The Order Processing System for a Fabrics Wholesaler

by

Mr. Amornsukh Sachdeva

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

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

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ABSTRACT

This project examines the design and implementation of an order processing system with a small firm that can utilize the computer system in their daily transaction to ensure maximum reliability and accuracy.

A survey of existing problem is done to find out the major problems in the wholesale fabrics business. By examining the major problems, we find that the majority of the problems revolves around lacking of a good order processing system. The project consists of the preparation of the business proposal on ways to improve the ordering system in the wholesale fabrics business. The potential in the future to make the best out of the operating system.

The system design will be accomplished by using the Microsoft Access to make the system database to ensure the system accuracy. The result from the evaluation suggests that the system perform accurately according to the objectives of the system.

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I. INTRODUCTION

1.1 Background of the Study

We are the wholesaler and distributor of fabrics. We take orders from the garment production factory and other fabrics wholesale outlet. The company will obtain the raw fabrics before being processed. All the orders received will be processed by forwarding the raw fabrics to the dying or printing factory according to the orders received. All the transaction are recorded manually without having a proper control of the source and the output of the product. The company does not have a proper procedure in entering the order and record is not well kept. The end results often becomes invalid orders or lost order due to insufficient time or resources to commit to the orders received. The purpose of this study is to improve the ordering system in the company to be able to commit and accept order without losing the data tracking and to be able to track the customer order in case of customer inquiry.

1.2 Background of the Business

We will emphasize our study on the major product that is Chicken skin fabrics. These are the raw materials that are used fundamentally in all kinds of frocks. The material will be in two sizes, one is 44 inches for the printed fabrics and 60 inches for the plain colour fabrics. The factory will place order for these raw materials with us by specifying the colour code or the print design according to their orders. For the plain colour fabrics we will have the colour samples of 60 colours and we will assign a number for each colour and distribute this colour sample to the customers (garments factory). The customer can call up the shop to order according to the numbers given in the colour sheet.

The Chicken Skin printed fabrics are in the width of 44-45 inches and there will be numerous design for customers to choose from. The design will be made available by two methods.

The major export markets of these frocks are Middle East countries and they will order their goods on a seasonal basis. Their seasons are Rammadan, Christmas, New Year and Hajj ceremony.

The long back order time causes a lot of damage for the company. The long back order time often surfaces from the following problems:

(a) No goods in stock

(b) Long lead time in back order production

(c) Not having gray stock in possession

(d) Factories have machinery problems

(e) Late delivery from the factory to the warehouse

(f) Weak coordination between order processing and tracking of goods

(g) Company does not have a report on due products to be received from the factory

(h) No step by step follow up of the products ordered.

(i) The rush orders are not given priorities

(j) Follow up is done on a daily basis without record on progress.

1.3 Importance of the Study

The time that is being consumed by the management to run the customers order is often used up following the order after due dates are passed and the customers are often dissatisfied due to delays in sending goods. The new system will be able to submit report of the due orders that needs to be done and the order that is past due will automatically prompt the management to speed up factory production and follow up the

unfinished order. The new system can reduce the redundancy of data and the duplication of work. We will have one master record and from that record we can trace and input the current situation that the company is doing.

Improving customer's satisfaction is through squeezing lead-time and having the order processed faster and more accurately. The colour and the printing design will be assigned with codes for the kinds and makes of fabrics which will be easier to have a better understanding between the company and the dying and printing factory. The majority of the problem cannot be solved after the fabrics are made, so an early stage detection and the checking of the order and authentication of orders needs to be done in advance before the factory starts their production. This project could be used for firms with small human resources because the one who stores the data can actually check them and edit them often. The time can be then emphasized on expanding the market and to reach out for more customers instead of only managing normal follow up of the orders.

The due items that are currently with one factory can be listed out in a short memo and send as a fax to the factory in order to check out the remaining time and the progress of the production. The daily production schedule can be followed up and the up to the minute update can be made to assess the percentage of completion for each order. Customers will have more reliable answer on their product being processed. A timely problem correction can be taken as and when the problem arises.

1.4 Objectives of the Project

The project is to develop the procedure in which the company can enter and record the sales order processing of the customer and be able to track down the orders delivery dates. The company should have more reliable source of information for

keeping their record and be able to make transactions and their commitments more accurately. The following itemize the objectives of the project:

(a) The speed of processing the order will be improved.

(b) The reliability of the record will be increased

(c) The tracebility of the ordered items is possible

(d) The accuracy of the quantity ordered can be measured

(e) The delivery variations can be maintained

(f) Increase the efficiency in follow up of goods ordered

1.5 Scope and Limitations

This study will concentrate on the order processing system of the company. Many of the major problems lie around lack in a good backbone of the company's system. Subsystem in a business system: Focus on the Order Processing.

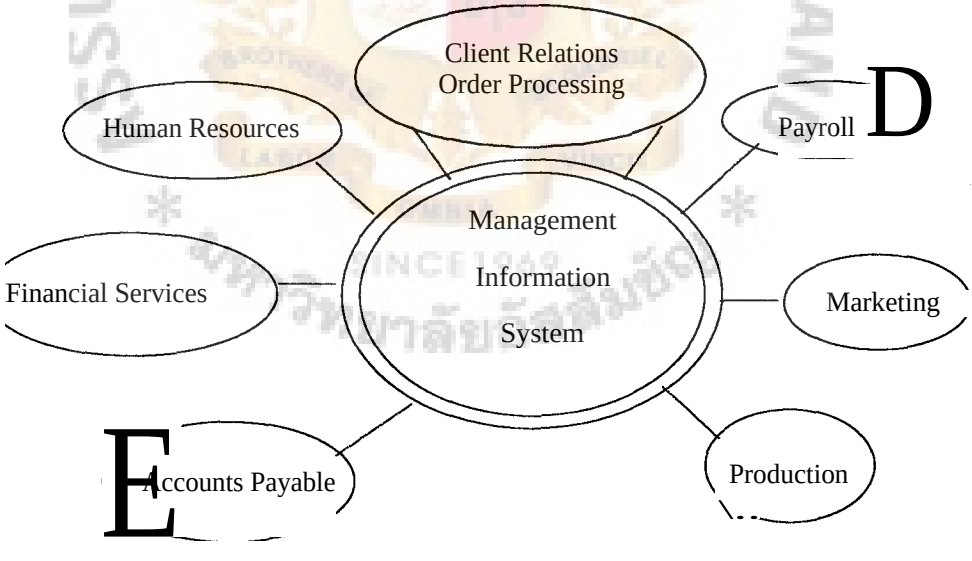


Figure 1.1. Subsystem in a Business System.

We will try to improve the order processing of the Company to be able to track trace and fill order accurately and reduce order lead time variability. The main emphasis will be on making the system user friendly.

We will use Microsoft Access program to maintain the ordering system. The Microsoft Access program is used because it can be easily updated and the user can add or edit functions of the program as and when needed. The main purpose of using this program is the ease of maintenance. Non-programmers can easily edit the program without the need for technical knowledge in operating the program.

As there is limitation in the time of study we will concentrate on the new product line of fabrics. The new product line that is becoming major player in the market will be managed in the new system of our study. This will avoid confusion and improve the management at the critical bottleneck of the company. The modules will be made such that if in the future after the completion of this project the company can easily add new product line in to the system without any major changes needed in the programming part.

The time available for making the project do not permit the program to be able to cover all aspects of the accounting procedure. We will make the module ready for expansion into other modules supporting the systems for accounting, finance and stocking in the future. For the current module the study will be on the order processing and it will be coordinated with the existing manual accounting system. The stocks of the goods will be input during the initial launch of the program. The stocking will be done on the system as there is no prior system available, the new system will be used at the start without any other manual record.

1.6 Statement of the Problem

In the past only the cost price was the critical success factor but right now the transaction in the fabrics market is being changed to the age of marketing and differentiation strategy.

Lost sales order. Inaccurate quantity being sent to customer which is different from the ordered amount, wrong colour output, difference in the print design supplied by the customer and the outcome of the production are major causes of returned and rejected goods from the customers. These are the major causes of dissatisfied customers and the customers turns to other wholesalers to order their raw fabrics.

The time of delivery will have effect on the customer whether to accept or reject the order. The customers will be giving their order to the wholesalers who can keep their promise in delivering the goods fast and at less time variability.

The time of delivery is also another success factor of the fabrics wholesaler. There are always rush orders that the customers will need to buy even at a higher rate than the market. The customer will rather buy from a wholesaler who has ready-made fabrics inside their godown rather than waiting for the printing and dying process. The customer will be willing to wait for the order to be completed and yet have time for making their garment production process.

Long delivery time is also another factor affecting the sale of the company. This is when the company already has the goods in the godown and takes a long time to deliver them to the customers.

The major time used before sending the goods are:

(a) Checking items received from the factory.

(b) Identify which items are for which customers.

(c) Making a list of what is to be sent.

Sending the list to the warehouse.

Picking the ordered item and packing them together to be ready for delivery.

Consolidating the goods for sending on the same route.

Assigning the vehicle to deliver the goods.

(1) A small lot will be send by motor cycle.

(2) A taxi will be utilized for a bigger lot.

(3) For large lots hired ten-wheeler trucks or pickup trucks will be used as conveyance.

II. LITERATURE REVIEW

Computer technology has had and will continue to have a considerable impact on the way in which business is carried out. Furthermore, computer systems are now providing new ways of working, rather than just automating existing processes. They are also providing new ways of doing business with the outside world.

Client services processes are almost always defined to be critical processes (Hawryszkiewycz 1998). They provide the interface to the organization's clients and must ensure that clients continue to do business with the organization. Most clients nowadays demand better and better services, with a consequent emphasis in organizations on providing what is now commonly known as a quality service.

The process usually begins with the client approaching the organization with a specific request — for example, placing an order. This request is recorded and checked to see if the order specifies its requirements completely and accurately. This may involve a check to see whether a part is available. If so, arrangements are then made within the organization to provide the service. This may be arranging for goods to be delivered. Any problems found at this stage are clarified with the customer. There is usually a follow-up on the service. It may involve a payment, in which case the accounting system will become involved in the process, or finding out whether the customer was satisfied with the service.

Usually, the client system should follow up such requests to ensure that the service is carried out and also answer any customer queries about the service. This is now usually the function of a help desk system. Emphasis on quality usually means that a client can always be kept informed of what the organization can do for them, as well as being able to quickly answer questions on the progress of any requested service.

The process must also deal with exceptional conditions and client inquiries. Thus there may be changes to the order or the order may be totally cancelled. An alternative is to place a back-order for the unavailable items. A back-order means that the order is placed on 'hold'. It waits until all the ordered items are obtained and is then filled. Alternatively, some of the ordered items may be supplied immediately, while only the unavailable items are back-ordered. The information must be designed in such a way that it is able to cope with all these possibilities.

Client systems are often integrated with other systems. Ordering systems are therefore often integrated with the inventory and accounting systems (Ballou 1992). Checking a client request and delivering a service may involve the inventory system, whereas the accounting unit would be involved in any financial transactions associated with the service.

Customer services processes can be, and often are, automated through a help desk. They are usually interactive to allow client queries to be easily resolved. For example, in an on-line ordering system, an order clerk will enter the order into the computer. The computer will then respond by describing the status of the ordered items. If all the ordered items are available, the computer will simply verify the order and generate a requisition to the warehouse. If, however, some of the ordered goods are not in the warehouse, the order clerk will be informed immediately. The order clerk will then probably contact the customer for advise about the action to be taken.

There is also a trend to provide better services for regular clients. This may be to provide direct access to an organization's products and to allow clients to keep track of their business with an organization.

2.1 A Database Management System (DBMS)

An organization's business unit has its static and dynamic components. The static component describes the structure and function of the unit, whereas the dynamic component describes the processes in the unit.

A Database is a collection of data organized to serve many applications efficiently by centralizing the data and minimizing redundant data. Rather than storing data in different files for each application, data stored in one location can be used many times by sharing the data (Laudon 1996).

Many of the business units in the structure chart will be supported by the computer-based information systems (Hawryszkiewycz 1998). The information system can therefore be divided into a number of subsystems where there is a separate subsystem for each business unit. Each subsystem may be further subdivided if necessary.

(a) The Human Resources Subsystem

The human resources subsystem maintains information concerning the organization's personnel. The materials subsystem keeps track of all the items owned by an organization. It records item quantities and locations, as well as their value. A distinction is often made between the organization's assets and consumable items. The stock inventory keeps track of the items produced and sold by the organization.

(b) The Financial Services Subsystem

The financial services subsystem, which keeps track of an organization's financial transactions as well as its financial status. The two most common subsystems here are the accounts receivable and accounts payable subsystems. The accounts receivable subsystem keeps track of

moneys owed to the organization. It produces invoices for sales, checks client credit limits, and records payments made against these invoices. It will also send out reminders when payments are overdue. This subsystem has an account for every one of the organization's customers. It is then responsible for keeping track of customer payments. It checks that the payment for each invoice is made and checks the payment against the invoice. Any differences between the payment and the invoice must be resolved. The system also keeps trace of the time taken by customers to make payments. Some systems can identify customers who are always late in making payments and bar them from receiving further credit.

(c) The Accounts Payable Subsystem

The accounts payable subsystem is the reverse of the accounts receivable subsystem and keeps trace of the moneys owed by the organization. It keeps track of purchases made by the organization by recording outgoing orders.

(d) The Payroll Subsystem

The payroll subsystem is often part of financial services. It uses information about entitlements from the human resources subsystem to produce paychecks on a regular basis.

(e) The Marketing Subsystem

The marketing subsystem, which publicizes the organization's products and services to its clients or potential clients. Marketing usually has two functions. One is to determine a strategy for selling its products or even for deciding what products to sell. It often includes market surveys to determine what is needed outside the organization. The number of potential

clients may be estimated and the services or products needed by them determined. Sometimes this work is called market research. Market research is important for many reasons. Primarily it establishes what customers need and ensures that the organization is actually producing useful products.

(f) The Client Relations Subsystem

The client relations subsystem, which maintains contact with the organization's clients. Organizations can differ in the kinds of external clients they have and the kind of information kept about them. Some organization have customers who order goods from the organization. The organization keeps track of order made by these customers and of deliveries made to them. This is the subsystem within the scope of this report.

(g) The Production Subsystem

The production subsystem, which is found in organizations that produce physical goods. Such organizations may have one or more factories that use consumable items to produce products which are later sold to customers. They need to maintain an information system about their production facilities, as well as schedules for these facilities. A production system includes a planning subsystem to determine what goods are to be produced, and a scheduling subsystem to schedule machines in order to produce these goods. It may also include a subsystem to requisition consumable items needed to produce these goods and to deliver produced items into inventory.

The Database Management System will be the source of all information that is being stored in the system. These Database will be made as simple as possible to keep

the codes and the link to different Database to ensure integrity and accuracy. Our database will be stored on the hard drive of the machine.

Database Management system (DBMS) is made popular in the early 1990 (Laudon 1996) it has been establish with the new technological trends that is taking place in advanced country. In the beginning DBMS system are first used in many European countries such as United Kingdom, France and Germany.

The Oracle and SAP DBMS is amongst the world's leading DBMS system. In the recent years the need for effective DBMS has risen dramatically. These DBMS developer are also called Business solutions provider. In the recent years these DBMS has found its way to Asian countries like Japan, Malaysia, the Philippines and Hongkong (Hawryszkiewycz 1998). Without any doubt today Thailand is becoming more aware of the DBMS and making full use of its capabilities.

There are tremendous developments in the field of DBMS. Now the DBMS do not limit itself to only big Multinational Corporation who is large in size and capital investment. But now the trend is moving towards Small and Medium Enterprises (SMEs). This is a change that result from the technology advancement. The new technology made it possible for small and medium size firms to invest in the new compact DBMS that requires less capital investment (Hawryszkiewycz 1998). The new DBMS are such advanced that user can develop module used in daily work on their own. People who have a moderate degree of computer expertise do the programming of the DBMS internally with the use of the application software that is design specially to aid small business organization to create their very own DBMS.

The system is being developed using real time information with the help of a Database Management system (DBMS). The new DBMS will be able to store, retrieve assimilate data, information for the company to be able to deal with the inquiry and smooth management of information. This information technology can deliver a cutting edge in the business by using theory like real time information. The System Analysis and Development is done to analyze the wide possibility of use. The system will be more accurate and more reliable in storing and using those data to yield the best result in business. The company can commit while having a perfect information of what needs to be done for the day.

2.2 System Integration

When you look at the dynamics of business operation you will find that there are many information flows between the subsystems. Orders from clients are sent from sales to the accounting subsystem to generate invoices, and to production subsystems to generate requisitions for parts that go to the materials subsystem.

Thus the trend is now to integrate these units to support organization-wide business processes (Ballou 1992). Many of these business processes involve more than one information subsystem and, as a consequence, such subsystems cannot often be built independently of each other. If this were done there could be duplication of data, as each organization-wide business process could include its own subsystem for the same business unit. Alternatively, if there were a policy to maintain separation of information subsystems, then there would be a considerable message flow between them. There are two ways of integrating subsystems so as to avoid these problems.

One way is to support integration (Hawrysziewycz 1998). Here there is a layer of software between the business process and the information subsystems to assist integration. This layer of software takes service requests from the business process and

sends them to the business unit, which then transmits the response back to the business process.

Another approach to integration is to have a centralized database management unit, or a data warehouse. This does not mean that all the data would be in the one location, or that one section would be responsible for it. Each subsystem can still be responsible for its own data , with the centralized database management unit providing the services needed to maintain this data. Business processes are able to obtain information easily from any subsystem through the integrated database management unit.

Business processes define the way the business or organization works and the way it does business. They define the way the organization achieves its goals, interacts with its clients and carries out its internal operations. An organization carries out a variety of business processes. There can be business processes within a business unit that are used to carry out the unit's function. There can also be organization-wide processes that include a number of business units.

2.3 Database Security

For the system security we will arrange programs for daily backup system for keeping the data safely. We will have seven backup disk sets for backing up the system at the end of each day (for 6 days and 1 for each week). The disk set will specify the day such as Monday, Tuesday, Wednesday, Thursday, Friday, Saturday and Weekly backup set. Doing this will ensure that the data will be assured for the period of one week. Should any components or transaction becomes erroneous the system will be able to recover from the last accurate disk of the day before. By having the backup each day the company can ensure that major important transaction for each day will not be lost.

With only two people using the Order Processing Application we find that the data control security will not be needed at the detail field level. However to avoid any outsider attempt to enter the database we will have a system for the user to verify the user name and their password (Hawryszkiewycz 1998). This will ensure authorization to the Company's owner and the Order Processing clerk only.

2.4 System Development Methodology

We can view analysis from two perspectives. One perspective is that of the system and what it is supposed to do. The other perspective is that of the work practices followed by people. These work practices include those followed by the people who use the information systems and by the people who build those systems. Work practice can be divided into what people do individually and what they do in teams. Because of increased emphasis on teamwork, analysis must ensure that systems meet objectives while also supporting teamwork within the system.

2.4.1 Survey of Problem Statement

It is now common to make a distinction between planned work and situated work. In planned work it is possible to predefine the tasks to be done and the sequence of doing them. Situated work is to some extent the opposite -- here work cannot be predefined, but people carry out tasks as the need arises.

Other classification is by the complexity of the problem itself. The problem may be a routine task, such as updating a record, or it may require a complex decision, such as how to make a large investment. This leads to a distinction between creative and routine tasks and raises the question of how to support these two kinds of tasks.

2.4.2 Concept Formation

One of the most important and first questions to ask in systems work is: what problem are we going to tackle? Or, what system should we analyze and how might we improve it? It is important to realize that it is necessary first to identify the problem to be solved. We must then justify that solving the problem is worthwhile in terms useful to the business and not just interesting because it is innovative in its use of computers. Problems can be justified in many different ways, some of which are informal.

(a) Finding Problems Using External Conditions

Some of the ways of finding problems externally are:

(1) Using normative models, which describe an accepted or conventional way of doing something;

(2) Using historical models of the ways in which organizations develop. This is particularly useful in information systems design because of the development of technology;

(3) Comparing our activities against a competitor's activities; and

(4) Analyzing changes to government policy and community attitudes.

(b) Finding Problems using internal conditions

Goals must be developed within the practical bounds of the organizations. One way to ensure this is to break down the project goal into more detailed subgoals that consider organizational constraints. During initial analysis, therefore, interviewers should search for deficiencies such as:

(1) Missing functions;

(2) Unsatisfactory performance; or

(3) Excessively costly operations.

2.4.3 Information Collection Methods

User requirements require an understanding of how the system works and what its problems are. In order to collect accurate information regarding the new system development, we have to use questionnaire, observation, and interview method. Interviewing is the most successful method of estimating the user requirement (Hawryszkiewycz 1998).

(a) Questionnaires

Questionnaires provide an alternative to interviews for finding out information about a system. Questionnaires are made up of questions about information sought by the analyst.

(b) Using Ethnography

New approach to analyzing computer system requirements. One of its most important goals is not to superimpose the interviewer's or analyst's viewpoint on the system but to use the viewpoint of the people within the system.

(c) Analysis by Participation

Ethnographic studies, because of their emphasis on interaction, are particularly important in studying the way that groups of people work. Their goal is to study the dynamic social situations that occur in such environments. It is usually here to identify communities or workers and to analyze their interactions.

(d) Analysis by Observation

The goal here is to observe what people do in an unobtrusive way

(e) Interviews

Interviewing is the main approach used to analyze large structure systems. It is used by analyst to gradually build a subject world model to understand any system problems.

The main steps are:

(1) Choose people to interview

(2) Right way to conduct an individual interview

2.4.4 Information Sources

(a) System Users

System users are the most important information source (Hawryszkiewycz 1998). From them it is possible to find out the existing system activities and to determine the user objectives and requirements. There are a number of ways of gathering information from users. One way is through interviews. Another is to use questionnaires. A third is through observation of user activities and behavior.

(b) Forms and Documents

Forms and documents are useful sources of information about system data flows and transactions. There are many different kinds of such documents in any large system. They may include management information such as budgets or they may be detailed records of transactions within a business. It is important for the analyst to identify the complete list of such documents. Analysts then go through the documents and analyze their contents. At this time it is usual to check for duplication and for naming consistency to ensure the same data item does not appear under two names.

It should again be noted that analysis should not begin by doing a detailed analysis of forms without first contacting users.

(c) Computer Programs

Computer programs can be used o determine the details of data structures or processes. The search methods are often laborious and involve reading the program or its documentation, sometimes running the program with test data to see what it does, and examining the current user interface.

(d) Procedure Manuals

Procedure manuals specify user activities in a business process. They can be used by analysts to determine detailed user activities. Which is important in detailed system design.

(e) Reports

This source indicates the kinds of outputs needed by users. It can be used as a basis for user interviews to determine any new output requirements that users may have.

2.5 Organization Structure

Many organizations now exist in environments where customer preferences are continually changing, must continually change to meet rapidly changing demands in these more volatile environments. This requires organizations that can quickly bring together people who have such skills and that can make changes quickly at the operational level by rearranging both resources and the tasks that people do. We are thus looking for more adaptive structures that make it easier to bring people from different parts of the organization together and to rearrange their activities as customer needs change.

The result is what is sometimes known as the formation of workgroups concerned with specific and often limited tasks. Such workgroups are usually empowered to make decisions on the use of resources without reference to management, whose main goal in this kind of organization is to provide support to the groups rather than to direct them.

2.6 Rules for Developing Successful System

2.6.1 The Importance of Process

There is now considerable emphasis placed on processes in organizations. The term process fundamentally describes the way we do things. The term quality is often used to describe how we want our processes to work. The term asynchronous is used where people refer to shared information at different times. Synchronous interaction is where people are in communication at the same time.

Software known as GroupWare or CSCW (Computer Supported Cooperative Work) is now increasingly used to support teams. Such software must be able to support a variety of working environments.For example, if group members are at different locations, then group support through an electronic meeting may be needed.

2.6.2 Planned Work

Prespecified or structured interactions are usually defined as workflows made up of a set of steps called planned work. The process is predefined as a sequence of steps, and one person usually carries out each step.

2.6.3 Transaction Processing System (TPS)

The term transaction is used here because it often implies an interaction with the database. Such interactions occur continually in a workflow, as people have to manipulate data at defined workflow stages. Computer programs can be used to allow people to access the database, make any necessary changes to the database and use them to initiate a further transaction (Hawryszkiewycz 1998). Thus if an order is approved, it

becomes the completion of an approve transaction. This may then activate the arrange transaction, and so on.

Most computer systems provide software for transaction processing. These often include a standard computer procedure for making a transaction. The transaction system first checks the transaction to ensure that no erroneous data are input into the computer (Hawryszkiewycz 1998). The transaction must then pass through a number of checks. The first check is usually called an edit, which ensures that all needed data are included in the transaction in a correct format. Thus, for example, we may check to see if an account number has been entered in a bank withdrawal transaction and if this is in the correct format.

This means that numeric data appear in numeric fields and alphanumeric data appear in alphanumeric fields. The edit also makes sure that there are no fields where information is missing. This is followed by checks which ensure that the input data are consistent with existing data in the database. A typical check here is to see if the account number in a bank withdrawal transaction actually exists in the database or whether there are sufficient funds to cover the withdrawal request. Once all the checks are made, the transaction is used to update the database.

The transaction system provides responses to the user as the transaction progresses through the system. Any errors and inconsistencies, as well as the result of the final updated database, are reported. Responses can be provided in a number of ways, depending on the transaction system mode.

Transactions may be input in on-line or in batch mode. In the on-line mode, transactions are input into the system as soon as they arise. In the batch mode, transactions are collected into batches which may be held for a while and input into the computer later, often overnight, often overnight when computers are not busy

processing on-line transactions. A common example of on-line systems is bank transactions. A bank withdrawal is entered directly into the computer system at the time the withdrawal is made. The person who entered the transaction receives an immediate response from the computer. Thus the system will immediately inform the operator if there are sufficient funds to meet the withdrawal.

Batched transaction systems do not provide such immediate responses. In a batch system, a number of transactions are collected before entry into a computer system. For example, a number of hourly work slips may be collected during the day and gathered into a batch. This batch will be input into the computer system at the end of the day, processed overnight, and the user will obtain any responses on the following day. It should perhaps be noted that batched transaction systems are not commonly used now, as there has been a trend to distributed on-line systems over the last few years.

2.6.4 Providing System for Unstructured works

There are a growing number of software products for typical group activities such as holding meetings, making appointments, and so on. What we can thus do is identify the group activities and select a software component for each such activity. We then tailor the different components to specific group needs and then integrate them into a single system.

2.7 Justifying a Solution

One important guideline for defining conceptual solutions is to remember that such solutions should not be unrealizable ideals that are subsequently ignored. Having found a problem or come up with an idea and identified conceptual solutions, we now have to justify these solutions (Hawryszkiewycz 1998). To do this, it is necessary to determine whether the solutions are feasible. Feasibility analysis usually considers a number of alternative solutions, one of which is chosen as possible to ensure that the

most satisfactory solution. It is advisable to investigate as many alternatives as possible to ensure that the best solutions is chosen.

2.7.1 Generations of Broad Alternative Solution

Feasibility analysis begins once the goals are defined and agreed upon. It starts by generating broad possible solutions, which are used to give indication of what the new system should look like. This is where creativity and imagination are used. Analysis must think up new ways of doing things — generate new ideas. There is no need to go into the detailed system operation yet. The solution should provide enough information to make reasonable estimates about project cost and give users an indication of how the new system will fit into the organization.

2.7.2 Evaluating the Proposal

Once proposals are generated, they are evaluated. Three things must be done to establish feasibility. First, it is necessary to check that the project is technically feasible. Does the organization have the technology and skills necessary to carry out the project and, if not, how should the required technology and skills be obtained? Second, operational feasibility must be established. To do this, it is necessary to consult the system users to see if the proposed solution satisfies user objectives and can be fitted into current system operation. Third, project economic feasibility needs to be checked. The study must determine whether the project's goals can be achieved within the resource limits allocated to it.

(a) Technical Feasibility

This evaluation determines whether the technology needed for the proposed system is available and how it can be integrated within the organization.

(b) Operation Feasibility

Operational feasibility covers two aspects. One is a technical performance aspect and the other is acceptance within the organization.

(c) Economic Feasibility

This evaluation looks at the financial aspects of the project.

(d) Organization Feasibility

Organization feasibility is how the proposed solution helps to advance the organization as a whole in efficiency, effectiveness and competency.

2.7.3 Determining Whether a Project Is Worthwhile

The costs and benefits are used to determine whether a project is economically feasible. There are two ways to do this: the payback method and the present value method.

(a) The payback method.

The payback method defines the time required to recover the money spent on a project.

(b) The present value method.

The idea of the present value method is to determine how much money it is worthwhile investing now in order to receive a given return in some years' time.

2.7.4 Selecting an Alternative

Ideally, a detailed cost analysis should be made for each alternative, but this is seldom possible. We would not choose one alternative simply because it is slightly cheaper than another. There are other considerations. Some alternatives are quickly ruled out on technical or operational grounds, or because of other internal organizational considerations.

2.8 System Evaluation

2.8.1 Inspection

Each of the roles in an inspection team would have well-defined responsibilities with in the inspection team. Fegan (system developer 1986) suggests a procedure made up of five steps, namely:

(a) Overview, where the producer of the work explain their work to the inspectors.

(b) Preparation, where the inspector prepare the work and the associated documentation for inspection.

(c) Inspection, which is a meeting moderated by the moderator and guided by a reader who goes through the work with the inspectors.

(d) Rework, which is any work required by the producers to correct any deficiencies

(e) Follow-up, where a check is made to ensure that any deficiencies have been corrected.

2.8.2 Walkthrough

The Walkthrough is a procedure that is commonly used to check the correctness of models produced by structured systems analysis, although its techniques are applicable to other design methodologies. The walkthrough will check that the model:

(1) meets system objectives;

(2) is a correct representation of the system;

(3) has no omission or ambiguities;

(4) will do the job that it is supposed to do;

(5) is easy to understand;

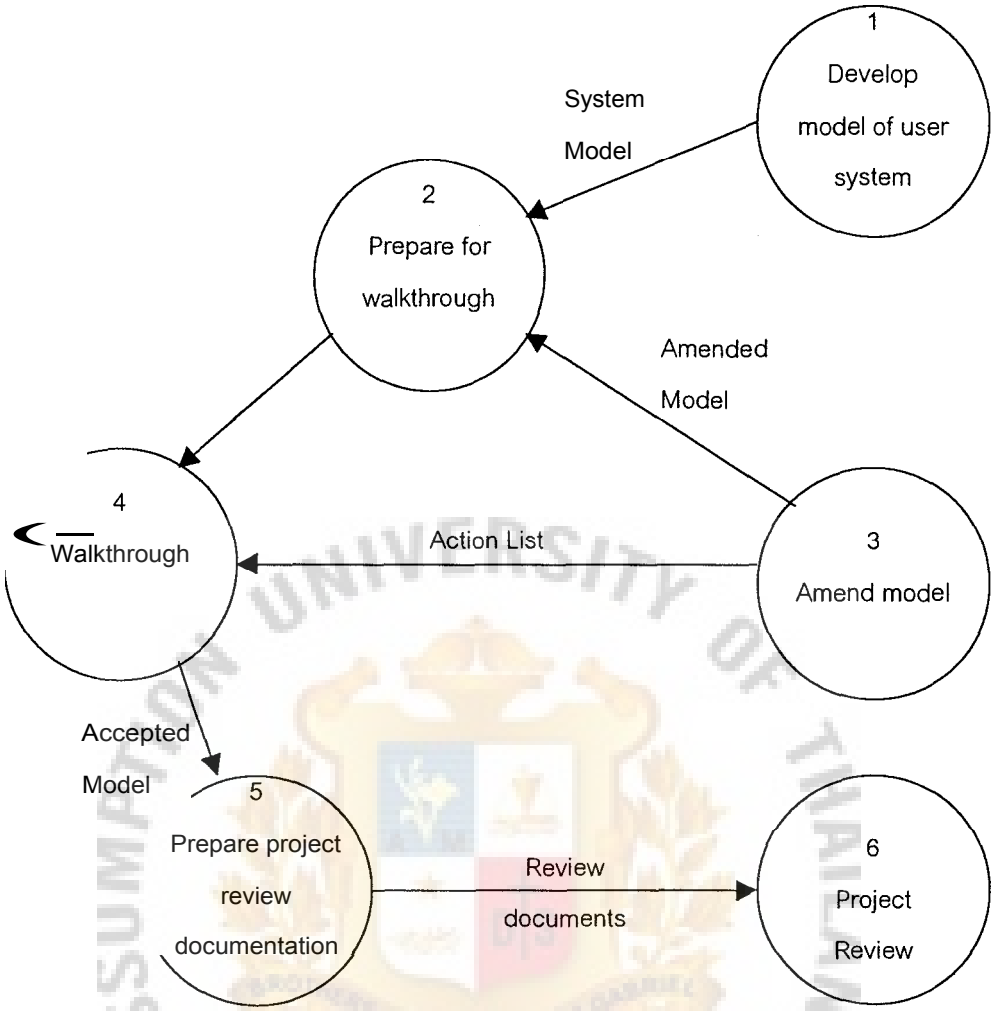


Figure 2.1. Walkthroughs and Reviews.

2.8.3 Program Testing with Test Data

The system analyst serves as an advisor and coordinator for program testing. In this capacity, the analyst works to ensure that correct testing techniques are implemented by programmers, but probably does not personally carry out this level of checking.

At this stage, programmers must first desk check their programs to verify the way the system will work. With desk checking, the programmer follows each step in the program on a paper to check whether the routine works as it is written.

Next, programmers must create both valid and invalid test data. Those data are then run to see if base routines work and also catch errors. If output from main routines is satisfactory, test data to check other routines can be added. Created test data should test minimum and maximum values as possible, as well as all variations in format and codes.

2.8.4 Link Testing with Test Data

When programs pass desk checking with test data, they must go through link testing checks to see if programs that are interdependent actually work together as planned.

First, typical test data are processed to see if the system can handle normal transactions, those that would make up the bulk of its load. If the system works with normal transactions, then variations are added, including invalid data used to ensure that the system can properly detect errors.

2.8.5 Post-implementation Review

The post-implementation review usually takes place about a year after the system is implemented. It evaluates the new system to see if it has indeed satisfied the goals set for it and realized the expected benefits.

2.8.6 Maintenance

Maintenance is necessary to eliminate errors in the system during its working and to tune the system to any variations in its working environment. There are always some errors detected that must be corrected. Often small system deficiencies are found as a system is brought into operation, and changes are made to remove these deficiencies.

Information system planners must always plan for resource availability to carry out these maintenance functions.

2.8.7 Evaluation Summary

The evaluation of the system conclude that all the information kept in the database is at the accurate by running several report from the database to the outcome. The system can generate the report by using the queries to summarize the total sales order for each day. It can print out report for Purchase order.

2.9 Summary

The database will be developed in-house to be flexible at low cost so that the whole system can deliver a better control over the activities in the workflow. The company does not wish to make high investment to design software for its use. Developing its own database management system is most appropriate for the company of this size. Making the best use of available resource to achieve the objective.

III. RESEARCH METHODOLOGY

3.1 Overview

The existing order processing procedure in the company is not so reliable in terms of the validity and the confusion of data entered, no standard form is used other than invoices. Sometimes invoices do not have the price on it and the price will be discussed later during the collection period.

We will first identify the problems with the existing systems. Followed by collection of information from the existing operation procedure. We have to form up alternatives and make the broad alternative followed by making a detailed alternative analysis. We will evaluate among the available alternatives and choose the best. We will solve these problems by designing software for integrating the order processing so that orders can be more accurately filled. The problem statement will help explain what needs to be corrected. The designing phase is done with the help of the analysis of the data flow diagram.

3.2 Research Direction

The company has a lot of problems regarding lost sales order due to insufficient goods in stock, insufficient gray fabrics in stock. Failure to take a competing price in the market is also another reason for losing a customer. But all these are factors that need a large amount of investment to overcome. On the other hand, lost of sales order due to the long delivery time, inaccurate information being sent to warehouse, incorrect prices mentioned and many more minor mistakes cause a lot of damages to the goodwill and customer loyalty.

The existing system was based on the manual record of customer order. These customers' orders are not always kept for further reference and it will be very difficult

to trace orders that are not filled instantly. The scrapbook is used to enter the customer inquiry and it will be nearly impossible to check the inquiry made prior to the order.

Mainly three channels take the orders:

(a) Telephone

(b) Fax

(c) Sales representative

The orders received by telephone are least confirmed and it has a record. The major problem will occur once the secretary receives the order that is being followed up with the sales person. There is no center of data where all the information is the same.

All the fax orders are considered as PO. Mostly, the design of the fabrics will be sent through fax machine. The PO will be kept together in a file that is used until the orders are fulfilled.

Once the orders are received from the customer the clerk or the manager will write down the colour code, quantity needed and price in the order book. As there is no format in the order book (free form book) the omission of vital information always occurs. Some information like price and appointment date can cause confusion on later dates.

The customers often order the goods without referring to the price, as it is understood that the old price will be given to the customer. Most confusion arise when the old price is difficult to find from the order book. The shop will have confusion once the customer is using an old price standing when the rate in the market has gone up. The fluctuations in the market price will cause an argument with the customer once the new price is used and not being mentioned when new orders are taken.

We will use simple software to keep information accurately and track down order processing to be able to solve the major problem that we face in the existing system.

The Microsoft access program is suitable for the company, as there are few employees in the firm. The limited amount of investment and the proficiency in the users are limited. We will need to train the employees to use and assimilate the data.

3.3 Analyzing the System Requirement

Correct systems can only be built if it is known exactly what the user needs and what the system must do. The first step is to agree on a broad conceptual solution. The next step is a detailed analysis of user requirements, followed by a system specification. This step is needed to develop a good understanding of the system and its problems. Usually it produces an analysis model which clearly describes how a system works now, as well as a requirements model of what the new system must do.

The system will need to replace the existing way of order entry to a more accurate and easier way to process order with more accuracy. The system needs two Personal Computers, Pentium **II** 300MHz processor with scanner and colour printer. The software needed to run the program would be Microsoft Access 97 based on Windows 98 platform. We will need a Backup power supply for emergency electricity dropout. The program will be backup daily using zip drive to backup the updated information. Modem connection is also needed for interfacing with the warehouse. The order can be forwarded to the warehouse directly as the daily delivery activity and the progress can be maintained.

3.4 System Development

To begin with, analysts discuss the system with users to familiarize themselves with it and to get a better idea of what the new system will be required to do. New ideas are also discussed and evaluated, with arguments and positions about the new system developed. Previous knowledge, or experience with similar systems, is used when developing new ideas. There may also be some experimentation to find out if some of

the various proposed ideas can be put into practice; opinions are formed and often used in design. During this time we maintain a record of what was discussed and what conclusions were reached about the system. This record becomes part of our general experience, or group memory, which can be used in this or other projects.

One aspect is communication. The second aspect is organization of this work into a process that must eventually produce a new system.

3.4.1 Linear Cycle Phase Development

The linear cycle begins with concept definition. This phase is important because it sets the direction for the remainder of the project and must be completed before the project can continue.

Phase 1 — Problem Definition

Problem definition is statement of user requirements, in user world terms — or what the users expect the system to do — and thus sets the direction for the whole project.

Phase 2 — Developing the System Specification

During the development of the system specification it is necessary to find out more about the system problems and what users require of any new or changed system.

(a) Producing a detailed analysis model describing how the current system works and what it does, usually in subject world terms;

(b) Using the statement of requirements, together with the more detailed systems analysis, to state what is needed from the new system by a requirements model in user terms;

(c) Producing a detailed model in subject terms of what the new system will do and how it will work — here called the design model; and

(d) Producing a high-level description of computer system requirements using system terms.

Phase 3 - System Design

This phase produces a design specification for the new system. There are many things to be done here. Designers must select the equipment needed to implement the system. They must specify new programs or changes to existing programs, as well as a new database or changes to the existing database.

Broad design. The broad design identifies the main architecture of the proposed system. This architecture is verified against the proposed system model and validated against user requirements. During this phase, the models produced in the system specification are converted into computer systems.

Detailed design. It is only when a broad solution is chosen that detailed design starts. During the detailed design phase, the database and program modules are designed and detailed user procedures are documented. The interactions between the system users and computers are also defined. These interfaces define exactly what the user will be expected to do to use the system.

The output of the design phase includes an implementation model for the new system. This includes the proposed equipment configuration together with specifications for the database and computer programs. Detailed user procedures are also provided.

3.4.2 System Development Phase

Like the design phase, this phase is often broken up into two smaller phases; development and implementation. The individual system components are built during the development period. Programs are written and tested, and user interfaces are developed and tried by users. The database is initialized with data.

During implementation, the components built during development are put into operational use. Usually this means that the new and old systems are run in parallel for some time. To complete the changeover, users must be trained in system operations and any existing procedures converted to the new system.

One important part of construction is testing. It is necessary to test all modules to make sure they are error-free once they are put into operation. Testing can be a process on its own. We first test individual modules, then we test their interfaces and see how they work together.

3.5 System Development Process

Defining the broad solution, finding the detailed user requirements including developing the system specification, and designing and constructing the system.

When one looks at the activities in detail, one sees that there are many ways to develop systems, each suited to different kinds of problems. Thus the development process used to design an organization-wide transaction system is different from that used to design, system to support decisions on what assets to buy. The former is usually built in a number of steps and centers around planned work, whereas the latter tends to be more experimental and centers around situated work. Furthermore, different models may be used to represent systems at different development steps.

Different development methods often need different kinds of work practices to be followed. Thus in some cases work can be easily subdivided and allocated to people who work independently; in others, people may have to work closely together. This is turn affects the way they exchange information, calling for different support processes and team structure. A good system will provide the right match of team to process, support it with proper tools and documentation, and provide the correct level of

management. Guidelines are now becoming available through standards that suggest both what must be done in the development process and the process steps themselves.

3.5.1 Describing the Development Process

Development processes are also known as the system life cycle, or the problem-solving cycle or sometimes as the system development cycle.

A development process must balance all of these needs to ensure completion while supporting the freedom needed to ensure creativity. System designers should therefore not just continue to create new ideas without ever putting them into practice. At the same time, they should not simply implement the first design they think of using a set of strict process rules. How this balance is reached between structure and freedom often depends on the kind of system being designed.

The development process must satisfy a number of other criteria. Perhaps the overriding criterion is to ensure that the system meets the original user requirements and that it works without error. Formerly, requirements were defined, the system was built, and then the whole system was tested to see it met the requirements without error. Any errors found were corrected. The approach of leaving error detection to the end, however, is no longer used. It was usually found that a large number of errors appeared in systems built in this way, and considerable time and effort was needed to clear them up. For this reason the trend has been to introduce various checks during the process to ensure that the number of errors on completion is minimized.

Quality assurance mechanisms check the process at its various stages to ensure that requirements are not lost or changed during the process and that errors are minimized. Quality assurance mechanisms include validation of outputs from various activities against original requirements. They also include verification of individual activities to ensure that each activity correctly converts its output to an input. Finally,

they include the testing of working components. Validation and verification are applied progressively during system development to ensure that the final system meets its requirements.

3.5.2 Defining the Development Steps

Perhaps the simplest view of the development process is a sequence of tasks, an approach that was used in the early days of developing computer-based information systems. Usually, a large number of detailed activities are needed to build an information system. Typical activities include writing a program, designing a form, finding out what a user needs, or selecting a piece of equipment.

Detailed test design takes place during system design, and testing is part of the development phase. Each phase in the sequence can only commence after the previous phase has been completed. Each phase usually produces one or more models, or products in later phases.

3.6 New System Development Methodology

So far, we have assumed that there is an existing system, parts of which are to be automated. But what if this is not the case, and there is no existing system? In that case we cannot examine what is currently happening nor identify current user activities. In a sense, the search procedures are now simpler because there are fewer sources of information. The procedures now emphasize user requirements and place less emphasis on the study of existing components. There are no reports or computer programs to go through and no manuals to examine. The whole procedure centers around interviews, but the thrust of these interviews is now different. The interviews do not need to search out how a system works but must determine users' expectations of the new system. They must then define the business processes and users' roles in these processes.

Prototyping is often useful here. We can build up typical interfaces and outputs to get reactions from users on the kind of system behaviour they would like.

Where totally new systems are proposed, analysts often look at sources outside the system for information. Often the new system is being suggested because someone has seen it somewhere else. Analysts can examine these external systems to see whether any of their features are applicable to the proposed new system.

3.7 Performance Testing and Evaluation

We will execute both Program testing with test data and Link testing with test data to ensure the correct linkage between the sub-program and have a logical explanation and confirmation of the outputs to be free of errors. We will use a pilot study for the testing of the program.

We will use the desk-check for checking the programming and print out the raw data being entered into the system and compare them to ensure the correct linkage of the system. The new program will be run together with the normal manual system. The discrepancies will be measured and if there is error it can be corrected by referring to the manual system.

The validity of the system will be measured against the existing output of the report from the program data. The activity time of performing different activities will be measured to assure that the system serves its purpose of accuracy and the speed of performing activities.

IV. SYSTEM DEVELOPMENT

4.1 Overview

We will need to develop the system under close interactions between the user of the system to have a clear understanding on the user requirements. The system will be developed using the Microsoft Access to integrate the master information to be used. The program will need the master information only once and the transaction information will need to be entered daily and all the data entry will be less duplicated. The workload will also be reduced.

We have covered the importance of a good order processing system and how it can help an organization to keep track and control its resources and time commitment with the customer. This will become a success factor if the company can successfully create and utilize the system that can control the data integrity. The reliability of the system can be assured if the system is designed with logic. We will use the Microsoft Access to create the database and make links and store data in the program. The Microsoft Access is suitable for the current size of business transaction in this company. The different units will be divided and assigned so that all the related work can be done without having to duplicate the work.

4.2 The System Operational Diagram

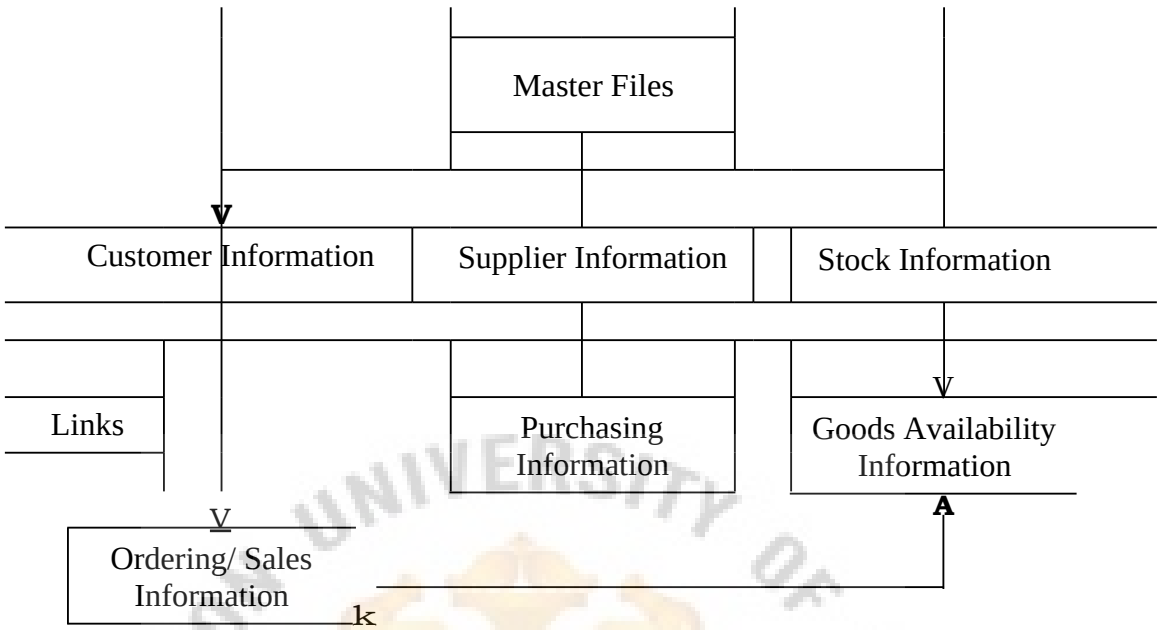


Figure 4.1. The System Operational Diagram.

The system operation diagram shows the relationship of the Master Table Files with the Links Table Files in the database. Upon execution of the program the database will be made at two levels. The information being input in the transaction file will not be able to change the data in the master files. All the changes in master information have to be input in the master files directly.

The system works like the following Data Flow diagram. In this system the customers make the inquiry for the desired goods and request for the quotation. The system will be able to give the full information on the availability and the condition specified for each particular customer. The system will be able to send orders to the suppliers and get the feedback on the orders being placed. There can be more accuracy in the receiving of goods from the factory. The system will need the management to view the orders before accepting or rejecting the order. The confirmed orders are placed in the sales order in which the information will be followed up into the current order status. Each order being performed is then called as finished order.

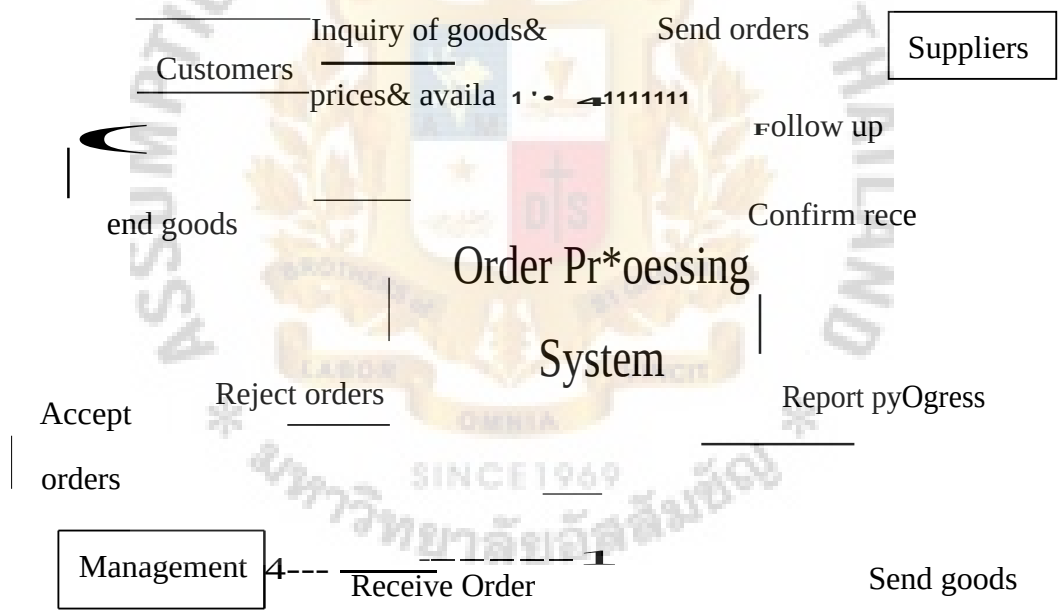


Figure 4.2. The DFD Diagram Level 0.

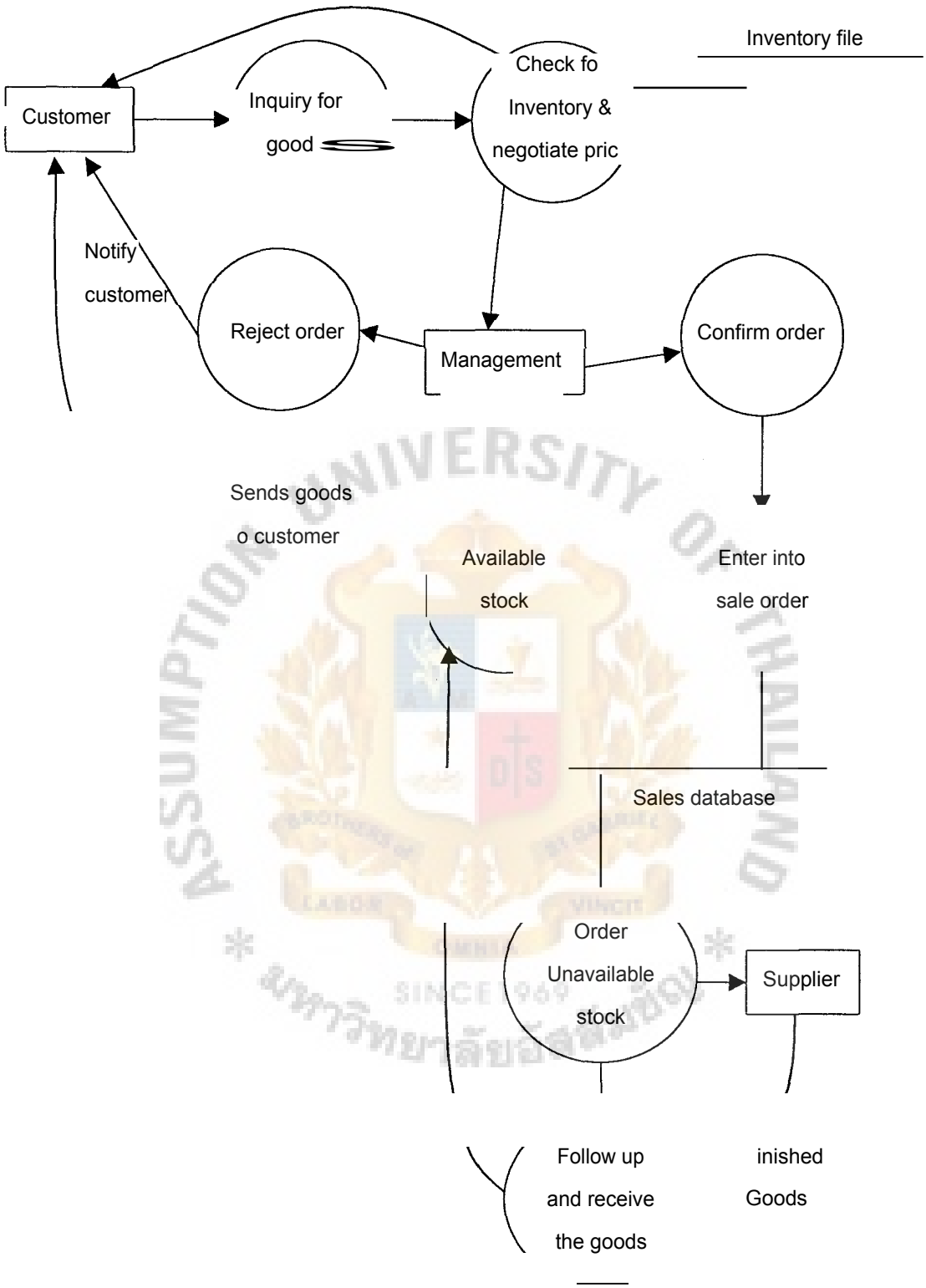


Figure 4.3. The Level 1 DFD Diagram.

4.3 The Database Management System

The data of the system can be linked together though a non-interrupt pattern. The Master document must be maintained as non-link tables. These non-links table will consist of data from the Master documents such as Customer information, Supplier Information, Master Stock Information and the user information. These information are independent of each other and we will have to enter the information at the starting point and the updates are not done very often. Even though there is a lot of transaction but the Master file will not be affected by the amount of transaction taking place in side the system.

The Program's database will be in the form of Microsoft excel so that the clerk can enter data correctly into the worksheet. The data can be imported for using in the Microsoft Access program by auto download. The data can also be entered directly into the database by using the screen page form for input.

We start by creating the Table to hold the information we would need. We come up with a list of tables as follows:

(a) Customers information

(b) Supplier information

(c) Stock information

(d) Goods availability Information

(e) Ordering/Sales information

(f) Purchasing information

(g) User information

Then we sub divide them into master tables that are:

(a) Customers information

(b) Supplier information

(c) Stock information (only the product type)

(d) User information

From the three masters document we will link it to other queries. All the masters document data will be kept as a record. All their fields will be mentioned in the following appendices. The information can be input without any change in the system. The information that is being input in the first place can be modified, and the links in the transaction files will be automatically updated.

And separated the other tables to be queries table that will fetch information from the master file and keeping their relationship. The linking tables are:

(a) Goods availability information

(b) Ordering/Sales information

(c) Purchasing information

These links tables will be keeping the relationship of the transaction file with the reference to the master file so that any information regarding the master file will not need to be entered again during the transaction data input. This process will eliminate the duplicate transaction. It will take up lesser space by 45%. The links used will take lesser time in processing the outcome and storage and retrieval of data can be done at a lot lesser time.

The first link will be the Master stock linking with the product category so that when new product category is added the Master stock will have that product category to choose from. The link will be keeping Master stock to be linked to product category. Each product category will be added to the Master stock. This Master stock will keep the stock in coming and out going. The balance of stock on hand will be kept for reference when needed.

Customer information will be linked with the order/Sales information. Whenever the new order is received the sales order will be entered into the Order/Sales information and the customer information will be linked to each order. The linking code will be customer number linking to the order number, where more than one order number can be linked to one customer number.

The supplier information will be linked to the purchase information. The purchase order being place with the supplier will be kept. The purchase information will be linked such that the purchase order number of each purchase will be linked to the Supplier information. One supplier number will be linked to more than one purchase order number.

The order/sales information stock sales will be finally deducted from the master stock inventory. The Purchase order information stock purchases will be added to the master stock to have an updated inventory.

4.4 The System User Interface

The system is design from the user requirement as the basis for execution. The Interface is worked closely with the system end users and the Management of the company. The program is designed to have a main menu for clicking on the button to select the function command When the program is run at start-up it will display this menu:

Figure 4.4. The Startup Menu Program.

The user now can select from the menu program for different usage.

The tree of the menu command is as follows:

Table 4.1. The Program Task Menu Detail.

Menu Task	Sub- Menu Task	Function
Sale Order		Input Sales Order
Purchase Order		Input Purchase Order
Current Delivery Status		View order delivery status
Add Data Information	Add category data Add color data Add Customer Data Add Supplier Data Add Stock Data Return to Main Menu	Add category of product Add colour of cloth Add customer data Add supplier data Add Stock data Go back to the Start up Menu
Edit Data Information	Edit category data Edit color data Edit Customer Data Edit Supplier Data Edit Stock Data Return to Main Menu	Edit Category of Product Edit Color of cloth Edit customer data Edit supplier data Edit Stock data Go back to the Start up Menu
Report Form	Purchase Order form Sales Order form Return to main menu	Report Purchase order Report Sales order Go back to the Start up Menu
End Program		Close Application

From the menu program we can enter and edit data according to the requirements by following each of these steps as mentioned in the guideline.

4.4.1 Input/Edit Customer Information

The Program will have a customer database for keeping the customer record. From the Menu page the user can click at the "Add Data Information" and then click at the "Add Customer Data".

To modify the existing Customer Information the user can click at the "Edit Data Information" then click at the "Edit Customer Data". The following screen will appear for customer information input.

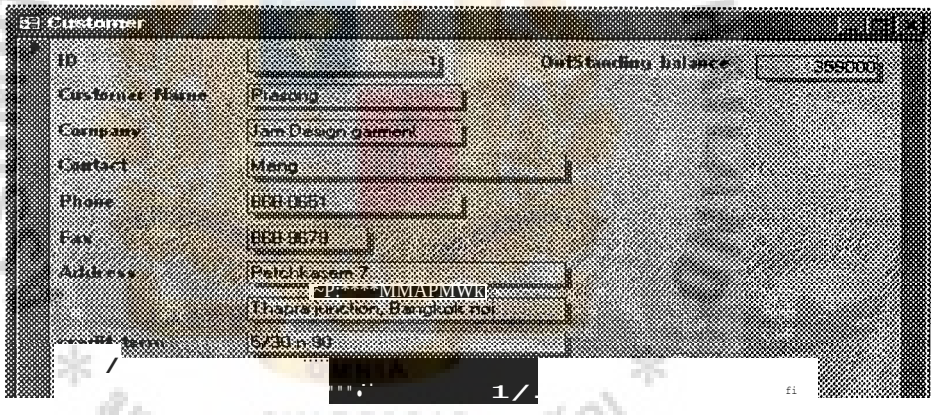


Figure 4.5. The Customer Information Add/Edit Page.

The user needs to input customer information for only once and every time that the customer needs to enter sales order they can browse from the Available Customer Data. This will ensure prevention of overlapped sales data. Using a search criteria for all the customer name, ensures that the goods sold to anyone must have the customer data for further follow up. The user can key in the data directly in to the fields available.

Table 4.2. The Database Field Description.

Customer name :	For input of the customer's known name
Company :	The company's name
Contact :	The name of the contact person in that company. Can have more than one name
Phone :	The company's phone number. Can contain up to 3 telephone numbers
Address :	The Customer's address. Only first line is required
Credit term :	The customer's credit period
* Credit limit :	Setting the maximum credit balance allowed The validation is set at < 1,500,000 baht
* Cr. Outstanding :	The customer's credit balance. Will be used in future when the

* The field Credit limit and Credit outstanding will be used when the accounting system is developed in the future.

4.4.2 Input Cloth Category

To Input the cloth category we have to go to the database that holds the information of the cloth category. From the Menu page the user can click at the "Add Data Information" and then click at the "Add Category Data".

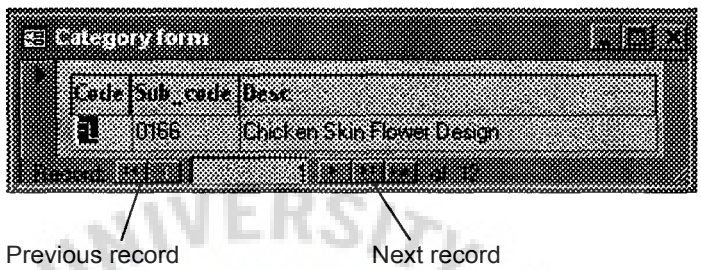


Figure 4.6. Category Add/Edit Page.

The clerk can enter the code number and the sub-code and description. The form can be automatically updated.

4.4.3 Add Cloth Color

The clerk can enter the color code. From the Menu page the user can click at the "Add Data Information" and then click at the "Add Category Data".

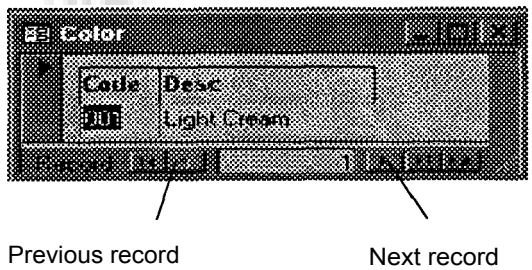


Figure 4.7. The Color Code Edit Page.

4.4.4 Input Sales Order

From the Menu, we select the Sales order button and click. The screen Sales Order will appear.

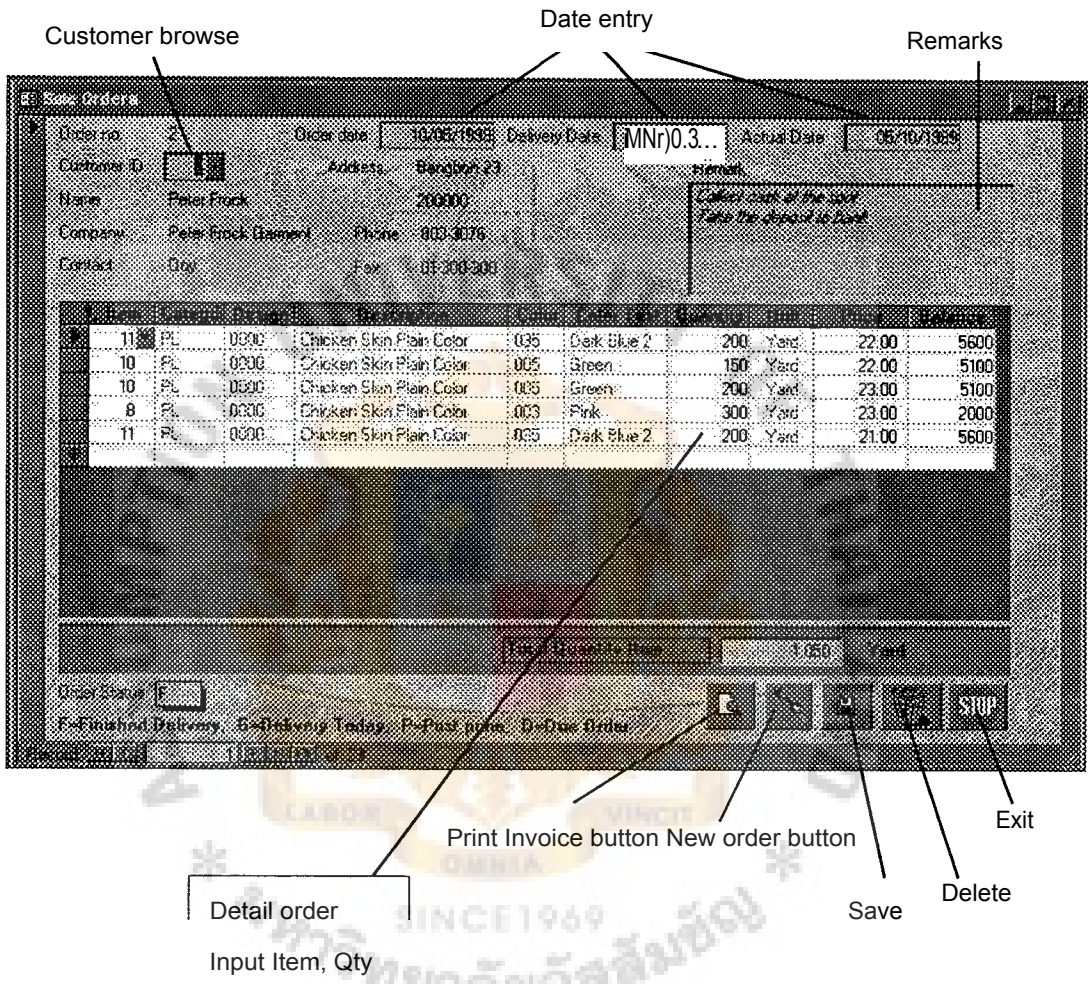


Figure 4.8. The Sales Order Add/Edit Page.

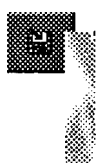
The user can input new customer order by first clicking on the pencil button to write new orders.

Click to add new order

Figure 4.9. Adding New Order Button.

The user can click at the customer ID., the customer name will be shown and the user can just click on the required customer name and that customer will be selected. The information regarding that customer will be shown on the screen. The field, which is Name, Company contact, Address, Phone, Fax will be automatically displayed. The user then key in the order date, delivery date and actual delivery date is when the goods are actually delivered. If there is any remarks the sales clerk can enter the remarks in the remark box.

After having the header information, the clerk can input the items ordered by the customers. The information are the product type and item name. Then the clerk enters the quantity of the particular items. Then the price is entered. If there are additional orders the clerk can start from a new line and enter the quantity and price again. When finished, the clerk clicks on the save button to save the record.



Click to Save record

Figure 4.10. Save Record Button.

After the sales clerk has saved the record he can add a new record by clicking the add new record button. If he wishes to stop entering sales order, he can click the stop button.

4.4.5 Current Delivery Status

The clerk can open the Current Delivery Status to view the due order and that day's order to be processed. The customer name and telephone number will be shown on this screen. If the order detail is needed the clerk can click on the "Go to order no." to show the current order number selected.

The clerk goes to the Main Menu of the Order Processing Application and clicks on the Current Order Status. The following screen will be shown:

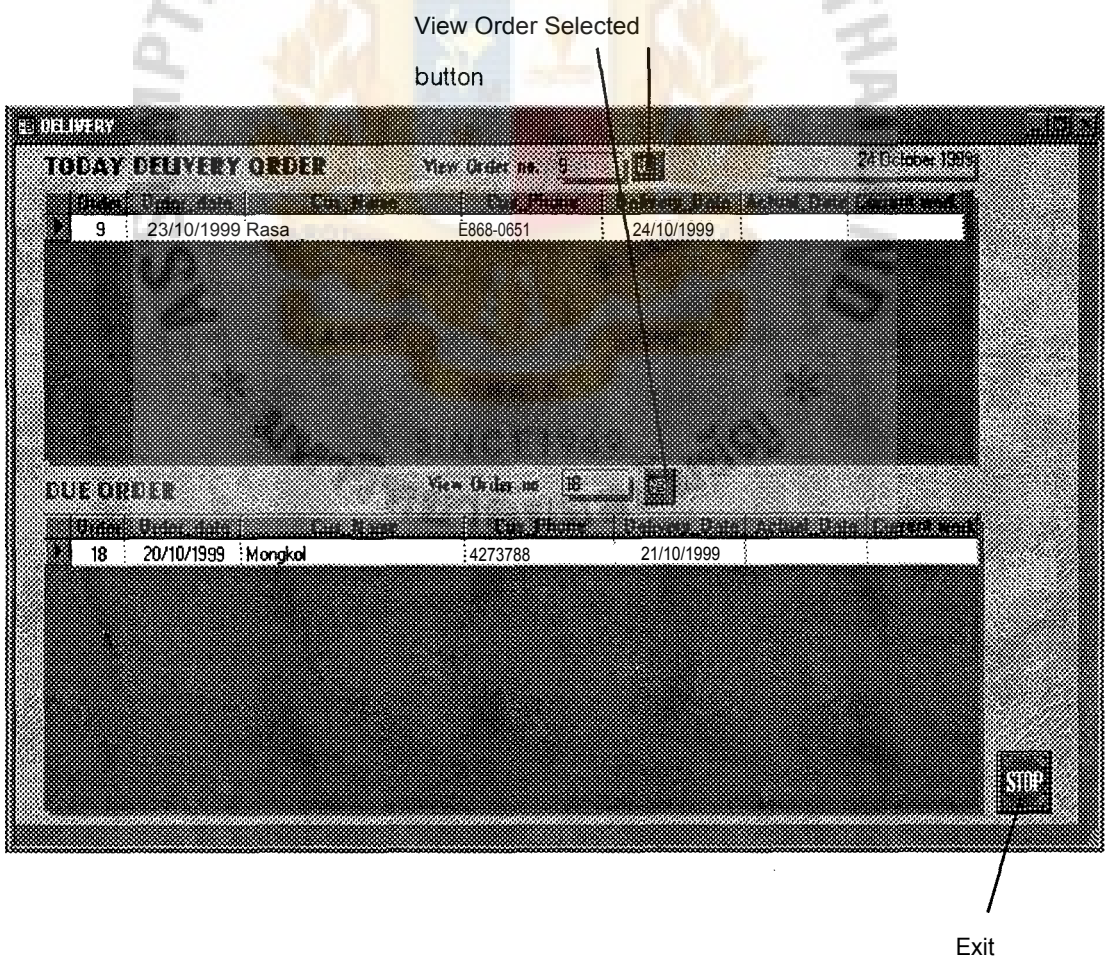


Figure 4.11. The Current Order Status View Page.

V. SYSTEM EVALUATION

First, individual program modules are tested by their developers. Once individual modules are tested, the next step is to test whether they can be combined. This is known as integration testing. During integration testing, groups of modules combined into test modules and tested together. The goal is to determine whether interfaces between modules work. Then the entire system is tested. It is important design test cases that test all the conditions that can arise in system inputs, while at the same time ensuring that the tests do not take too long.

5.1 Overview

The system was developed and tested along with the normal day to day work. The new system performs successfully in terms of data accuracy and reliability. No data lost was reported. The user needs training to understand clearly on how the new system works. The sales clerk will be taught on the basics steps to use the system and what could be done in case of errors. The system proves to be better than storing the information on books and paper notes. The old information was never referred to for future usage. With the new system the computer can store and utilize the information on a long term. The system can meet the objective being set by the company.

There might be some updates needed from time to time as no system is always perfect. For ease of expansion and edition we have made the program open ended so that any changes needed to be done can be made to the program easily without affecting the database. Any change that would affect the database need to be authorized from the management before doing so.

5.2 Verification

Checking the link between files and forms does the Verification of a database. All the links has to be checked to ensure correctness in the logic of creating a database and they can be verifiable through the constant application of forms and links. All the tables in the database should have the same format to accomplish the correct database arrangements.

The verification is set on each database line to have an auto record on the date and time of the latest update. This will be done automatically each time a record is created or modified. The use of the record is to have a trace of the source of the input time and to check the validity of each data entered.

The system validity is set in different areas of the program. The system will not allow the program to overwrite command in the record unless it is needed.

Checking the information kept in the books will verify the system. This will ensure that the system has the correct database storage. The book storage will be kept along with the system storage. The book and the database can be cross-checked for checking the database verification.

5.2.1 Program Testing with Test Data

The method of applying Program testing with test data will be used to desk check the program whether the program is written correctly and confirm that it will work out as planned.

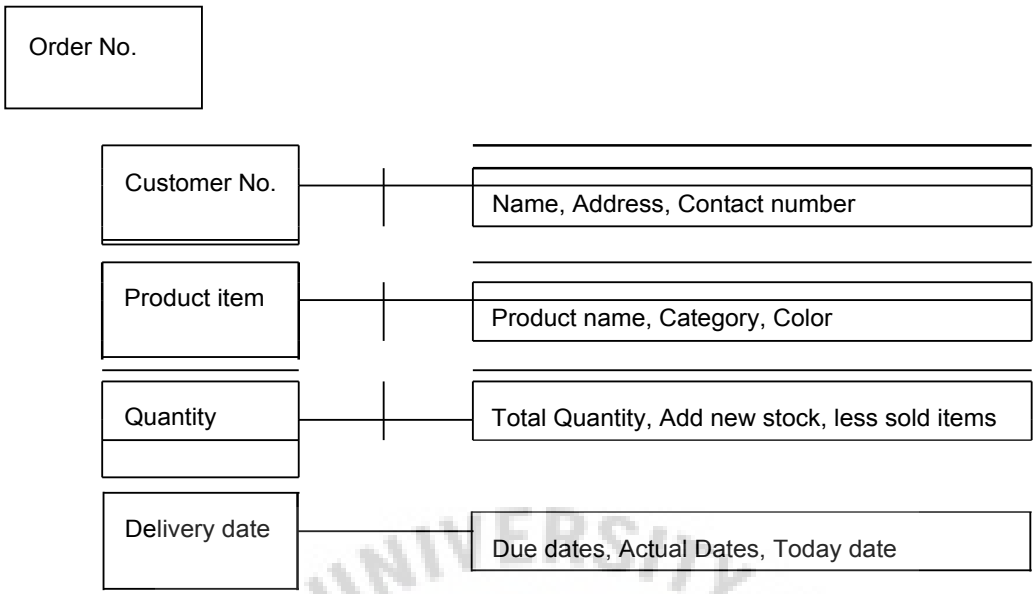


Figure 5.1. The Link Information for Data Field.

5.2.2 Link Testing with Test Data

The analyst will make a judgement of the sales information data being input into the computer as a way of checking for errors in the system. Sales order information using the manual system will be as followed.

The manual system represent the normal customer information which only has the name and the telephone number so each and every time that the delivery person is changed they have to call up to check the address of the customer. These are the information that will be available manually.

Table 5.1. The Manual Customer Information.

Customer Name	Customer Phone
Prasong	868-0651
Peter Frock	803-3076
K T	807-4262
Nutty	432-1294
Mongkol	4273788
Monthira company	427-1212
Duang Chai	221-7595
CK Electech	281-5607
Kishimoto Sangyo	260-8624
S.V. Tex.	226-5820
Aphichai Industry	212-6972

With the new system the information are kept inside with much more details. We will key in the information as given through the interface. Then print out the output in the file from the program. We will also add available information along with some other information to enrich the database. The output of the keyed in database are as follows:

Table 5.2. The Database Information for a Customer.

ID	Cus_Name	Cus_Company	Cus_Contact	Cus_Phone	Cus_Fax	Cus_Add
1	Prasong	Jam Design	Meng	868-0651	868-9678	Petchkasem 7
2	Peter Frock	Peter Frock Garment	Ooy	803-3076	01-300-300	Bangbon 23
3	K T	Chock anand	eng	807-4262		Petchkasem 71
4	Nutty	Nutty House	prasert	432-1294		Bangbon 41
5	Mongkol	Suriwongse Garme	Mr Mongkol	4273788	018285284	Sukhsawad 26
6	Monthira company	Monthira garment		427-1212	7123212	198/181 sathorn
7	Duang Chai	Duang Chai Shop	Somkiet T.	221-7595		6-7 60 Pahurat Bkk
8	CK Electech	C.K. Electech Co.	Warangkana	281-5607	280-3660	31-14 Damrongruk
9	Kishimoto Sangyo	Kishimoto Sangyo	Yoshikazu N.	260-8624	260-8631	159 Sermmitr T.
10	S.V. Tex.	S.V. Tex Co., Ltd.	Somsak S.	226-5820	222-7752	95/4 Prajeenburi
11	Aphichai Industry	Aphichai Industry Co	Aphichai N.	212-6972		33/60 St. Louis 3

The manual system will represent the current order book being used which have got no format and the notes are made in a normal account book. This will be written without format here in the Table 5.3.

Table 5.3. The Manual Sales Order Record.

Nutty	$2^{3}/_{1}0/99$	sent	23/10/99	Chicken skin no. 8	60y	@23.5
K T	$2^{3}/_{1}0/99$	sent	23/10/99	Chicken skin no.6	5000y	@20
Peter	23/10/99	sent	23/10/99	Chicken skin no.10	2000y	@21
Prasong	24/10/99	sent	24/10/99	Chicken skin no.29,63 @	250y	@22
Monkol	23/10/99	sent	23/10/99	Chicken skin no.37	500y	@22

The ouput from the computer files which is being printed out are as follows:

Table 5.4. The Computerized Sales Order Information Header.

Order Header

Order no	Order date	Customer	Delivery_Date	Actual Date	Delivery_Status
3	$2^{3}/_{1}0/1999$	4	23/10/1999	23/10/1999	F
4	23/10/1999	3	23/10/1999	23/10/1999	F
5	23/10/1999	2	23/10/1999	23/10/1999	F
6	24/10/1999	1	24/10/1999	24/10/1999	F
7	23/10/1999	5	23/10/1999	24/10/1999	F

Table 5.5. The Computerized Sales Order Information Detail.

Order Detail

Order no	No	Item	Quantity	Unit	Price
3	0	7	60	Yard	23.50
4	0	6	5000	Yard	20.00
5	0	10	2000	Yard	21.00
6	0	29	250	Yard	22.00
6	0	63	250	Yard	22.00
7	0	37	500	Yard	22.00

Interpretation:

The order No. is generated by computer to each different orders. The customer No. is set to be in numbers according to the set customer. So the meaning of the first line of order header means customer No. 4= Nutty, delivery date=$2^{3}/_{1}$0/1999,order date=23/10/1999. The order details shows the entire goods being ordered. The item for order No. 3 is item No. 8 with quantity of 60 yards at the price of 23.5 bahts.

Comparison with the original manual order is exactly correct:

Nutty 23/10/99 sent 23/10/99 Chicken skin no.8 60y @23.5

5.3 Validation

The implementation of the database needs to satisfy the criteria which it has been created for. For example the database must make sure that the outcome is relevant to what we require as an output. The output of the database must be checked to compare the correctness and to answer the question whether the database serves the purpose.

We will begin by comparing the raw information with the actual information being developed from the system and comparing the output of the old system and the new one, to ensure that the database enhances the workflow.

We will try to compare the speed of operation of the existing system and then compare to the new system. We will keep track of the time by using a stop watch to record the time of receiving a phone call and able to perform different task as follows.

Table 5.6. Old System Time Usage.

Criteria \ Time taken (minutes)	1	2	3	4	5	AVG
1. The Speed of Checking Available Stock	35	90	86	70	85	73.2
2. Checking items received from the factory.	25	30	39	28	32	30.8
3. Identify which items are for which customers.	10	25	23	18	26	20.4
4. Making a list of what is to be sent today	15	22	19	23	18	19.4
5. Sending the list to the warehouse.	30	35	20	26	35	29.2
6. Picking the ordered item and packing them together to be ready for delivery.	20	26	24	23	30	24.6

Table 5.7. New System Time Usage.

Criteria \ Time taken (minutes)	1	2	3	4	5	AVG
1. The Speed of Checking Available Stock	3	1.5	2	5	3	2.9
2. Checking items received from the factory.	34	25	42	33	28	32.4
3. Identify which items are for which customers.	1.2	2.2	1.4	1.8	1.3	1.58
4. Making a list of what is to be sent today	0.7	1.2	1.4	1.2	1.0	1.1
5. Sending the list to the warehouse.(Fax)	1.2	1.6	1.3	1.2	1.5	1.36
6. Picking the ordered item and packing them together to be ready for delivery.	18	28	35	20	23	24.8

Both the above tables indicate the difference in the time taken to perform different activities in various aspects of the workflow. The program will be used to measure the changes that are being brought about into the workflow to determine the effectiveness of the program.

Table 5.8. Comparison between Old and New Systems.

Criteria	Old System	New System
1. The Speed of Checking Available Stock	73.2	2.9
2. Checking items received from the factory.	30.8	32.4
3. Identify which items are for which customers.	20.4	1.58
4. Making a list of what is to be sent today	19.4	1.1
5. Sending the list to the warehouse.	29.2	1.36
6. Picking the ordered item and packing them together to be ready for delivery.	24.6	24.8
7. Consolidating the goods for sending along the same route.	No pre-plan	Can Pre-plan
8. Assigning the vehicle to deliver the goods.	According to each lot size	According to consolidated lot size.

The comparison of the results shows a very good improvement in the speed of checking available stock with better accuracy. The system also has proven a positive result for Identifying Customer Orders and Making List of Goods to be sent. Fax also helps in sending the list of goods to be sent to the warehouse easier and more accurately. There is no significant changes in the Checking of Received Items from the factory because we still rely on the manual system of the factory. In the Future if the bar code system is applied, this activity will have a significant improvement in the time taken.

VI. CONCLUSIONS & RECOMMENDATIONS

6.1 Conclusions

We have developed an order processing application for usage within the company. This program helps in maintaining the data and the transaction taking place within the company. The research tries to find ways in which the problems of the company can be resolved within the limited budget and available time frame.

The order processing application can improve the system of the company. The company can now keep order information that will be critical for their success in getting customer trust. This program will be able to store and retrieve data very accurately. The customer information will be used for further analysis and product planning. The system being developed will be solving major problems of the company. Lost sales order would be reduced. The order processing system can give reliable information for the company to give reliable service to its customers.

The result of using the program can show a great improvement in the area of the back office work which normally consume a considerable amount of time. The new program being used showed a great improvement in the time to check the available stock. It also helped in identifying the customers order and helps in dispatching the goods faster. This helps in the logistics system of the transportation of goods to the customer faster and will improve the working time to accomplish each order and will increase the capacity to serve the market better in the future.

6.2 Recommendations

The future trends of the company can be in using the application to cover all areas of its workload. The future expansion of the application might be done to cover other important areas such as account receivables, sales projection and Internet order system. Account receivables could be linked from the purchases made by the customer to further classify the aging of the account receivables. This system will be good for generating report on collections and customers credit standing. The whole accounting system can summarize the total sales by sector, by product type and by time frame. The sales projection could be in place when we have collected enough data over one year. Using the collected information we could classify the kinds of fabrics to be stocked more or less during which period of the years. The Internet ordering system homepage can also be launched so that when customers need to check the required items they can view the company's homepage and check inventory and even place order through the Internet. The graphics of the cloth design can be stored in the homepage for the customer to choose from and the salesman will not need to travel to distribute the design samples. The advancement will need to be implemented along with the market situation, the competitor and the company's own objectives.

APPENDIX A

THE TABLES OF DATA CODING

SQL

```
SELECT [Order Header].Delivery_Status, [Order Header].Order_date, [Order
Header].Delivery_Date, [Order Header].Actual_Date, [Order Header].Order_no,
[Order Header].Cus_Name, [Order Header].Cus_Phone, [Order Header].
[Current work]
FROM [Order Header]
WHERE ((([Order Header].Delivery_Status)=TY))
ORDER BY [Order Header].Delivery_Status;
```

Columns

Name	Type	Size
Delivery_Status	Text	1
Order_date	Date/Time	8
Delivery Date	Date/Time	8
Actual_Date	Date/Time	8
Order_no	Number (Long)	4
Cus_Name	Text	20
Cus_Phone	Text	20
Current work	Text	1

Table Indexes

Name	Number of Fields
Code	1
Customer	1
PrimaryKey	1
PrimaryKey	1
Code	1
Customer	1
PrimaryKey	1

SQL

```
SELECT Stock.Code, Stock.Category, Category.Code, Category.Desc,
Category. Sub_co de,
Stock. Color, Color.Desc, Stock.Size, Stock.Size_Unit, Stock. Quantity,
S to ck. B alance,
Stock. Update
FROM Category INNER JOIN (Stock INNER JOIN Color ON Stock.Color =
Color. Code) ON
Category. [No] = Stock.Category;
```

Columns

Name	Type	Size
Stock.Code	Number (Long)	4
Category	Number (Long)	4
Category. Code	Text	2
Category.Desc	Text	35
Sub_code	Text	4
Color	Text	3
Color.Desc	Text	15
Size	Number (Long)	4
Size_Unit	Text	5
Quantity	Number (Long)	4
Balance	Number (Long)	4
Update	Date/Time	8

Table Indexes

Name	Number of Fields
Category	1
Code	1
Color	1
PrimaryKey	1
Code	1
PrimaryKey	1
Sub_code	1
Category	1
Code	1
Color	1
PrimaryKey	1
Category	1

SQL

```
SELECT [Order Header].Order_no, [Order Header].Order_date, [Order Header].Cus_Name,
[Order Header].Cus_Add, [Order Header].Cus_Add2, [Order Detail 2].Item, [Order Detail
2].Category.Code, [Order Detail 2].Sub_code, [Order Detail 2].Category.Desc, [Order Detail
2].Color, [Order Detail 2].Quantity, [Order Detail 2].Price
FROM [Order Header] INNER JOIN [Order Detail 2] ON [Order Header].Order_no = [Order
Detail 2].Order_no
WHERE ((([Order Header].Order_no)=[Forms]![Sale Orders]![Order_no]))
ORDER BY [Order Header].Order_no;
```

Columns

Name	Type	Size
Order_no	Number (Long)	4
Order_date	Date/Time	8
Cus Name	Text	20
Cus_Add	Text	50
Cus Add2	Text	50
Item	Number (Long)	4
Code	Text	2
Sub code	Text	4
Desc	Text	35
Color	Text	3
Quantity	Number (Long)	4
Price	Currency	8

Table Indexes

Name	Number of Fields
Code	1
Customer	1
PrimaryKey	1
Item	1
Order_no	1
Code	1
PrimaryKey	1
Sub_code	1
Category	1
Code	1
Color	1
PrimaryKey	1
Item	1
Order_no	1

Properties

FilterOn: False OrderByOn: False
Record Source: Customer

Objects

Group Level 0

Control Source: Cus Name GroupFooter: False
GroupHeader: False Groupinterval: 1
GroupOn: Each Value Keep Together: No
SortOrder: False

Section: Detail
Section: PageFooter
Section: PageHeader
Section: ReportFooter
Section: ReportHeader
Text Box: Cus_Add
Control Source: Cus_Add Running Sum: No

Label: Cus_Add Label
Text Box: Cus_Add2
Control Source: Cus_Add2 Running Sum: No

Label: Cus_Add2 Label
Text Box: Cus_Company
Control Source: Cus_Company Running Sum: No

Label: Cus_Company Label

Text Box: Cus_Contact
Control Source: Cus_Contact Running Sum: No

Label: Cus_Contact Label
Text Box: Cus_Fax
Control Source: Cus_Fax Running Sum: No

Label: Cus_Fax Label
Text Box: Cus_Name
Control Source: Cus_Name Running Sum: No

Label: Cus_Name Label
Text Box: Cus_Phone
Control Source: Cus_Phone Running Sum: No

Label: Cus_Phone Label
Text Box: Cus_term
Control Source: Cus_term Running Sum: No

Label: Cus_term Label
Text Box: ID
Control Source: **ID** Running Sum: No

Label: Label22
Line: Line25
Line: Line26
Text Box: Text23
Control Source: =Now() Running Sum: No

Text Box: Text24
Control Source: ="Page " & [Page] & " of " &
Running Sum: No
[Pages]

Properties

FilterOn: False OrderByOn: False

Record Source: Order Delivery Form

Objects

Group Level 0

Control Source: Order_no GroupFooter: True

GroupHeader: True GroupInterval: 1

GroupOn: Each Value Keep Together: Whole Group

SortOrder: False

Section: Detail

Section: GroupFooterl

Section: GroupHeader°

Section: PageFooter

Section: PageHeader

Text Box: Code

Control Source: Code Running Sum: No

Text Box: Color

Control Source: Color Running Sum: No

Text Box: Cus_Add

Control Source: Cus_Add Running Sum: No

Text Box: Cus_Add2

Control Source: Cus_Add2 Running Sum: No

Text Box: Cus_Name

Control Source: Cus Name

Running Sum: No

Text Box: Desc

Control Source: Desc Running Sum: No

Text Box: Item

Control Source: Item Running Sum: No

Label: Label()
Label: Labe11
Label: Labe112
Label: Label2
Label: Label3
Label: Label4
Text Box: Order_date
Control Source: Order_date Running Sum: No

Text Box: Order_no
Control Source: Order_no Running Sum: No

Text Box: Price
Control Source: Price Running Sum: No

Text Box: Quantity
Control Source: Quantity Running Sum: No

Text Box: Sub_code
Control Source: Sub_code Running Sum: No

Text Box: Text13
Control Source: =Sum([Price}) Running Sum: No

User Permissions
Admin

Group Permissions
Admins
Users

Properties
FilterOn: False OrderByOn: False
Record Source: Purchase Query Form

Ob'ects

Group Level 0
Control Source: Pur_no GroupFooter: True
GroupHeader: True Groupinterval: 1
GroupOn: Each Value Keep Together: No
SortOrder: False

Group Level 1
Control Source: Item GroupFooter: False
GroupHeader: False Groupinterval: 1
GroupOn: Each Value Keep Together: No
SortOrder: False

Section: Detail
Section: GroupFooterl
Section: GroupHeader°
Section: PageFooter
Section: PageHeader
Section: ReportFooter
Section: ReportHeader
Text Box: Category.Code
Control Source: Category.Code Running Sum: No

Label: Category.Code Label
Text Box: Category.Desc
Control Source: Category.Desc Running Sum: No

Label: Category.Desc Label
Text Box: Color.Desc
Control Source: Color.Desc Running Sum: No

Label: Color.Desc Label
Text Box: Item
Control Source: Item Running Sum: No

Label: Item Label
Label: Labe137
Label: Label39
Label: Label4l
Line: Line44
Line: Line45
Line: Line46
Text Box: Price
Control Source: Price Running Sum: No

Label: Price Label
Text Box: Pur Date
Control Source: Pur_Date Running Sum: No

Label: Pur_Date Label
Text Box: Pur_no
Control Source: Pur_no Running Sum: No

Label: Pur no Label
Text Box: Quantity
Control Source: Quantity Running Sum: No

Text Box: Quantity Grand Total Sum

Control Source: ----Sum([Quantity]) Running Sum: No

Label: Quantity Label
Text Box: Receive_Date
Control Source: Receive Date Running Sum: No

Label: Receive_Date Label
Text Box: Stock.Code
Control Source: Stock.Code Running Sum: No

Label: Stock.Code Label
Text Box: Sub_code
Control Source: Sub_code Running Sum: No

Label: Sub_code Label
Text Box: Sum Of Quantity
Control Source: =Sum([Quantity]) Running Sum: No

Text Box: Sup_Addl
Control Source: Sup_Addl Running Sum: No

Label: Sup_Addl Label
Text Box: Sup_Add2
Control Source: Sup_Add2 Running Sum: No

Label: Sup_Add2 Label
Text Box: Sup_Contact
Control Source: Sup_Contact Running Sum: No

Label: Sup_Contact Label
Text Box: Sup_Name
Control Source: Sup_Name Running Sum: No

Label: Sup_Name Label
Text Box: Sup_Phone
Control Source: Sup_Phone Running Sum: No

Label: Sup_Phone Label

Text Box: Supplier
Control Source: Supplier Running Sum: No

Label: Supplier Label
Text Box: Text36
Control Source: ="Summary for " & "'Pur no°
Running Sum: No
& [Pur no] & " (" & Count(*) & " " &
IIf(Count(*) = 1, "detail record",
"detail records") & ")"

Text Box: Text42
Control Source: =Now() Running Sum: No

Text Box: Text43
Control Source: ="Page " & [Page] & " of " &
Running Sum: No

Text Box: Unit
Control Source: Unit Running Sum: No

Label: Unit Label

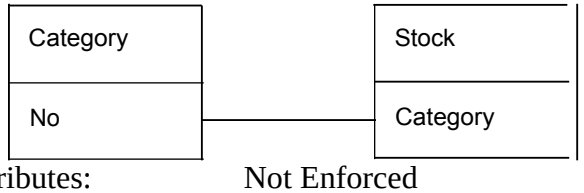
<u>Properties</u>

AccessVersion: 07.53 AllowBreakIntoCode: True
AllowBuiltlnToolbars: True AllowFullMenus: True
AllowShortcutMenus: True AllowSpecialKeys: True
AllowToolbarChange True Build: 3555
Collating Order: 1054 Def. Updatable: True
Query Timeout: 60 Records Affected: 0
Show Values in 1 Show Values in 1
Show Values in 0 Show Values Limit: 1000
StartUpForm: Switchboard StartUpMenuBar: NorthwindCustomMenuBar
StartUpShowDBWin True StartUpShowStatusB True
Transactions: True Version : 3.0

<u>Relationships</u>

Reference

Attributes: One-To-Many

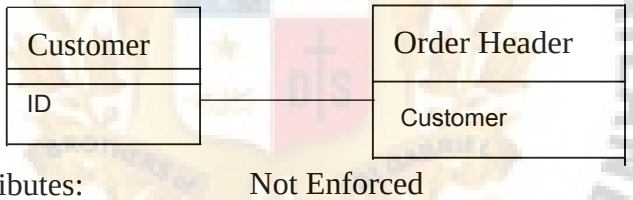


Attributes: Not Enforced

Reference)

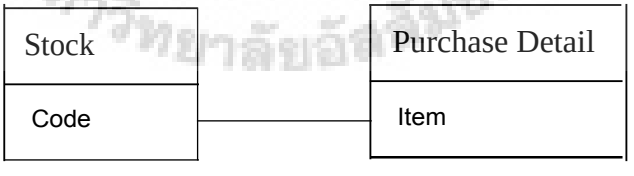
Attributes: Not Enforced
Attributes: One-To-Many

Reference2



Attributes: Not Enforced
Attributes: One-To-Many

Reference3



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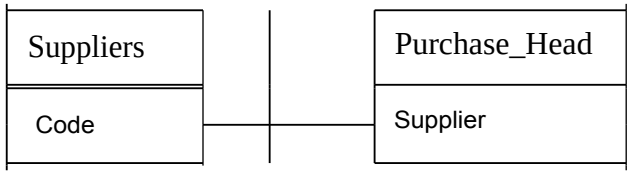
Reference4



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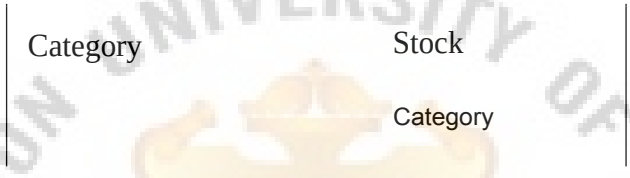
Reference5



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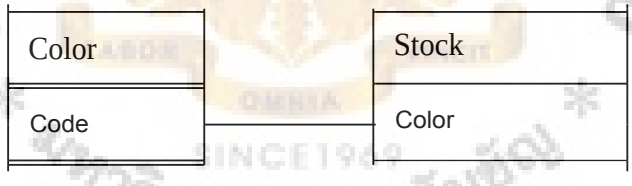
Reference6



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