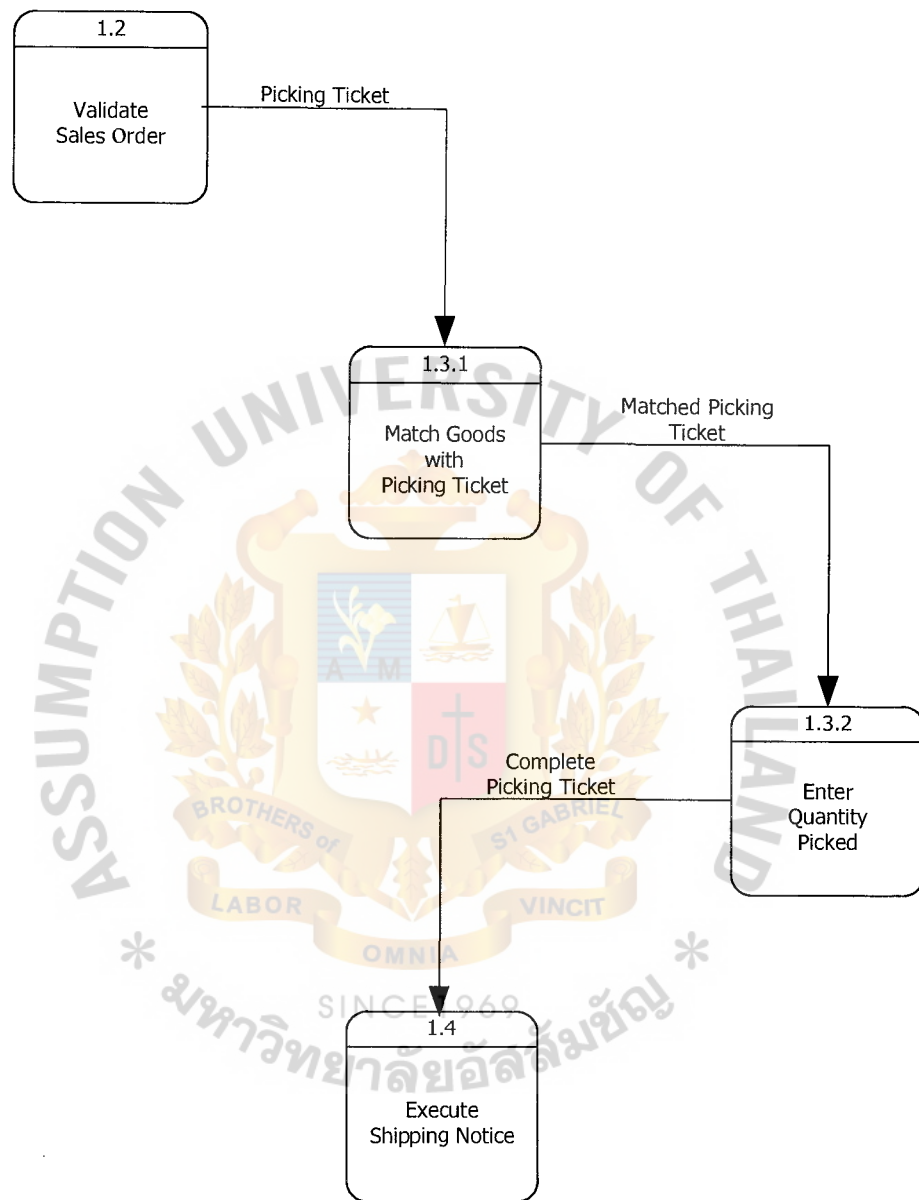
Figure A.6.   Level 2 Data Flow Diagram of Integrated Accounting System of
Pakorn Construction Materials Co., Ltd. (Complete Picking Ticket).
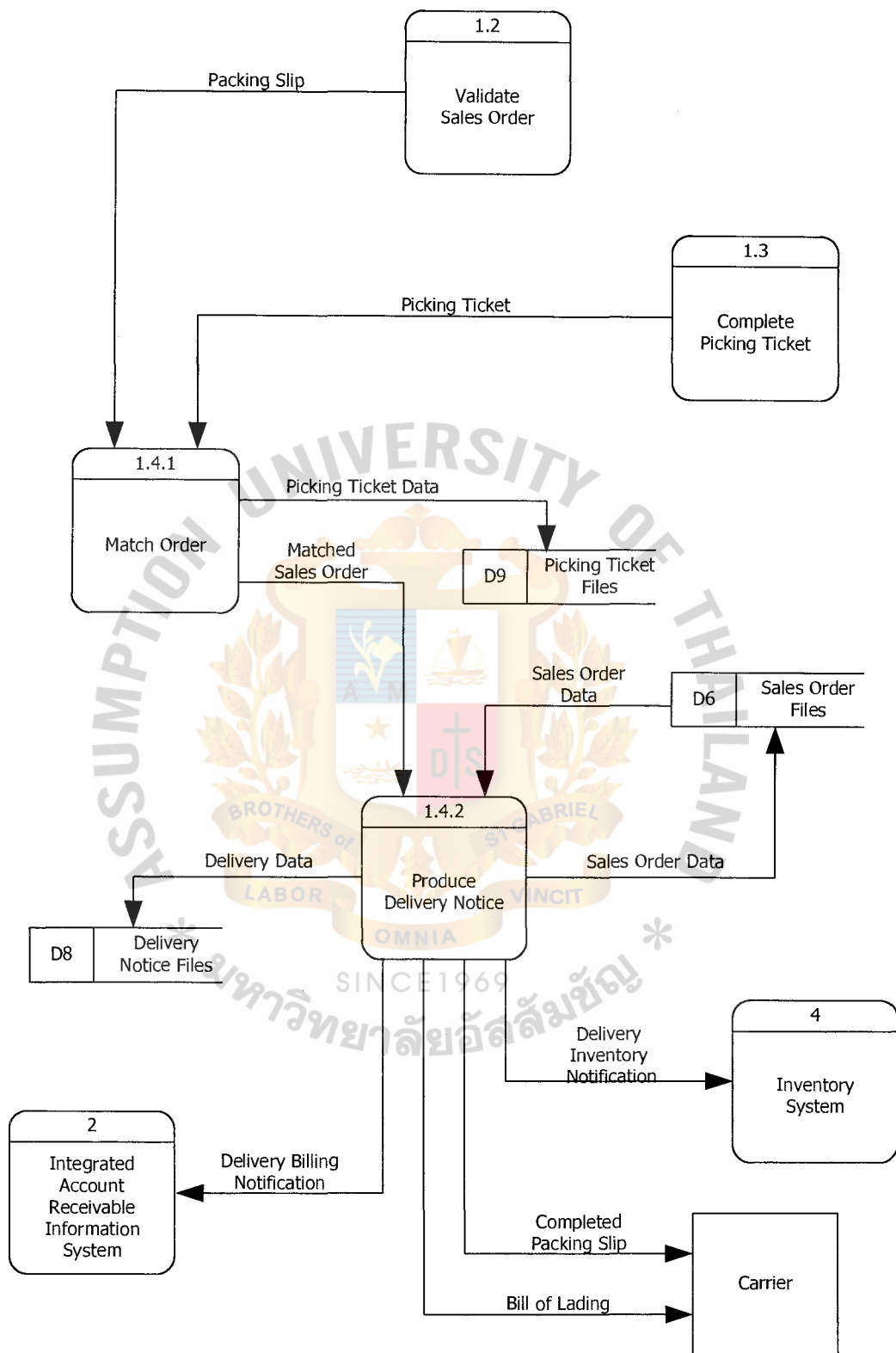
Figure A.7.   Level 2 Data Flow Diagram of Integrated Accounting System of
Pakorn Construction Materials Co., Ltd. (Execute Shipping Notice).
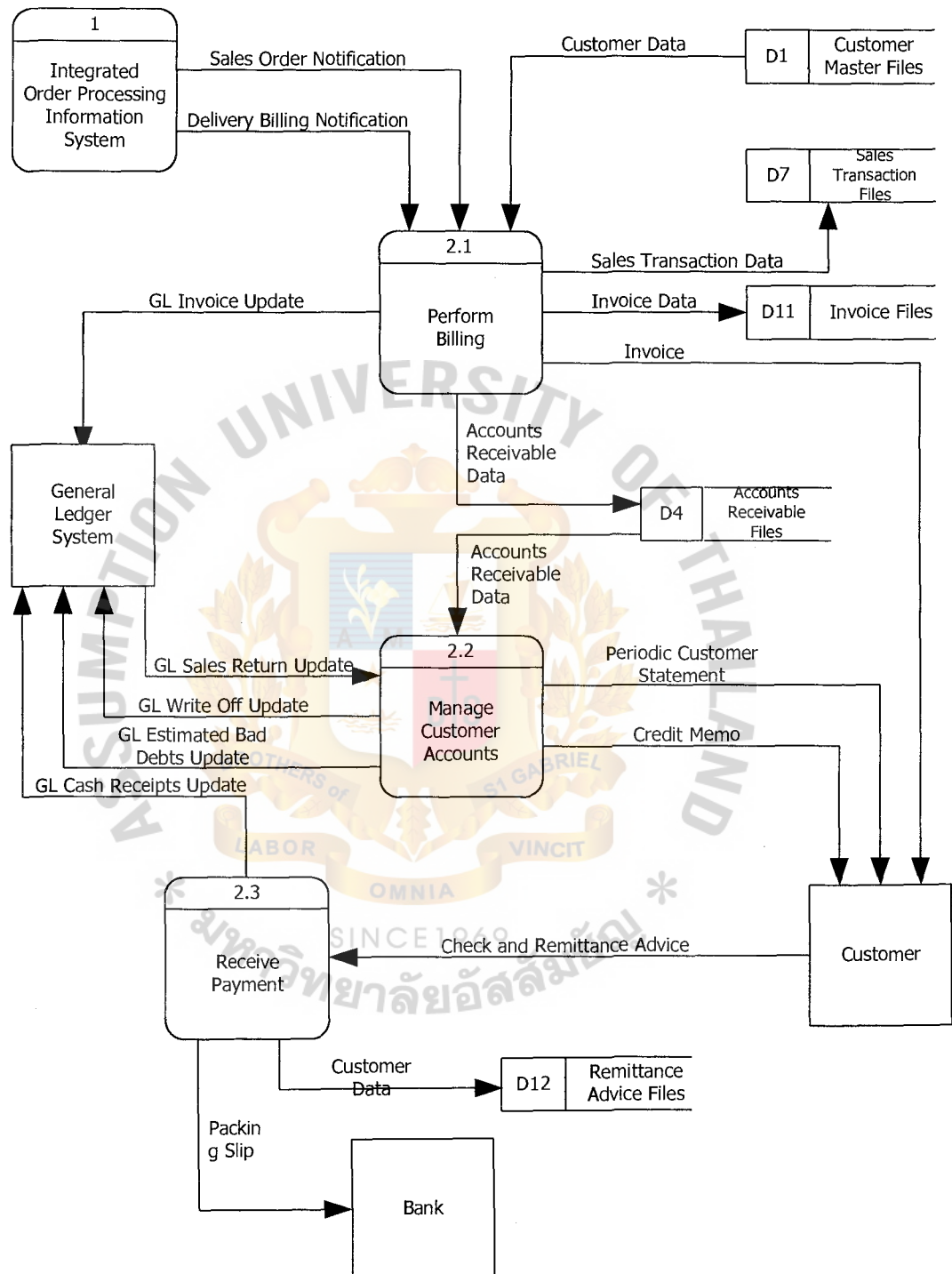
Figure A.8. Level 1 Data Flow Diagram of Integrated Accounting System of
Pakorn Construction Materials Co., Ltd. (The Integrated Account
Receivable Information System).
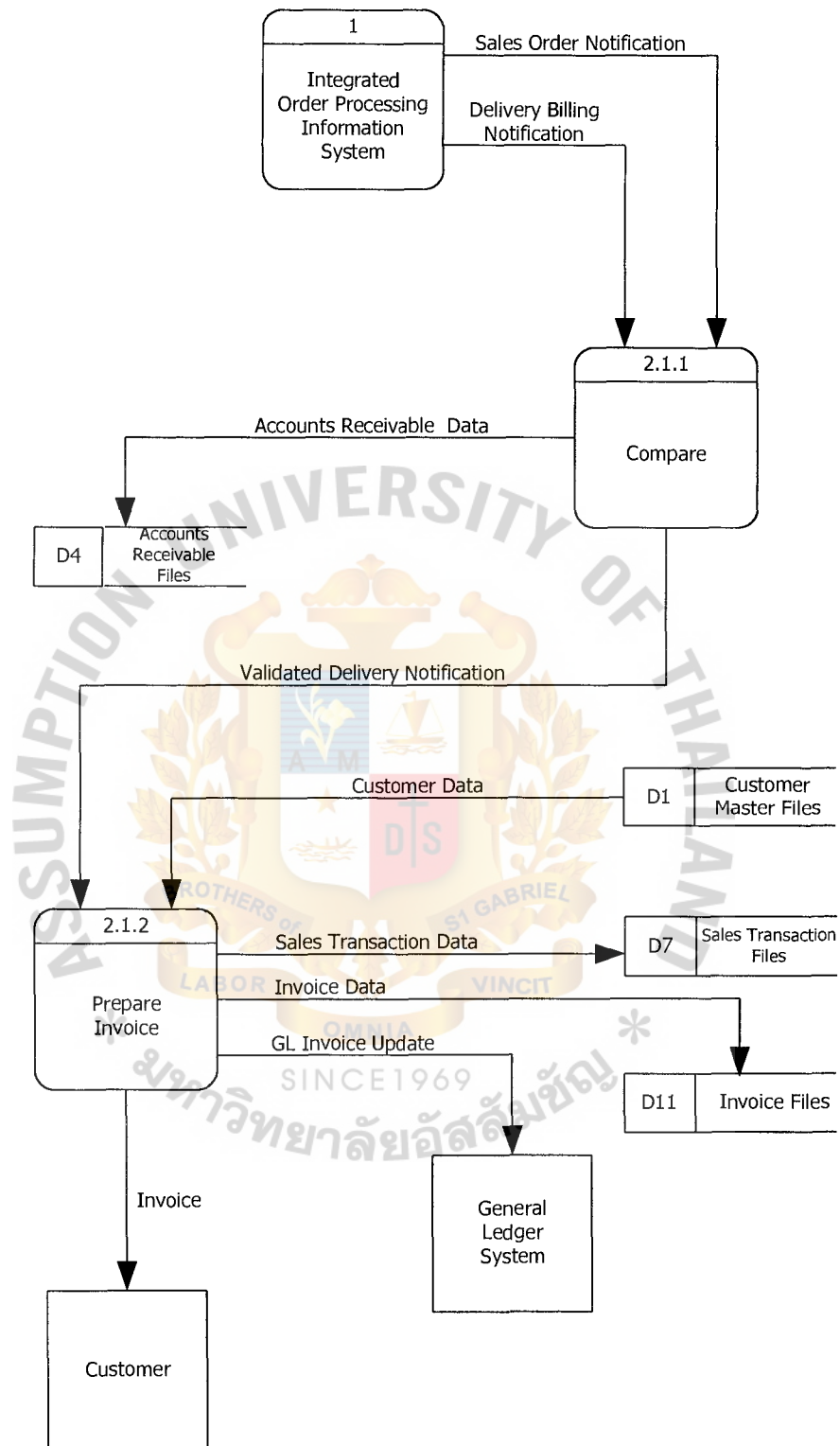
Figure A.9. Level 2 Data Flow Diagram of Integrated Accounting System of Pakorn Construction Materials Co., Ltd. (Perform Billing).
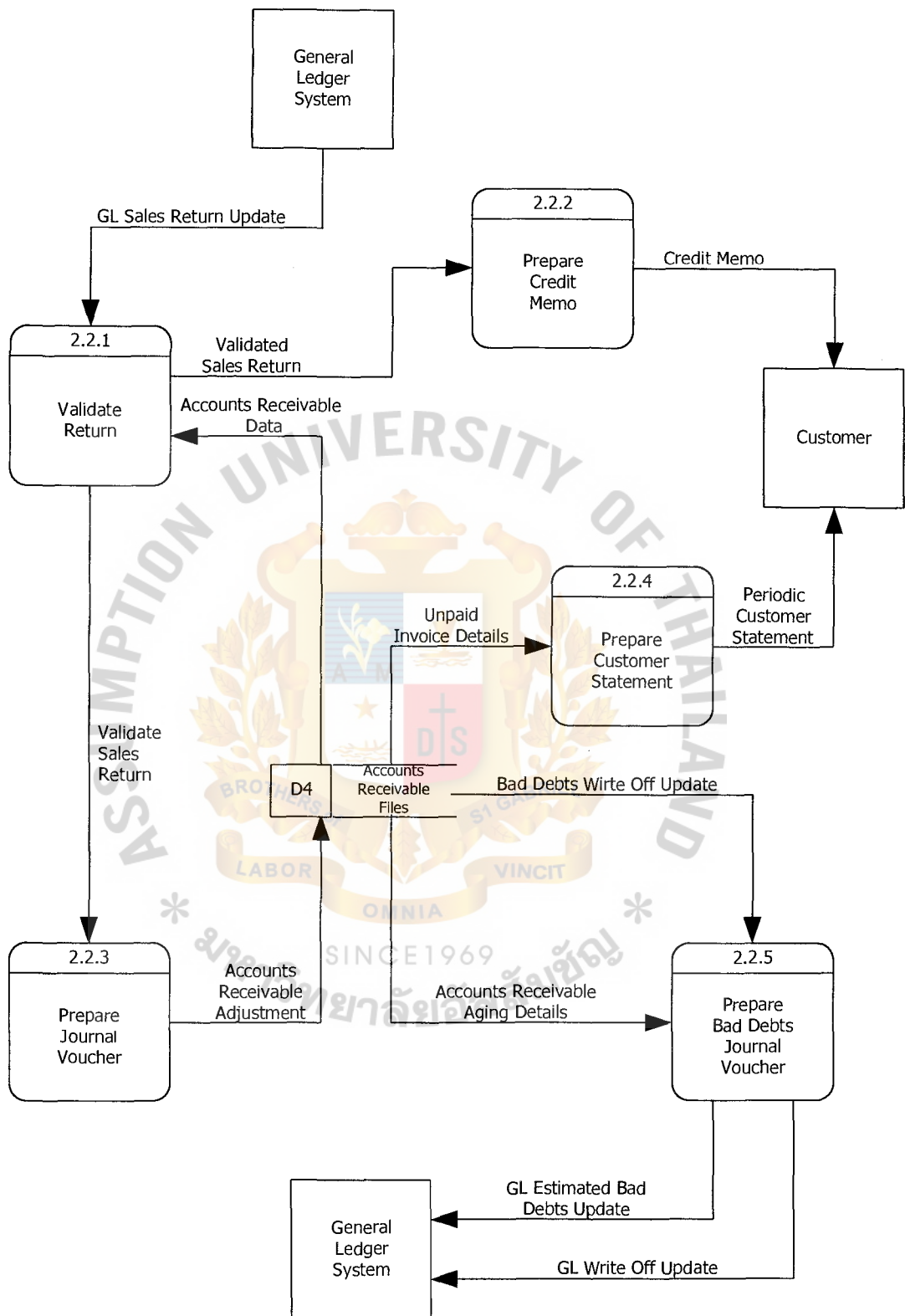
Figure A.10. Level 2 Data Flow Diagram of Integrated Accounting System of
Pakorn Construction Materials Co., Ltd. (Manage Customer
Accounts).
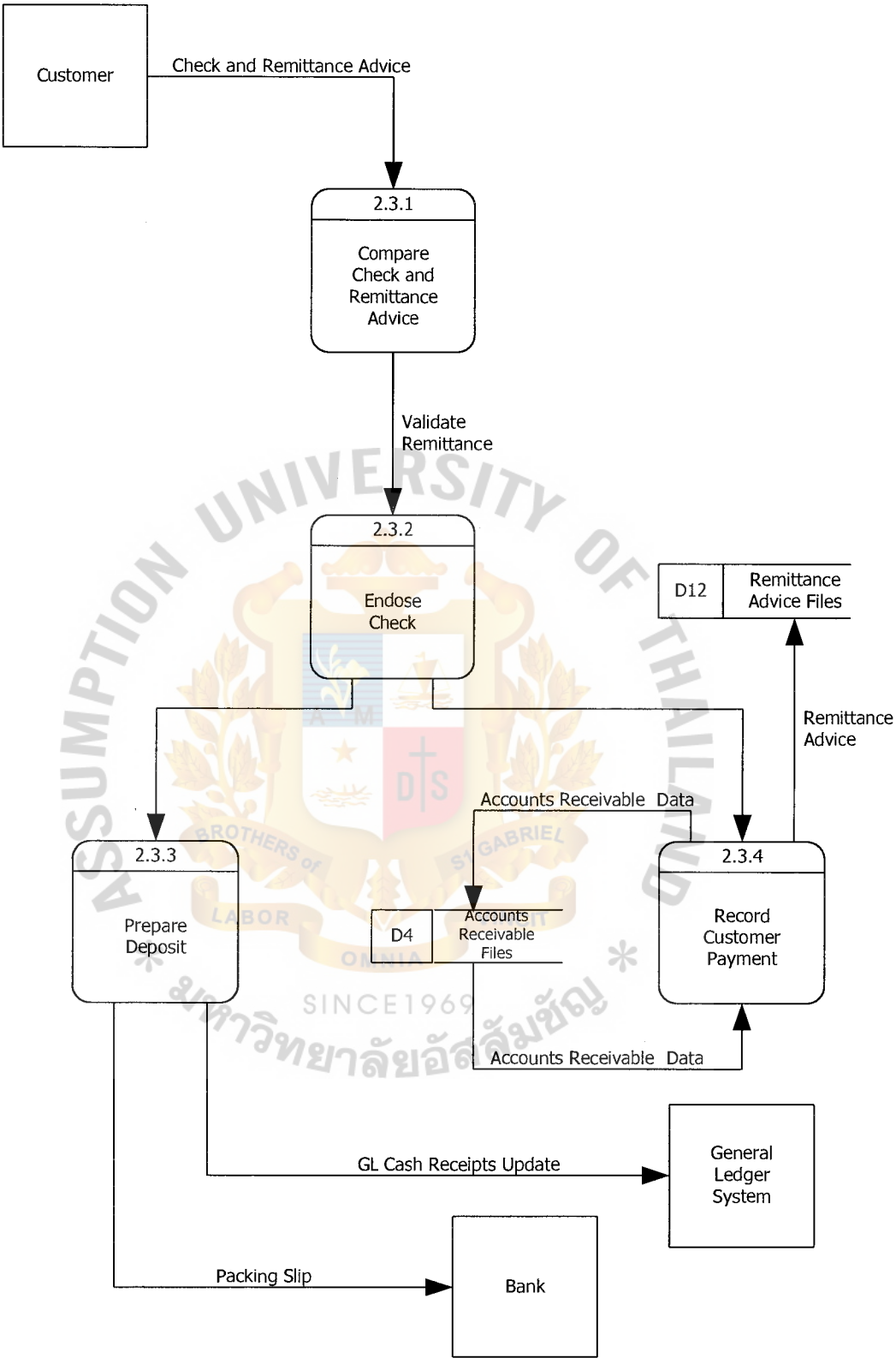
Figure A.11.   Level 2 Data Flow Diagram of Integrated Accounting System of
               Pakorn Construction Materials Co., Ltd. (Receive Payment).
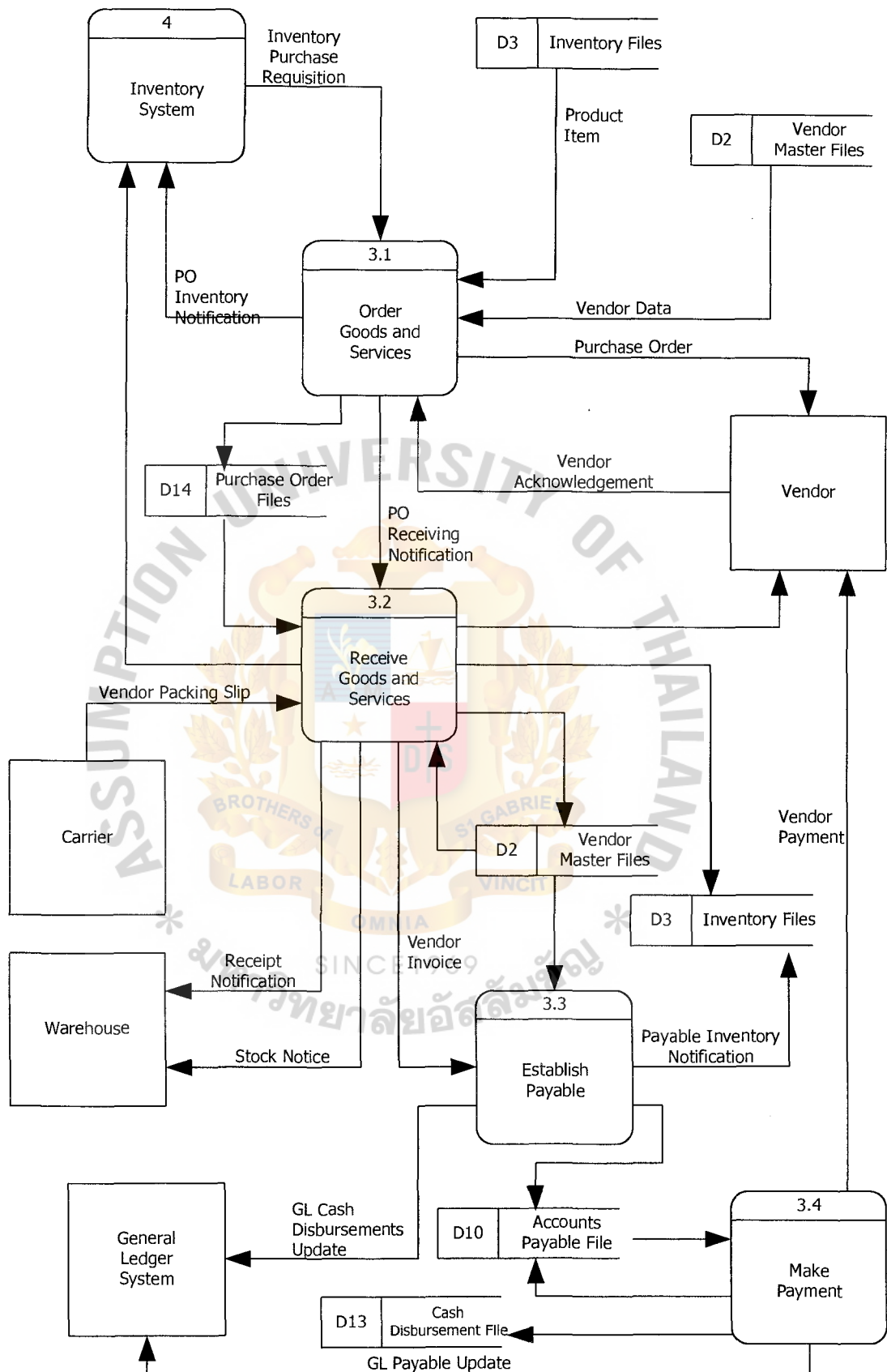
Figure A.12.   Level 1 Data Flow Diagram of Integrated Accounting System of
Pakorn Construction Materials Co., Ltd. (The Integrated Account
Payable Information System).
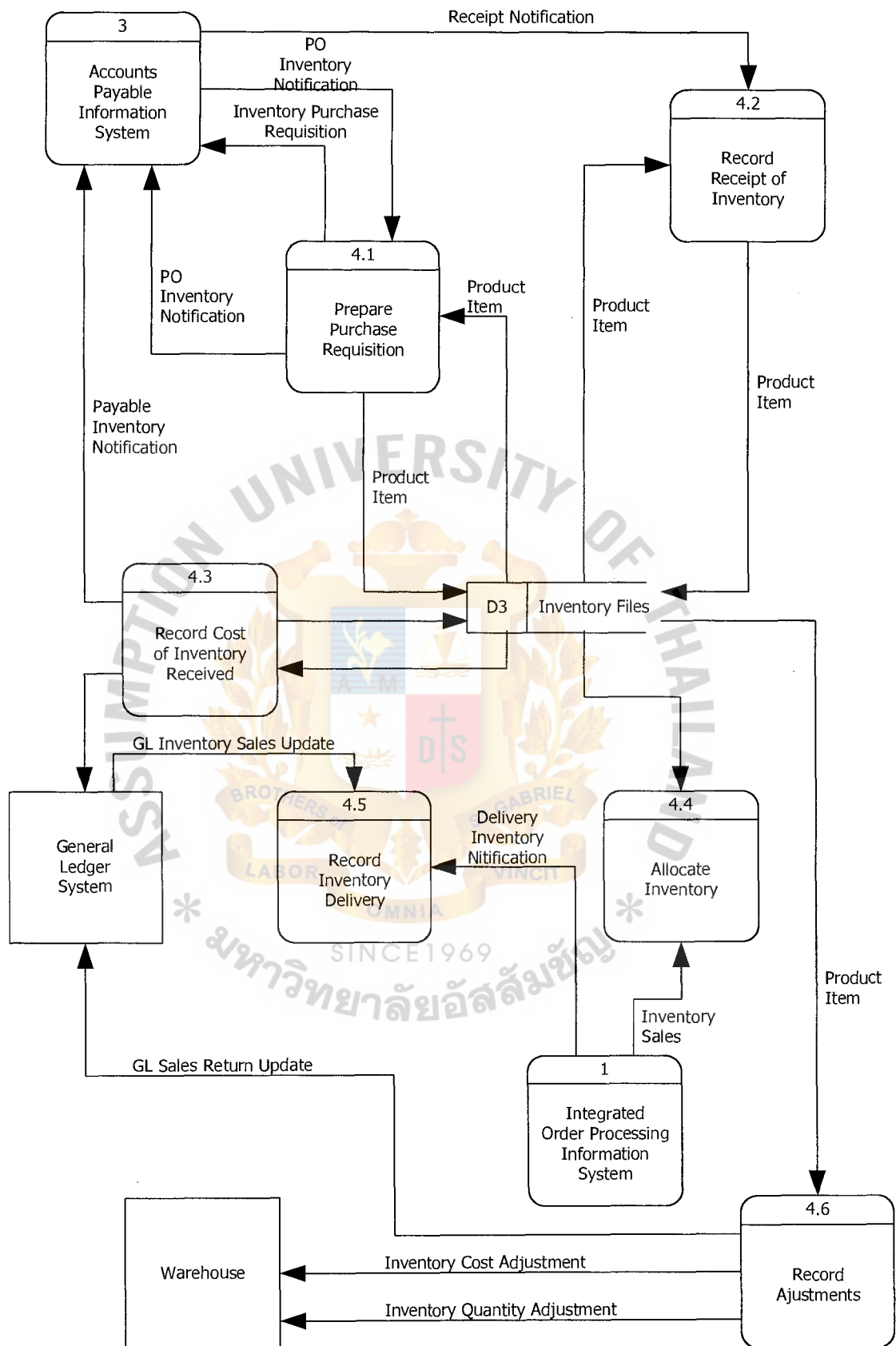
Figure A.13.   Level 1 Data Flow Diagram of Integrated Accounting System of
Pakorn Construction Materials Co., Ltd. (The Inventory System).
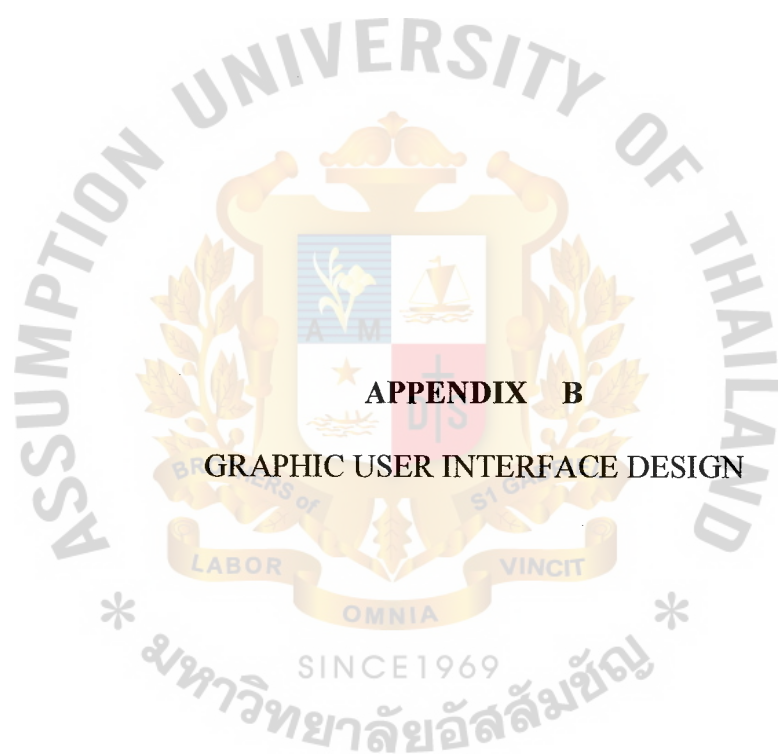
APPENDIX   B

GRAPHIC USER INTERFACE DESIGN

Figure B.1. Logon Form.

Figure B.2.   Main Page Form.

Figure B.3.   Vendor Information Form.

100

Figure B.4. Customer Information Form.

Figure B.5. Sales Invoice Form.

Figure B.6.   Purchase Order Form.

103

APPENDIX   C

REPORT DESIGN

Pakorn Construction Materials Co., Ltd.

รายงานการขายสินค้าประจำวัน

เลขที่ DS190643

วันที่ 19 มิถุนายน พ.ศ. 2543

แผ่นที่ 1 / 10

ลำดับ	รายการ	รหัสสินค้า	จำนวนสินค้า		จำนวนเงิน	
1	กระเบื้องแผ่นเรียบ "ตราช้าง" ขนาด 120 X 120 X 0.4 ซม.	2064120	500	แผ่น	43,615	00
2	กระเบื้องแผ่นเรียบ "ตราช้าง" ขนาด 120 X 240 X 0.4 ซม.	2064240	300	แผ่น	50,622	00
3	ท่อระบายน้ำซิเมนต์ใยหิน "ตราช้าง" $\varnothing$ 400 มม. X 4 ม.	2640340	20	ท่อน	38,000	00
4	พื้นสำเร็จรูปคอนกรีตอัดแรงแบบ กลวง ขนาด 0.20 X 1.20 ม. 4 $\varnothing$ ½"	3245000	200	ตร.ม.	80,000	00
5	ซีแพคบล็อค 4" บล็อคลายคลื่น	3400090	4,000	ก้อน	27,000	00
6	บล็อคปูถนน ลายคดกริช สีเทา	3460000	5,500	ก้อน	16,500	00
7	บล็อคปูถนน ลายคดกริช สีเหลือง	3460050	4,500	ก้อน	15,750	00
8	บล็อคปูถนน ขอบคันหิน	3466000	300	ท่อน	24,000	00
9	กระเบื้องหลังคาซีแพคโมเนีย "ตราช้าง" ลอนโค้ง สีเทานกพิราบ	3510060	7,200	แผ่น	61,200	00
				รวมเงิน	356,687	00

วันที่พิมพ์ 20 มิถุนายน พ.ศ. 2543

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(ผู้ตรวจสอบ)

Figure C.1.   Daily Sales Report.

104

Pakorn Construction Materials Co., Ltd.

รายงานการขายสินค้าประจำเดือนพฤษภาคม 2543

เลขที่ DS0643

แผ่นที่ 1 / 5

วันที่	รายการ	เดบิต		เครดิต		จำนวนเงิน	
01 มิ.ย. 2543	เงินสด	50,500	00			50,500	00
	ลูกหนี้การค้า	103,445	55			103,445	55
	ส่งคืน			0	00	- 0	00
	รวม					153,945	55
02 มิ.ย. 2543	เงินสด	55,600	00			55,600	00
	ลูกหนี้การค้า	298,300	35			298,300	35
	ส่งคืน			4,500	00	- 4,50	00
	รวม					0	35
03 มิ.ย. 2543	เงินสด	25,501	50			349,400	50
	ลูกหนี้การค้า	102,544	23			25,501	23
	ส่งคืน			0	00	102,544	00
	รวม					- 0	73
05 มิ.ย. 2543	เงินสด	65,502	00			128,045	00
	ลูกหนี้การค้า	87,464	46			65,502	46
	ส่งคืน			0	00	87,464	00
	รวม					- 0	46
06 มิ.ย. 2543	เงินสด	45,333	00			152,966	00
	ลูกหนี้การค้า	155,499	00			45,333	00
	ส่งคืน			0	00	155,499	00
	รวม					- 0	00
						200,832	
				รวมเงิน		985,190	09

วันที่พิมพ์ 01 มิถุนายน พ.ศ. 2543   (ผู้ตรวจสอบ)

Figure C.2.   Monthly Sales Report.

105

<table>
<tr><td colspan="7" align="center">**Pakorn Construction Materials Co., Ltd.**</td></tr>
<tr><td colspan="7" align="center">รายงานการรับเงินประจำวัน</td></tr>
<tr><td colspan="7">เลขที่ AR190643</td></tr>
<tr><td colspan="7">วันที่ 19 มิถุนายน พ.ศ. 2543</td></tr>
<tr><td colspan="7">แผ่นที่   1   /   1</td></tr>
</table>

ลำดับ	รายการ	จำนวนเงิน		รวมยอด		หมายเหตุ.
1	รับเงินจากการขายปลีก					
	หน้าร้าน	244,555	00			
	หน้าคลังสินค้า	50,588	00	295,143	00	
2	รับชำระหนี้จากลูกค้า			85,970	00	
3	รับชำระหนี้โดยพนักงานเก็บเงิน					
	บจก. รัฐภรณ์	26,304	00			
	บจก. ชฎาภรณ์	79,650	00	105,954	00	
4	รายรับอื่นๆ			13,052	00	
	รวมรายรับทั้งสิ้น			**500,119**	**00**	
	สรุป					
	เงินสด			308,195	00	
	เช็ค			26,304	00	
	เช็คลงวันที่ล่วงหน้า			165,620	00	
	รวมเงินทั้งสิ้น			**500,119**	**00**	

วันที่พิมพ์ 20 มิถุนายน พ.ศ. 2543	_____ (ผู้ตรวจสอบ)

Figure C.3.   Accounts Receivable Report.

Pakorn Construction Materials Co., Ltd.

รายงานการซื้อสินค้าประจำเดือนพฤษภาคม 2543

เลขที่ AP190643

แผ่นที่ 1 / 1

ลำดับ	รายการ	เลขที่ ใบสั่งซื้อ	รวม จำนวนเงิน		ซื้อ		ภาษีซื้อ	
1	บมจ. ปูนซิเมนต์ไทย	PO31110	450,530	00	421,056	07	29,473	93
		PO31112	2,890,955	00	2,701,827	10	189,127	90
		PO31115	2,455,030	00	2,294,420	56	160,609	44
		PO31120	3,123,400	00	2,919,065	42	204,334	58
		PO31121	588,433	00	549,937	38	38,495	62
		PO31122	488,500	00	456,542	06	31,957	94
		PO31123	1,900,456	00	1,776,127	10	124,328	90
2	บจก. ค้าสากลซิเมนต์ไทย	PO31111	433,000	00	404,672	90	28,327	10
3	บจก. อริยะผล	PO31113	45,522	00	42,543	93	2,978	07
4	บจก. กรุงเทพผลิตเหล็ก	PO31114	300,400	00	280,747	66	19,652	34
5	หจก. นามทองโลหะกิจ	PO31116	53,000	00	49,532	71	3,467	29
6	บจก. จินดาสุขคอมเมอร์เชียล (1980)	PO31117	12,200	00	11,401	87	798	13
7	บจก. บางกอกวัสดุภัณฑ์	PO31118	43,300	00	40,467	29	2,832	71
8	บจก. สหพรเคริญสตีล	PO31119	51,100	00	47,757	01	3,342	99
9	บจก. นาป้า	PO31124	300,450	00	280,794	39	19,655	61
10	บจก. แจ็ค (ประเทศไทย)	PO31125	23,300	00	21,775	70	1,524	30
11	บจก. ที.เค.เอส. ทูลส์ แอนด์ เทรดดิ้ง	PO31126	45,500	00	42,523	36	2,976	64
	รวมเงินทั้งสิ้น		13,205,076	00	12,341,192	52	863,883	48

วันที่พิมพ์ 01 มิถุนายน พ.ศ. 2543

(ผู้ตรวจสอบ)

Figure C.4.   Monthly Purchasing Report.

Pakorn Construction Materials Co., Ltd.

ทะเบียนควบคุมเช็ครับล่วงหน้า

เลขที่ CR190643

แผ่นที่ 1 / 1

วันที่	ใบสำคัญ เลขที่	ใบแจ้งหนี้ เลขที่	ชื่อลูกค้า	จำนวนเงิน		รายละเอียดเช็ค			สงวันที่	วันรับฝาก ธนาคาร	ผู้นำฝาก	หมายเหตุ
						ธนาคาร	สาขา	เช็คเลขที่				
19 มิ.ย. 43	INV40111	DN30303	บจก. รัฐกรณ์	26,104	00	BKB	สุวินทวงศ์-ลก	21201230	29 มิ.ย. 43	19 มิ.ย. 43	พัฒนา	
19 มิ.ย. 43	INV40097	DN30300	บจก. ชฎากรณ์	79,650	00	TFB	นวราชวาส	06112300	01 ก.ค. 43	19 มิ.ย. 43	จารียะ	

วันที่พิมพ์ 20 มิถุนายน พ.ศ. 2543

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(ผู้ตรวจสอบ)

Figure C.5.   Receivable Check Control in Advance Report.

Pakorn Construction Materials Co., Ltd.

ทะเบียนความคุมเช็คจ่ายล่วงหน้า

เลขที่ CP190643
แผ่นที่ 1 / 1

วันที่	วันสำคัญ เลขที่	ใบสั่งซื้อ เลขที่	ชื่อลูกค้า	จำนวนเงิน		รายละเอียดเช็ค			ส่งวันที่	วันรับนำส่ง	นำส่งโดย	หมายเหตุ
						ธนาคาร	สาขา	เช็คเลขที่				
05 มิ.ย.43	PO31110	AA030002	บมจ. ปูนซีเมนต์ไทย	450,530	00	BKB	สุ่ไหงโก-ลก	01664358	15 มิ.ย.43	05 มิ.ย.43	นำส่งผู้แทนขาย	
05 มิ.ย.43	PO31112	AA030006	บมจ. ปูนซีเมนต์ไทย	2,890,955	00	BKB	สุ่ไหงโก-ลก	01664358	15 มิ.ย.43	05 มิ.ย.43	นำส่งผู้แทนขาย	
05 มิ.ย.43	PO31115	AA030019	บมจ. ปูนซีเมนต์ไทย	2,455,030	00	BKB	สุ่ไหงโก-ลก	01664358	15 มิ.ย.43	05 มิ.ย.43	นำส่งผู้แทนขาย	
05 มิ.ย.43	PO31120	AA030056	บมจ. ปูนซีเมนต์ไทย	3,123,400	00	BKB	สุ่ไหงโก-ลก	01664358	15 มิ.ย.43	05 มิ.ย.41	นำส่งผู้แทนขาย	
05 มิ.ย.43	PO31121	AA030123	บมจ. ปูนซีเมนต์ไทย	588,433	00	BKB	สุ่ไหงโก-ลก	01664358	15 มิ.ย.43	05 มิ.ย.43	นำส่งผู้แทนขาย	
05 มิ.ย.43	PO31122	AA030156	บมจ. ปูนซีเมนต์ไทย	488,500	00	BKB	สุ่ไหงโก-ลก	01664358	15 มิ.ย.43	05 มิ.ย.43	นำส่งผู้แทนขาย	
05 มิ.ย.43	PO31123	AA030157	บมจ. ปูนซีเมนต์ไทย	1,900,456	00	BKB	สุ่ไหงโก-ลก	01664358	15 มิ.ย.43	05 มิ.ย.43	ปณ.ลงทะเบียน	
19 มิ.ย.43	PO31111	DN43356	บจก. ค้าวัสดุก่อสร้างไทย	433,000	00	BKB	สุ่ไหงโก-ลก	01664359	01 ก.ค.43	19 มิ.ย.43	ปณ.ลงทะเบียน	
19 มิ.ย.43	PO31113	V455053	บจก. อรัยะผล	45,522	00	BKB	สุ่ไหงโก-ลก	01664360	01 ก.ค.43	19 มิ.ย.43	ปณ.ลงทะเบียน	
19 มิ.ย.43	PO31114	H566664	บจก. กรุงเทพผลิตเหล็ก	300,400	00	BKB	สุ่ไหงโก-ลก	01664361	01 ก.ค.43	19 มิ.ย.43	นำส่งผู้แทนขาย	
21 มิ.ย.43	PO31116	GG3353	หจก. นานทอง โลหะกิจ	53,000	00	BKB	สุ่ไหงโก-ลก	01664362	01 ก.ค.43	21 มิ.ย.43	ปณ.ลงทะเบียน	
21 มิ.ย.43	PO31117	FA4463	บจก. ยิ่งเจริญคอนกรีตอัดแรง (1980)	12,200	00	BKB	สุ่ไหงโก-ลก	01664363	01 ก.ค.43	21 มิ.ย.43	ปณ.ลงทะเบียน	
21 มิ.ย.43	PO31118	H11300	บจก. บางกอกวัสดุภัณฑ์	43,300	00	BKB	สุ่ไหงโก-ลก	01664364	01 ก.ค.43	21 มิ.ย.43	ปณ.ลงทะเบียน	
21 มิ.ย.43	PO31119	KK456661	บจก. สาทรครึ่งชั่ง	51,100	00	BKB	สุ่ไหงโก-ลก	01664365	01 ก.ค.43	21 มิ.ย.43	ปณ.ลงทะเบียน	
21 มิ.ย.43	PO31124	U54511	บจก. นาป้า	300,450	00	BKB	สุ่ไหงโก-ลก	01664366	01 ก.ค.43	21 มิ.ย.43	ปณ.ลงทะเบียน	
21 มิ.ย.43	PO31125	YH0421	บจก. แจ็ค (ประเทศไทย)	23,300	00	BKB	สุ่ไหงโก-ลก	01664367	01 ก.ค.43	21 มิ.ย.43	นำส่งผู้แทนขาย	
21 มิ.ย.43	PO31126	JJF551	บจก. ที.เค.เอช. ฐบลดิ แอนด์ เทรดดิ้ง	45,500	00	BKB	สุ่ไหงโก-ลก	01664368	01 ก.ค.43	21 มิ.ย.43	ปณ.ลงทะเบียน	

วันที่พิมพ์ 20 มิถุนายน พ.ศ. 2543

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(ผู้ตรวจสอบ)

Figure C.6.   Payable Check Control in Advance Report.

109

Pakorn Construction Materials Co., Ltd.

ทะเบียนเจ้าหนี้

แผ่นที่ 1 / 1

ชื่อลูกหนี้	บจก. กรุงเทพผลิตเหล็ก
ที่อยู่	205 อาคารตู้ในแต่ตัดพลาวมิลล์ ถนนราชวงศ์ สัมพันธวงศ์ กรุงเทพฯ 10100
ชื่อผู้ติดต่อ	คุณเกษม ลักษมีวัฒนา
เบอร์โทรศัพท์	(02) 223-2387, 223-1572
เบอร์โทรสาร	(02) 224-7698

วันที่พิมพ์ 20 มิถุนายน พ.ศ. 2543

เลขที่ใบสั่งซื้อ	เลขที่ใบอ้างอิง	วันที่ในใบอ้างอิง	วันที่ใครบ	จำนวนเงิน		ส่วนลด	จำนวนเงินสุทธิที่ค้างชำระ		วันที่นัดชำระเงิน	วันที่กำหนดชำระ	ผู้นัด/โดย	หมายเหตุ
PO100588	UA7111	07 มิ.ย. 43	11 มิ.ย. 43	458,050	00	35 %	297,732	50	07 มิ.ย. 43	07 มิ.ย. 43	เกษม	
PO1001593	UA7120	18 มิ.ย. 43	20 มิ.ย. 43	102,000	00	35 %	364,032	50	18 มิ.ย. 43	18 มิ.ย. 43	เกษม	

ตรวจสอบโดย _____

Figure C.7. Credit Vendor Report.

110

Pakorn Construction Materials Co., Ltd.

ทะเบียนลูกหนี้

แผ่นที่ 1 / 1

ชื่อลูกหนี้	บจก. รัฐธรรม		ชื่อผู้ติดต่อ	คุณสมาน ทองสี		วันที่พิมพ์	20 มิถุนายน พ.ศ. 2543
ที่อยู่	15/22-24 ถ.วงศ์วัฒ สู่ไหงโก-ลก นราธิวาส 96120		เบอร์โทรศัพท์	(073) 611-694			
			เบอร์โทรสาร	(073) 611-695			

เลขที่ ใบสั่งของ	เลขที่ ใบส่งของ	วันที่ ใบส่งของ	วันที่ ได้รับ	จำนวนเงิน	ส่วนลด	จำนวนเงินสุทธิ	วันที่ครบกำหนด	วันที่กำหนด ส่วนลด	โดย	หมายเหตุ
SO101333	DL010335	08 มิ.ย. 43	08 มิ.ย. 43	334,500.00	5 %	317,775.00	05 มิ.ย. 43	05 มิ.ย. 43	ผจก.	
SO101356	DL010346	13 มิ.ย. 43	14 มิ.ย. 43	510,300.00	5 %	802,560.00	13 มิ.ย. 43	13 มิ.ย. 43	ผจก.	

ตรวจสอบโดย

Figure C.8. Debit Customer Report.

Pakorn Construction Materials Co., Ltd.

รายงานสินค้าแยกตามวิธีเก็บ

FIRST-IN, FIRST-OUT

ชนิด/วิธี
สินค้า ปูนซีเมนต์
ชื่อ ชนิด/ขนาด ปูนฉาบ "ตราเสือ 3 ตัว" 25 กก.
รหัสสินค้า 1030011
ปริมาณหน่วยนับ ถุง

วันที่พิมพ์ 30 มิถุนายน พ.ศ. 2543
ตรวจสอบโดย

แผ่นที่ 1 / 1

รายการรับ					รายการจ่าย				คงเหลือ		
วันเดือนปี	ใบสำคัญรับ	ปริมาณ	ราคาต้นทุนต่อหน่วย	ราคาต้นทุนทั้งสิ้น	วันเดือนปี	ใบสำคัญรับ	ปริมาณ	ราคาต้นทุนต่อหน่วย	ราคาต้นทุนทั้งสิ้น	ปริมาณ	ราคาต้นทุนต่อหน่วย	ราคาต้นทุนทั้งสิ้น
1 มิ.ย. 43										650	55.00	35,750.00
					5 มิ.ย. 43		350	55.00	19,250.00	300	55.00	16,500.00
9 มิ.ย. 43		600	55.00	33,000						900	55.00	49,500.00
					9 มิ.ย. 43		600	55.00	33,000	300	55.00	16,500.00
15 มิ.ย. 43		300	55.00	16,500						600	55.00	33,000.00

Figure C.9.   Inventory Item Report.

Pakorn Construction Materials Co., Ltd.

รายงานเปรียบเทียบการคำนวณสินค้าคงเหลือตามประเภทสินค้า

วันที่พิมพ์ 30 มิถุนายน พ.ศ. 2543

ตรวจสอบโดย _____

สินค้า ปูนซีเมนต์

ปริมาณหน่วยเป็น ถุง

ประเภทสินค้า	รายการรับ					รายการจ่าย					คงเหลือ		
	วันเดือนปี	ใบสำคัญรับ	ปริมาณ	ราคาต้นทุนต่อหน่วย	ราคาต้นทุนพิเศษ	วันเดือนปี	ใบสำคัญจ่าย	ปริมาณ	ราคาต้นทุนต่อหน่วย	ราคาต้นทุนพิเศษ	ปริมาณ	ราคาต้นทุนต่อหน่วย	ราคาต้นทุนพิเศษ
ปูนซีเมนต์ "ตราเสือ"	1 มิ.ย. 43										650	55.00	35,750.00
						5 มิ.ย. 43		350	55.00	19,250.00	300	55.00	16,500.00
	9 มิ.ย. 43		600	55.00	33,000						900	55.00	49,500.00
						9 มิ.ย. 43		600	55.00	33,000.00	300	55.00	16,500.00
	15 มิ.ย. 43		300	55.00	16,500						600	55.00	33,000.00
ปูนซีเมนต์ เบอร์แลนด์ "ตราช้าง"	1 มิ.ย. 43										1,000	85.00	85,000.00
						10 มิ.ย. 43		650	85.00	55,250.00	350	85.00	29,750.00
						11 มิ.ย. 43		325	85.00	27,625.00	25	85.00	2,125.00
	15 มิ.ย. 43		650	87.25	56,712.50						675	87.25	54,843.75

Figure C.10. Comparison on Inventory Item Type Report.

Pakorn Construction Materials Co., Ltd.

รายงานการรับคืนสินค้าประจำเดือนพฤษภาคม 2543

เลขที่ RI190643

แผ่นที่ 1 / 1

วัน เดือน ปี	เลขที่ ใบกำกับ สินค้า	รายการ	วันที่ซื้อ สินค้า	เหตุผลที่รับ คืน/ลดยอด ลูกหนี้	รวมจำนวน เงิน	เดบิต	
						รับคืน	ภาษี ขาย
20 พ.ค. 43	IN 10333	ท่อระบายน้ำซิเมนต์ใยหิน "ตราช้าง" ⌀ 400 มม. X 4 ม.	19 พ.ค. 43	ขอบแตกชำรุด	50,622.00	47,310.28	3,311.72
		รวมเงินทั้งสิ้น			50,622.00	47,310.28	3,311.72

วันที่พิมพ์ 01 มิถุนายน พ.ศ. 2543

(ผู้ตรวจสอบ)

Figure C.11.   Return of Sales Inventory Item Report.

114

Pakorn Construction Materials Co., Ltd.

รายงานการส่งคืนสินค้าประจำเดือนพฤษภาคม 2543

เลขที่ RP190643

แผ่นที่   1   /   1

วัน เดือน ปี	เลขที่ ใบกำกับ สินค้า	รายการ	วันที่ซื้อ สินค้า	เหตุผลที่ส่ง คืน/ลดยอด เจ้าหนี้	รวมจำนวน เงิน	เครดิต	
						ส่งคืน	ภาษี ขาย
03 พ.ค. 43	PO310003	กระเบื้องเซรามิค COTTO ขนาด 4" X 4" ลายเมมา สีชมพู	28 เม.ย. 43	ผิดลาย	50,622.00	47,310.28	3,311.72
15 พ.ค. 43	PO31006	กุญแจ ลูกบิด "TITAN" รุ่น 303	09 พ.ค. 43	ล็อคเสีย	5,500.00	5,140.19	359.81
		รวมเงินทั้งสิ้น			56,122.00	52,450.47	3,671.53

วันที่พิมพ์ 01 มิถุนายน พ.ศ. 2543

(ผู้ตรวจสอบ)

Figure C.12.   Return of Purchased Inventory Item Report.

115

APPENDIX   D

TABLE REFERENCE

Table D.1.   Customer Table.

<u>Properties</u>

Search table name:	CUSTOMER
Table type:	Entity
Database location:	Freetrade.mdb
Table description:	Customer master file

<u>Attributes</u>

Name	Type	Size
CUST Id	Text	8
CUST Name	Text	50
CUST Inactive YN	Number (Integer)	2
CUST Address 1	Text	30
CUST Address 2	Text	30
CUST City	Text	20
CUST Province	Text	20
CUST Postal	Text	20
CUST Country	Text	20
CUST Phone	Text	20
CUST Phone Ext	Text	10
CUST Fax	Text	20
CUST Contact	Text	20
CUST Notes	Memo	-
CUST Deliver to Name	Text	50
CUST Deliver to Address 1	Text	30
CUST Deliver to Address 2	Text	30
CUST Deliver to City	Text	20
CUST Deliver to Province	Text	20
CUST Deliver to Postal	Text	20
CUST Deliver to Country	Text	20
CUST Deliver to Phone	Text	20
CUST Deliver to Phone Ext	Text	10
CUST Deliver to Contact	Text	20
CUST Type	Text	20
CUST Payment Terms	Text	20
CUST Credit Limit	Number (Double)	8
CUST Tax ID	Text	20
CUST First Contact	Date/Time	8
CUST Last Revised	Date/Time	8

<u>Table Indexes</u>

Name	Number of Fields
Primary Key	1
Field	INV ITEM Id, Ascending
Foreign Key	0
Field	-

Table D.2.   Sales Order Table.

<u>Properties</u>

        Search table name: SALES_ORDER
        Table type: Entity
        Database location: Freetrade.mdb
        Table description: Sales Order file

<u>Attributes</u>

Name	Type	Size
SALES ORD Number	Text	8
SALES ORD Quantity	Number (Double)	8
SALES ORD Date	Date/Time	20
SALES ORD Item Id	Text	20
SALES ORD Units	Text	255
SALES INV Description	Text	8
SALES INV Item Cost	Number (Double)	8
SALES INV Unit Price	Number (Double)	8
SALES INV Item Total	Number (Double)	8
CUST Number	Text	8
CUST PO Number	Text	8
CUST PO Date	Date	8

<u>Table Indexes</u>

Name	Number of Fields
Primary Key	1
Field	SALE ORD Number, Ascending
Foreign Key	1
Field	CUST Number

117

Table D.3.   Sales Order Product Item Table.

Properties
        Search table name: SALES_ORDER_PRODUCT_ITEM
        Table type: Associative entity
                                            (1) SALES_ORDER
                                            (2) INVENTORY
        Database location: Freetrade.mdb
        Table description: Sales Order Product Item file

Attributes

Name	Type	Size
SALES ORD Number	Text	8
INV ITEM Number	Text	8
INV SALES ITEM Quantity	Number (Double)	8
INV SALES ITEM Units	Text	20

Table Indexes

Name	Number of Fields
Primary Key	1
Field	SALE ORD Number, Ascending
Field	INV ITEM Number, Ascending
Foreign Key	1
Field	SALE ORD Number, Ascending
Field	INV ITEM Number, Ascending

118

Table D.4.   Inventory Table.

Properties
        Search table name: **INVENTORY**
        Table type: Entity
        Database location: Freetrade.mdb
        Table description: Inventory file

Attributes

Name	Type	Size
INV ITEM Number	Text	8
INV ITEM Inactive YN	Number (Double)	2
INV ITEM Type	Text	20
INV ITEM Description	Text	255
INV ITEM Category	Text	20
INV ITEM Sales Account	Text	50
INV ITEM Inventory Account	Text	50
INV ITEM Cost of Sales Account	Text	50
INV ITEM Unit	Text	20
INV ITEM Price	Number (Double)	8
INV ITEM Taxable YN	Yes/No	1
INV ITEM Pricing Method	Number (Integer)	2
INV ITEM Costing Method	Number (Integer)	2
INV ITEM Vendor ID	Text	8
INV ITEM Vendors Number	Text	50
INV ITEM Reorder Level	Number (Double)	8
INV ITEM Reorder Qty	Number (Double)	8
INV ITEM Qty On Hand	Number (Double)	8
INV ITEM Qty On Order	Number (Double)	8
INV ITEM Average Cost	Number (Double)	8
INV ITEM Last Cost	Number (Double)	8
INV ITEM Standard Cost	Number (Double)	8
INV ITEM New Price	Number (Double)	8
INV ITEM Notes	Memo	-

Table Indexes

Name	Number of Fields
Primary Key	1
Field	INV ITEM Id, Ascending
Foreign Key	0
Field	-

Table D.5.   Stock Picking Product Item Table.

Properties
    Search table name: **STOCK_PICKING_PRODUCT_ITEM**
    Table type: Associative entity
                                (1) STOCK_PICKING
                                (2) INVENTORY
    Database location: Freetrade.mdb
    Table description: Inventory file

Attributes

Name	Type	Size
INV ITEM Number	Text	8
STCK PICK Number	Text	8
INV PICK Quantity	Number (Double)	8

Table Indexes

Name	Number of Fields
Primary Key	2
Field	INV ITEM Number, Ascending
Field	STCK PICK Number, Ascending
Foreign Key	2
Field	INV ITEM Number, Ascending
Field	STCK PICK Number, Ascending

120

Table D.6.   Stock Picking Table.

Properties
       Search table name: STOCK_PICKING
       Table type: Entity
       Database location: Freetrade.mdb
       Table description: Stock picking file

Attributes

Name	Type	Size
STCK PICK Number	Text	8
STCK PICK Date	Date	8
STCK PICK Name	Text	20
SALE ORD Number	Text	8

Table Indexes

Name	Number of Fields
Primary Key	1
Field	INV ITEM Id, Ascending
Foreign Key	1
Field	SALE ORD Number, Ascending

Table D.7.   Delivery Table.

<u>Properties</u>

Search table name:	**DELIVERY**
Table type:	Entity
Database location:	Freetrade.mdb
Table description:	Delivery file

<u>Attributes</u>

Name	Type	Size
DLVR Number	Text	8
DLVR Date	Date	8
DLVR Vehicle Type	Text	20
DLVR Vehicle Number	Text	8
CUST Id	Text	8
STCK PICK Number	Text	8
INV ITEM Number	Text	8

<u>Table Indexes</u>

Name	Number of Fields
Primary Key	1
Field	INV ITEM Id, Ascending
Foreign Key	3
Field	CUST Id
Field	STCK PICK Number
Field	INV ITEM Number

Table D.8.   Sales Invoice Table.

Properties
      Search table name: SALES_INVOICE
      Table type: Entity
      Database location: Freetrade.mdb
      Table description: Sales invoice file

Attributes

Name	Type	Size
SALES INV Number	Text	8
SALES INV Qty	Number (Double)	8
SALES INV Date	Date/Time	8
SALES INV Item Id	Text	21
SALES INV Units	Text	21
SALES INV Discount %	Number (Double)	8
SALES INV Tax	Yes/No	1
SALES INV Tax Rate	Number (Double)	8
SALES INV Description	Yes/No	255
SALES INV Item Cost	Number (Double)	8
SALES INV Item Total	Number (Double)	8
DLVR Number	Text	8
CUST Id	Text	8

Table Indexes

Name	Number of Fields
Primary Key	1
Field	SALES INV Number, Ascending
Foreign Key	2
Field	DLVR Number, Ascending
Field	CUST Id, Ascending

Table D.9.   Purchased Product Item Table.

<u>Properties</u>
   Search table name: PURCHASED_PRODUCT_ITEM
   Table type: Associative entity
            (1) INVENTORY
            (2) VENDOR
   Database location: Freetrade.mdb
   Table description: Purchased Product Item file

<u>Attributes</u>

Name	Type	Size
INV ITEM Number	Text	8
VEND Id	Text	8
ITEM PUR Qty	Number (Double)	8
ITEM PUR Ordered Date	Date/Time	8
ITEM PUR Received Date	Date/Time	8

<u>Table Indexes</u>

Name	Number of Fields
Primary Key	2
Field	INV ITEM, Ascending
Field	VEND Id, Ascending
Foreign Key	2
Field	INV ITEM, Ascending
Field	VEND Id, Ascending

Table D.10.   Vendor Table.

<u>Properties</u>

Search table name:	VENDOR
Table type:	Entity
Database location:	Freetrade.mdb
Table description:	**Vendor master file**

<u>Attributes</u>

Name	Type	Size
VEND Id	Text	8
VEND Name	Text	50
VEND Inactive YN	Number (Double)	2
VEND Address 1	Text	30
VEND Address 2	Text	30
VEND City	Text	20
VEND Province	Text	20
VEND Postal	Text	20
VEND Country	Text	20
VEND Phone	Text	20
VEND Phone Ext	Text	10
VEND Fax	Text	20
VEND Contact	Text	20
VEND Notes	Memo	-
VEND Remit Name	Text	50
VEND Remit Address 1	Text	30
VEND Remit Address 2	Text	30
VEND Remit City	Text	20
VEND Remit Province	Text	20
VEND Remit Postal	Text	20
VEND Remit Country	Text	20
VEND Remit Phone	Text	20
VEND Remit Phone Ext	Text	10
VEND Remit Fax	Text	20
VEND Remit Contact	Text	20
VEND Buying Terms	Text	20
VEND Type	Text	20
VEND Tax ID	Text	20
VEND First Contact	Date/Time	8
VEND Last Revised Date	Date/Time	8

<u>Table Indexes</u>

Name	Number of Fields
Primary Key	1
Field	VEND Id, Ascending
Foreign Key	0
Field	-

APPENDIX   E

PROCESS SPECIFICATION

Table E.1.   Process Specification of Process 1.1.

Process Name:	Edit and route
Data In:	Customer data
Data Out:	Marketing file Edited order
Process:	(1) Get customer's inquiry (2) Retrieve customer data (3) Acknowledge the customer (4) Get customer's order (5) Deliver the edit order
Attachment:	(1) Process 1.2 Response to inquiry

126

Table E.2.   Process Specification of Process 1.2.

Process Name:	Respond to inquiry
Data In:	Customer data Inventory data (products available) Sales order data
Data Out:	Edited order Customer reply
Process:	(1) Retrieve edited order (2) Retrieve customer data, inventory data, and sales order data (3) Respond to the customer (4) Deliver edited order
Attachment:	(1) Process 2.1 Check credit

127

Table E.3.   Process Specification of Process 2.1.

Process Name:	Check credit
Data In:	Get edited order Retrieve customer data, accounts receivable data
Data Out:	Customer acknowledgement Sales order data Credit approved order
Process:	(1) Check the customer data (2) Check account receivable (customer status) (3) Respond to the customer (4) Update sales order data (5) Deliver credit approved order
Attachment:	(1) Process 2.2 Verify inventory available

Table E.4.   Process Specification of Process 2.2.

Process Name:	Verify inventory available
Data In:	Credit approved order Sales order data
Data Out:	Customer acknowledgement Sales order notification Inventory data Back order Accepted order
Process:	(1) Get credit approved order (2) Retrieve sales order data (3) Check the inventory stock available (4) (if stock not available) issue back order (5) Deliver accepted order
Attachment:	(1) Process 2.3 Complete sales order

Table E.5.   Process Specification of Process 2.3.

Process Name:	Complete sales order
Data In:	Accepted order
Data Out:	Inventory sales Packing slip Picking ticket
Process:	(1) Get accepted order (2) Update inventory sale (3) Issue packing slip and picking ticket (4) Deliver packing slip and picking ticket
Attachment:	(1) Process 3.1 Match goods with picking ticket (2) Process 4.1 Match order

Table E.6.   Process Specification of Process 3.1.

Process Name:	Match goods with picking ticket
Data In:	Picking ticket
Data Out:	Matched picking ticket
Process:	(1) Get picking ticket (2) Match goods in inventory with picking ticket (3) Deliver matched picking ticket
Attachment:	(1) Process 3.2 Enter quantity picked

Table E.7.   Process Specification of Process 3.2.

Process Name:	Enter quantity picked
Data In:	Matched picking ticket
Data Out:	Completed picking ticket
Process:	(1) Get matched picking ticket (2) Key in the quantity picked (3) Deliver completed picking ticket to carrier
Attachment:	(1) Process 4.1 Match order

Table E.8.   Process Specification of Process 4.1.

Process Name:	Match order
Data In:	Picking slip
Data Out:	Picking ticket data Matched sales order
Process:	(1) Get Picking slip and complete picking ticket (2) Compare the Picking slip and complete picking ticket and approve (3) Update picking ticket data (4) Deliver matched sales order
Attachment:	(1) Process 4.2 Produce delivery notice

132

Table E.9.   Process Specification of Process 4.2.

Process Name:	Produce delivery notice
Data In:	Matched sales order Sales order data
Data Out:	Completed picking slip Sales order data Delivery billing notification Delivery data Delivery inventory notification Bill of lading
Process:	(1) Get matched order (2) Check and compare matched order with sales order file (3) Issue sales order, bill of lading and update sales order (4) Approve completed picking slip and update delivery data (5) Deliver completed picking slip, billing of lading and the inventory and billing notification
Attachment:	(1) Carrier

APPENDIX   F

DATA DICTIONARY

Table F.1.   Customer File Data Dictionary Entry.

Customer File

    Customer record.........................the file consists of one or more of

                                  these records

    Customer number........................used to identify the customer

    Customer identification

        Customer name.......................name of the customer to be billed

        Customer address....................address to which the bill is sent

        Customer deliver-to-name............if different from the billing name

        Customer deliver-to address.........if different from the billing address

    Customer information

        Customer limit.......................determined by the company committee

        Customer first contact.................data of the first bough the

                                  company merchandise

        Customer last revised.................date of the last file maintenance activity

        Credit terms...........................determined by the company committee

134

Table F.2.   Vendor File Data Dictionary Entry.

Vendor File

    Vendor record……………………..the file consists of one or more of

                                 These records

    Vendor number…………………….used to identify the vendor

Vendor identification

      Vendor name…………………..name of the vendor to be billed

      Vendor address……………….address to which the bill is sent

      Vendor deliver-to-name…………..if different from the billing name

      Vendor deliver-to address………if different from the billing address

Vendor information

      Vendor limit…………………..determined by the company committee

      Vendor first contract……………date of the first file added

      Vendor last revised………………date of the last file maintenance activity

      Credit terms………………………determined by the vendor

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