CHAPTER 5

WORKING MODEL OF THE PROPOSED SYSTEM - GEM (GARMENT EXPORT MANAGEMENT) MODEL

5.1 ENTERPRISE RESOURCE PLANNING

Enterprise Resource Planning (ERP) is a cross-functional enterprise system driven by an integrated suite of software modules that supports the basic internal business processes of a company. An ERP gives a company an integrated real-time view of its core business processes such as production, order processing and inventory management, tied together by ERP applications software and a common database maintained by database management systems. ERP systems track business resources (such as cash, raw materials and production capacity) and the status of commitments made by the business (such as customer orders, purchase orders and employee payroll), no matter which department (manufacturing, purchasing, sales, accounting and so on) has entered the data into the system. ERP facilitates information flow between all business functions inside the organization and manages connections to outside stakeholders. Enterprise system software is a multi-billion dollar industry that produces components that support a variety of business functions. IT investments have become the largest category of capital expenditure in United States based businesses over the past decade.
Enterprise systems are complex software packages that offer the potentiality of integrating data and processes across functions in an enterprise. Although the initial ERP systems focused on large enterprises, there has been a shift towards smaller enterprises also using ERP systems. Organizations consider the ERP system a vital organizational tool because it integrates varied organizational systems and enables flawless transactions and production. However, an ERP system is radically different from traditional systems development. ERP systems can run on a variety of computer hardware and network configurations, typically employing a database as a repository for information. As a part of research work the researcher has developed an ERP system for garments industry to manage its overall operations effectively and efficiently. Enterprise resource planning system integrates internal and external management to find information across the entire organization embracing finance and accounting, manufacturing, sales and service, customer relationship management, etc. ERP systems automate this activity with an integrated software application and this is ERP’s true ambition. ERP attempts to integrate all departments and functions across a company onto a single computer system that can serve all those different departments’ particular needs. Each of those departments typically has its own computer system optimized for the particular way that the department does its work. But ERP combines them all together into a single, integrated software program that runs off a single database so that the various departments can more easily share information and communicate with each other. That integrated approach can have a tremendous payback if companies install the software correctly.
5.2 ERP IN BUSINESS

There are many reasons why companies undertake an ERP. Major applications are integration of financial information, customer order information, speed up the process of production and reducing the inventory information. The major functions are discussed as: *Integrate Financial Information* - the CEO of the company tries to understand the company’s overall performance, and many different versions of the truth may be detected. Finance has its own set of revenue numbers, sales has another version and the different business units may each have their own version of how much they contributed to revenues. ERP creates a single version of the truth that cannot be questioned because everyone is using the same system. *Integrate Customer Order Information* - ERP systems can become the place where the customer order lives from the time a customer service representative receives it until the loading dock ships the merchandise and finance sends an invoice. By having this information in one software system, rather than scattered among many different systems that can’t communicate with one another, companies can keep track of orders more easily and coordinate manufacturing, inventory and shipping among many different locations at the same time.

*Standardize and Speed up Manufacturing Processes* - manufacturing companies especially those with an appetite for mergers and acquisitions often find that multiple business units across the company make the same widget using different methods and computer systems. ERP systems come with standard methods for automating some of the steps of a manufacturing process. Standardizing those processes and using a single, integrated computer system can save time, increase productivity and reduce head count. *Reduce Inventory* - ERP helps the manufacturing process flow more smoothly and it improves visibility of the order
fulfillment process inside the company that can lead to reduce inventories of the stuff which helps to make products (work in progress inventory) and it can help users better to plan deliveries to customers, reducing the finished goods inventory at the warehouses and shipping docks. To improve the flow of supply chain, supply chain software is really essential, but ERP helps too. *Standardized HR Information* especially in companies with multiple business units, HR may not have a unified, simple method for tracking employee’s time and communicating with them about benefits and services but ERP can fix that.

### 5.3 GEM-MODULE DESCRIPTION

The researcher has developed two types of modules. They are;

- Intranet Module
- Extranet Module

#### 5.3.1 Intranet Module

This module is used to manage the communication between departments within the organization. The following features are available in this module. They are

- Customer Service
- Production
- Accounts Management
- Stock Holding
• Manpower (or) Employee Management

• Delivery

5.3.2 Extranet Module

This module is used to manage the communication between authorized customers or suppliers and the departments of the organization. The major functions in this module are

• Client

• Supplier

5.3.3 Modules Description with Client Functionalities

This module mainly deals with client side operations. Client module is used to make a proper communication with the client of the garment industry. This creates a separate portal for clients and their operations. This client module has the following operational functions; registration, product enquiry, enquiry response, placing order, confirmation of order, status of order and queries (or) messages.

Registration

Clients enter their details into a registration form. These details are sent to merchandiser of the concern organization for verification. If the merchandiser approves the request, the client’s portal has been created and he can able to login his portal and if the merchandiser is not interested to carry over any transactions then he can automatically reject the request of the client.
➤ **Product Enquiry**

The client can send enquiry for available products in the garment firm. Client chooses products and sent enquiry request to the selected products to the merchandiser.

➤ **Enquiry Response**

The client can view the response for his enquiry from the merchandiser.

➤ **Placing Order**

Client can place the product orders from his portal to the merchandiser.

➤ **Confirmation of Order**

The product order can be confirmed by both client and merchandiser if the particular product is available and can be delivered within the stipulated time.

➤ **Status of Order**

The client can view the status of his order as either the product is in cutting stage or packing process or delivered or waiting for raw materials to start the process.

➤ **Queries (or) Messages**

Client’s can communicate with the organization employees through messages. They can also send their queries and messages to
merchandiser for receiving detailed information regarding the products and price.

- **Production**

  This module handles the product order of clients. This consists of sub modules like procurement, cutting, tailoring, ironing and packing.

- **Procurement**

  This module is used to check product order requirements before its confirmation. It has the following tasks to confirm an order from a client. Raw Material Enquiry-this is used to check the availability of stocks for the recommended product order. Comparison Statement- this is used to give the price details and stock details for the product order. Order Placement- if all the required resources are available, the order has been moved to production; else the order will be kept in hold and notification will be sent to the corresponding departments to collect resources for the given order. Delivery Status- if an order’s status is changed as “Delivery”, the order has been moved to delivery department. Receipt of Materials; it enables the clients to view the invoice for their orders. It is in downloadable format.

- **Cutting**

  This module requires the measurements of product as specified by the client. It also checks stocks availability for required raw material. After the checking process, the status of order will be updated and that order moves to the next level.
➢ **Tailoring**

After the checking process, the status of order will undergo the tailoring process where the order comes to completion stage. After this process the particular order has been updated and that order moves to next level.

➢ **Ironing**

In this process, the clothes undergo the process of ironing for the next stage of packaging.

➢ **Packing**

After the checking process, the status of order will be updated and that order moves to delivery department after the complete packaging.

➢ **Delivery**

This module handles dispatching the product to the clients. If the client does not get satisfied with the delivered goods then the final products are again sent to reproduction.

➢ **Stock Holding**

This module is used to keep the stock details, stock report, supplier details etc., with the following functions: Available stock report- it provides available stocks report and it also displays unavailable stock reports. Make purchase order- it is used to make purchase order for unavailable products. Update stock details- After receiving stocks from supplier, the stocks will be added into warehouse system and stock list has been updated
➤ **Account Management**

This module handles the accounting operations in the garments industry. The functions in this module will generate income report and expense report of an organization in a downloadable format.

➤ **Manpower (or) Employee Management**

This module handles the complete employee details and their responsibilities in that garment industry. This module comprises the following functions.

- Employee Registration / Remove - This is used to register a newly employed person in the organization and also removes an existing employee from the organization if the person concerned quits the job

- Employee Profiles - It searches the employee profiles based on their names and displays the search details

- Update Employee Status - The employee profile has been updated for any promotion or increment or any other training course if undergone etc.

➤ **Merchandiser**

This module acts as an intermediate between client, suppliers and management for the organized process flow in a garment industry. The functions that a merchandiser carries out are
• Registration Approval / Rejection for clients or suppliers - The client registration has been approved or rejected by further investigation of the details provided in the registration form

• Enquiry Details - Response for the client’s enquiries about the products or price or delivery or order status is provided

• Messages - It is used to communicate with intranet people (within the organization) and Extranet People (outside the organization)

• Moving Orders to Production - After confirmation on both sides (client & merchandiser), the product order has been moved to production

5.4 SYSTEM DESIGN

5.4.1 Input Design and Completeness Check

The input design is the main feature of the system. Input design determines the format and validations criteria for data entering in the system. Inputs originate with end users; human factors play a significant role in input design. The input design is designed to control the input, to avoid delay or errors in data, to avoid extra steps and to keep the process simple. The following are the general principles which are considered in designing inputs; enter only variable data; do not insert input data that can be calculated; list of values and sequence entry is vital. This checks whether the important fields have been keyed or not. For example the document number, which is a required field for any entry, if it is not entered by the user then message should be raised as the ‘Field must be
entered’. The main function is to insist the user to enter value for the field and by restricting them from accessing the other fields without entering it.

5.4.2 Output Design

Designing the output is more important than working up with few layout charts and reports. The outputs are designed based on the issue encountered. It will also take care of who will receive the output, for what it is produced, how much details are needed, when it is needed and by what method. The output designed in this system is easy to use and helpful for the day to day jobs. The outputs are simple to read and interpret. The outputs obtained from this system are designed by using a few guidelines, which are as follows: The information should be clear and accurate, yet concise and restricted to relevant data. Reports should have titles, the data and descriptive heading for columns of data, numbered pages and so on. The report’s contents should be in a logical arrangement so that user can easily locate what they need. The report should come on an output medium that best suits the user’s needs.

5.4.3 System Architecture and Use Case Diagram

The process flow of an integrated system process in a garment export industry is shown in Figure 4.2. The process starts with client side application.

5.4.3.1 Client

The overall functionality performed by the client side is depicted in Figure 5.1. Initially the client who wants to access ExportsMis.com must be a registered authenticated user and so he is in need of his user id and password to access the service of ExportsMis.com.
So, he enters his details in registration application. In order to get website access, the details of the customer has been sent to merchandiser for approval.

If merchandiser approves the request, a portal for that client has been created and now the client is an authorized user of the ExportsMis.com. If merchandiser rejects the request, the client is denied for the access of this portal. Authorized client enters his user id and password in the login portal to access his portal in ExportsMis.com. If the user has been approved, the user is redirected to his portal page. If the user’s request is not processed by the merchandiser then in the user home page a message “Waiting” will be displayed.

If the user id and password are incorrect, the system shows an error message to user for incorrect id and password. The user portal consists of “dashboard” for all the required activities. In messages link, the user can send mail, view message from merchandiser and can also compose new mails. In product enquiry functionality, the user can send his enquiry for products. At first, user wants to choose the range of products from the list and enter his enquiry message then have to click the “pass” button to send that enquiry to merchandiser.
Figure 5.1  Functions in client side

In product order functionality, there are two steps to place an order in ExportsMis.com for a user. The user chooses the product from the product list for placing an order and then clicks the “Place Order” to confirm the product order. The confirmation page will be displayed. In that page, user enters the details for the selected product order such as quantity. It shows price total for each selected product and overall total amount of that particular product order. After entering all details, the user can choose the “Delivery Date” from the date picker. Then he clicks the “Confirm Order” function to confirm the product order. It will now appear as a notification in the ExportsMis.com. In the functionality, “My Orders” the user can view the product order and enquiry details about the chosen product. Then the user clicks the status link of his order, it shows the product order details. The banking function is used for payments. It has two activities as clients choose product orders for paying amount and can view and download payment history.
5.4.3.2 Supplier

The function of a supplier is also vital for any industry and this is depicted in Figure 5.3. If new suppliers want to use ExportMis.com, they are in need of their supplier id and password to access the website of ExportMis.com. So, they enter their details in registration application which will be then sent to merchandiser for approval. If merchandiser approves the request, a portal for the request has been created and supplier can access the system. If merchandiser rejects the request, the supplier becomes an unauthorized person for the access of the website ExportMis.com. Supplier enters their supplier id and password in the login portal to access their portal in ExportMis.com. If the supplier has been approved by the merchandiser, the supplier is redirected to his portal page. If the supplier’s request is not processed, the user shows an alert for “Waiting”. If the
supplier id and password are incorrect, the system shows an error message to user.

**Figure 5.3  Supplier function**

After successful login, the supplier is redirected to the supplier home page. It contains notification for that supplier. The web page displays “Dashboard” for all activities. In purchase order, supplier can view incoming purchase order details. It has two categories; “New Incoming Orders” and “Processed Orders”. If the supplier clicks “Status of Order”, he can view the details of the purchase order. In “New Orders” web page, the supplier can accept or reject an order depending on the availability of the product materials. If the purchase order has been accepted, the price for that purchase order should be fixed by supplier before the approval. In banking functionality, supplier can view the payment transactions from the ExportsMis.com. The details can be downloaded in MS word format.

5.4.3.3  Merchandiser

Merchandiser is the super user of the ExportsMis.com. He can authorize the accounts of both clients and suppliers and also can access all
the departments within the ExportsMis.com; the functions are shown in Figure 5.4. In messages functionality, the merchandiser can perform three actions for communication with user and supplier. They are inbox, sent mail and compose mail. Inbox contains received messages. When merchandiser opens the message, the message details get displayed in a dialog. Sent mail contains the list of mails that has been sent to his clients, suppliers and other departments in that organization. In compose mail, merchandiser can create new message for the information flow. In “User Appraisal” functionality, the incoming user requests can be viewed and while accessing the “view” link user’s details can be seen. After verification, the merchandiser can approve or reject the request from clients or as well as suppliers.

![Diagram of functions of merchandiser](image)

**Figure 5.4  Functions of merchandiser**

In the functionality “Order”, the merchandiser views incoming new orders from the users. It contains customer name, user name and the date of delivery of that product order. By accessing “View Details” link, he
can view the product order description. He can approve the product order or reject. If the particular product order has been approved, then that order has been moved to production. In “Enquiries” link, the merchandiser can view the product enquiry and he gives the response for that product. In enquiry page, it shows the enquiry details like product variety, price, colors, time for delivery etc. Merchandiser can click “Reply to Customer” link to send the response message to clients. In “Price” link, the price list of each and every product has been listed. The price list will be updated then and there. The price list contains values for Rupees, Dollar, Yuan, Dirham, Pound Sterling, Bangladesh Taka where majority of garment exports takes place. In “Accounts” link there are two activities; “Income Report” and “Expenses Report”. Income report contains over all incoming report for ExportsMis.com. Expenses report contains over all expenses details of ExportsMis.com.

In “Delivery” functionality, the merchandiser chooses product order that is in delivery status. While selecting product order id, the details has been displayed under the product id. The product order confirmation should be given by the supervisor and the supervisor will give results as either “Pass” or “Fail”. He enters remarks for product order. If the result is pass, it is then delivered to customers and if the result fails, the particular order move to reproduction. The “Employee” link consists of two activities as “New Employee” and “Search Employee”. In “New Employee”, employee details has been entered such as first name, last name, gender, address, department, designation, salary and employee photo has been selected. When the “Register” button is clicked, the employee details get uploaded into the ExportsMis.com. In “Search Employee”, user can view employee details based on their names and click “Search” button so that the details will be displayed from the database.
The “Warehouse” functionality is used to maintain the stock details in ExportsMis.com. It contains the following activities; “Notification” - warehouse has three options for communication with employees and suppliers; they are inbox, sent mail and compose mail. “Supplier Registration” - The supplier enters the details to register for the suppliers. “Stock Report” - It shows the stock details which contain three options as - all goods, the goods which are available and goods which are not available. Based on this option, the stock details will be displayed. If users want to make purchase order, they can click on “Purchase Order” link. In that “Purchase” page, user enters quantities for those products. After clicking “Send Purchase Order”, the details will be sent to respective supplier. “Update Stocks” - user clicks this option, the stock details are updated. The received stock details have been updated into the current stock list. “Payments” - user select purchase id for payment of that purchase order. After clicking “Pay Amount”, the amount has been transferred into corresponding supplier account.

5.5 SYSTEM SPECIFICATION

5.5.1 Hardware Specification

The hardware used for the development of the module is as follows:

<table>
<thead>
<tr>
<th>Processor</th>
<th>Dual core</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Speed</td>
<td>1.8 GHz</td>
</tr>
<tr>
<td>RAM</td>
<td>512 MB</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>80 GB</td>
</tr>
</tbody>
</table>
CD Drive : 52X Samsung Drive
Floppy Drive : 1.44 MB
Monitor : 17’’ LG Color Monitor
Keyboard : Logitech
Mouse : IBM Optical Mouse
Printer : Laser Jet 2000

5.5.2 Software Specification

The software used for the development of the module is:

Operating System : Windows XP
Application Server : XAMPP Server
Front End : HTML 5, CSS3
Client Side Script : JQuery, AJAX
Server Side Script : PHP (Hyper Text Preprocessor 5.0)
Bug Tool : Firebug
Back End : MySQL 5.5
5.5.3 Description of Software Specification

5.5.3.1 Features of PHP (Hypertext Preprocessor)

PHP is a server-side scripting language designed for web development but also used as a general-purpose programming language. PHP is now installed on more than 244 million websites and 2.1 million web servers. Originally created by Rasmus Lerdorf in 1995, the reference implementation of PHP is now produced by PHP Group. While PHP originally stood for Personal Home Page, it now stands for Hypertext Preprocessor, a recursive acronym. PHP code is interpreted by a web server with a PHP processor module which generates the resulting web page: PHP commands can be embedded directly into an HTML source document rather than calling an external file to process data. It has also evolved to include a command-line interface capability and can be used in standalone graphical applications. PHP is free software released under the PHP license, which is incompatible with the GNU General Public License (GPL) due to restrictions on the usage of the term PHP. PHP can be deployed on most web servers and also as a standalone shell on almost every operating system and platform on free of charge.

5.5.3.2 Sample Syntax

The following “Hello world” program is written in PHP code embedded in a HTML document:

```html
<!DOCTYPE html>

<meta charset="utf-8">

<title>PHP Test</title>
```
<?php

echo 'Hello World';

?>

However as PHP does not need to be embedded in HTML, or used with a web server, the simplest version of a Hello World program can be written like this:

<? = 'Hello world'>;

The PHP interpreter only executes PHP code within its delimiters. Anything outside its delimiters is not processed by PHP (although non-PHP text is still subject to control structures described in PHP code). The most common delimiters are <?php to open and ?> to close PHP sections. <script language= "php"> and </script> delimiters are also available, as the shortened forms <? Or <? = (which is used to echo back a string or variable) and?> as well as ASP-style short forms <% or <%= and %>. While short delimiters are used, they make script files less portable as support for them can be disabled in the PHP configuration and so they are discouraged. The purpose of all these delimiters is to separate PHP code from non-PHP code, including HTML. The first form of delimiters, <?php and ?>, in XHTML and other XML documents, creates correctly formed XML ‘processing instructions’. This means that the resulting mixture of PHP code and other markup in the server-side file itself is a well-formed XML.
5.5.3.3 Data Types

PHP stores whole numbers in a platform-dependent range, either a 64-bit or 32-bit signed integer equivalent to the C-language long type. Unsigned integers are converted to signed values in certain situations; this behavior is different from other programming languages. Integer variables can be assigned using decimal (positive and negative), octal, hexadecimal and binary notations. Floating point numbers are also stored in a platform-specific range. They can be specified using floating point notation or two forms of scientific notation. PHP has a native boolean type that is similar to the native boolean types in Java and C++. Using the boolean type conversion rules, non-zero values are interpreted as true and zero are represented as false as in Perl and C++. The null data type represents a variable that has no value and the only value in the null data type is NULL. Variables of the “resource” type represent references to resources from external sources. These are typically created by functions from a particular extension, and can only be processed by functions from the same extension; examples include file, image, and database resources. Arrays can contain elements of any type that PHP can handle, including resources, objects and even other arrays. Order is preserved in lists of values and in hashes with both keys and values and these two can be intermingled. PHP also supports strings, which can be used with single quotes, double quotes, nowdoc or heredoc syntax. The Standard PHP Library (SPL) attempts to solve standard problems and implements efficient data access interfaces and classes.

5.5.3.4 Functions

PHP has hundreds of base functions and thousands more via extensions. These functions are well documented on the PHP site;
however, the built-in library has a wide variety of naming conventions and inconsistencies. PHP currently has no functions for thread programming, although it does support multi process programming on POSIX systems. Additional functions can be defined by a developer:

```php
function myFunction() { // declares a function, this is named myFunction
    return 'John Doe'; // returns the value 'John Doe'
}
```

```php
echo 'My name is'. myFunction() . '!'; //outputs the text concatenated with the return value of myFunction.
```

// myFunction is called as a result of this syntax.

// the result of the output will be 'My name is John Doe!'

In PHP 5.2 and earlier, functions are not first-class functions and can only be referenced by their name, directly or dynamically by a variable containing the name of the function. User-defined functions can be created at any time without being prototyped. Functions can be defined inside code blocks, permitting a run-time decision as to whether or not a function should be defined. Function calls must use parentheses, with the exception of zero argument class constructor functions called with the PHP new operator, where parentheses are optional. PHP supports quasi-anonymous functions through the `create_function()` function, although they are not true anonymous functions because anonymous functions are nameless, but functions can only be referenced by name, or indirectly through a variable
$function_name ( ); in PHP. PHP gained support for closures in PHP 5.3. True anonymous functions are supported using the following syntax:

```php
function getAdder($x) {
    return function($y) use ($x) {
        return $x + $y;
    };
}

$adder = getAdder(8);
echo $adder(2); // prints “10”
```

Here, the `getAdder ( )` function creates a closure using the parameter $x (the keyword use imports a variable from the lexical context), which takes an additional argument $y and returns it to the caller. Such a function is a first class object, meaning that it can be stored in a variable, passed as a parameter to other functions, etc. The goto flow control statement is used as follows:

```php
function lock ( ) {
    $file = fopen('file.txt', 'r+');
    retry:
    if (!flock($file, LOCK_EX | LOCK_NB)) {
        goto retry;
    }
    fwrite($file, ‘Success!’);
    fclose($file);
}
```
When flock ( ) is called, PHP opens a file and tries to lock it. The target label retry: defines the point to which execution should return if flock ( ) is unsuccessful and goto retry; is called. The goto statement is restricted and requires that the target label be in the same file and context. The goto statement has been supported since PHP 5.3.

5.5.3.5 Use of PHP

The PHP is one of the powerful scripting languages. It can be used to develop small dynamic website to large complex e-commerce web application. PHP can be used to:

- Develop small dynamic website
- Develop emailing form script for the website
- Can be used to develop the visitor counter for the website
- Develop the online forms to receive the client inquiry
- Develop the CMS application for the website
- Develop large complex e-commerce application

PHP is one of the most popular server side scripting languages running today. It is used for creating dynamic web pages that interact with the user offering customized information. PHP offers many advantages; it is fast, stable, secure, easy to use and open source. Rasmus Lerdorf wrote the first PHP (initially called Personal Home Page) scripts as a series of Perl scripts that he used to track visitors to his webpage and to see who were viewing his resume. He eventually rewrote PHP as a scripting engine
and added support for forms. PHP has been evolving since 1994 as an open
source code. A community of followers and developers formed and began
using and further developing PHP. Over the years the Personal Home Page
acronym was dropped and it evolved into the PHP Hypertext Preprocessor.
PHP code is inserted directly into the HTML that makes up a website.
When a visitor comes to the website, the code is executed. Because PHP is
a server side technology, the user does not need any special browser or
plug-ins to see the PHP in action. The beauty of PHP lies in its simplicity.
It is easy to understand and learn, especially for those with backgrounds in
programming such as C, JavaScript and HTML. The language is similar to
C and Perl so that anyone with a background in either C or Perl
programming will feel comfortable in using and understanding PHP.
PHP also runs on just about every platform including most UNIX and
Macs and Windows Versions.

5.6 IMPLEMENTATION PHASE

Implementation uses the design document to produce code.
Demonstrating that the program satisfies its specifications validates the
code. Typically, sample runs of the program demonstrating the behavior
for expected data values and boundary values are required. It may take
several iterations of the model to produce a working program. As programs
get more complicated, testing and debugging alone may not be enough to
produce reliable code. Instead, programs can be written in a manner that
will help insure that errors are caught or avoided. While implementing, the
system should satisfy the needs of the customer. On implementing the
required system there is a need to provide required training to the staffs in
the changeover procedure and evaluation methods. The first task in
implementing is planning i.e., deciding on the methods of time scale
adopted. Once planning has been completed, the major effort is to ensure
that programming the system as well as browsers such as ‘Netscape Navigator’ and ‘Internet Explorer’ is working properly and concentrate on training user staff. The system that is implemented should be flexible, compatible and accurate. The system should work in a friendly manner so that it will be easy to operate. In case if there is any error, the system will display appropriate error message.

5.7 SYSTEM TESTING

Software testing is a critical element of software quality and represents the ultimate review of the specification, review and coding. System testing is actually a series of different tests for the purpose of fully exercising the computer based system. The successful test is that in which no errors are found. The objective is to design tests that systematically uncover different classes of errors and do so with a minimum amount of time and effort. Testing is done for two primary purposes: ‘To demonstrate quality or proper behavior’ and ‘To detect and fix problems’.

5.7.1 Unit Testing

During the implementation of the system each module of the system was tested separately to uncover errors within its boundaries. The user interface was used as a guide in the process. Unit testing involves the design of test cases and validate that the internal program logic is functioning properly and that program input produce valid output. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application. Unit tests perform basic tests at component level and test a specific business process, application or system configuration. Unit tests ensure that each unique path
of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

### 5.7.2 Integration Testing

Integration testing strategy has two different approaches namely the top down approach in which the integration is carried out from the top level module to the bottom up approach in which the integration is carried out from the low level modules to the top. This test was used to identify the errors in the interface and the errors in passing the parameters between the functions and to correct them.

### 5.7.3 Performance Testing

Performance testing is the process of determining the speed or effectiveness of a computer, network, software program or device. The process can involve quantitative tests, such as measuring the response time or the number of MIPS (Millions of Instructions per Second) at which a system functions. Qualitative attributes such as reliability, scalability and interoperability may also be evaluated. Performance testing is often done in conjunction with stress testing. Performance testing can verify that a system meets the specifications claimed by its manufacturer or vendor. The process can compare two or more devices or programs in terms of parameters such as speed, data transfer rate, bandwidth, throughput, efficiency or reliability.

### 5.8 FUTURE ENHANCEMENT

Every application has its own merits and demerits. The project has covered almost all the requirements. Further requirements and improvements can easily be done since the coding is mainly structured or
modular in nature. Changing the existing modules or adding new modules can append improvements. Further enhancements can be made to the application, so that the website functions will be very attractive and useful manner than the present one. This model has been made up of static layouts and fixed style sheets and now these should be changed as responsive web layouts. That is used to support all type of devices such as computers, laptops, tablets and any type of mobile devices. This existing website does not have any options for money transfer from one side to another side. A new feature to transfer money from organization to suppliers and supplier to organization can be included as an extension of this work in future and this can be done using Paypal integration with this proposed model.

The attendance for employee of the organization can be implemented and this is very useful for salary calculation of that employee. This attendance system can be implemented neither using bio-metrics or with RFID tags. Payroll system can also be implemented such that the employee’s salary has been deposited into his/her bank account (or) delivery to employee by cash (or) cheque. A mobile application can be developed for customers and suppliers for accessing the functionalities from his mobile without using the website. This is very useful to provide services for all clients and suppliers. This is to improve the customer’s satisfaction on the product. Supplier can upload his/her sample for their product order and these images are stored into the database as separate tables but these images consume huge amount of memory space. In future, the images can be stored in a compression format, retrieved and displayed as high quality images using efficient decompression algorithm without losing image contents. After approving or rejecting the product order, the result has been sent to customer through messages and emails. This has been done with the help of POP or IMAP protocol configuration.
5.9 CONCLUSION

The developed GEM model is found to be working accurately. It is tested for its effectiveness, flexibility, accuracy and user friendly. The system is found to run efficiently under the single window system. The programming technique used in the design of the system provides a scope for further expansion and implementation of any changes which may occur in future. The system has been tested with all sample data covering all possible options for each function. Its performance is satisfactory and implementation of the system is completed. The system has been designed and developed according to the current requirements of the user. At the same time the system is very flexible and extensible, hence, future enhancements, if needed can be made without much difficulty, so that new applications can be developed and it can be integrated with the existing one in an easy manner.

SCREEN SHOTS

![Image of the user login page of the ExportsMIS.com website]

Figure 5.5 User - login page

The developed website is named as ExportsMis.com. Figure 5.5 shows the user login page of the website. If the user has already registered
then he can access the website if not the user must register and should receive approval from the merchandiser.

![User Registration Application](image1)

**Figure 5.6  Registration page**

Registration page of the user shown in Figure 5.6 contains name, designation, organization, address, mail id, phone number and account information for the purpose of login to the website.

![User homepage](image2)

**Figure 5.7  User homepage**

Figure 5.7 shows the home page of the webportal of user. It includes functionalities like messages, product enquiry, placing order, my order and banking.
Figure 5.8  Messages

Figure 5.8 displays the action link in messages functionality. It includes inbox (received messages), new messages, sent mails and the option to keep a message in user page or to discard the unwanted messages.

Figure 5.9  View messages

Figure 5.9 displays the message received and sent by the customer to the merchandiser.
Figure 5.10  Product enquiry

Figure 5.10 explains about the list of product available and the user can send enquiry regarding the product to the ExportsMis.com.

Figure 5.11  Product order confirmation

Figure 5.11 displays details of a product order which has product name, price of that particular product, quantity and delivery date for that product. After filing up the details, the customers can confirm their order.
Figure 5.12  My order status

Figure 5.12 exhibits the status of each product order that has been placed by the customer including the date of enquiry and delivery date of that particular product.

Figure 5.13  Enquiry status

Figure 5.13 displays the enquiry status of a particular order i.e. whether the merchandiser has read the query or responded the query etc.,
Figure 5.14  Order details

Figure 5.14 shows the order details given by the customer to the merchandiser which consists of date of order, date of delivery, purchase ID, product name, quantity, price, order status and total amount to be paid. The invoice can be downloaded from the action link given in the same web portal.

Figure 5.15  Invoice document

Figure 5.15 presents the invoice document for the purchase order given by the customer to the merchandiser.
Figure 5.16  Banking

Figure 5.16 demonstrates the functionalities which includes activities like new payments and payment history of the order that are carried out by the customer.

Figure 5.17  User payment history

Figure 5.17 shows the overall payment history for a particular customer which includes information like transaction id, amount paid, order id and transaction date along with payment statement, which is in downloadable format.
Figure 5.18  Payment document

Figure 5.18 displays the payment history of the user which consists of the personal details and the payment details.

Figure 5.19  Supplier login

Figure 5.19 is the login page of the supplier. The registered suppliers can access the website but the new user must register and get approval from the merchandiser for further process.
Figure 5.20  Supplier homepage

Figure 5.20 explains the supplier homepage which has action links to notification for new messages, purchase order and banking.

Figure 5.21  Purchase order

Figure 5.21 displays the purchase order of a supplier which contains information like purchase id, purchase date, price and the status of the purchase order.
Figure 5.22  Details of purchase order

Figure 5.22 exhibits the details of the purchase order like from whom the purchase was done, on which date it was done and the quantity of product purchased including the price list. The price should be fixed by the supplier.

Figure 5.23  Banking - supplier

Figure 5.23 shows the banking activities like transaction id, amount, order id and transaction date done so for by a particular supplier.
Figure 5.24  Supplier’s payment statement

Figure 5.24 displays the payment history statement of a supplier with the order ID’s on particular dates.

Figure 5.25  Merchandiser login

Figure 5.25 is the merchandiser login page which has the entire access for extranet and intranet modules.
Figure 5.26  Merchandiser homepage

The home page of the merchandiser (Figure 5.26) comprises of links to messages, user appraisal, orders, enquiry, customers and price list. Apart from the departmental activities like production, warehouse, HR and delivery is also carried over by merchandiser.

Figure 5.27  Messages

Figure 5.27  displays the messages received at the merchandiser portal. By clicking the link, the message will display with details like from whom and when it was sent and also the content of the message.
Figure 5.28 User details verification for authentication

Figure 5.28 shows how the merchandiser approves or rejects the request from the customer by seeing the details of the customer.

Figure 5.29 Product order details

Figure 5.29 demonstrates about the product order received from the customer and then the merchandiser decides whether to accept or reject the received order based on some factors like availability of materials and time duration mentioned in the order.
Figure 5.30  Production department

Figure 5.30 displays the activities that are carried over in production department. It comprises of procurement, status of order, notification and order monitor.

Figure 5.31  Procurement details

Figure 5.31 presents the procurement details for the merchandisers by which they approve and move the order to production.
Figure 5.32  Order status

Figure 5.32 displays the status of order. The order id can be selected from the drop down list so that the details of the order gets displayed. And the merchandiser can update the status if there is any progress mean time (i.e. material from cutting to tailoring or from ironing to packing).

Figure 5.33  Payments from merchandiser
Figure 5.33 demonstrates the payment that should be done by the merchant to the selected purchase id. The merchant can pay the amount in dues. Thus the balance amount to be paid can be known.

![Dashboard](image1.png)

**Figure 5.34  Warehouse**

Figure 5.34 shows the activities like notification, supplier registration, stock report, updation about stock, payments and supplier activation that are carried over in warehouse department.

![Merchandiser](image2.png)

**Figure 5.35  Price details**
Figure 5.35 displays the price details for all the products. The money value of various countries where maximum garment exports are done is shown and the merchandiser can update the price for each selected goods from time to time if necessary.

![Image of price list](image)

**Figure 5.36  Update price list**

Figure 5.36 exhibits the link for updating the price from which the merchandiser can update the price according to the fluctuations in the market.

![Image of accounting department](image)

**Figure 5.37  Accounts department**
Figure 5.37 shows the activities carried over by the accounts department. It contains income and expenses report. The income report gives information about the amount that are to be paid by the firm.

![Figure 5.38 Delivery department](image)

**Figure 5.38 Delivery department**

Figure 5.38 the delivery department undergoes a series of inspection and if the result is “pass” the goods will be delivered and for negative results the order will be moved to reproduction.

![Figure 5.39 Employee portal](image)

**Figure 5.39 Employee portal**
The employee portal comprises of two major activities as shown in Figure 5.39. They are registration for new employee and search facility of employee details.

Figure 5.40  Search employee details

Figure 5.40 explains about how to search for a particular employee details and there is also an option for employee updation and removal.