An Inventory System for YMS Co., Ltd.

by

Ms. Voraluck Aphiratsakul

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

Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science
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Project Title	An Inventory System for YMS Co., Ltd.
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Academic Year	November 2006

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

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ABSTRACT

This project was analyzed, designed, and developed in order to be used by YMS Co., Ltd. This project focuses on the inventory system which is controlled by transactional database. Database was basically designed and created as a tool to increase efficiency of data processing, data sharing, faster operation, reduce time, reduce mistakes and error etc.

The existing system was a noncomputerized system which has only performed many data transactions day by day. The existing system had many data transactions which are recorded on paper that may contain many errors and mistakes. Therefore, it is difficult to obtain the useful information from this existing system. This project provides the analysis of inventory system. The analysis is divided into many parts such as understanding of the existing system, setting up the scope of the new system, designing useful database, maintaining previous paper-based database and implementation.

The proposed system is designed under the system analysis theory and business condition such as organization's chart, data flow diagram and entity relational diagram. It has a main database for consistency and shared resource.

This system can resolve the existing operation's problem in order to reduce cost and time. It also included a decision for supporting system in order to support decision making of the management.

ACKNOWLEDGEMENTS

I would like to express my thanks and gratefulness for the insights provided by Dr. Chamnong Jungthirapanich, my project advisor, for all his valuable suggestions, recommendation and kindness. The kind of teacher who sacrifices himself for the student. After being interviewed by him on the first date of MS-CEM program, I realized that I chose the right program to further my studies.

I am grateful to all the respondents who helped me to complete the survey since the data collecting phase.

Special appreciation goes to my parents for always being my supporters and building up my inspiration. I would like to extend my thanks to all my friends for helping me while doing this project. Without them, this project would not have finished.

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I. INTRODUCTION

1.1 Background of the Project

There are many distributors who have their own inventory system. The existing system is a noncomputerized system that only performed many data transactions day by day. It has many data transactions which are recorded on paper and they may contain errors and mistakes. Therefore, it is difficult to obtain useful information from them.

YMS Co., Ltd. was established in 2001. It is located in Pathumwan, Bangkok. This company is SMEs (Small and Medium Enterprises). It performs business by distributing pianos.

This report describes a new inventory system of YMS Co., Ltd. The new system will improve general reports to reduce the delay of time in preparing them and also reduce lead-times in many operational processes. The system will enable the company to obtain useful information on inventory department for effective management and competent planning control.

1.2 Objectives of the Project

The Objective of Inventory System is to support the decision-making of all levels of management officers in order to make the right decision of purchasing products, managing inventory control, maintaining existing products used in YMS Co., Ltd. This new system is designed to manage the inventory in order to make the company more efficient, and easy for users to check the number of products available and to determine the number of products to be order or maintained. Up-to-date data can be collected easily and summarized into report that can serve all levels of management.

The objectives for this project include the following:

(1) To set up the database to keep track of inventory in order to reduce the problem of store complication, decrease the data redundancy and increase the easiness to check the inventory information.

(2) To set up the database to support the decision-making of purchasing officers in order to purchase the right number of products at the right time.

(3) To prepare the MIS report that can print out all the essential details for middle and top level management everyday as a daily report. The report will help the management team in making the best decision.

(4) To decrease the number of manual officers which will be replaced which computer.

(5) To establish good updated inventory database that has related information that can be useful in providing solutions for the management team to analyze and plan for the future.

(6) To set up the standard for the company and lead the company to gain the competitive advantage over the others.

1.3 Scope of the Project

This cross-functional project will support the following business function and external party:

(1) Inventory Management

(a) To collect the data of products that is received from publishing company and suppliers.

(b) To update the stock when publishing company and supplier delivered the materials.

(c) Can check the amount of available products.

(2) Queue management

(a) To query the retailer by using first in – first out concept.

(b) To check who ordered products.

(3) MIS report

(a) Can report the amount of products anytime if the manager request.

(b) Can report best selling products anytime.

(c) Can list the retailer detail (retailer's name, date, time, amount, price) of each product anytime.

(4) Supplier Information

(a) To collect supplier data.

(b) Able to add new supplier.

(c) Able to delete and edit existing supplier detail.

(5) Worker Information

(a) To collect worker's data (officers).

(b) Able to add new worker.

(c) Able to delete and edit existing worker detail.

(6) Purchasing Management

(a) Able to retrieve product's data.

(b) Able to retrieve supplier's data.

(c) Able to print purchase order.

II. THE EXISTING SYSTEM

2.1 Background of the Organization

YMS Co., Ltd. is a small company that performed business as SMEs (Small and Medium Enterprises). The company was established five years ago and has only 5-8 staffs. The company is divided into three departments and all departments are controlled by executive management as shown in company's organization chart in Figure 2.1 and company's department chart in Figure 2.2.

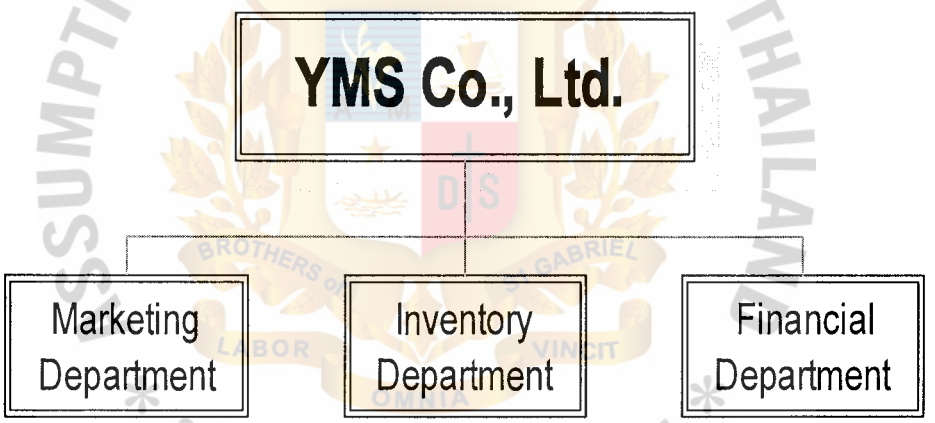

Figure 2.1 YMS Co., Ltd. Organization Chart.

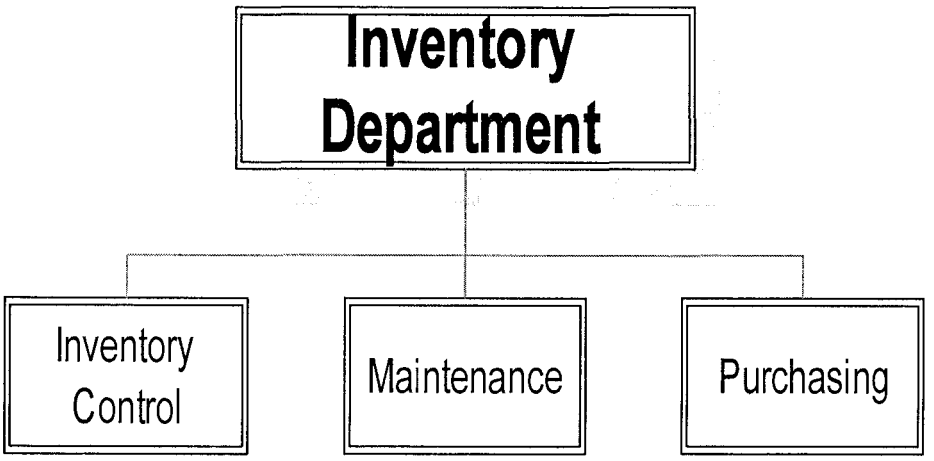

Figure 2.2 YMS Co., Ltd. Department Chart.

The departments of company are divided as follows:

2.1.1 Inventory Department

This project focuses on inventory department so it is the most important department. Inventory department is divided into three divisions; inventory control, inventory maintenance and purchasing. It is responsible for inventory management for checking, updating and maintaining in order to save cost. It also deals with the suppliers to corporate and negotiate for requested products, issue purchasing order, search solution to solve supplier's problem and keep ordering records.

2.1.2 Marketing Department

Marketing Department focuses on how to promote products and how to close sale. Marketing department is divided into four main divisions; sales, marketing support, sale promotion and advertising. This department is responsible for setting up marketing strategies, promotional plans and how to implement these strategies or plans. It also takes care of the sales representative to coordinate with the marketing team and follow the plans to achieve the sales target.

2.1.3 Financial and Accounting Department

Financial and Accounting Department focuses on collecting money from account receivable and paying to account payable. Financial and Accounting Department is divided into two main divisions; accounting and financing. It is responsible for controlling and monitoring company's cash flow and all expenditures. It is also responsible for recording and clarifying all transactions and preparing the company's financial reports.

2.2 Existing Business Function and System

(1) Retailers request products by sending purchasing order.

(2) Company distributed products according to the purchase order.

(3) Company sends requested order to suppliers in order to fulfilled the order requirement

(4) Supplier delivers the requested products to company.

(5) Purchasing department will receive unavailable product records in order to make purchasing.

(6) Purchasing department checks unavailable product in order to create order form and send it to suppliers.

(7) Delivery department gets purchasing order from retailers.

(8) Delivery department delivers available products to retailers according to purchasing order.

(9) Accounting department issues invoice to purchasing department.

(10) Accounting department receives bill of order from suppliers.

2.3 Current Problems and Areas of Improvement

According to current system, the systems are different from each other. So there are many problems in this existing system as listed below:

(1) Data are unable to share efficiently with the other departments to support decision making efficiently.

(2) The existing system cannot prepare necessary information that the management needed at the right time.

(3) An inaccuracy of inventory data causes an inefficient financial control and management.

(4) Transaction data are increasing day by day so it is hard to analyze or obtain useful information from it manually.

(5) The demand of products is also increasing. Today, in this business, there is a fierce competition. The competitors are rapidly increasing in a short period. The company needs an effective analyzing system in order to get competitive advantage.

(6) A lot of paper works created by the existing system makes data hard to be searched and causes the storage problems as sometimes the data are lost or forgotten.

(7) The manual system is inefficient for staffs to provide the up-to-date information to analyze and make decision.

(8) Inventory reports do not cover all the information needed and often with wrong or outdated information.

(9) The documents are not secured.

(10) The manual system has a lot of workers in the work flow.

(11) The system has data redundancy.

Areas for improvement:

(1) Create the systems that support their business function base on the existing system.

(2) Add the analysis system on the new system.

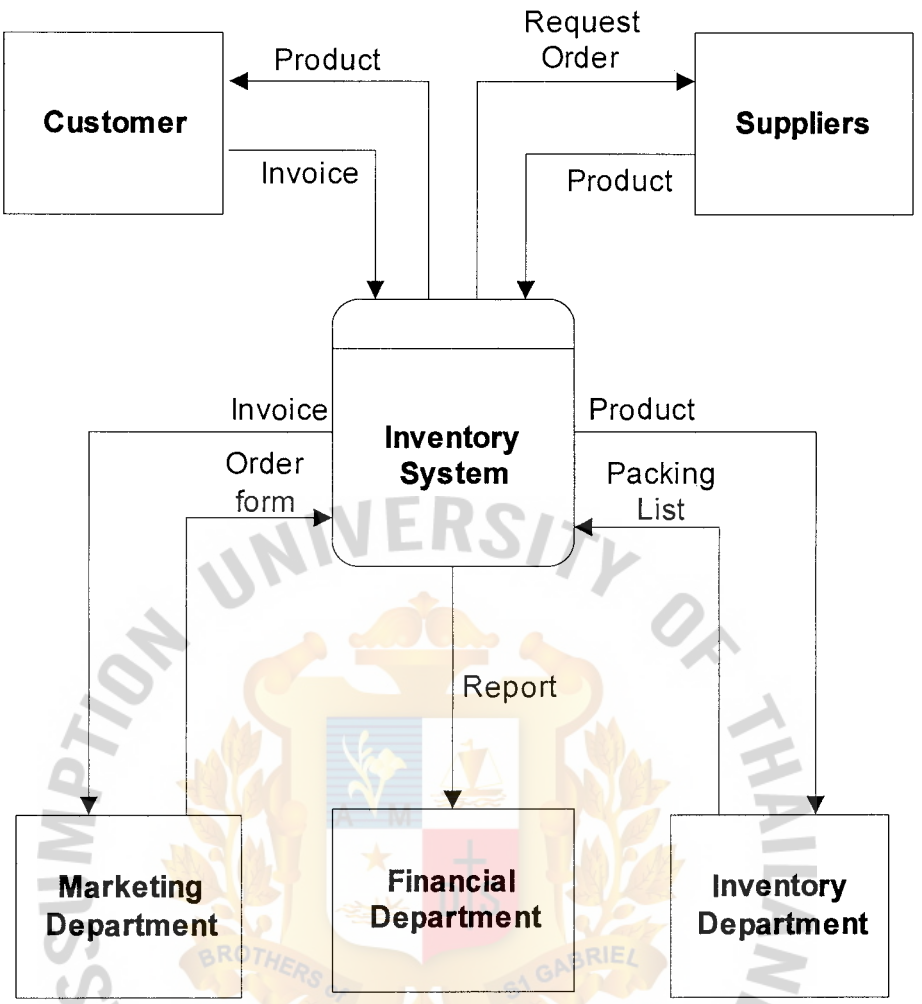

Figure 2.3 The Context Diagram of the Existing System

III. THE PROPOSED SYSTEM

3.1 Management's Requirement

The Management's requirement is highly expected to know the current situation of the company and also the inventory situation. Generally, the company had to have inventory management system.

An Inventory System has to let the executive management to know about the situation of the company concerning the departments in order to help them to make any decision makings.

Management also needs to give a security control in order to force all users to follow the provided directions in each transaction and also to keep the information into the computer system such as the resignation of the staffs, inventory records and supplier's details.

All the management's requirement are really objective to make the decision to have the computerized system in their company.

3.2 User's Requirement

Computerized system has to provide all user requirements as follows:

(1) The inventory system has to group the related functions together in order to avoid any confusions of the work process.

(2) The inventory system has to simplify menu in each transaction or must be user-friendly system in order to facilitate the user to work easily.

(3) The system must have a main menu that identifies the purpose of each menu and covers all the transactions of inventory work process.

(4) The system has to create reports in each transaction at any given situations such as when there's something wrong in the work flows, users can print out

a transactional report and print directly to serve managers anytime if they want to see. Then managers will know what are mistakes in the system or what happen in the work flows.

(5) In each department, the system performed as a cross-functional system. It is a centralized system that any departments can coordinate to each other according to the privilege level. For example, management level can access to the whole system but marketing staff cannot access to the inventory management sub-system.

(6) The system has a centralized database that will permit any departments to retrieve necessary data from it.

(7) The system can prepare MIS reports that will support manager's need under time condition such as by date, by month and by year.

(8) The system can keep all transactional inputs into the database and can retrieve it anytime when they would like to see. It can display in the form of data field in the computer screen and the reports can be served directly to the users.

(9) This computerized system always updates in order to get accuracy and up-to-date information

(10) The proposed system is an online system. Therefore, the users are able to exchange and retrieve information simultaneously by using LAN.

(11) Computerized system has to reduce time consumption, operational cost, and eliminate redundancy data.

3.3 System Design

The computerized system was designed to meet the two important requirements as management's requirement and user's requirement. In case of management's requirement, it focuses on how to provide executive information for executive management in order to make a decision. In case of user's requirement, it focuses on the inventory control in order to help users manage inventory stock easily. The new system is also designed under two objectives. The first, the system must link with all the concerned information to the concerned department in order to share business information in the company. The second, the system must link with all the transactions of the inventory system following the management's direction.

In the designing stage, the logical Data Flow Diagram (DFD) is used as a tool for both structure analysis and system design. Figure 3.1 represents the context diagram of the products management system. The Data Flow Diagram level 0 is shown in Figure 3.2 and the Data Flow Diagram level 1 is shown in Figure 3.3 and onward.

The proposed system can be divided into 6 main processes as follows:

(1) Product availability checking process: The process checks whether the products are available in the stock or not. This process monitors the quantity of products available in the stock.

(2) Product transmission process: The process transfers the product's details. The system will retrieve requested product detail from inventory department. If the products are available in the stock, the systems have to transfer the available product details to marketing department and also update it into database.

(3) Ordering process: It is a process that order products from suppliers. If the products are unavailable in the stock, the system has to get the purchased

product details from inventory department and supplier information from a supplier records and previous order information from order records. The system has to process the ordering transaction by sending purchase order details to suppliers and also update it into database.

(4) Product receive and checking process: This process performs many functions. The system has to get ordered product details from suppliers and send invalid order details back to suppliers in case of error and also update the correct ordered product details into a database. In case of new product, the system has to generate individual product code automatically. The system can send received order details to accounting department for preparing a payment to suppliers. Inventory department can retrieve product's details from this system.

(5) Generate product code: This process is designed to generate the code of a new product. This process occurred when the system receives the new products which do not have a product code. The system has to generate the code for each new product automatically.

(6) Create report: This Process generates reports for related units and for the manager to check, plan and develop the company. This process also help management level in making a decision.

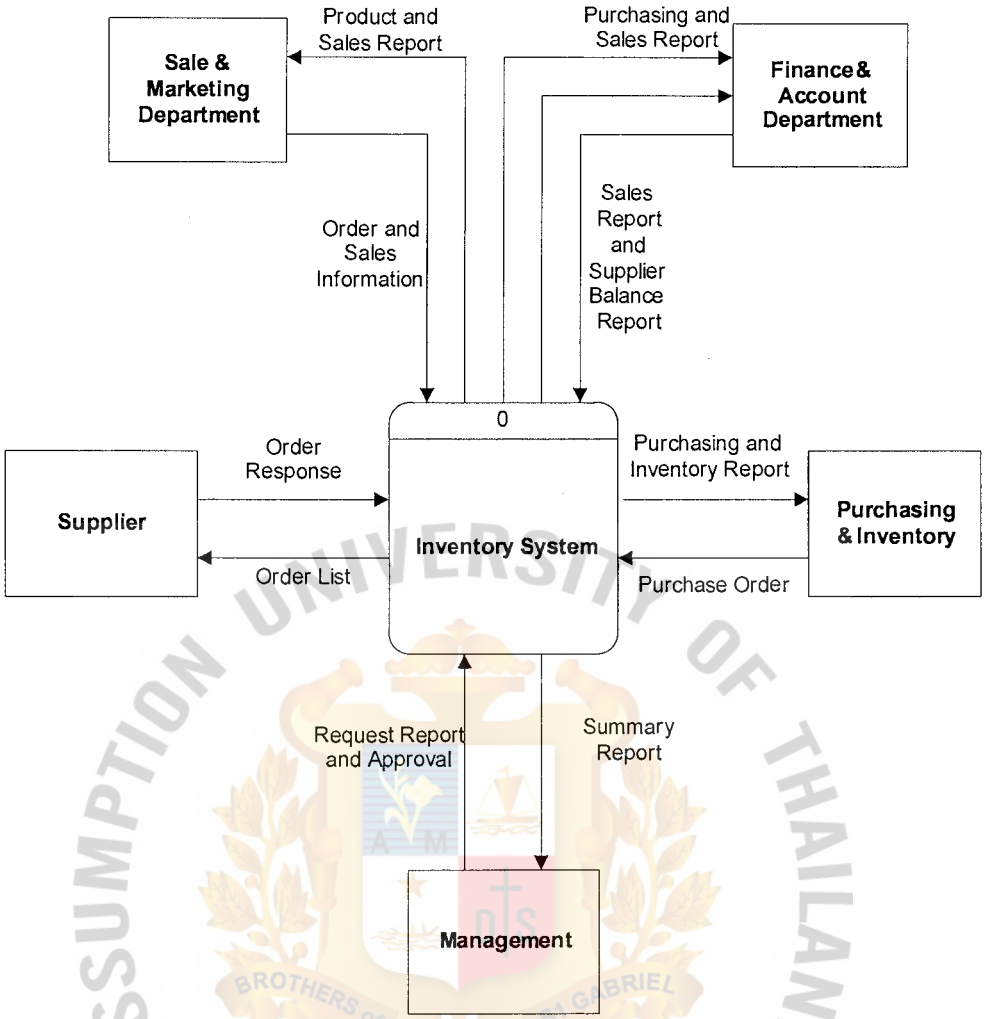

Figure 3.1 Proposed System Context Diagram.

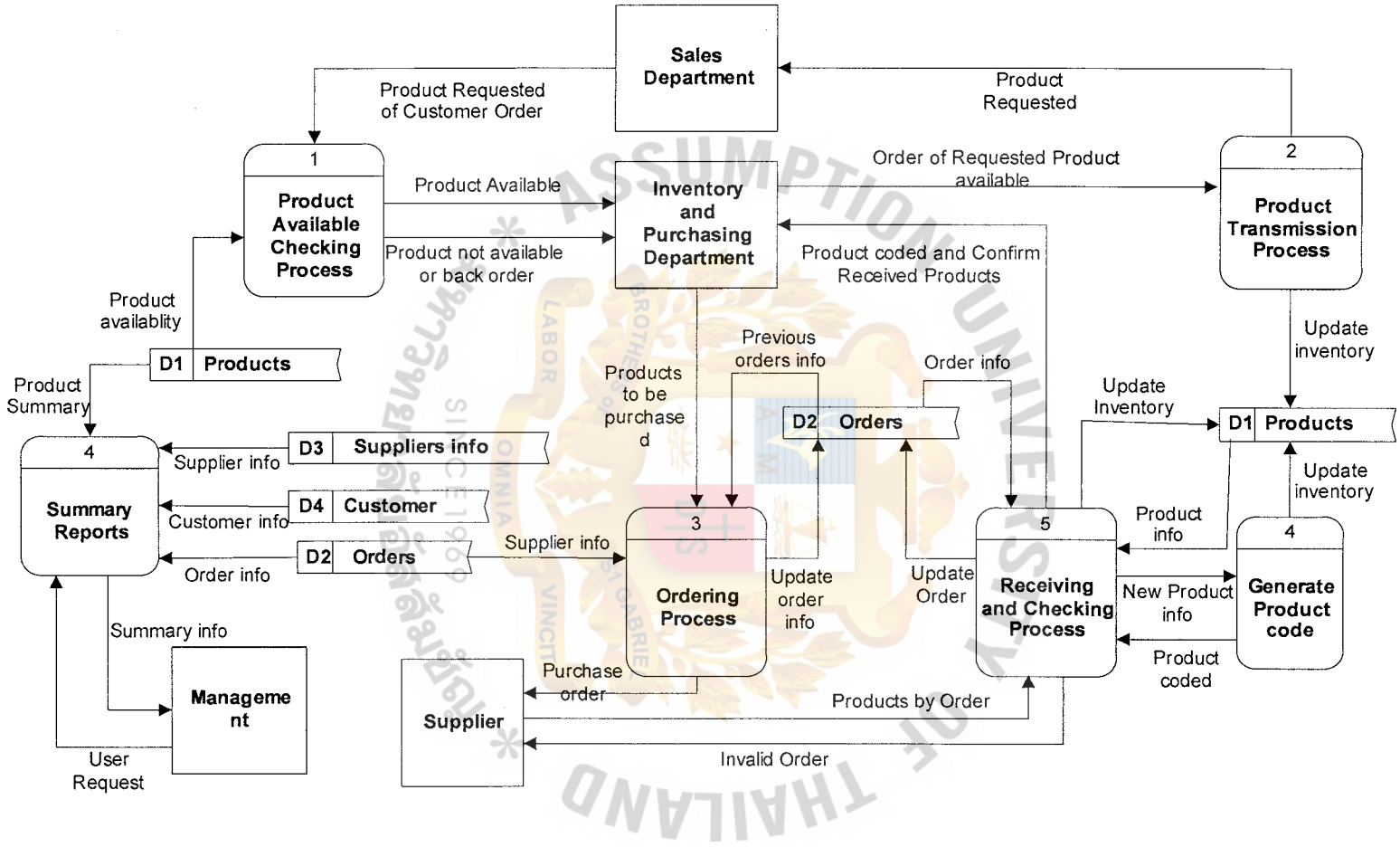

Figure 3.2 Data Flow Diagram Level 0.

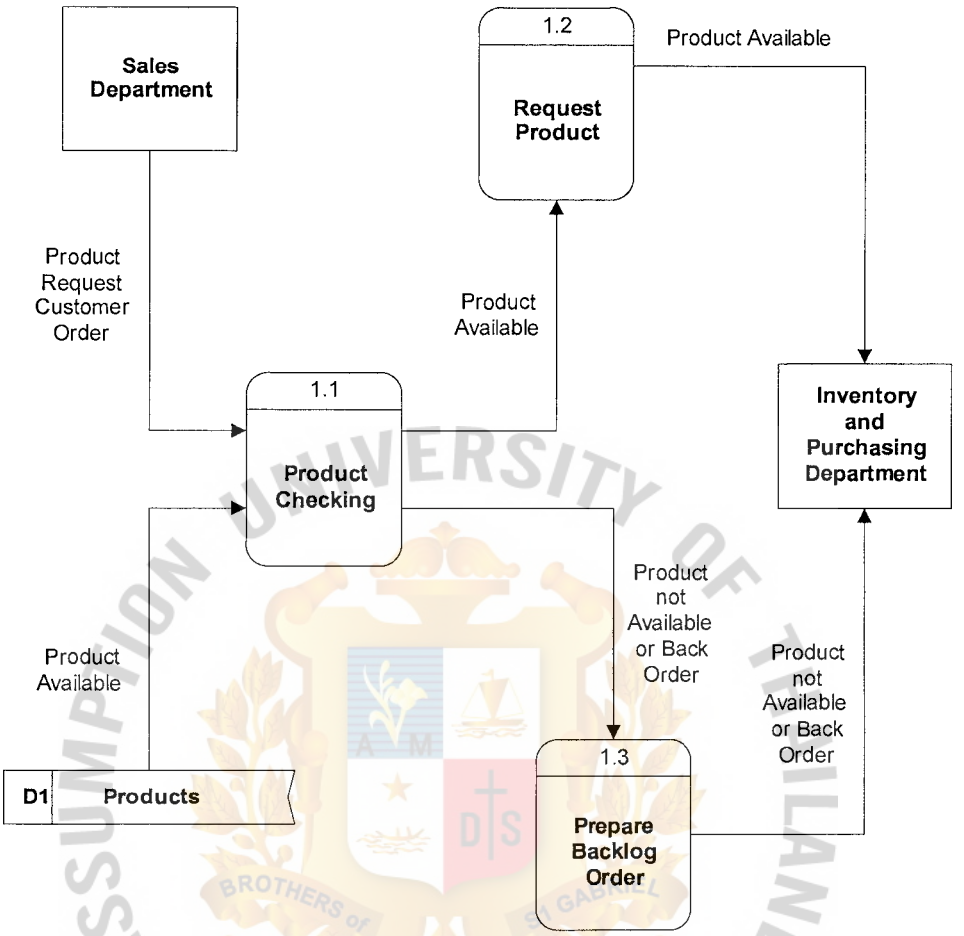

Figure 3.3 Data Flow Diagram Process 1 Level 1.

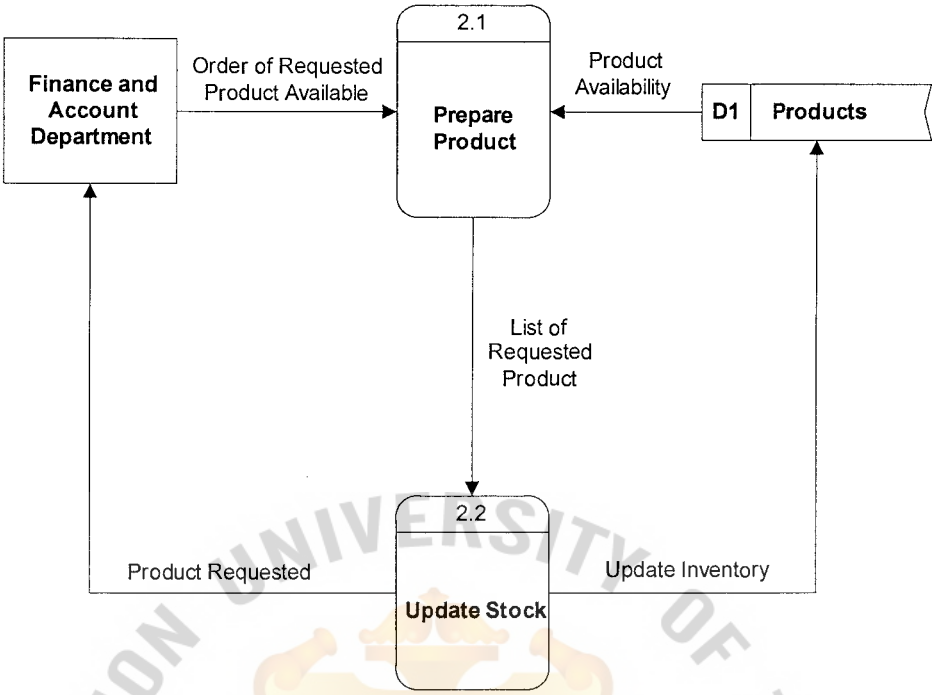

Figure 3.4 Data Flow Diagram Process 2 Level 1.

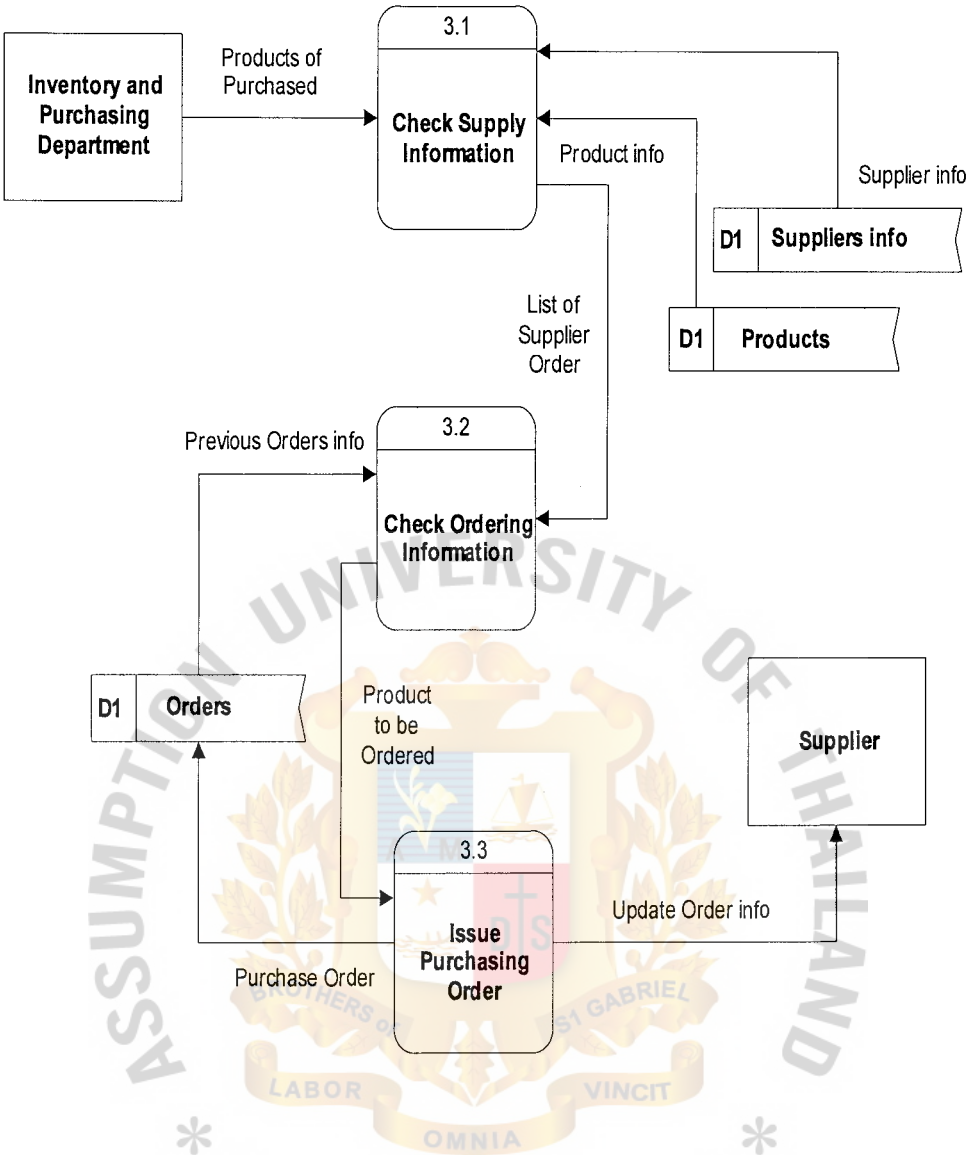

Figure 3.5 Data Flow Diagram Process 3 Level 1.

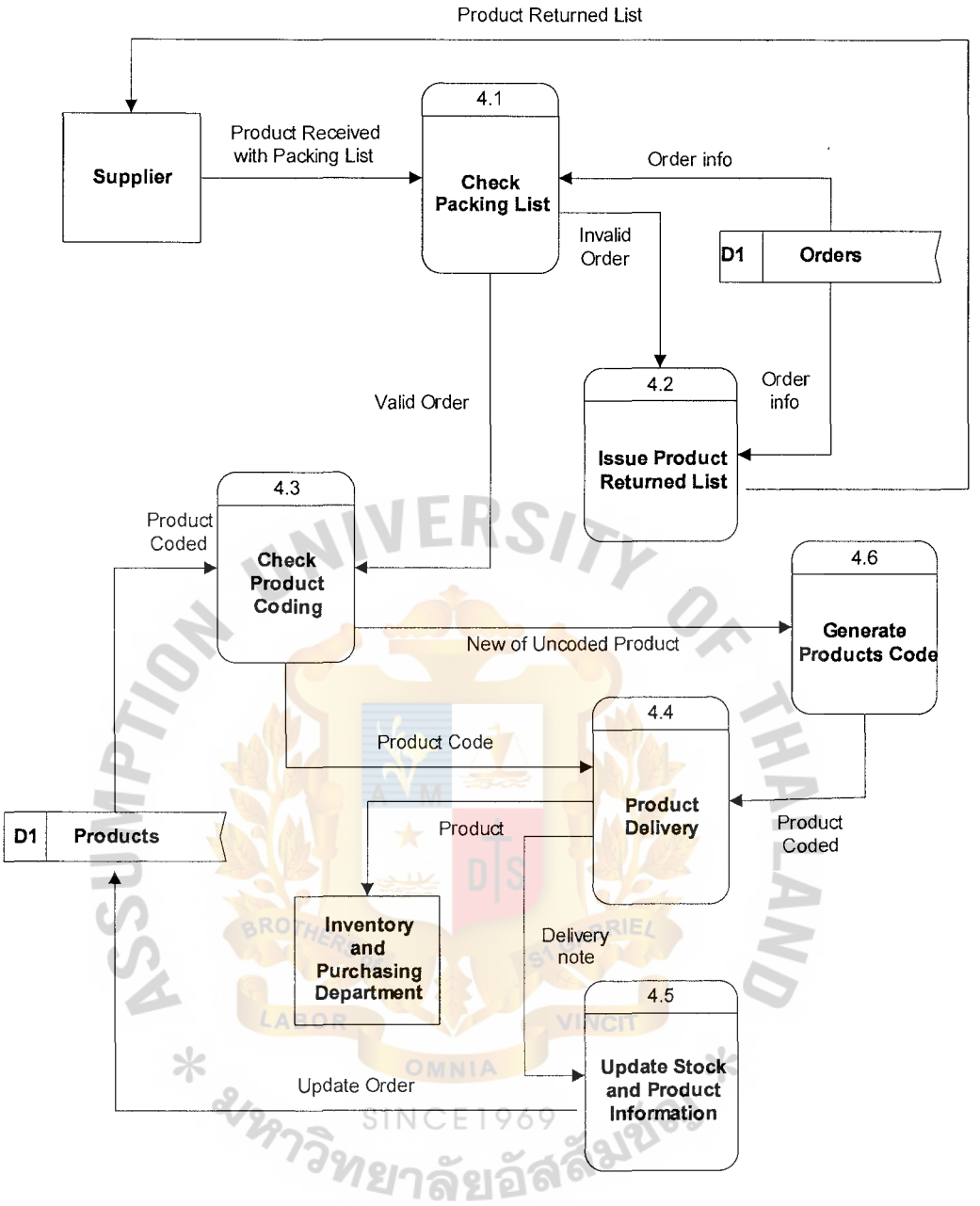

Figure 3.6 Data Flow Diagram Process 4 Level 1.

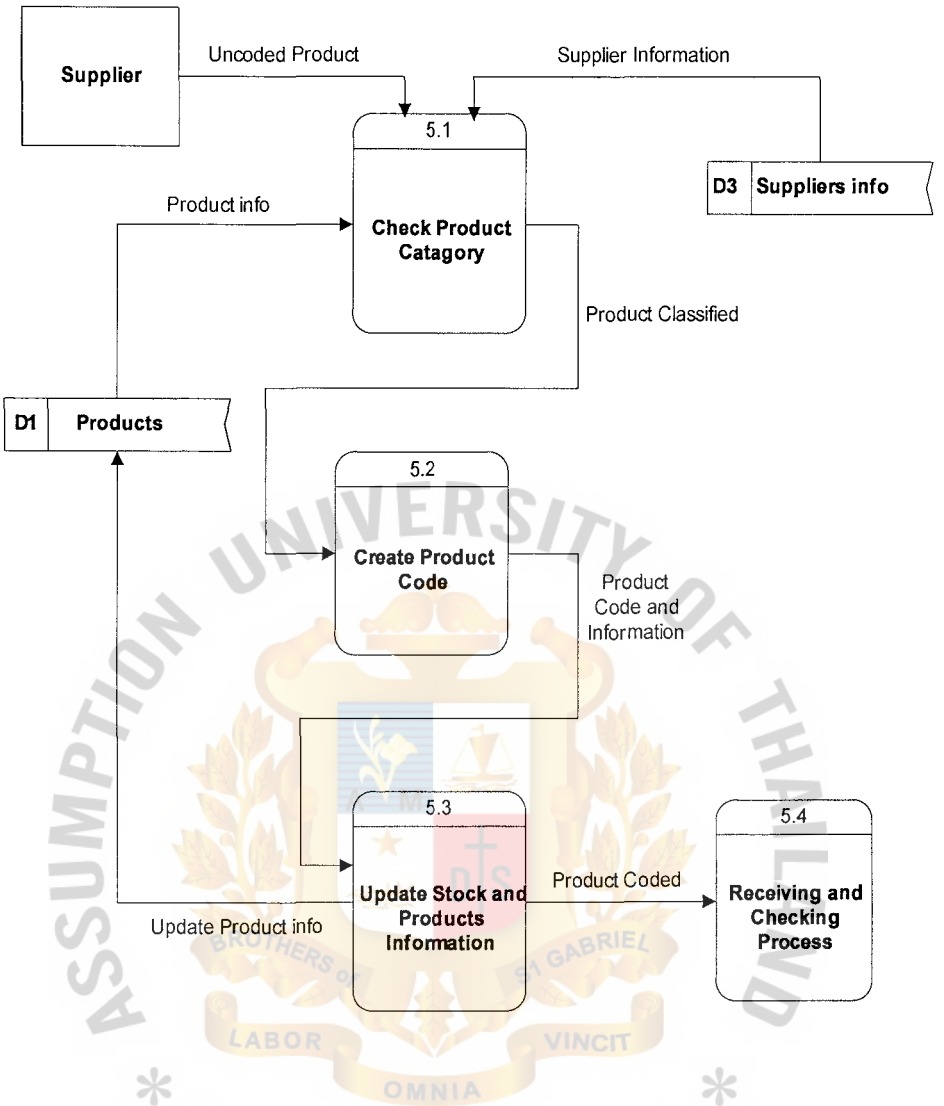

Figure 3.7 Data Flow Diagram Process 5 Level 1.

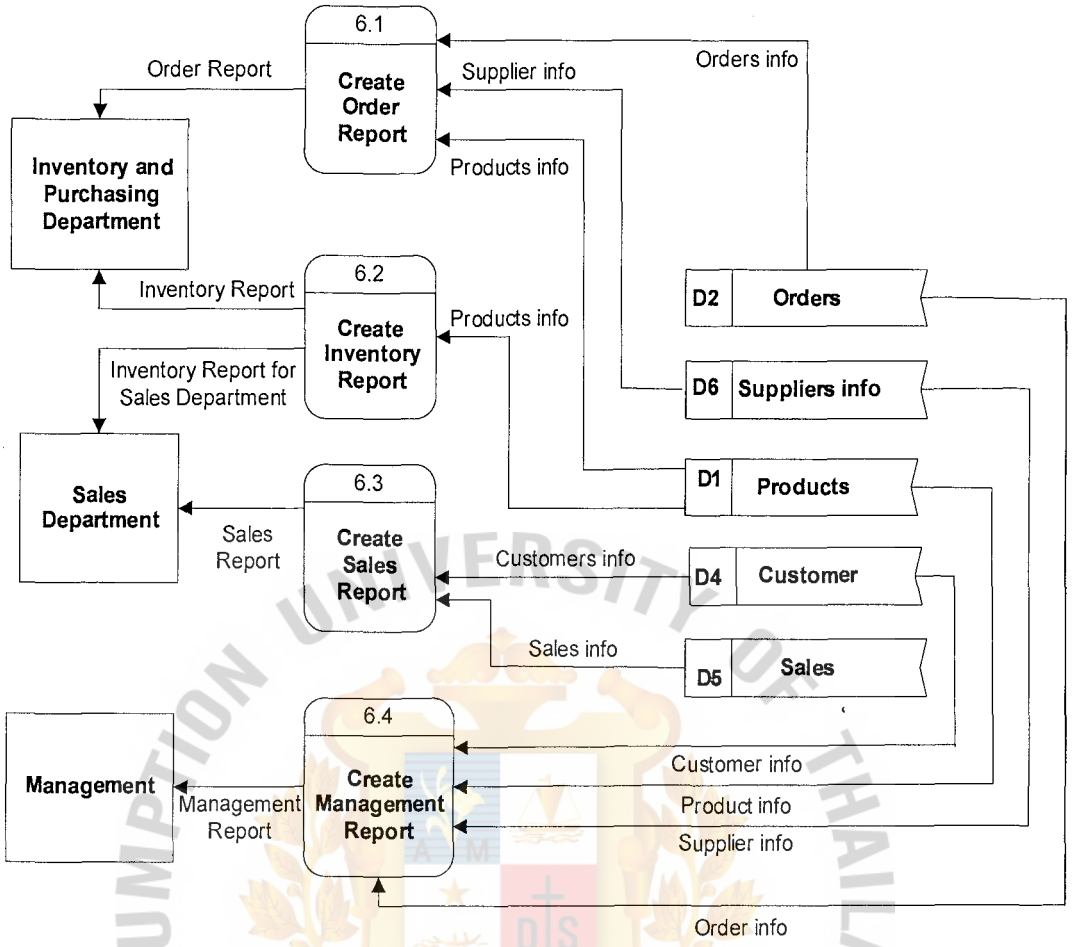

Figure 3.8 Data Flow Diagram Process 6 Level 1.

3.4 Hardware and Software Requirements

The following are the hardware and software requirement for the proposed system. The proposed inventory system is to be run on the Local Area Network (LAN) on the basis of file server architecture. Initially, the system will be installed to one server and in four workstations, connected with two dot matrix printers sharing on LAN.

3.4.1 Hardware Requirement.

Requirement for a server and for client computers specification

(a) Speed of CPU 1.4 GHz. or higher processor

(b) 80 GB Hard disk or higher

(c) 1.44 MB. Floppy Disk

(d) 256 MB. RAM or higher

(e) Compatible input Device : Mouse & Keyboard

(f) VIDEO Display: VGA Controller 8 MB. or higher

(g) 15" SVGA or Compatible Display (Monitor) or higher

(h) Network Card 10/100

Requirement for the facility on Network System

(a) HUB 10/100 8 Ports or higher

(b) Unshielded twisted Pair Cable

(c) Dot Matrix printer (EPSON LQ 300+)

(d) Modem 56 KB. or higher for Server computer

(e) UPS 500 VA. or higher for Server computer

(f) Barcode Printer 1 set

3.4.2 Software Requirement

The Inventory System will be implemented by using Graphic User Interface (GUI) environment. This is achievable by using Microsoft Windows XP Thai Edition (Second of Service Pack). With the development tool and database software, it will use Visual Basic vision 6. (Fifth of Service Pack) as defined in the following detail;

(a) Windows XP Thai Edition (Second of Service Pack)

(b) Components System of Visual Basic 6.0, Data Base and Crystal Report 8.0

(c) Microsoft Access 2000

3.4.3 People ware Requirement

Expected computer people ware needs to be employed, as an application program in a small system was designed only to support small workgroup in the first phase. The company does not need to employ permanent programmers or technicians. May be an advisor will be required at the beginning as a part timer to consult the implementation program efficiency.

The persons expected to be assigned in this computerized system are the persons who are currently working for the company, by sending them for training on how to use and implement the program.

3.5 Security and Control

The Information of Inventory control system is important to many sections. The following security and controls should be covered by the computerized system.

3.5.1 Software and Data Security Control

(a) Operating system controls, which are limitations enforced by the operating system to protect user from all other users.

(b) There must be a username and password to login the system and to prevent unauthorized users to access into the system.

(c) There must be back up devices for data and program backup & restoring.

(d) Every report must be kept in safe place.

(e) Reports must be produced upon the predetermined conditions or management request as needed.

3.5.2 Hardware and Physical Security Control

Some of the security control are physical security control that include locks on doors, guards at entry points, backup copies of important software and data, and others.

IV. SYSTEM EVALUATION AND IMPLEMENTATION

4.1 Cost Analysis

Cost analysis focuses on the cost of the system derived from non-operating and operating costs.

(1) System Costs of Existing System

Table 4.1 Cost of Existing System, (Baht).

Cost	Years				
	1	2	3	4	5
Fixed Costs:					
Hardware					
Workstation					
Computer Intel Celeron 1.4 GHz. 1 set @ 16,000	16,000	-	-	-	-
UPS 1000 VA	2,100	-	-	-	-
Printer Inkjet HP 1220C	8,200	-	-	-	-
Software					
Windows 98 @ 2,600	2,600	-	-	-	-
Ms-Office 2000 @ 18,000	18,000	-	-	-	-
Implementation Cost					
Maintenance Costs	-	1,000	1,000	1,000	1,000
Total Fixed Costs	46,900	1,000	1,000	1,000	1,000
Operating Costs: (Per Annual)					
Staff					
Manager @ 25,000/month	300,000	315,000	330,750	347,288	364,652
2 Stock Officers @7,500/month	180,000	189,000	198,450	208,373	218,791
4 Officers @ 7,500/month	360,000	378,000	396,900	416,745	437,582
Maintenance Officer@7,500/month	90,000	94,500	99,225	104,186	109,396
Paper	21,500	21,930	22,387	22,816	23,272
Utility	24,000	24,480	24,970	25,469	25,978
Miscellaneous	30,000	30,600	31,212	31,836	32,473
Total Operating Costs	1,005,500	1,053,510	1,103,893	1,156,712	1,212,144
Total Cost of Existing System	1,052,400	1,054,510	1,104,893	1,157,712	1,213,144

(2) System Costs of Proposed System

Table 4.2 Cost of Proposed System, (Baht).

Cost	Years				
	1	2	3	4	5
Fixed Costs:					
Hardware					
Workstation					
Computer Intel Celeron 2.0 GHz. 4 sets @ 26,000	104,000	-	-	-	-
UPS 1000 VA	2,100	-	-	-	-
Printer Dot Matrix EPSON LQ630 ESC/PZ	16,000	-	-	-	-
Barcode Printer	20,000	-	-	-	-
Network Cost		-	-	-	-
Hub 8 Ports 10/100	3,000				
UTP Cable	1,500	-	-	-	-
Software					
Licensed Windows 98 4 set@2,500	10,000	-	-	-	-
Microsoft Office 2000 4 set@18,000	72,000	-	-	-	-
Implementation Cost					
Development Cost (200Hrs@500)	100,000	-	-	-	-
Training Cost (10Hrs@300)	3,000	-	-	-	-
Maintenance Costs	-	4,000	4,000	4,000	4,000
Total Fixed Costs	331,600	4,000	4,000	4,000	4,000
Operating Costs: (Per Annual)					
Staff					
Manager @ 25,000/month	300,000	315,000	330,750	347,288	364,652
1 Stock Officers @ 7,500/month	90,000	94,500	99,225	104,186	109,396
3 Officers @ 7,500/month	270,000	283,500	297,675	312,559	328,187
Maintenance Officer@ 7,500/month	90,000	94,500	99,225	104,186	109,396
Paper	18,500	18,870	19,247	19,632	20,025
Utility	18,000	18,360	18,727	19,102	19,484
Miscellaneous	30,000	30,600	31,212	31,836	32,473
Total Operating Costs	816,500	855,330	896,062	938,789	983,611
Total Cost of Existing System	1,148,100	859,330	900,062	942,789	987,611

(3) The Comparison of Accumulated System Costs between Existing System and Proposed System

Table 4.3 Accumulated System Costs of Existing System for 5 Years, (Baht).

Year	Total Annual Cost	Accumulated Cost
1	1,052,400	1,052,400
2	1,054,510	2,106,910
3	1,104,893	3,211,803
4	1,157,712	4,369,516
5	1,213,144	5,582,660

Table 4.4 Accumulated System Costs of Proposed System for 5 Years, (Baht).

Year	Total Annual Cost	Accumulated Cost
1	1,148,100	1,148,100
2	859,330	2,007,430
3	900,062	2,907,492
4	942,789	3,850,281
5	987,611	4,837,892

Table 4.5 The Comparison of Accumulated System Costs, (Baht).

Year	Accumulated Existing System Cost	Accumulated Proposed System Cost
1	1,052,400	1,148,100
2	2,106,910	2,007,430
3	3,211,803	2,907,492
4	4,369,516	3,850,281
5	5,582,660	4,837,892

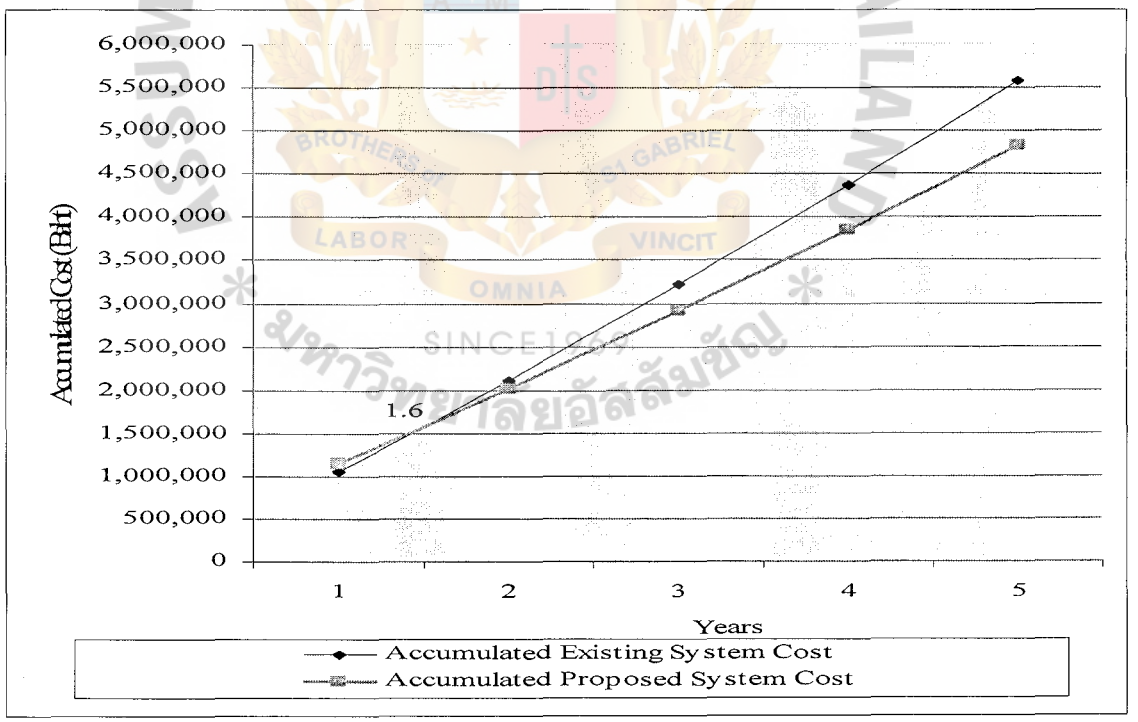

Figure 4.1 Break-Even Analysis

Remark: The calculation is based on these conditions:

(a) Salaries will be increased by 5 percent each year.

(b) The prices that used to calculate cost is based on market price at Central Department store.

(c) The detail of operating cost is under the copyright of YMS Co., Ltd. Therefore, it is not suitable to describe in details.

(d) Maintenance cost has fixed rate for 5 years.

(e) Comparison between Cost of The Existing System and Cost of The Proposed system

From the comparison of the two systems, we found that the proposed system has lower cost than the existing system. We found that the cost of the computerized system is cheaper than the manual system, because the computerized system uses just only a small group of people to handle the system, but the manual system needs many people to handle the system.

The total accumulated cost of the proposed system for 5 years is cheaper than the total accumulated cost of the existing system. The total accumulated cost of the proposed system for 5 years is 4,837,892 baht, whereas the total accumulated cost of the existing system for 5 years is 5,582,660 baht. If we adopt the new system, it will reduce about 744,768 baht business running cost within 5 years.

4.2 Overview of Project Implementation

The users of the company can use the new system to follow the user requirement. The major advantage of the new system is to keep track of inventory and to decrease the problem of store complication. It also helps user to search and check inventory easier than the existing system. The system was designed and developed based on the basis of user's requirement.

4.3 Test Plan and Results

Unit Test

Programmer is responsible for testing the function of the program to make sure that function is complete. They test the program to check if the program's processing runs accurately and completely.

Integration Test

Programmer is responsible for testing each function of the program to make sure that every function is complete. They include each and every function of the program to check if the program's processing runs accurately and completely.

System Testing

The system testing is a test of the entire system using data exercise of all processing situations under typical condition.

User Acceptance Testing

The entire system is tested if the requirements established by the user can be used and operated to satisfy the user's system.

4.4 Implementation of the System

The implementation of the system includes:

(1) User Training: Introduce and train users to use the program for the input filling and the output generation.

(2) Documentation: Creating the documents using the system program and how to operate it.

V. CONCLUSION AND RECOMMENDATION

5.1 Conclusions

YMS Co., Ltd. is one of the distributors of pianos. The products are from Press Company and Suppliers. The existing system has many problems because it has to produce a lot of data like transactional records, timely, paper work, mistakes and errors. Therefore, it is difficult to manually obtain useful information from them. Actually the main problem of YMS Co., Ltd. was managing its business in a noncomputerize system. The existing system has manual system that has only produced a lot of paper work day by day. The company also has many suppliers, so it is difficult to control the stock. Sometimes, products will get lost and take a lot of time to check. It is hard to check who took it. Sometimes, it can have redundancy in sale processing. So I have to analyze this existing system and develop a new system in order to manage its inventory stocks.

The new system is an inventory control system. It was designed to meet the two important requirements as management's requirement and user's requirement. In case of management's requirement, it focuses on how to provide executive information for executive management in order to make a decision. In case of user's requirement, it focuses on inventory's control in order to help users to manage inventory stock easily. The new system is also designed under two objectives. Firstly, the system must be linked with all the concerned information to the concerned department in order to share business information in the company. Secondly, the system must be linked with all the transaction of the inventory system following the management direction.

The management can access the required information to support their decision making in the mean time. The time spent on each process of the proposed system compared with the existing system is shown in Table 5.1.

Table 5.1 The Degree of Achievement of the Proposed System.

Process	Existing System (Minutes)	Proposed System (Minutes)	
		System's process	Activity's time
Product Checking	30	0.3	2
Product Requested	10	0.3	2
Prepare Backlog Order	10	0.3	4
Update Inventory	60	0.6	3
Check Supply Information	20	0.3	5
Issue Purchasing Order	10	0.3	2
Check Packing List	30	0.3	10
Generate Product Code	0	0.1	3
Make Summary Report	30	0.5	5
Total	**200**	**3**	**36**
Sum	**200**	**39.00**	

All functions of the proposed inventory system are the reason's why the company has to change, to be computerized company, to use high technology in order to get high performance and to put the suitable people into the right job in order to reduce their operational cost. According to this change, the company will gain more profit and also increase the company's confidential to survive in this competitive market. The management can access the required information to support their decision making in the mean time. The time spent on each process of the proposed system compared with the existing system is shown in Table 5.1

5.2 Recommendations

The system developers believe that the new system will help the company to work more efficiently than the old system. Any information accuracy can be verified by the system.

The Inventory Control System is a part of the process to implement and develop by emphasizing on the Inventory department of the company which provides distribution service to the store, "YMS Co., Ltd.".

The system is used for supporting the decision-making of executive management in order to make the right decision of selling products and provide new company's retailers in the right location. This System is designed to analyze consumer behavior in each area of retailer's shop to absorb information of what kind of products customers in the specific areas like and what amount of products should be ordered and by keeping each retailer's record in its own database. Correct dates can be collected easily and summarized into a report that can serve the executive management.

In the past, the company used paper-based system in order to manage the inventory. It causes some complication in adjusting the information. It wasted costs and time.

In the future, the company should consider the development of accounting and financing systems to integrate into this system. The database's maintenance is also a big challenge that the company should adopt because MS-Access that we have used is suitable only for small or medium database sizes. For the expansion of the company's database sizes, the Microsoft MSDE 2000 (Microsoft SQL Server 2000 Desktop Engine) is the first choice that the company would like to choose because it can keep more transaction records and has more securities than MS-Access in order to completely support more user requirement and management's requirement.

APPENDIX A

DATA DICTIONARY

Table A.1 Data Dictionary of Market Basket Analysis System.

Field	Meaning
Available product	The products that remain in the stock
Backlog order	The list of product that has to be ordered
Cost	The cost of the product that has been purchased
Customer ID	Customer identification represents customer's name and detail information
Invalid order	The packing list that have been mistaken
Inventory report	Report shown the inventory status
Invoice	Document that is used for transferring the stock value
Invoice list	List of document that is used for transferring the stock value
Management report	Summary reports used for decision making support
Non available product	The product that is out of stock
Order ID	Order Identification represents order no. and detail information
Order Report	Report show detail of ordering information
Packing list	The list of product's detail to be sent to the suppliers
Price	The price of products to be sold
Product	Things that are usually ordered for sale
Product classified	The product that have been categorized
Product code	The code used to identify the product
Product ID	Product Identification represents product's name and detail information
Product on hand	The amount of products that remain in the stock
Product requested	The list of product requested to be sold to customers
Purchase order ID	Purchase Order Identification represents purchase order number
Quantity	The amount of products

Field	Meaning
Supplier	Business partner who supply products
Supplier ID	Supplier Identification represents supplier's name and detail information
Valid order	The packing list that have been approved

APPENDIX B

PROCESS SPECIFICATION

Table B.1 Process Specification of Process 1.1.

Process Name	**Product Checking**
Data In:	Product Requested or Customer order Product Info
Data Out:	Product available list Product not available list
Process:	1. Receive Product requested list 2. Read Product available info 3. If Product available, issue product requested that's available list 4. If product not available, issue product not available list
Attachment	Product Info

Table B.2 Process Specification of Process 1.2.

Process Name	**Request Product**
Data In:	Product Requested list
Data Out:	List of requested product available
Process:	1. Receive product requested list 2. Check product requested list 3. Issue product requested list
Attachment	Product Info

Table B.3 Process Specification of Process 1.3.

Process Name	**Prepare Backlog order**
Data In:	Product Requested that not available
Data Out:	Backlog Order
Process:	1. Receive Product Requested that not available 2. Process prepare backlog order 3. Issue Backlog order
Attachment	Product Info

Table B.4 Process Specification of Process 2.1.

Process Name	**Product Checking**
Data In:	List of requested product available Product Info
Data Out:	Product available list
Process:	1. Receive Product requested list 2. Read Product available info 3. Issue product available list
Attachment	Product Info

Table B.5 Process Specification of Process 2.2.

Process Name	**Update Stock**
Data In:	Product available list
Data Out:	Product requested that available
Process:	1. Receive Product available list 2. Prepare product requested 3. Update stock files
Attachment	Product Info

Table B.6 Process Specification of Process 3.1.

Process Name	**Check supply Information**
Data In:	Supplier's information Product info Backlog Order
Data Out:	List of suppliers to be ordered
Process:	1. Receive Backlog order 2. Read Supplier's information 3. Read Product information 4. Issue list of Suppliers to be order
Attachment	Supplier's information Product Info

Table B.7 Process Specification of Process 3.2.

Process Name	**Check ordering information**
Data In:	Order Information List of suppliers to be ordered
Data Out:	List of products to be ordered
Process:	1. Receive list of suppliers to be ordered 2. Read previous ordering information 3. Issue list of product to be order
Attachment	Order information

Table B.8 Process Specification of Process 3.3.

Process Name	**Issue purchasing order**
Data In:	Product to be ordered
Data Out:	Purchasing order
Process:	1. Receive product to be ordered list 2. Check for supplier and product information 3. Issue purchasing order 4. Update order files
Attachment	Order information

Table B.9 Process Specification of Process 4.1.

Process Name	**Check packing list**
Data In:	Packing list Ordering information
Data Out:	Packing list approval Packing list not approval
Process:	1. Receive product with packing list 2. Check packing list with purchasing order 3. Approval or not approval packing list
Attachment	Order information

Table B.10 Process Specification of Process 4.2.

Process Name	**Issue product returned list**
Data In:	Packing list that not approved Ordering information
Data Out:	Product returned list
Process:	1. Receive packing list that not approved 2. Check packing list with purchasing order 3. Issue product returned list
Attachment	Order information

Table B.11 Process Specification of Process 4.3.

Process Name	**Check product coding**
Data In:	Approved packing list Product info
Data Out:	Product arriving list New product to be coded
Process:	1. Receive approved packing list 2. Read product information 3. Product coded ready to be sent 4. New product ready to be coding
Attachment	Product info

Table B.12 Process Specification of Process 4.4.

Process Name	**Product delivery**
Data In:	List of products to be delivered
Data Out:	Delivery note
Process:	1. Receive list of product to be delivered 2. Send products to inventory 3. Issue delivery note

Table B.13 Process Specification of Process 4.5.

Process Name	**Update stock and product**
Data In:	Delivery notes
Data Out:	Product and inventory updated
Process:	1. Receive delivery notes 2. Update product & Inventory
Attachment	Product info

Table B.14 Process Specification of Process 5.1.

Process Name	**Check product category**
Data In:	Product uncoded list Supplier's information Product info
Data Out:	Product classified list
Process:	1. Receive product uncoded list 2. Categorized the list 3. Issue product categorized list
Attachment	Product info Supplier's information

Table B.15 Process Specification of Process 5.2.

Process Name	**Create product code**
Data In:	Product categorized list
Data Out:	Product coding list
Process:	1. Receive product categorized list 2. Read supplier's information 3. Read product information 4. Create product code 5. Issue product coding list
Attachment	Product info Supplier's information

Table B.16 Process Specification of Process 5.3.

Process Name	**Update stock and product**
Data In:	Product coding list
Data Out:	Product and inventory updated
Process:	1. Receive product coding list 2. Update product & Inventory
Attachment	Product info

Table B.17 Process Specification of Process 6.1.

Process Name	**Create order report**
Data In:	Supplier's information Ordering information Product information
Data Out:	Order report
Process:	1. Read Supplier's information 2. Read Ordering information 3. Read Product information 4. Generate order report
Attachment	Supplier's information Ordering information Product information

Table B.18 Process Specification of Process 6.2.

Process Name	**Create inventory report**
Data In:	Product information
Data Out:	Inventory report
Process:	1. Read Product information 2. Generate inventory report
Attachment	Product information

Table B.19 Process Specification of Process 6.3.

Process Name	**Create order report**
Data In:	Customer's information Sale's information
Data Out:	Sales report
Process:	1. Read Customer's information 2. Read Sale's information 3. Generate sales report
Attachment	Customer's information Sale's information

Table B.20 Process Specification of Process 6.4.

Process Name	**Create management report**
Data In:	Supplier's information Ordering information Product information Sales information Customer's information
Data Out:	Management report
Process:	1. Read Supplier's information 2. Read Ordering information 3. Read Product information 4. Read Customer's information 5. Read Sale's information 6. Generate management report
Attachment	Supplier's information Ordering information Product information Sales information Customer's information

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