THE DESIGN AND DEVELOPMENT OF A SALES SYSTEM FOR A COAT TAILOR PROCESSING BUSINESS USING ELECTRONIC COMMERCE

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THE DESIGN AND DEVELOPMENT OF A SALES SYSTEM FOR A COAT TAILOR PROCESSING BUSINESS USING ELECTRONIC COMMERCE

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ABSTRACT

The purpose of this thematic study was to analyze, design and develop a sales system for a coat tailor processing business using electronic commerce. Sales processes and data from a coat tailor business were used as a case study.

The theory of electronic commerce, the system development life cycle, database management, and web site design were studied. This research also investigated the sales system for a coat tailor processing business and conditions of the sales system. Systems that were analyzed and designed included two main parts, a front office system and a back office system.

The front office system was composed of the following: 1) Register, 2) Product Categories, 3) Customer Profiles, 4) Customer's Orders, 5) Payment System, and 6) Order Status.

The back office system covered product management, order confirmation, a reporting system, and also a stock management system.

The system was developed using Microsoft Windows XP as the operating system and MySQL server as the system database software. Apache server and Tomcat server were used as web servers. It connected to the users by using Mozilla Firefox Web Browser and programming was done with a PHP development tool and Jasper Report tool. The security system used was SSL (Secure Socket Layer) for the transfer of data between the client and server. After the completion of system development, the system was tested and found to achieve the system objectives. Evaluation of the system found that 26.67% of the users were satisfied at the highest level, 52% at a high level, 18.33% at a moderate level and 3% at a low level.

This research will be significantly useful when considering a sales system for coat tailor processing businesses and other similar businesses. It can improve the effectiveness and efficiency of a sales system, and also help to facilitate working processes for customers so as to gain convenience and acceleration.

KEY WORDS: ELECTRONIC COMMERCE/ E-COMMERCE/ SALES SYSTEM/ WEB APPLICATION/ COAT TAILOR

101 Pages

การออกแบบและพัฒนาระบบงานขายสินค้าของกระบวนการธุรกิจตัดเย็บชุดสูทด้วยระบบพาณิชย์อิเล็กทรอนิกส์

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บทคัดย่อ

สารนิพนธ์ฉบับนี้ มีวัตถุประสงค์เพื่อการวิเคราะห์ ออกแบบ และพัฒนาระบบงานขายสินค้าของกระบวนการธุรกิจตัดเย็บชุดสูทด้วยระบบพาณิชย์อิเล็กทรอนิกส์ โดยใช้กระบวนการขายและข้อมูลจาก ธุรกิจตัดเย็บชุดสูทเป็นกรณีศึกษา

ผู้วิจัยได้ศึกษาทฤษฎี พาณิชย์อิเล็กทรอนิกส์ วงจรการพัฒนาระบบ ระบบการจัดการฐานข้อมูล การออกแบบเว็บไซต์ รวมถึงได้ศึกษาขั้นตอนระบบงานขายสินค้าของกระบวนการธุรกิจตัดเย็บชุดสูท และเงื่อนไขต่างๆของระบบงานขายสินค้า ซึ่งผู้วิจัยได้วิเคราะห์และออกแบบระบบงานไว้ 2 ระบบงานหลักไว้ดังนี้: ระบบงานหน้าร้านและระบบงานหลังร้าน

ระบบงานหน้าร้านประกอบด้วยระบบดังนี้ 1) การลงทะเบียน 2) ประเภทของสินค้า 3) ข้อมูลประวัติลูกค้า 4) คำสั่งสั่งซื้อของลูกค้า 5) ระบบจ่ายเงิน 6) แสดงสถานะคำสั่งซื้อ

ระบบงานหลังร้านครอบคลุมถึงการบริหารจัดการสินค้า การยืนยันคำสั่งซื้อ ระบบรายงานและระบบการบริหารจัดการสินค้าคงคลัง

ผู้วิจัยได้พัฒนาระบบโดยใช้ไมโครซอฟท์วินโดว์เอ็กพีเป็นระบบปฏิบัติการและมายเอสคิวแอลเซอร์ฟเวอร์สำหรับระบบฐานข้อมูล เว็บเซอร์ฟเวอร์ใช้อาพาเชเซอร์ฟเวอร์และทอมแคทเซอร์ฟเวอร์ สำหรับการติดต่อกับผู้ใช้มอนซิลล่าไฟร์ฟอคเป็นเว็บบราวเซอร์ และเครื่องมือที่ใช้เขียนโปรกแรมคือ พีเอทพีเดเวลลอปเมนทูลและจาสเปอร์รีพอร์ททูล ระบบการรักษาความปลอดภัยใช้ระบบเอสเอสเอลสำหรับการส่งข้อมูลระหว่างเคื่องแม่ค่ายและเครื่องลูกข่าย หลังจากพัฒนาระบบเสร็จสิ้นแล้ว ผู้วิจัยได้ทำการทดสอบการทำงานและพบว่าระบบสามารถทำงานได้ตามวัตถุประสงค์ การประเมินผลพบว่าผู้ใช้ร้อยละ 26.67% มีความพึงพอใจในระดับสูงที่สุด ร้อยละ 52% ในระดับสูง ร้อยละ 18.33% ในระดับปานกลาง และร้อยละ 3% ในระดับต่ำ

งานวิจัยครั้งนี้ จะเป็นประโยชน์ต่อธุรกิจตัดเย็บชุดสูท และธุรกิจที่มีลักษณะการขายคล้ายคลึงกัน อีกทั้งเพิ่มประสิทธิภาพและประสิทธผลในระบบงานขายสินค้า และช่วยการดำเนินธุรกรรมของลูกค้าได้รับความสะดวกและรวดเร็ว

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CHAPTER I
INTRODUCTION

1.1 General Introduction

Technology of communication and computer are more development cause fast communication on internet, so it is important channel and tool in business that uses communication sale and service product. It is electronic commerce system.

Electronic commerce system is principle in now business, such as financial business and large business. Electronic commerce system cause change economic process of Thailand.

Coat business is importance industry because it is basic necessity of human, such as formal clothes type. It is more importance in present because it wears for business contract and importance time.

1.2 Statement of Problems

Because formal clothes have more users in feature, it is interesting business. There are any enterprise want this business that affects increase rate of competitor, so business will be survival or over competitor. Enterprise should be careful customer and increase new customer, so basic strategy apply for business competitor, such as low cost, product and service difference that are not success.

Above mentioned problem needs information technology for electronic commerce that manages strategy for marketing, sale, data analysis and business for advantage over other business.

1.3 Objectives of Study

The objectives of the study are:

1.3.1 For study and analysis is a computer system for a sale system of coat tailor processing business with electronic commerce system.

1.3.2 For design and development is a computer system for a sale system of coat tailor processing business with electronic commerce system.

1.4 Scopes of Study

The scopes of this study are:

1.4.1 Design and development are a computer system for a sale system of coat tailor processing business with electronic commerce system. Researcher uses coat tailor business data that is case study.

1.4.2 Design and development are a computer system for a sale system of coat tailor processing business with electronic commerce system that is able to front service and back service. As follow,

1.4.2.1 The function for front office. As follow,

- Customer register.
- Receiving purchase order.
- Purchase order status display.
- Able display to texture, color and coat type.
- Able select to texture, color and coat type.
- Able selection to tailor or product readymade.
- Able selection payment type (Cash, Credit Card).
- Able send e-mail to administrator when customer purchase product.
- Able send e-mail to customer that forget password.
- User verifies purchase order status by login to order page.
- There is customer size form system.

1.4.2.2 The function of back office. As follow,

- Administrator can be update order status and send e-mail to customer.
- Stock system for readymade product and it cuts stock automatic.
- Administrator can manage product detail.

There are report and analysis system as follow,

- Top 5 product sale for month report
- Sale summary for month report
- Sale summary for year report
- Credit card and cash payment summary (time)
- Customers use webpage service analysis report for day
- Customers use webpage service analysis report for month
- Top 5 purchase of customer analysis divide by customer
- Sale performance analysis report divides by product

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CHAPTER II
LITERATURE REVIEW

This chapter includes literature, theories and other related document on the electronic commerce and web-based.

2.1 Electronic Commerce

Electronic commerce, commonly known as (electronic marketing) e-commerce or eCommerce, consists of the buying and selling of products or services over electronic systems such as the Internet and other computer networks. The amount of trade conducted electronically has grown extraordinarily with widespread Internet usage. The use of commerce is conducted in this way, spurring and drawing on innovations in electronic funds transfer, supply chain management, Internet marketing, online transaction processing, electronic data interchange (EDI), inventory management systems, and automated data collection systems. Modern electronic commerce typically uses the World Wide Web at least at some point in the transaction's lifecycle, although it can encompass a wider range of technologies such as e-mail as well.

A large percentage of electronic commerce is conducted entirely electronically for virtual items such as access to premium content on a website, but most electronic commerce involves the transportation of physical items in some way. Online retailers are sometimes known as e-tailers and online retail is sometimes known as e-tail. Almost all big retailers have electronic commerce presence on the World Wide Web.

Electronic commerce that is conducted between businesses is referred to as business-to-business or B2B. B2B can be open to all interested parties (e.g. commodity exchange) or limited to specific, pre-qualified participants (private electronic market). Electronic commerce that is conducted between businesses and

consumers, on the other hand, is referred to as business-to-consumer or B2C. This is the type of electronic commerce conducted by companies such as Amazon.com.

Electronic commerce is generally considered to be the sales aspect of e-business. It also consists of the exchange of data to facilitate the financing and payment aspects of the business transactions.

2.2 Security System for Electronic Commerce

The security services that will enable widespread use and acceptance of commerce over the Internet include the following:

2.2.1 Authentication

Where by an individual, an organization, or a computer can prove its identity.

2.2.2 Authorization

The ability of a system, once identity is verified, to control access to specific resources.

2.2.3 Confidentiality

The ability to maintain the secrecy of the contents of a transmission between authorized parties.

2.2.4 Integrity

The capability of ensuring that a transmission arrives at its destination in exactly the same form as it was sent.

2.2.5 Non-repudiation of origin

In applications of electronic commerce, encryption is typically used to provide security. However, the industry seems to recognize that cryptography, while a critical component of secure networking, is not enough to protect a business from fraud. Cryptography provides for transaction security, but does not do much to prevent

unauthorized access to information and accounts. A good analogy would be using an armored van to transport cash from one branch to another, and then leaving it in the middle of the lobby once it reaches its destination. Information needs to be put in the vault" once it reaches its destination, and another component is needed to do this: a firewall to secure this local network from Internet access.

Security methods, such as Internet firewalls, are very popular now, but many organizations may believe, or be led to believe, that an Internet firewall alone is sufficient for securing their network. It is like getting the most secure front door money can buy for your house but leaving the garage door unlocked or the same, weak sliding door entrance from your back deck. Only if everyone plays by the same rules is it effective. Thus, we may expect to see smart cards and their related technology flourishing, as a mean to provide businesses with reliable access control and authentication processes: smart cards may be used to carry and to prove the user's identity, as well as other relevant personal information, and all this in a secure manner.

However, firewalls and smart cards are not enough. A risk and business analysis is almost always required, leading into the development of a security policy and the prescription of security mechanisms and methods for implementation within the local computing environment. Besides, doing this once is not enough. Threats change, vulnerabilities change, business requirements change, and the available counter-measures change: all of these must be periodically and routinely reevaluated.

2.3 Payment system for Electronic Commerce

An e-commerce payment system facilitates the acceptance of electronic payment for online transactions. Also known as Electronic Data Interchange (EDI), e-commerce payment systems have become increasingly popular due to the widespread use of the internet-based shopping and banking. In the early years of B2C transactions, many consumers were apprehensive of using their credit and debit cards over the internet because of the perceived increased risk of fraud. Recent research shows that 30% of people in the United Kingdom still do not shop online because they do not trust online payment systems. However, 54% do believe that it is safe to shop online which is an increase from 26% in 2006.

There are numerous different payments systems available for online merchants. These include the traditional credit, debit and charge card but also new technologies such as digital-wallets, e-cash, mobile payment and e-checks. Another form of payment system is allowing a 3rd party to complete the online transaction for you. These companies are called Payment Service Providers (PSP), a good example is Paypal or WorldPay. (Note Paypal also offers its own payment system)

2.4 System Development Life Cycle: (SDLC)

Systems Development Life Cycle (SDLC) is a logical process used by a systems analyst to develop an information system, including requirements, validation, training, and user (stakeholder) ownership. Any SDLC should result in a high quality system that meets or exceeds customer expectations, reaches completion within time and cost estimates, works effectively and efficiently in the current and planned Information Technology infrastructure, and is inexpensive to maintain and cost-effective to enhance.

Computer systems are complex and often (especially with the recent rise of Service-Oriented Architecture) link multiple traditional systems potentially supplied by different software vendors. To manage this level of complexity, a number of systems development life cycle (SDLC) models have been created: "waterfall"; "fountain"; "spiral"; "build and fix"; "rapid prototyping"; "incremental"; and "synchronize and stabilize".

SDLC models can be described along a spectrum of agile to iterative to sequential. Agile methodologies, such as XP and Scrum, focus on light-weight processes which allow for rapid changes along the development cycle. Iterative methodologies, such as Rational Unified Process and Dynamic Systems Development Method, focus on limited project scopes and expanding or improving products by multiple iterations. Sequential or big-design-upfront (BDUF) models, such as Waterfall, focus on complete and correct planning to guide large projects and risks to successful and predictable results.

Some agile and iterative proponents confuse the term SDLC with sequential or "more traditional" processes; however, SDLC is an umbrella term for all methodologies for the design, implementation, and release of software.

In project management a project can be defined both with a project life cycle (PLC) and an SDLC, during which slightly different activities occur. According to Taylor (2004) "the project life cycle encompasses all the activities of the project, while the systems development life cycle focuses on realizing the product requirements".

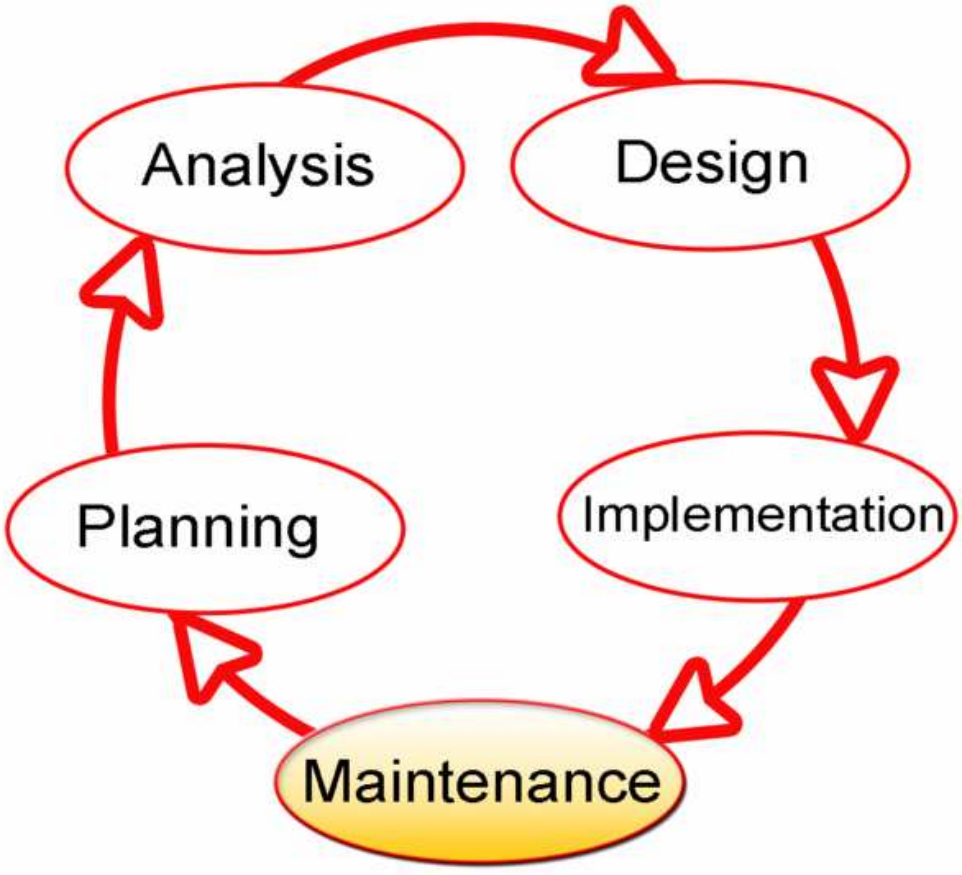


Figure 2.1 Model of the Systems Development Life Cycle

2.5 Database Management System: DBMS

A Database Management System (DBMS) is a set of computer programs that controls the creation, maintenance, and the use of the database with computer as a platform or of an organization and its end users. It allows organizations to place control of organization-wide database development in the hands of database administrators (DBAs) and other specialists. A DBMS is a system software package that helps the use of integrated collection of data records and files known as databases. It allows different user application programs to easily access the same database. DBMSs may use any of a variety of database models, such as the network model or relational model. In large systems, a DBMS allows users and other software to store and retrieve data in a structured way. Instead of having to write computer programs to extract information, user can ask simple questions in a query language. Thus, many DBMS packages provide Fourth-generation programming language (4GLs) and other application development features. It helps to specify the logical organization for a database and access and use the information within a database. It provides facilities for controlling data access, enforcing data integrity, managing concurrency controlled, and restoring database.

2.6 Relational Database

Strictly, a relational database is a collection of relations (frequently called tables). Other items are frequently considered part of the database, as they help to organize and structure the data, in addition to forcing the database to conform to a set of requirements.

2.6.1 Terminology

The term relational database was originally defined and coined by Edgar Codd at IBM Almaden Research Center in 1970.

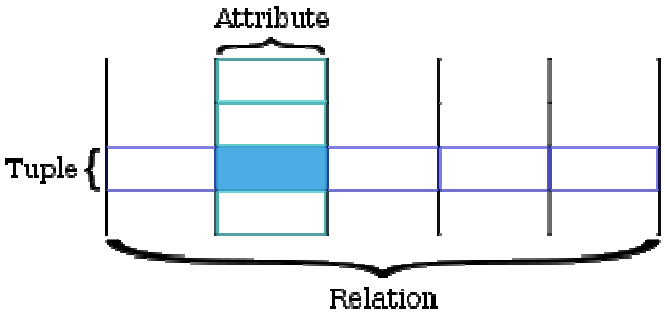


Figure 2.2 The term relational database

2.6.2 Relational Database Terminology

Relational database theory uses a set of mathematical terms, which are roughly equivalent to SQL database terminology. The table below summarizes some of the most important relational database terms and their SQL database equivalents.

Table 2.1 Relational Database Terminology

Relational term	SQL equivalent
relation, base relvar	table
derived relvar	view, query result, result set
tuple	row
attribute	column

2.6.3 Relations or Tables

A relation is defined as a set of tuples that have the same attributes. A tuple usually represents an object and information about that object. Objects are typically physical objects or concepts. A relation is usually described as a table, which is organized into rows and columns. All the data referenced by an attribute are in the same domain and conform to the same constraints.

The relational model specifies that the tuples of a relation have no specific order and that the tuples, in turn, impose no order on the attributes. Applications access data by specifying queries, which use operations such as select to identify

tuples, project to identify attributes, and join to combine relations. Relations can be modified using the insert, delete, and update operators. New tuples can supply explicit values or be derived from a query. Similarly, queries identify tuples for updating or deleting. It is necessary for each tuple of a relation to be uniquely identifiable by some combination (one or more) of its attribute values. This combination is referred to as the primary key.

2.6.4 Base and derived relations

In a relational database, all data are stored and accessed via relations. Relations that store data are called "base relations", and in implementations are called "tables". Other relations do not store data, but are computed by applying relational operations to other relations. These relations are sometimes called "derived relations". In implementations these are called "views" or "queries". Derived relations are convenient in that though they may grab information from several relations, they act as a single relation. Also, derived relations can be used as an abstraction layer.

2.6.5 Domain

A domain describes the set of possible values for a given attribute. Because a domain constrains the attribute's values and name, it can be considered constraints. Mathematically, attaching a domain to an attribute means that "all values for this attribute must be an element of the specified set."

The character data value 'ABC', for instance, is not in the integer domain. The integer value 123 satisfies the domain constraint.

2.6.6 Constraints

Constraints allow you to further restrict the domain of an attribute. For instance, a constraint can restrict a given integer attribute to values between 1 and 10. Constraints provide one method of implementing business rules in the database. SQL implements constraint functionality in the form of check constraints.

Constraints restrict the data that can be stored in relations. These are usually defined using expressions that result in a boolean value, indicating whether or not the data satisfies the constraint. Constraints can apply to single attributes, to a tuple (restricting combinations of attributes) or to an entire relation.

Since every attribute has an associated domain, there are constraints (domain constraints). The two principal rules for the relational model are known as entity integrity and referential integrity.

2.6.7 Primary Keys

A primary key uniquely defines a relationship within a database. In order for an attribute to be a good primary key it must not repeat. While natural attributes are sometimes good primary keys, Surrogate keys are often used instead. A surrogate key is an artificial attribute assigned to an object which uniquely identifies it (For instance, in a table of information about students at a school they might all be assigned a Student ID in order to differentiate them). The surrogate key has no intrinsic meaning, but rather is useful through its ability to uniquely identify a tupelo.

Another common occurrence, especially in regards to N: M cardinality is the composite key. A composite key is a key made up of two or more attributes within a table that (together) uniquely identify a record. Classes could be uniquely identified by a composite key of their room number and time slot, since no other class could have that exact same combination of attributes. In fact, use of a composite key such as this can be a form of data verification, albeit a weak one.)

2.6.8 Foreign keys

A foreign key is a reference to a key in another relation, meaning that the referencing table has, as one of its attributes, the values of a key in the referenced table. Foreign keys need not have unique values in the referencing relation. Foreign

keys effectively use the values of attributes in the referenced relation to restrict the domain of one or more attributes in the referencing relation.

A foreign key could be described formally as: "For all tables in the referencing relation projected over the referencing attributes, there must exist a table in the referenced relation projected over those same attributes such that the values in each of the referencing attributes match the corresponding values in the referenced attributes."

2.6.9 Stored procedures

A stored procedure is executable code that is associated with, and generally stored in, the database. Stored procedures usually collect and customize common operations, like inserting a tupelo into a relation, gathering statistical information about usage patterns, or encapsulating complex business logic and calculations. Frequently they are used as an application programming interface (API) for security or simplicity. Implementations of stored procedures on SQL DBMSs often allow developers to take advantage of procedural extensions (often vendor-specific) to the standard declarative SQL syntax.

Stored procedures are not part of the relational database model, but all commercial implementations include them.

2.6.10 Indices

An index is one way of providing quicker access to data. Indices can be created on any combination of attributes on a relation. Queries that filter using those attributes can find matching tuples randomly using the index, without having to check each tuple in turn. Relational databases typically supply multiple indexing techniques, each of which is optimal for some combination of data distribution, relation size, and typical access pattern. B+ trees, R-trees, and bitmaps.

Indices are usually not considered part of the database, as they are considered an implementation detail, though indices are usually maintained by the same group that maintains the other parts of the database.

2.6.11 Relational operations

Queries made against the relational database, and the derived relvars in the database are expressed in a relational calculus or a relational algebra. In his original relational algebra, Codd introduced eight relational operators in two groups of four operators each. The first four operators were based on the traditional mathematical set operations:

- The union operator combines the tuples of two relations and removes all duplicate tuples from the result. The relational union operator is equivalent to the SQL UNION operator.
- The intersection operator produces the set of tuples that two relations share in common. Intersection is implemented in SQL in the form of the INTERSECT operator.
- The difference operator acts on two relations and produces the set of tuples from the first relation that do not exist in the second relation. Difference is implemented in SQL in the form of the EXCEPT or MINUS operator.
- The cartesian product of two relations is a join that is not restricted by any criteria, resulting in every tuple of the first relation being matched with every tuple of the second relation. The cartesian product is implemented in SQL as the CROSS JOIN join operator.

The remaining operators proposed by Codd involve special operations specific to relational databases:

- The selection, or restriction, operation retrieves tuples from a relation, limiting the results to only those that meet a specific criteria, i.e. a subset in terms of set theory. The SQL equivalent of selection is the SELECT query statement with a WHERE clause.
- The projection operation is essentially a selection operation in which duplicate tuples are removed from the result. The SQL GROUP BY clause, or the DISTINCT keyword implemented by some SQL dialects, can be used to remove duplicates from a result set.
- The join operation defined for relational databases is often referred to as a natural join. In this type of join, two relations are connected by their common attributes. SQL's approximation of a natural join is the INNER JOIN join operator.

The relational division operation is a slightly more complex operation, which involves essentially using the tuples of one relation (the dividend) to partition a second relation (the divisor). The relational division operator is effectively the opposite of the cartesian product operator (hence the name).

2.6.12 Normalization

Normalization was first proposed by Codd as an integral part of the relational model. It encompasses a set of best practices designed to eliminate the duplication of data, which in turn prevents data manipulation anomalies and loss of data integrity. The most common forms of normalization applied to databases are called the normal forms. Normalization trades reducing redundancy for increased information entropy. Normalization is criticized because it increases complexity and processing overhead required to join multiple tables representing what are conceptually a single item.

2.6.13 Relational database management systems

Relational databases, as implemented in relational database management systems, have become a predominant choice for the storage of information in new databases used for financial records, manufacturing and logistical information, personnel data and much more. Relational databases have often replaced legacy hierarchical databases and network databases because they are easier to understand and use, even though they are much less efficient. As computer power has increased, the inefficiencies of relational databases, which made them impractical in earlier times, have been outweighed by their ease of use. However, relational databases have been challenged by Object Databases, which were introduced in an attempt to address the object-relational impedance mismatch in relational database, and XML databases.

2.7 Web Site Design

Web design is the skill of creating presentations of content (usually hypertext or hypermedia) that is delivered to an end-user through the World Wide Web, by way of a Web browser or other Web-enabled software like Internet television clients, micro blogging clients and RSS readers.

The intent of web design is to create a web site a collection of electronic files that reside on a web server/servers and present content and interactive features/interfaces to the end user in form of Web pages once requested. Such elements as text, bit-mapped images (GIFs, JPEGs) and forms can be placed on the page using HTML/XHTML/XML tags. Displaying more complex media (vector graphics, animations, videos, sounds) requires plug-ins such as Adobe Flash, QuickTime, Java run-time environment, etc. Plug-ins are also embedded into web page by using HTML/XHTML tags.

Improvements in browsers' compliance with W3C standards prompted a widespread acceptance and usage of XHTML/XML in conjunction with Cascading Style Sheets (CSS) to position and manipulate web page elements and objects. Latest standards and proposals aim at leading to browsers' ability to deliver a wide variety of media and accessibility options to the client possibly without employing plug-ins.

Typically web pages are classified as static or dynamic:

- Static pages don’t change content and layout with every request unless a human (web master/programmer) manually updates the page. A simple HTML page is an example of static content.

- Dynamic pages adapt their content and/or appearance depending on end-user’s input/interaction or changes in the computing environment (user, time, database modifications, etc.) Content can be changed on the client side (end-user's computer) by using client-side scripting languages (JavaScript, JScript, Actionscript, etc.) to alter DOM elements (DHTML). Dynamic content is often compiled on the server utilizing server-side scripting languages (Perl, PHP, ASP, JSP, ColdFusion, etc.). Both approaches are usually used in complex applications.

With growing specialization in the information technology field there is a strong tendency to draw a clear line between web design and web development.

Web design is a kind of graphic design intended for development and styling of objects of the Internet's information environment to provide them with high-end consumer features and aesthetic qualities. The offered definition separates web design from web programming, emphasizing the functional features of a web site, as well as positioning web design as a kind of graphic design.

The process of designing web pages, web sites, web applications or multimedia for the Web may utilize multiple disciplines, such as animation, authoring, communication design, corporate identity, graphic design, human-computer interaction, information architecture, interaction design, marketing, photography, search engine optimization and typography.

- Markup languages (such as HTML, XHTML and XML)
- Style sheet languages (such as CSS and XSL)
- Client-side scripting (such as JavaScript)
- Server-side scripting (such as PHP and ASP)
- Database technologies (such as MySQL and PostgreSQL)
- Multimedia technologies (such as Flash and Silverlight)

Web pages and web sites can be static pages, or can be programmed to be dynamic pages that automatically adapt content or visual appearance depending on a variety of factors, such as input from the end-user, input from the Webmaster or changes in the computing environment such as the site's associated database having been modified.

With growing specialization within communication design and information technology fields, there is a strong tendency to draw a clear line between web design specifically for web pages and web development for the overall logistics of all web-based services.

2.8 Data Flow Diagram: DFD

A data-flow diagram (DFD) is a graphical representation of the "flow" of data through an information system. DFDs can also be used for the visualization of data processing (structured design).

On a DFD, data items flow from an external data source or an internal data store to an internal data store or an external data sink, via an internal process.

A DFD provides no information about the timing or ordering of processes, or about whether processes will operate in sequence or in parallel. It is therefore quite different from a flowchart, which shows the flow of control through an algorithm, allowing a reader to determine what operations will be performed, in what order, and under what circumstances, but not what kinds of data will be input to and output from the system, nor where the data will come from and go to, nor where the data will be stored (all of which are shown on a DFD).

Figure 2.3 Data-flow diagram examples

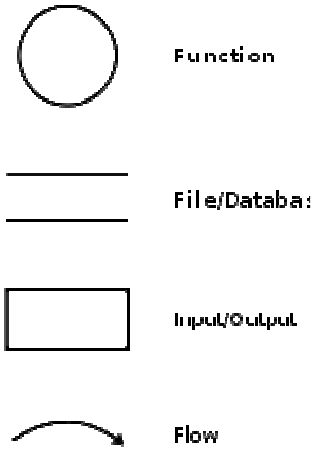


Figure 2.4 Data flow symbol

2.8.1 Top-down approach

1. The system designer makes "a context level DFD" or Level 0, which shows the "interaction" (data flows) between "the system" (represented by one process) and "the system environment" (represented by terminators).

2. The system is "decomposed in lower-level DFD (Level 1)" into a set of "processes, data stores, and the data flows between these processes and data stores".

3. Each process is then decomposed into an "even-lower-level diagram containing its sub processes".

4. This approach "then continues on the subsequent sub processes", until a necessary and sufficient level of detail is reached which is called the primitive process (aka chewable in one bite).

2.9 Related Research

A Design and Development of a Sale System of Steel Processing Business with Electronic Commerce System (Sukij Akkakijkoson, 2005**)**

The purpose of this is to analyze, design and develop a sales system for steel processing business with electronic commerce system. Sale process and data from Bangkok Coil Center Company Limited are used as a case study. Researcher analyzed and designed the systems which were master data maintenance, customer registration, customer ordering, customer order verification, order status inquiry. Researcher developed the system based on the relational data model using Microsoft SQL 6.0 and Microsoft Visual Interdev 6.0 for application development tools. The developed system is Windows-based system compatible. After the completion of system development, research tested the system and found that it achieved the system objectives. The result of this study is that useful for steel processing business and other similar business. It can improve the effectiveness and efficiency of sales system, and it also helps to facilitate working process for customers and relevant departments so as to gain convenience, acceleration and accuracy.

Electronic Commerce System for National Laboratory Animal Center, Mahidol University (Ratri Thepkasetkul, 2006**)**

The purpose of this research was to develop an E-commerce system for the National Laboratory Animal Center, Mahidol University. The B2C E-commerce system was chosen to solve the problems of the present system, to extend the opportunity and capacity of customers' order and also to assist in improvement of the Center's efficiency to its satisfactory reliance level. In order to develop this system, we used Microsoft Window 2000 Server for the Operating System and Microsoft Access 2000 for the system databases. Internet Information server (IIS) was Web

Server.It connected with the users by Web Browser and programming by Active Server Pages (ASP). There are two main parts of this system: the Front Office System and the Back Office System. The Front Office System was composed of 1.General Information of National Laboratory Animal Center 2.Production and Service 3.How to order 4.News and Advertisement of National Laboratory Animal Center 5.FAQs 6.Map of website 7. Customers' order The Back Office System was covered management, orders and also the transportation system. This new system enables products to be sold online. It also showed general information, products and all services, so that it was more efficient not only in service but also in communicating with customers. In order to get the most efficient and excellent system, more development is necessary to connect with other departments of the National Laboratory Animal Center or apply the decision support system for National Laboratory Animal Center boards.

Development of Electronics Commercial System for Paisarn Electronic (Tanawat Rotthanakit**,** 2006)

The objective of this research is to increase the customer base and to improve the distribution of goods from Paisarm Electronic via the internet. The system was developed as a web application using Macromedia Dreamweaver MX together with PHP programming language to connect to MySQL database. The result of this research is an establishment of integrated electronics commercial system, which can present the products to the customers and lead to doing business via the internet. This system has 2 parts. They are: customer part which is able to manage products data, communicate, contract with customers and receive invoices; administrator and employees part which divides into 4 systems. They are managing data, shop control, customer care and invoice care system. The system was tested using Microsoft Internet Explorer 6.02900 as client web browser.

CHAPTER III
MATERIALS AND METHODS

In this chapter will describe research methodology for requirement's a sale system of coat tailor processing business with electronic commerce system.

3.1 Research Methodology

In this research, steps of methodology are consisting of the processes as show in Figure 3.1

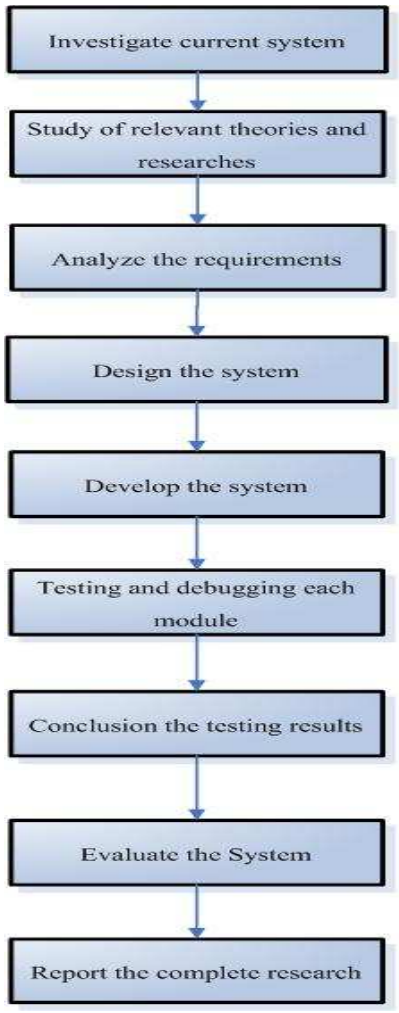


Figure 3.1 Steps of Research

3.1.1 Investigate current system of the sale system of coat tailor processing business, to identify problem statement, to find requirement of work, user needs and studying the infrastructure of the business.

3.1.2 Study of relevant theories and researches as follow:

- Study the knowledge of e-Commerce such as articles, papers, thesis, and journal.

- Study the knowledge, theories and tools which involve E-Commerce such as Security, Payment etc.

3.1.3 Analyze the requirement which are investigated from step 3.1.1

3.1.4 Design the system from the requirement analysis in step 3.1.3 to be able to create model which consists of

- Web-page
- Web server
- Database for
    - Front office
    - Back office
    - Information security on Internet
    - Graphic user interface

3.1.5 Develop the system from step 3.1.4 to build a prototype for the sale system of coat tailor processing business.

3.1.6 Test the system by simulating the business process on electronic commerce.

3.1.7 Conclusion the testing results in step 3.1.6.

3.1.8 Evaluate the System

After implement and testing of the system, conclusion for this application will be conducted. A questionnaire (Appendix A) will be evaluated from coat tailor business and customers about advantages and disadvantages of the application.

If the point of evaluation over the 70% means that the systems are satisfied.

3.1.9 Report the complete research and mark suggestions for the recommendation and the further study.

3.2 Materials

3.2.1 Hardware

3.2.1.1. Computer laptop for Server/Client

- Pentium Dual-Core speed 1.86 GHZ
- RAM 512 MB
- Hard disk 60 GB
- Network LAN Card 10/100 MB

3.2.2 Software

3.2.2.1. Operating system is Microsoft Windows XP

3.2.2.2. Database relational management is MySQL

3.2.2.3. Web server is Apache and Tomcat

3.2.2.4. Open SSL

3.2.2.5. PHP development tool

3.2.2.6. Jasper Report tool by JAVA language

3.2.2.7. Web Browser is Mozilla Firefox

3.2.2.8. ArGoSoft Mail Sever

3.2.2.9. Microsoft Office 2003

3.2.2.10. Adobe Reader 8

3.2.2.11. Microsoft Internet Explorer

3.3 Research Schedule

The Study consumes time as table below

Table 3.1 Research Schedule

Task Name	Duration	Feb	Mar	Apr	May	Jun
1. Study process and procedure of system	10 Days	→				
2. Collection data and problem analysis and collection requirement	10 Days	→				
3. Analysis and design data	10 Days	→				
4. System Design	10 Days	→				
5. System Development	30 Days	→	→			
6. Test and Solve System	10 Days		→			
7. Conclusion & Recommendations	20 Days		→	→		
8. Documentation	20 Days			→	→	

CHAPTER IV
RESULTS

The result of this research is a sale system of coat tailor processing business with electronic commerce system: a case study of coat tailor business. Which focuses on improve present system in order to opportunity and capability to the coat tailor business to serves more customers. This system is developed under software development life cycle which contains six phase: preliminary investigation, analysis, design, development, testing and evaluation. So this chapter will describe the detail followed by software development life cycle.

4.1 Preliminary Investigation

This step is to investigate current system of a sale system of coat tailor processing business to identify problem statement, to find requirement of work, user needs and studying the infrastructure of the organization. The requirements are based on to solve the e-commerce problem by development the system software for a sale system of coat tailor processing business.

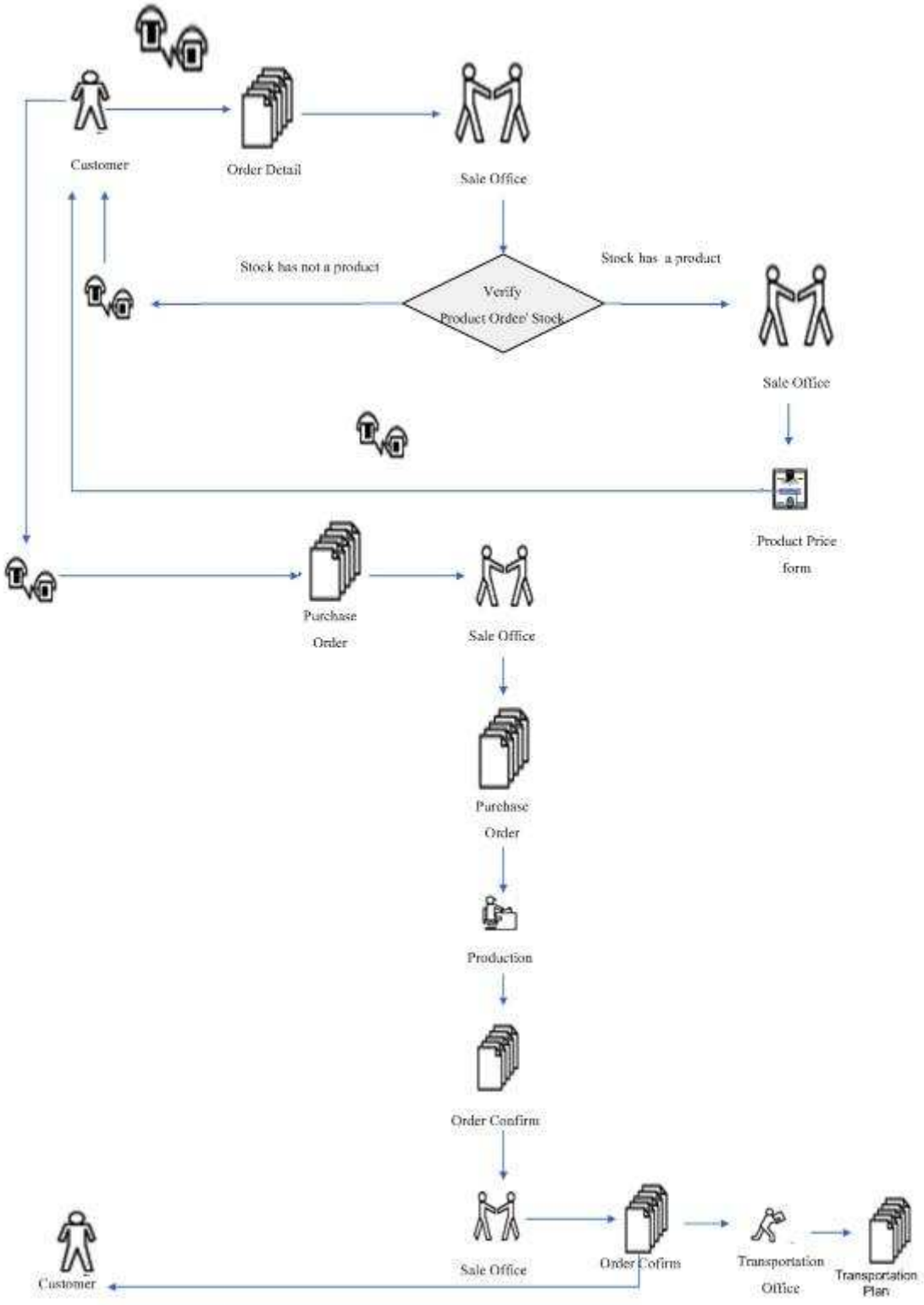


Figure 4.1 Purchase order receives process

1. Purchase order receives process in figure 4.1 that divides sub procedure. As follow,

1.1 Sale office receives purchase order from customer, such as product characteristic, coat size, quantity and customer profile.

1.2 Sale office verifies purchase order detail and product quantity in stock.

- If stock has not product, sale office informs to customer.
- If stock has product, sale office confirms product price with customer and follows purchase order.

1.3 When customer confirms purchase order, sale office receives purchase order from e-mail or fax.

1.4 Sale office verifies purchase order detail, such as product characteristic, product quantity, transportation date, product price. If data lack, sale office communicates with customer.

1.5 Sale office sends purchase order detail to production office that considers production capability.

1.6 Production office considers production capability from a production planning, material. After they considered, them considers in an order confirm form and send to sale office.

1.7 Sale office sends an order confirms form to customer by fax for confirms with customer, and they copies purchase order and order confirm to transportation office that prepare transportation planning.

2. The procedure changes purchase order. As follow,

2.1 If company changes purchase order, such as transportation date, product characteristic, product quantity, production office records purchase order change detail and sends to sale office that verifies purchase order change detail. Sale office confirms with customer and sends confirm form from customer to production office. In figure 4.2

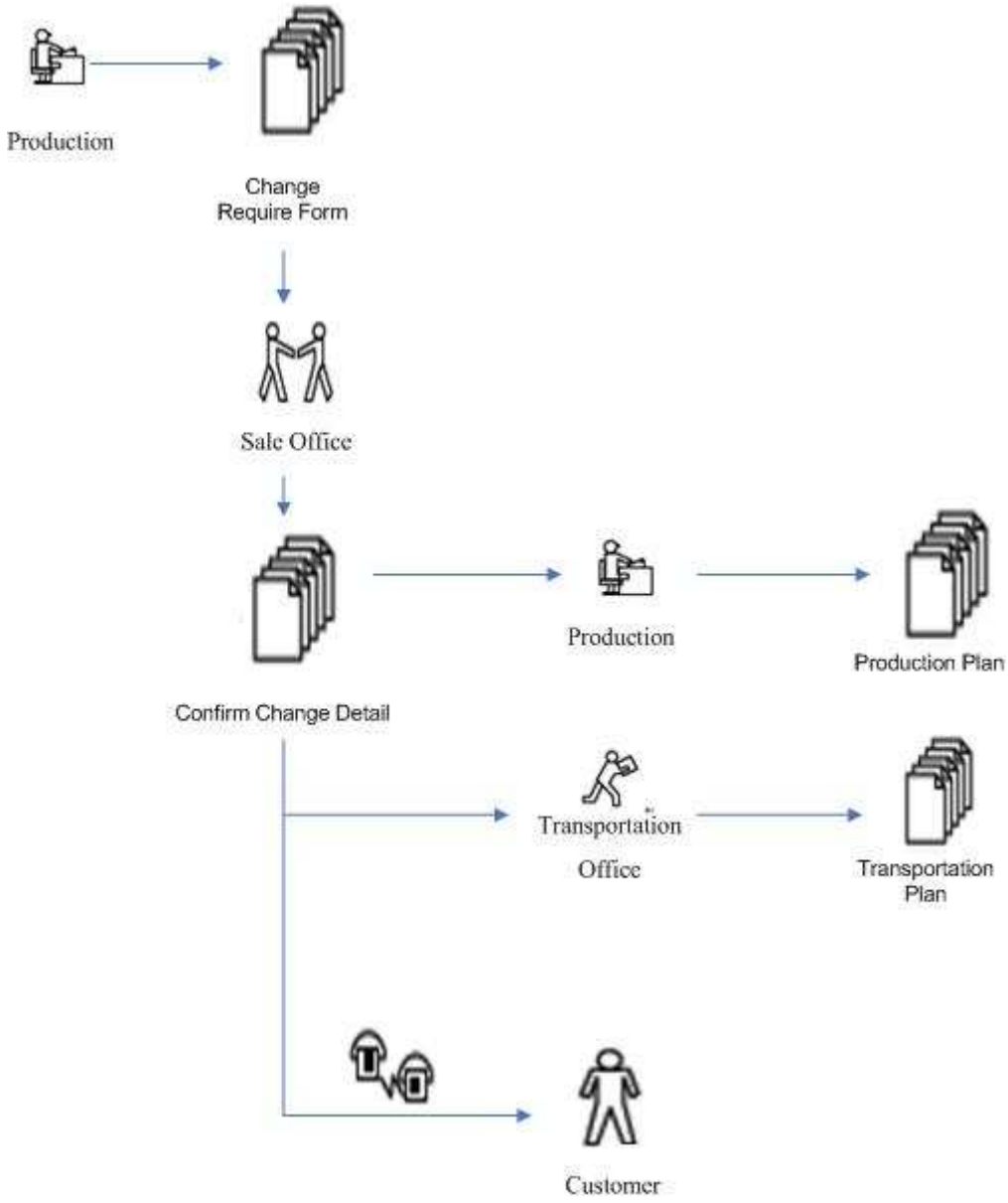


Figure 4.2 The procedure change purchase order by company.

2.2 If changes purchase order by customer, sale office verifies a purchase order change detail and confirms with customer. If purchase order can change, sale office records a change detail and sends document to production office and transportation office that changes production planning and transportation planning. In figure 4.3

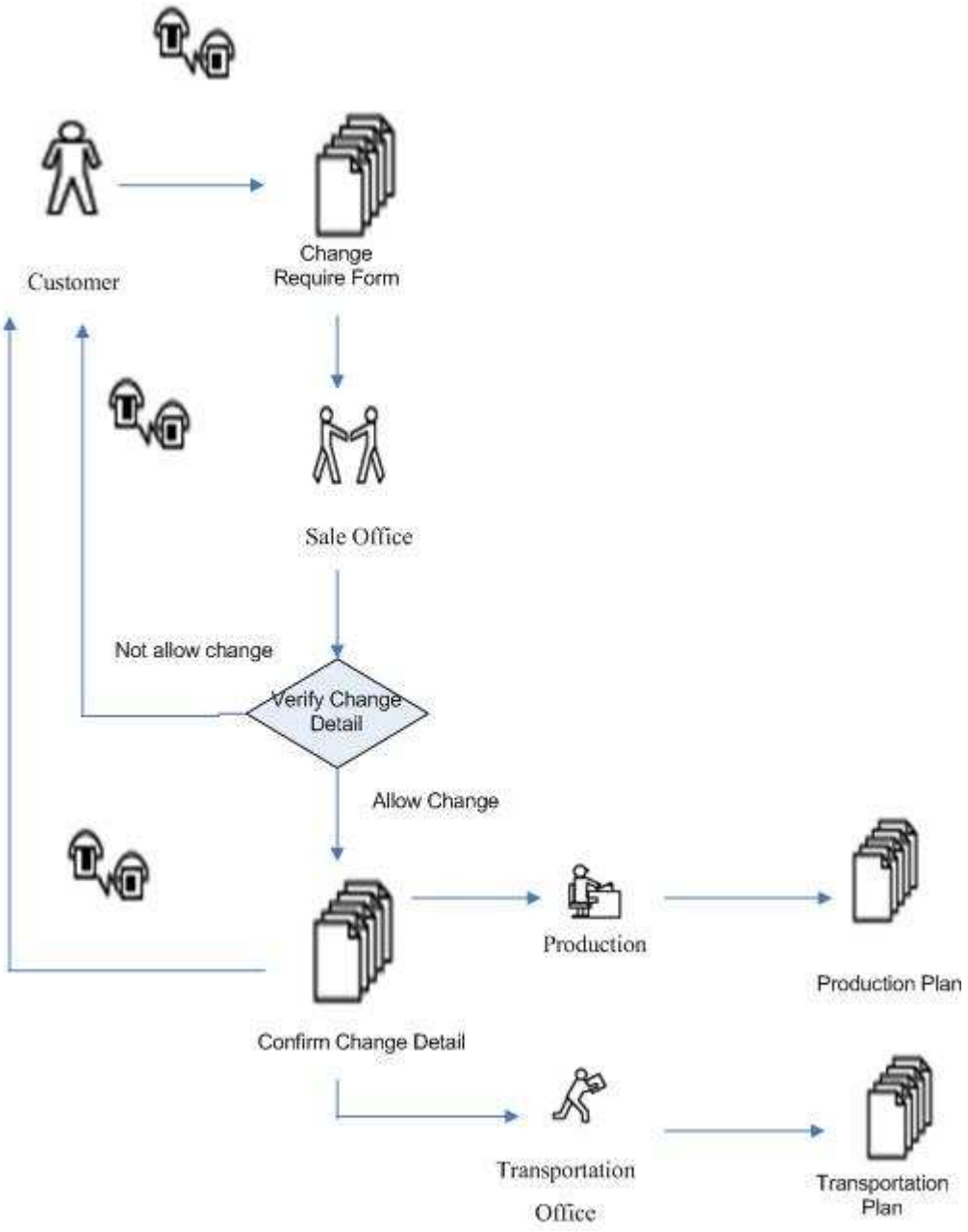


Figure 4.3 The procedure changes purchase order by customer.

3. The procedure cancels purchase order in figure 4.4. As follow,

3.1 Sale office receives a cancellation transaction from customer.

3.2 Sale office verifies a cancellation transaction from customer.

- If product produces finish, sale office will consider to customer. It can not cancel.
- If product don't production, sale office will confirm with customer and sends to production office and transportation office.

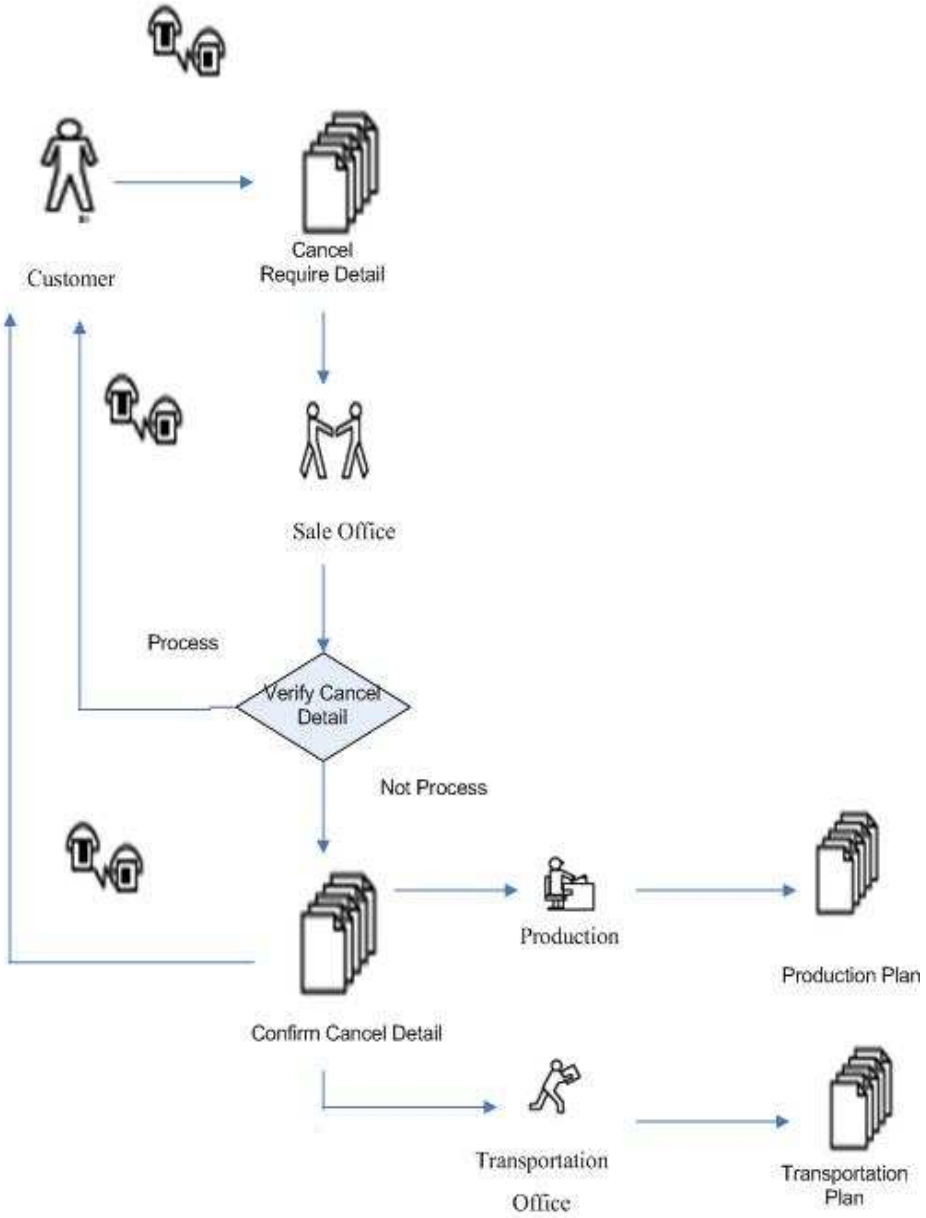


Figure 4.4 Purchase order cancel process

From study and analysis, that knows office relation with system, is sale office and executive, so a development system need response to any office and user, such as customer, executive and sale office. A system can specifies detail of user requirement. As follow,

Table 4.1 User requirement

Process Functional	Customer		Sale office	Executive
	Other	Company		
1. Basic maintenance				
1.1 Product data			/	
1.2 Customer data			/	
1.3 Bank data			/	
1.4 User data			/	
2. Customer Register				
2.1 Customer registering	/	/	/	
2.2 Password change	/	/		
2.3 Password ask	/	/		
3. Purchase order receive				
3.1 Last purchase order display	/	/	/	
3.2 Product search	/	/	/	
3.3 Product detail display	/	/	/	
3.4 Credit card payment	/	/		
3.5 Payment transaction verify			/	
3.6 Purchase order transaction record	/	/	/	
3.7 Payment transaction reject			/	
3.8 Payment transaction record			/	

3.9 Transfer purchase order confirm data			/	
4. Purchase order transaction verify				
4.1 Purchase order transaction display			/	
4.2 Purchase order transaction rejection			/	
4.3 Purchase order transaction record			/	
5. Purchase order status				
5.1 Purchase order search	/	/	/	
5.2 Purchase order status display	/	/	/	
6. Report				
6.1 Top 5 product sale for month report			/	/
6.2 Sale summary for month report			/	/
6.3 Sale summary for year report			/	/
6.4 Credit card and cash payment summary (time)			/	/
6.5 Customers use webpage service analysis report for day			/	/
6.6 Customers use webpage service analysis report for month			/	/
6.7 Top 5 purchase of customer analysis divide by customer			/	/
6.8 Sale performance analysis report divides by product			/	/
7. Stock Management				
7.1 Add/Delete/Edit stock			/	
7.2 Stock automatic update when approve a purchase transaction			/	

Table 4.1 User requirement (cont.)

4.2 System Analysis

After studying the requirement then analysis the overview of electronic commerce business process shows in Figure 4.5.

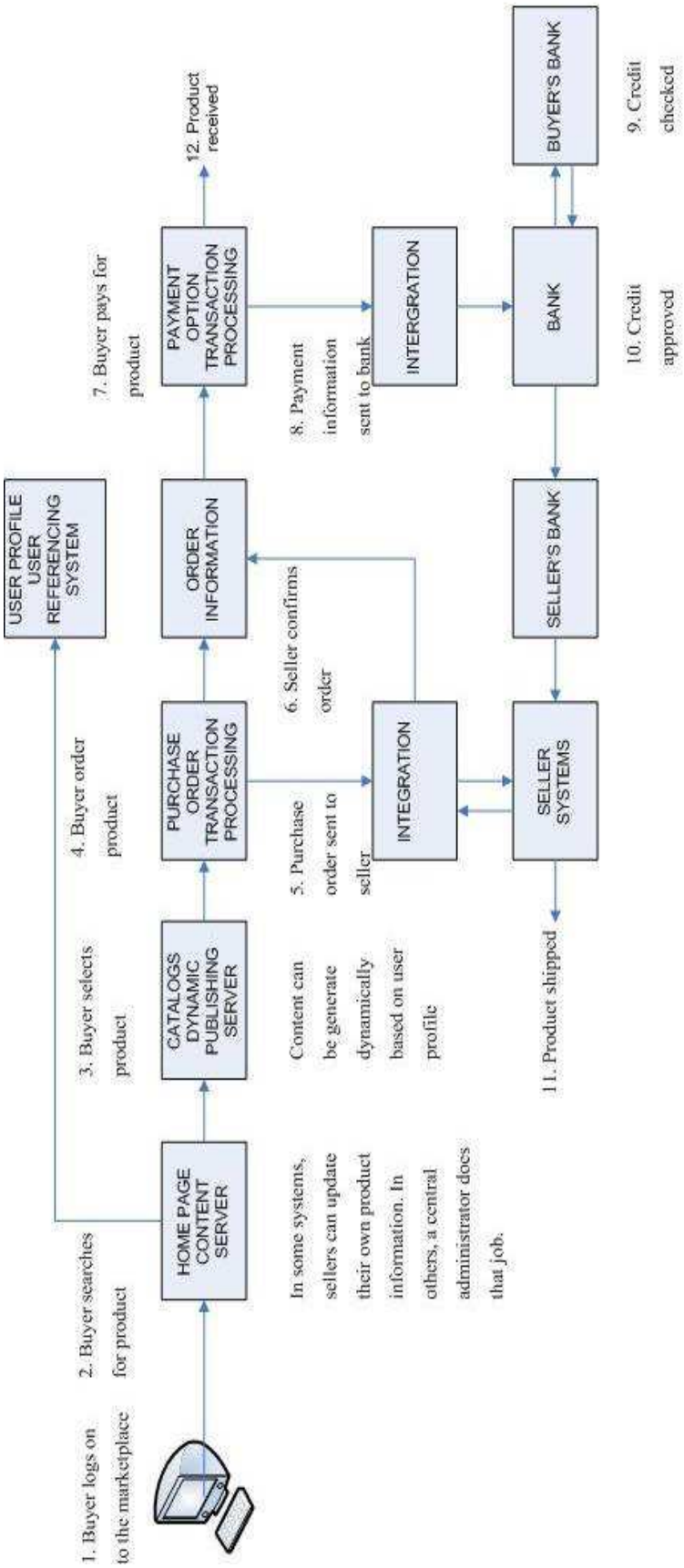


Figure 4.5 The overview of E-Commerce business process

4.2.1 Data modeling

Data modeling methods use the Entity Relationship Diagram (ERD) to identify data object and their relationship using graphic notation. The ERD is used to conduct the data modeling activity. The attribute of each data object noted in ERD can be described using a data object description. The ERD of e-Commerce System for a sale system of coat tailor processing business which compose of sale system and sale system relate accessories ordering process are show in Figure 4.6.

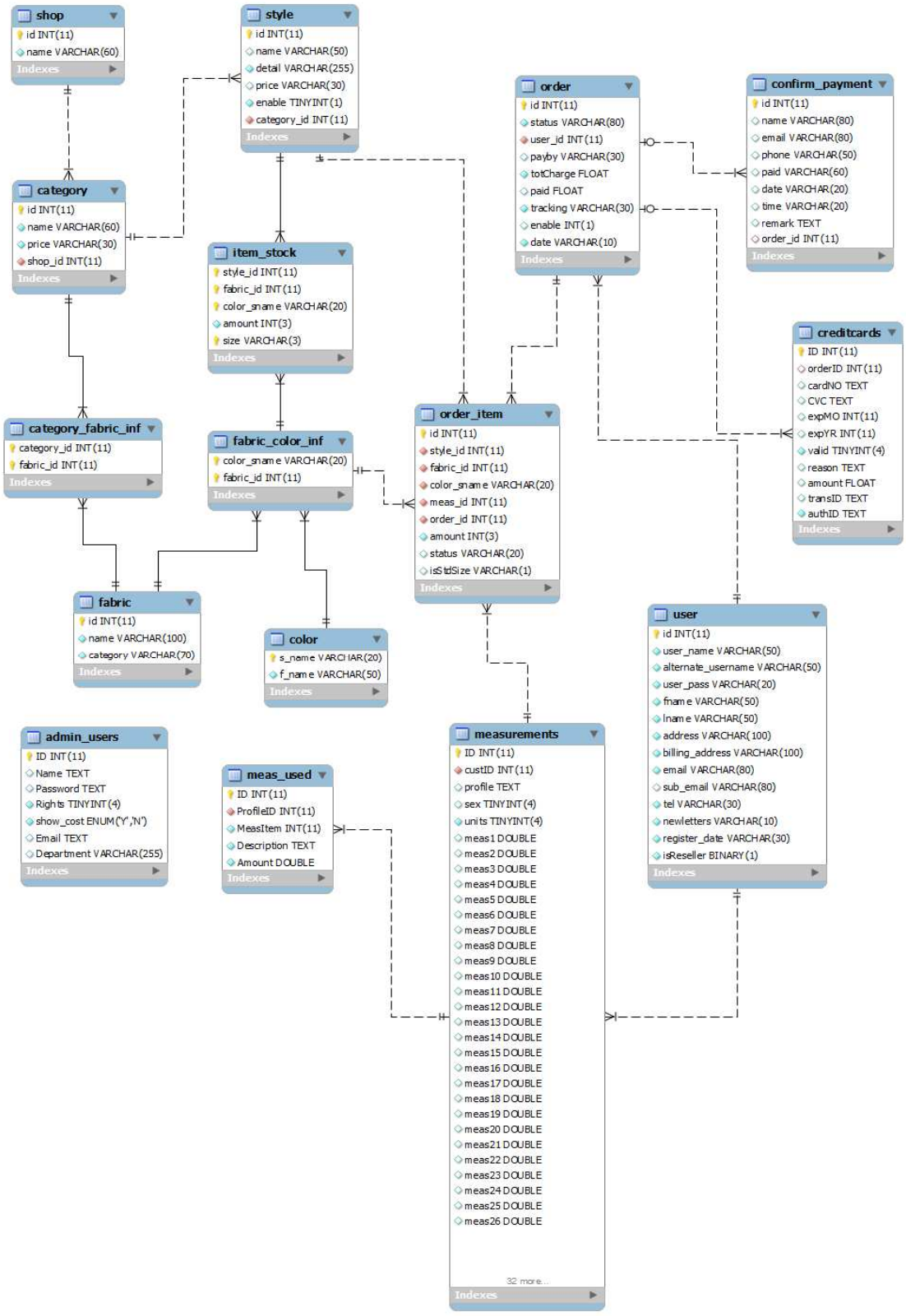


Figure 4.6 Entity Relationship Diagram (ERD)

4.2.2 Functional modeling

Data Flow Diagram (DFD) provides a mechanism for functional modeling. Theses diagrams show the flow of data into the system and between processes and data stores. They provide an indication of how data are transformed as they move through the system and depict the function that transforms the data flow. A description of each function presented in the DFD. The Context Diagram and the first level DFD of Electronic Commerce System for a sale system of coat tailor processing business are show in Figure 4.7-4.11 respectively.

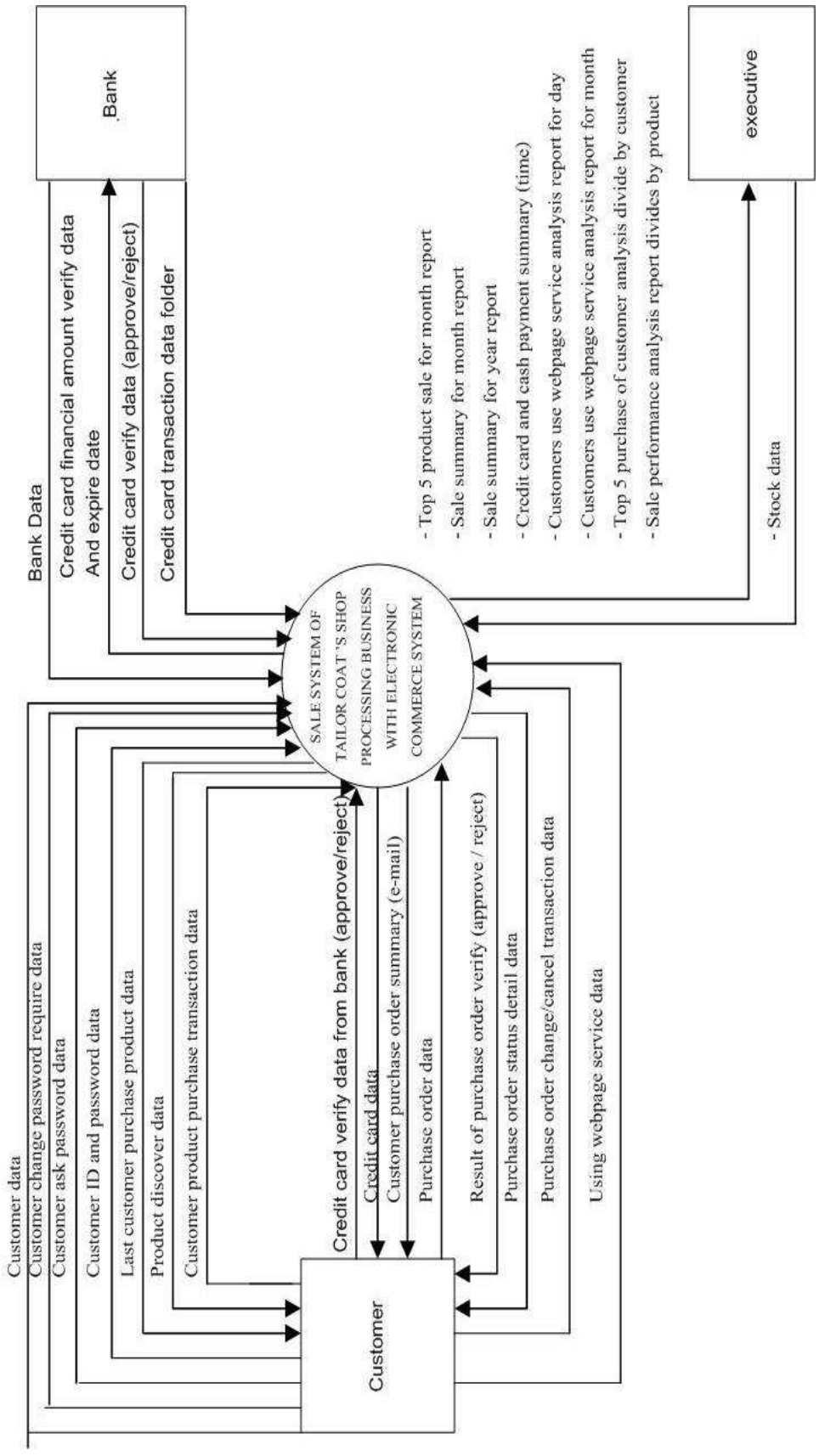


Figure 4.7 Data Flow Diagram Level 0 (Context diagram) of Electronic Commerce System for a sale system of coat tailor processing business

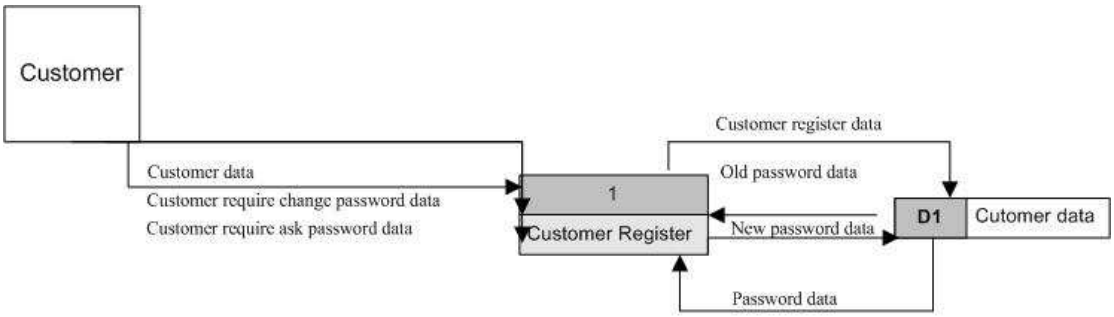


Figure 4.8 Data Flow Diagram Level 1 Customer Register Process

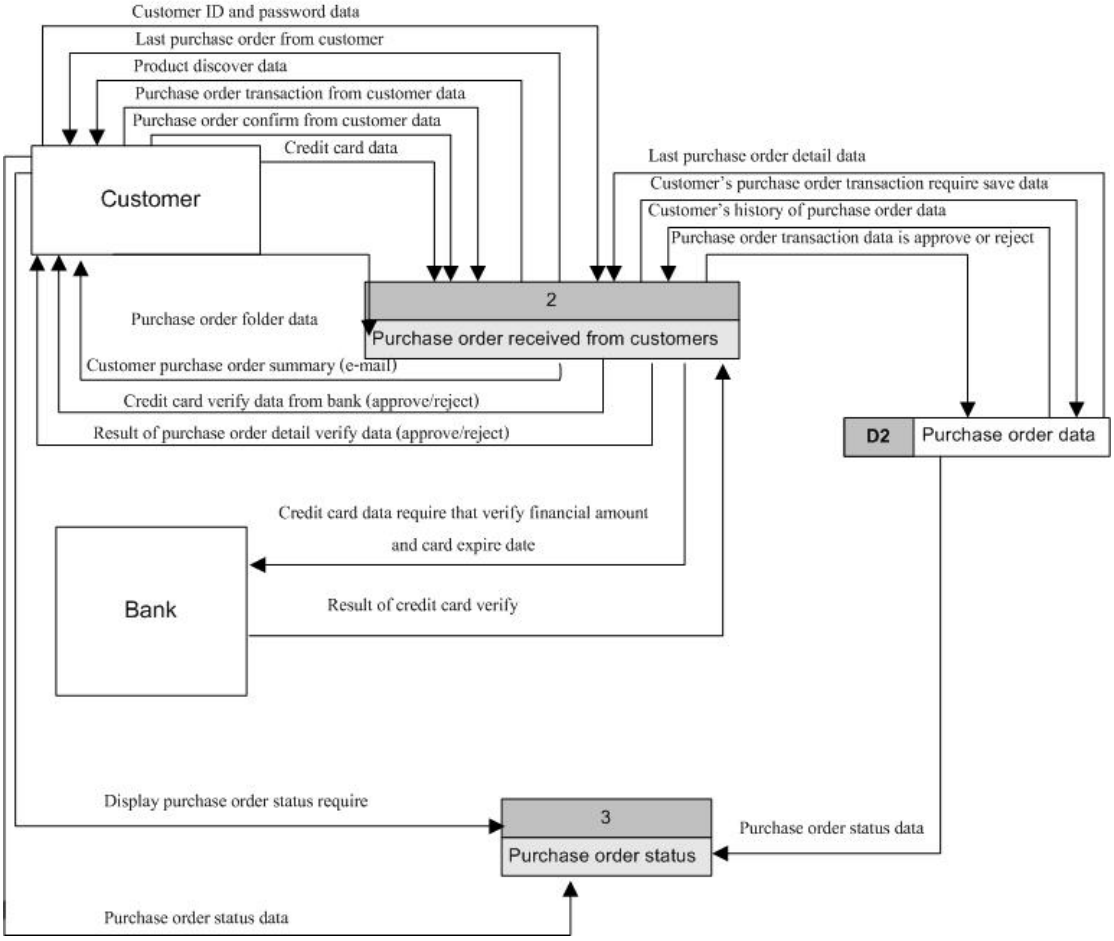


Figure 4.9 Data Flow Diagram Level 1 Purchase Order Received Process & Purchase Order Status Process

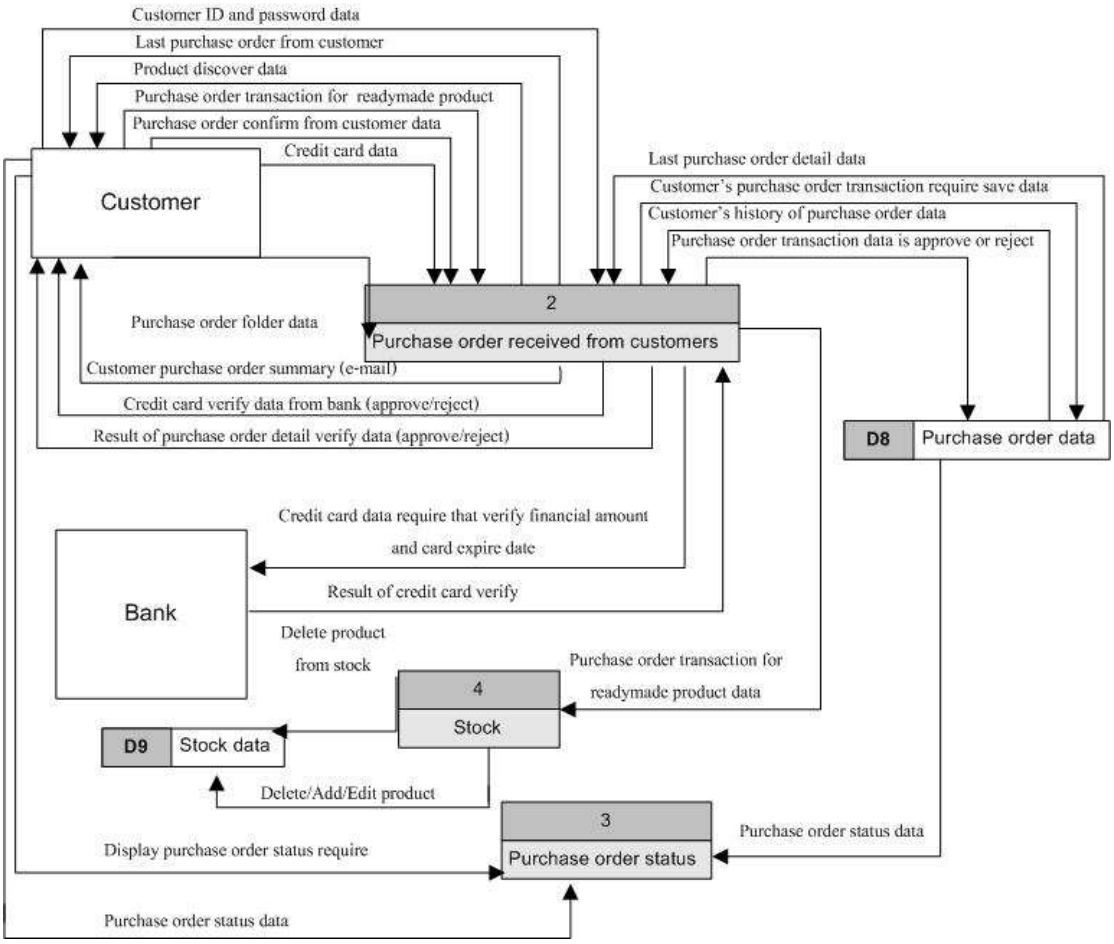


Figure 4.10 Data Flow Diagram Level 1 Stock Process

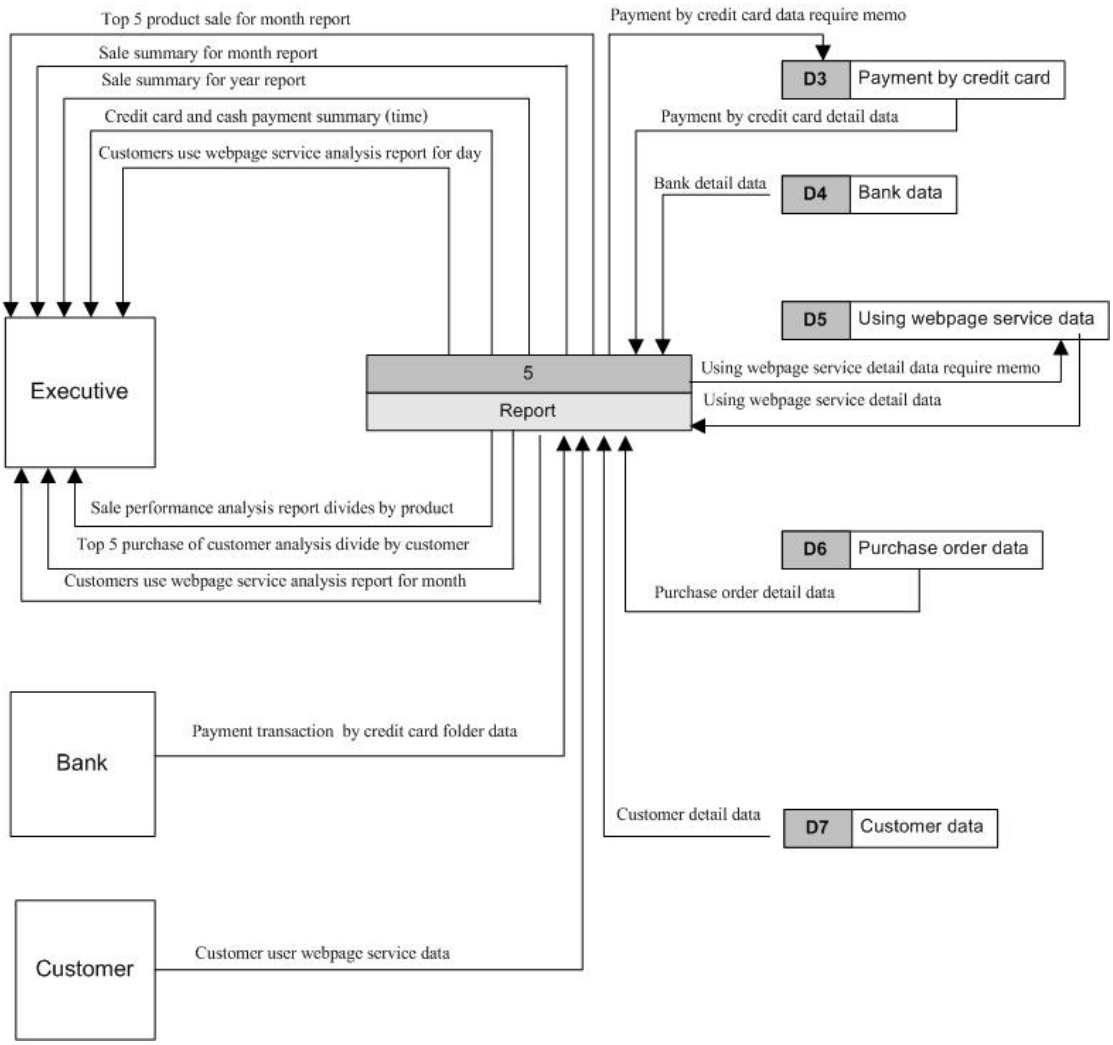


Figure 4.11 Data Flow Diagram Level 1 Report Process

From the Data Flow Diagram that illustrates the Electronic Commerce System for a sale system of coat tailor processing business which comprises 4 main processes as follows:

Process 1: Customer Register Process

The customers register process, which design for a customer, record data and website register. Customer able to changes and ask password if customer forgot password. After customer registers success, customer able to uses username and password that purchase product. The customers register process comprises various process that show in figure 4.8. As follow,

1.1 Customer Register Process is process for customer who records profile, such as first name, last name, address, customer size, username and password, so customer able to uses profile data that purchase product and all data will transfer to customer data folder.

1.2 Password Change Process, which changes old password to new password, will asks old password and new password. After customer change password complete, system records new password data in customer data folder.

1.3 Ask Password process is a process which customer ask password. When customer forgot password, a system sends password to customer e-mail.

Process 2: Purchase Order Receiving Process Design

A purchase order receiving process designs for customer who able to purchases product by website. It is easy, quickly and less error for purchasing because this process will transfer a confirm data to customer when system receives a purchase order from website. After system receives a purchase order, company verifies production capacity and transportation date, and then inform to customer for confirm. This system has sub process. In figure 4.9

A purchase order receiving process is process for customer who able to purchase and payment by credit card or cash transfer. A payment system encoded credit card data by SSL system that protects change or illegal data use. A purchase order receiving process comprises sub process in figure 4.9. As follow,

2.1 Process of last purchase order transaction display

After customer login to system that will verify a purchase history from purchase folder. A system will show all purchase transaction for facility of customer.

2.2 Process of product detail display

Customers able to select coat type, color and texture, that a system show characteristic to customers who decision and selection.

2.3 Process of purchase order management

Customers able to record purchase detail, such as product characteristic, product size and product quantity. Customers able to change or delete purchase order transaction in cart.

2.4 Process of payment transaction verify

After customers recorded purchase data, customers should record credit card data that payment in bank website, such as credit card number, credit card type. Bank takes a credit card data and total bill that verify credit card status, credit card owner and financial amount.

2.5 Process of payment transaction rejection

After bank verifies credit card data and sends rejection result to company, a system will show payment rejection status.

2.6 Process of purchase order transaction record

After bank verified credit card data and sends approve result or complete cash transfer, a system records purchase order transaction to purchase data folder and shows payment complete status.

2.7 Process of payment complete confirm data sending

A system sends payment data to customer e-mail when received cash or credit card approved.

Process 3: The stock management process design for readymade product

The stock process designs for readymade product management and data collection that collects readymade product detail and quantity In Figure4.10. As follows,

3.1 Stock management

Administrator able to increase or decrease product, and then able to edit product detail.

3.2 Stock automatic update

When customer purchase readymade product, and payment transaction is complete, a system will cuts product from stock database by automatic system.

Process 4: Report process design

A report process designs for report summary and report analysis, so executive use various report that develop organization process to more efficiency. In report process, has various sup process in figure 4.11. As follow,

4.1 Top 5 product sales for month report

4.2 Sale summary for month report

4.3 Sale summary for year report

4.4 Credit card and cash payment summary (time)

4.5 Customers use webpage service analysis report for day

4.6 Customers use webpage service analysis report for month

4.7 Top 5 purchase of customer analysis divide by customer

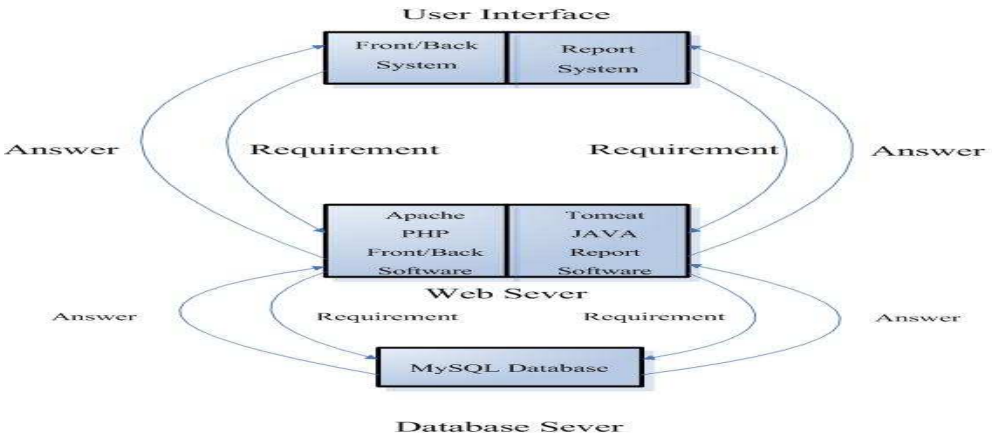
4.8 Sale performance analysis report divides by product

4.3 System Design

According to define the system analysis phase, a Data Flow Diagram (DFD) is used as a base model to design the database system in system design phase. There are four related design: architecture design, structure design, database design, and interface design.

4.3.1 Architecture design

Client/Server system uses for research that is complete system. Client sends requirement to server by network system. Server will receive requirement and calculate and search data, and sends answer to client. In figure 4.12



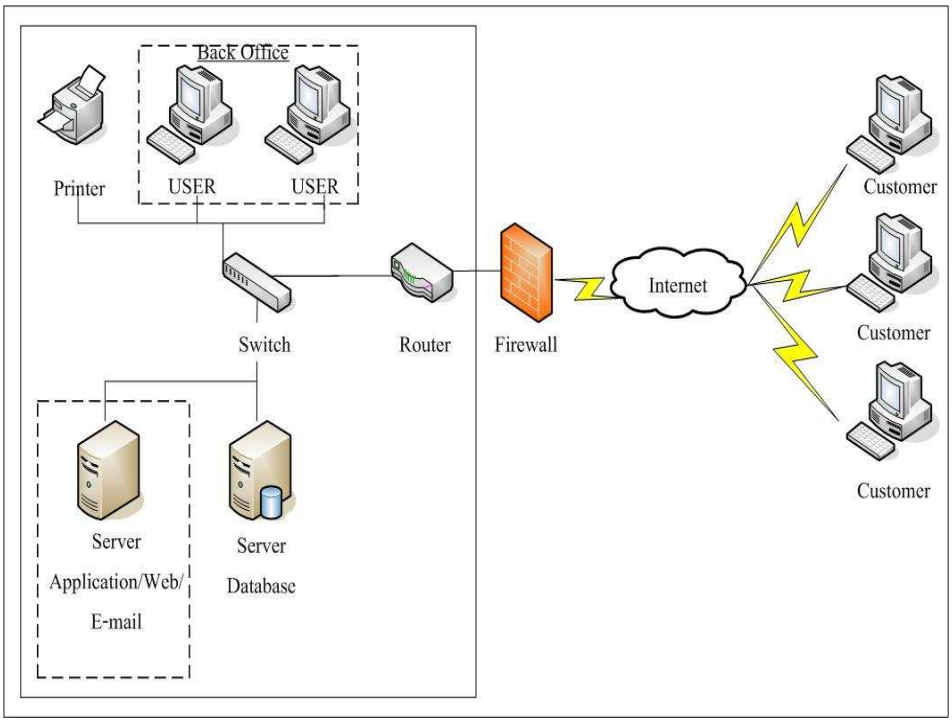


Figure 4.12 Client/Server Design

4.3.2 Security design

4.3.2.1 Information security on Internet

For this application which is working via Internet, a security system has been designed. The application is provided 2 partitions. First partition is the general information for the persons to search products and view detail about this web site, the other is the process to doing business for member customers. Customer needs to make registration to be member customer. The system will provide member id for member customer after registration and the member customer can create their own password. The member must log on by member id and password before access the system, the system will not allow the wrong member id or password. To do this for protection non-registered persons who have not really had intention to process the order and to reduce the junk mail in the system.

4.3.2.2 Internet security system by applying PKI infrastructure and SSL

For Internet security system, a public key infrastructure (PKI) and Secure Socket Layer are designed to use in this application. A public key

infrastructure enables uses of basically unsecured public network such as the Internet to securely and privately exchange data and money through the use of a public and private cryptography key pair that is obtained and share through a trusted authority. A Certification Authority (CA) is an authority in a network that issues and manages security credentials and public key for message encryption.

Secure Socket Layer (SSL) is a general-purpose cryptographic protocol to be used to provide security and privacy. SSL operates at the TCP/IP layer. This means that any application that relies on TCP/IP such as the Web (HTTP) and e-mail (SMTP) can be secured by SSL. SSL is the encryption system that is used by web browsers and supports a variety of encryption algorithms and authentication methods.

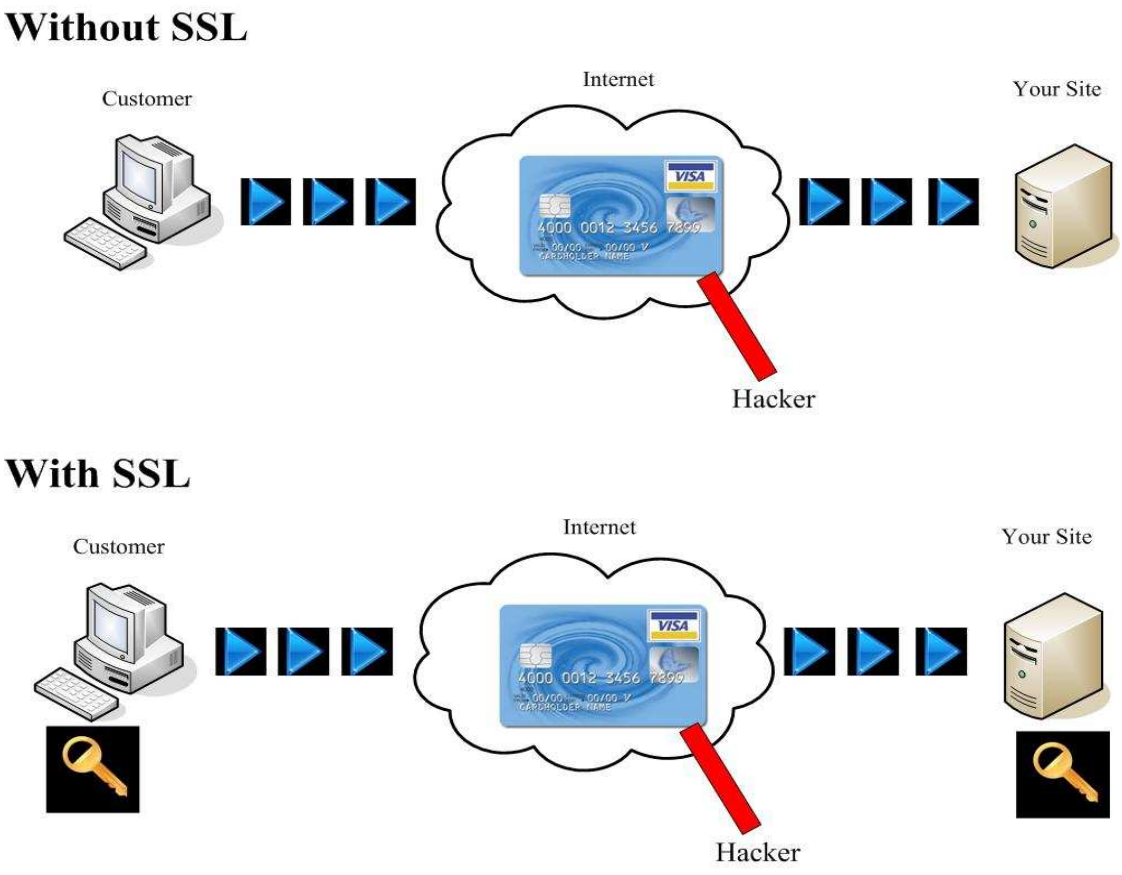


Figure 4.13 Diagram show to send data over the internet for the Electronic Commerce System for a sale system of coat tailor processing business

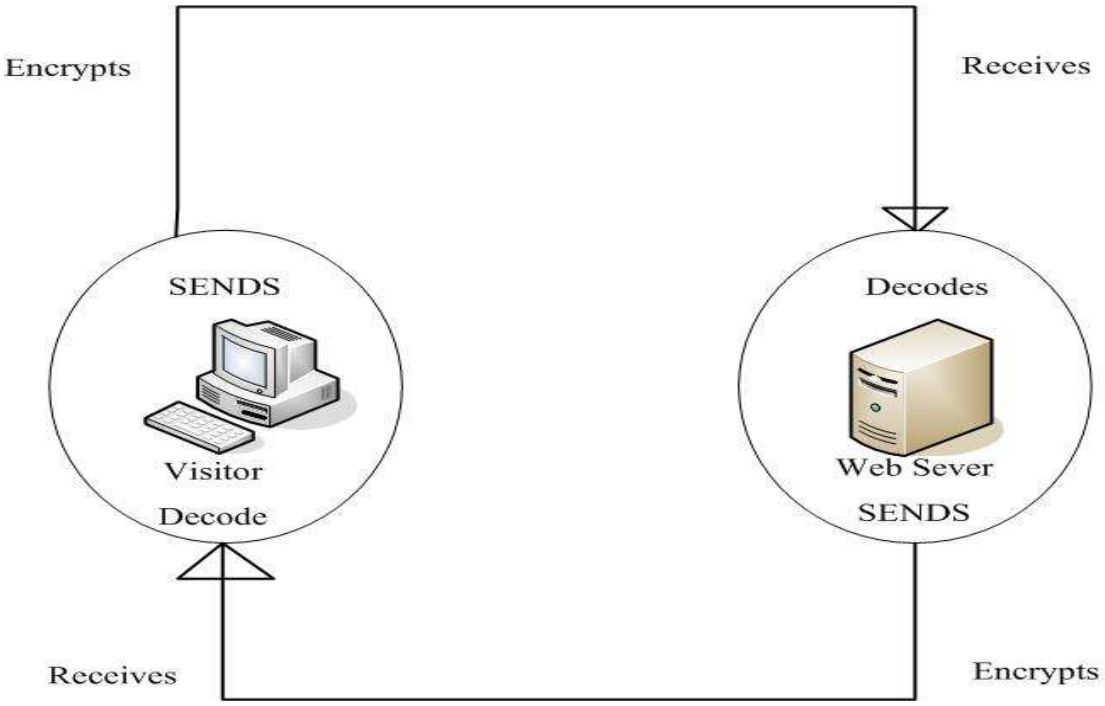


Figure 4.14 Diagram show how to encrypt and decode data with SSL architecture

Without using SSL, the credit card information is send through the Internet as plain text which could be pick up by a hacker through packet sniffing and easily stolen. If this were to happen, the customer would blame you for allowing his or her credit card information to leak to the hacker, even though your site was only indirectly at fault.

With SSL, packet sniffing becomes useless as each packet of data is encrypted using digital keys by both the web browser and your site's web server. Note that SSL does not prevent packet sniffing, but any data the hacker could see would appear to be random, nonsensical characters, only readable by your server, which possesses the digital key to decrypt, or unscramble, the data.

4.3.3 Structural design

The structural chart is used to represent the program structure. It defines the components of the system, which are called modules, and the manner in which those components are packaged and interact with one another. The structure chart is designed to cover all process in Data Flow Diagram. The overall structure chart of Electronic Commerce System for a sale system of coat tailor processing business is show in figure 4.15, figure 4.16 and figure 4.17 respectively.

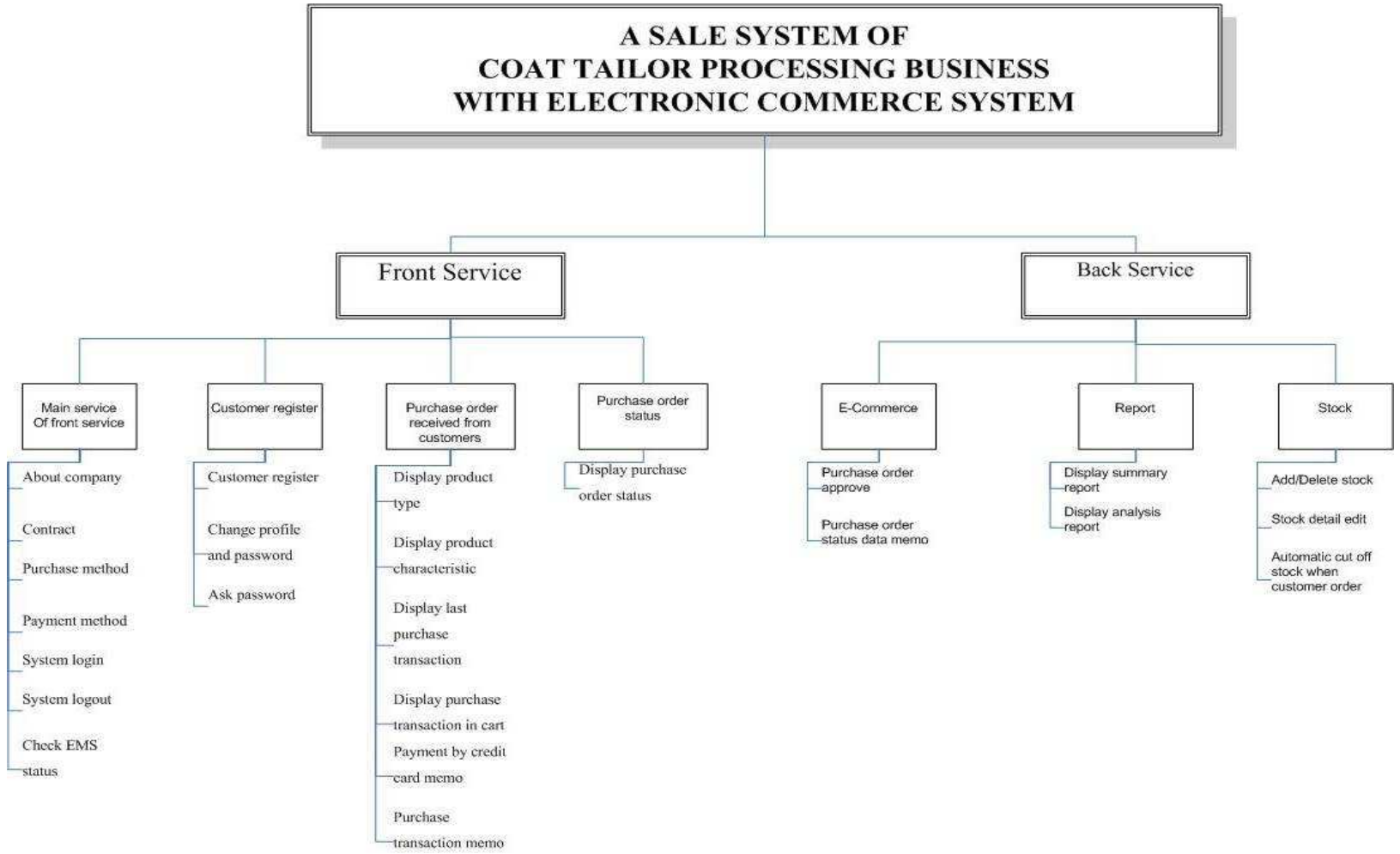


Figure 4.15The Overall Structure Chart of Electronic Commerce System for a sale system of coat tailor processing business

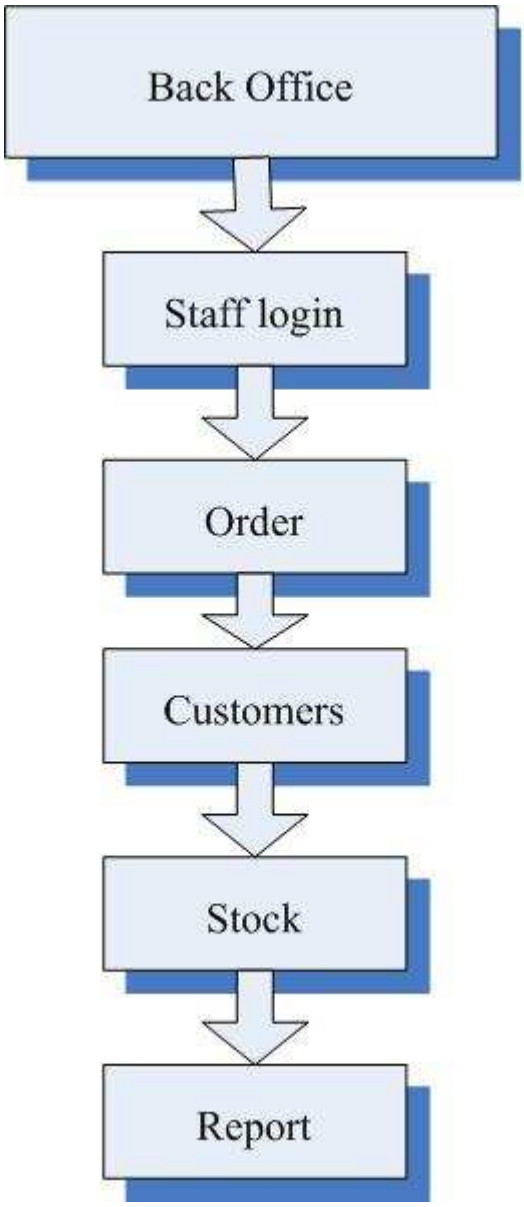


Figure 4.16 Structure Chart of Back office process

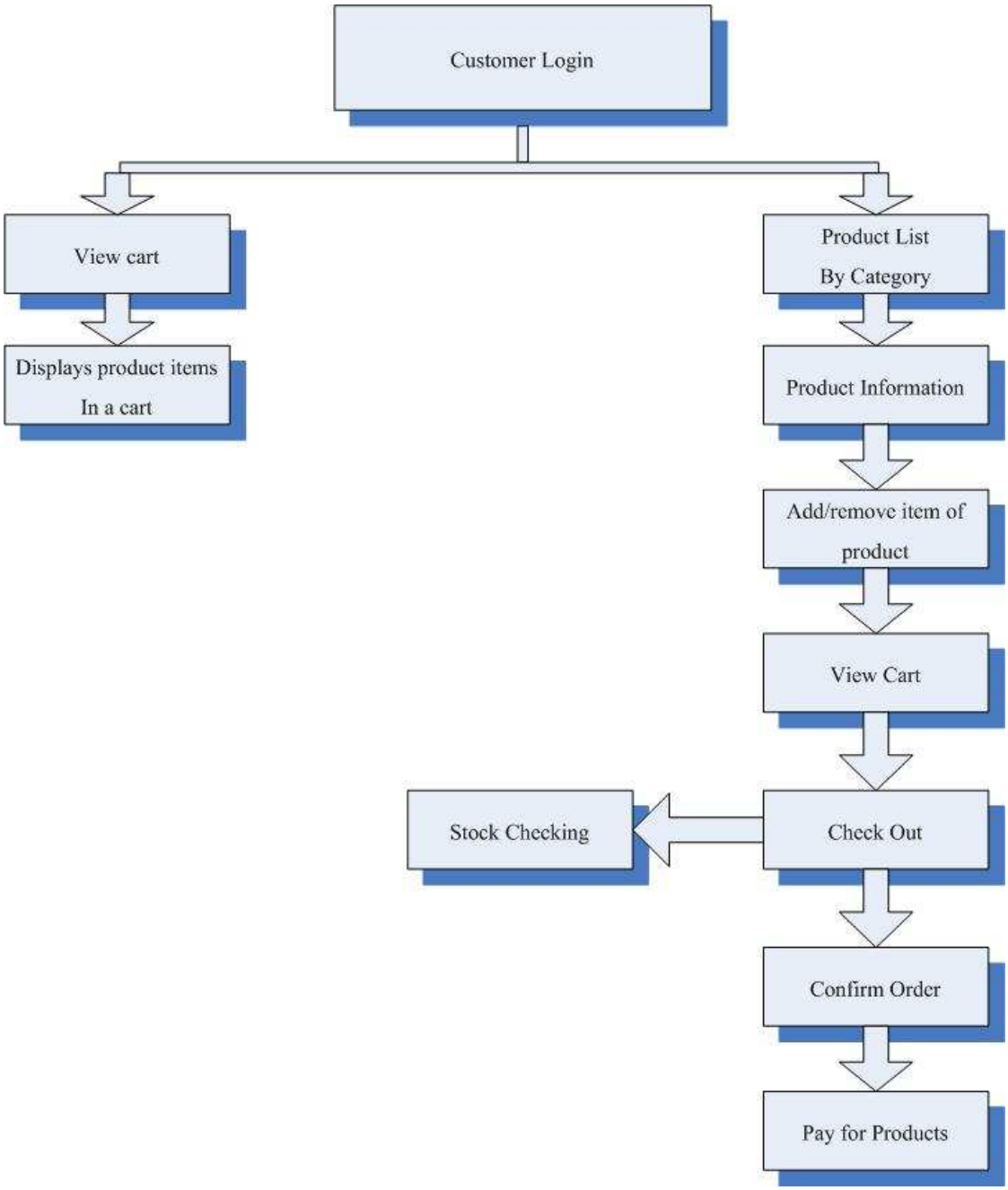


Figure 4.17 Structure Chart of Front office process

4.3.4 Database design

The Entity Relationship Diagram created during the analysis phase is used to represent the design of system. The relational database is produced by using the normalization theory, which prevents the update anomalies and minimizes data

redundancy. The complete data dictionary is show in Table 4.2 Data Dictionary and File Structure.

Table 4.2 Data Dictionary and File Structure

The following tables are shared tables for ordering products. It consists of 16 tables: admin_users, category, category_fabric_inf, color, confirm_payment, creditscard, fabric, fabric_color_inf, item_stock, meas_used, measurements, order, order_item, shop, style and user.

Table Name admin_users						
Table Description The Detail of System Administrator						
No.	**Column Name**	**Description**	**Data Type**	**Scale**	**Key**	**Validation**
1	id	admin user id	int	11	PK	Not Null
2	name	name	Text	-	-	
3	department	admin department	varchar	255		

Table Name category						
Table Description product's category						
No.	**Column Name**	**Description**	**Data Type**	**Scale**	**Key**	**Validation**
1	id	id	int	11	PK	Not Null
2	name	name	varchar	60	-	Not Null
3	price	price	varchar	30	-	Not Null
4	shop_id	group of category id	int	11	-	Not Null

Table Name category_fabric_inf						
Table Description category and fabric data mapping						
No.	**Column Name**	**Description**	**Data Type**	**Scale**	**Key**	**Validation**
1	category_id	category id	int	11	PK,FK	Not Null
2	fabric_id	fabric id	int	11	PK,FK	Not Null

Table Name color						
Table Description contain fabric color detail						
No.	**Column Name**	**Description**	**Data Type**	**Scale**	**Key**	**Validation**
1	s_name	short name	varchar	20	PK	Not Null
2	f_name	full name	varchar	50		Not Null

Table Name confirm_payment						
Table Description store user's confirm payment data (transfering money via bank)						
No.	**Column Name**	**Description**	**Data Type**	**Scale**	**Key**	**Validation**
1	id	id	int	11	PK	Not Null
2	name	customer name	varchar	80		
3	email	customer email	varchar	80		
4	phone	customer phone numberf	varchar	50		
5	paid	total tranfer amount	varchar	60		
6	date	transaction date	varchar	20		
7	time	transaction time	varchar	20		
8	remark	addition information for comfirming	text			
9	order_id	reference order id that pay for	int	11	FK	Not Null

Table Name creditscard						
Table Description payment information by using creditcard method						
No.	**Column Name**	**Description**	**Data Type**	**Scale**	**Key**	**Validation**
1	id	id	int	11	PK	Not Null
2	order_id	order id	int	11	FK	Not Null
3	cardNO	creditcard number	text			
4	cvc	cvc number	text			
5	expMO	expire month	int	11		
6	expYR	expire year	int	11		
7	amount	total money	float			
8	transID	transaction id	text			
9	authID	authentication id	text			

Table Name fabric						
Table Description fabric information						
No.	**Column Name**	**Description**	**Data Type**	**Scale**	**Key**	**Validation**
1	id	id	int	11	PK	Not Null
2	name	name	varchar	100		Not Null
3	category	fabric category	varchar	70		Not Null

Table Name fabric_color_inf

Table Description fabric and color data mapping

No.	Column Name	Description	Data Type	Scale	Key	Validation
1	color_sname	color's short name	varchar	20	PK,FK	Not Null
2	fabric_id	fabric id	int	11	PK,FK	Not Null

Table Name item_stock

Table Description product stocking data

No.	Column Name	Description	Data Type	Scale	Key	Validation
1	style_id	style id	int	11	PK,FK	Not Null
2	fabric_id	fabric id	int	11	PK,FK	Not Null
3	color_sname	color's short name	varchar	20	PK,FK	Not Null
4	amout	amount for this item	int	3		Not Null
5	size	item's size	varchar	3		Not Null

Table Name meas_used

Table Description measurent profile that is using during order process

No.	Column Name	Description	Data Type	Scale	Key	Validation
1	id	id	int	11	PK	Not Null
2	profile_id	measurement profile id	int	11	FK	Not Null
3	meas_item	measurement profile item	int	11		
4	description	description for this mesurment	text			

Table Name meas_used						
Table Description measurent profile that is using during order process						
No.	**Column Name**	**Description**	**Data Type**	**Scale**	**Key**	**Validation**
		profile item				
5	amount	measurement item value	double			

Table Name measurements						
Table Description user's measurenemt profile data						
No.	**Column Name**	**Description**	**Data Type**	**Scale**	**Key**	**Validation**
1	id	id	int	11	PK	Not Null
2	custID	owner of this profile	int	11	FK	Not Null
3	profile	profile name	text			
4	sex	profile's gender	tinyint	4		
8	units	measurement unit	tinyint	4		Not Null
9	meas1	jacket length	double			
10	meas2	upper length	double			
11	meas3	jacket lengthing back	double			
12	meas4	coat length	double			
13	meas5	chest	double			
14	meas6	stomach	double			
15	meas7	waist	double			
16	meas8	hips	double			
17	meas9	fullshoulder	double			
18	meas10	haftshoulder	double			

Table Name measurements						
Table Description user's measurenemt profile data						
No.	**Column Name**	**Description**	**Data Type**	**Scale**	**Key**	**Validation**
19	meas11	sleeveslength	double			
20	meas12	front	double			
21	meas13	back	double			
22	meas14	neck	double			
23	meas15	trousers length	double			
24	meas16	trousers inseam	double			
25	meas17	trousers ucrutch	double			
26	meas18	thighs exact	double			
27	meas19	thighs require	double			
28	meas20	trousers required cuffs	double			
29	meas21	vest length	double			
30	meas22	sleeves cuffs	double			
31	meas23	thighs exact	double			
32	meas24	thighs required	double			
33	meas25	trousers required cuffs	double			
34	meas26	skirt length	double			
35	shoulders	shoulders	text			
36	posture	posture	text			
37	activities	activities	text			
38	EUsize	EUsize	text			
39	height	height	text			
40	weight	weight	text			

Table Name measurements						
Table Description user's measurenemt profile data						
No.	**Column Name**	**Description**	**Data Type**	**Scale**	**Key**	**Validation**
41	ethnicity	ethnicity	text			
42	SizesAre	SizesAre	text			
43	WearTrousers	WearTrousers	text			
44	LikesClothes	LikesClothes	text			
45	instructions	instructions	text			
46	Age	Age	text			Not Null
47	Sleeves	Sleeves	text			Not Null
48	Arm	Arm	text			Not Null
49	FrontChest	FrontChest	text			Not Null
50	Stomach	Stomach	text			Not Null
51	Back	Back	text			Not Null
52	Standing	Standing	text			Not Null
53	Neck	Neck	text			Not Null
54	NeckHeight	NeckHeight	text			Not Null
55	Leg	Leg	text			Not Null
56	Thigh	Thigh	text			Not Null
57	Seat	Seat	text			Not Null
58	Waist	Waist	text			Not Null
59	Creat_date	profile creation date	date			Not Null
60	Update_date	profile last update date	date			Not Null
61	cal_size	standard size for this profile	varchar	20		Not Null

Table Name order						
Table Description user's order data						
No.	**Column Name**	**Description**	**Data Type**	**Scale**	**Key**	**Validation**
1	id	id	int	11	PK	Not Null
2	status	order status	varchar	80	FK	Not Null
3	user_id	reference to user id	int	11		Not Null
4	payby	payment method	varchar	30		
5	totCharge	total charge	float			Not Null
6	paid	total user cash	float			
7	tracking	tracking number for sending item	varchar	30		Not Null
8	enable	show item to order list or not	int			
9	date	order date	date			Not Null

Table Name order_item						
Table Description item that is hold by order						
No.	**Column Name**	**Description**	**Data Type**	**Scale**	**Key**	**Validation**
1	id	id	int	11	PK	Not Null
2	style_id	style id	int	11	FK	Not Null
3	fabric_id	fabric id	int	11	FK	Not Null
4	color_sname	color short name	varchar	20	FK	Not Null
5	meas_id	measurement profile id	int	11	FK	Not Null
6	order_id	order id	int	11	FK	Not Null
7	amount	amount of this item	int	3		Not Null

Table Name order_item						
Table Description item that is hold by order						
No.	**Column Name**	**Description**	**Data Type**	**Scale**	**Key**	**Validation**
8	isStdSize	Is item is use standard size ?	varchar	1		

Table Name shop						
Table Description root type of product						
No.	**Column Name**	**Description**	**Data Type**	**Scale**	**Key**	**Validation**
1	id	id	int	11	PK	Not Null
2	name	shop name	varchar	60		Not Null

Table Name user						
Table Description store registered user						
No.	**Column Name**	**Description**	**Data Type**	**Scale**	**Key**	**Validation**
1	id	id	int	11	PK	Not Null
2	name	name	varchar	50		
3	detail	detion	varchar	255		Not Null
4	price	price(usually specify in category)	varchar	30		
5	enable	show or hide this style to web page	tinyint	1		Not Null
6	category_id	category id	int	11	FK	Not Null

Table Name user						
Table Description store registered user						
No.	**Column Name**	**Description**	**Data Type**	**Scale**	**Key**	**Validation**
1	id	id	int	11	PK	Not Null
2	user_name	user name (email address)	varchar	50		Not Null
3	user_pass	password	varchar	20		Not Null
4	fname	first name	varchar	50		Not Null
5	lname	last name	varchar	50		Not Null
6	address	user address	varchar	100		Not Null
7	billing_address	billing adress	varchar	100		Not Null
8	email	email address	varchar	80		Not Null
9	sub_email	alternate email address	varchar	80		
10	tel	telephone number	varchar	30		Not Null
11	register_date	registration date	varchar	30		Not Null

4.3.5 Interface design

Interface design, involves designing input and output screens that communicate with the user. It demands an understanding of the human factor and interface technology.

The interface design influences the effectiveness of the user of the system, as well as the frequency of mistakes and errors when entering data or instruction. Input and output screens of the Electronic Commerce System for a sale system of coat tailor processing business are accessed via menu selection. All of the Electronic Commerce System for a sale system of coat tailor processing business screens is shown in figure 4.18 - 4.59.

4.3.5.1 Front Office Interface Design

Figure 4.18 Main Web Application for Front Office Screen

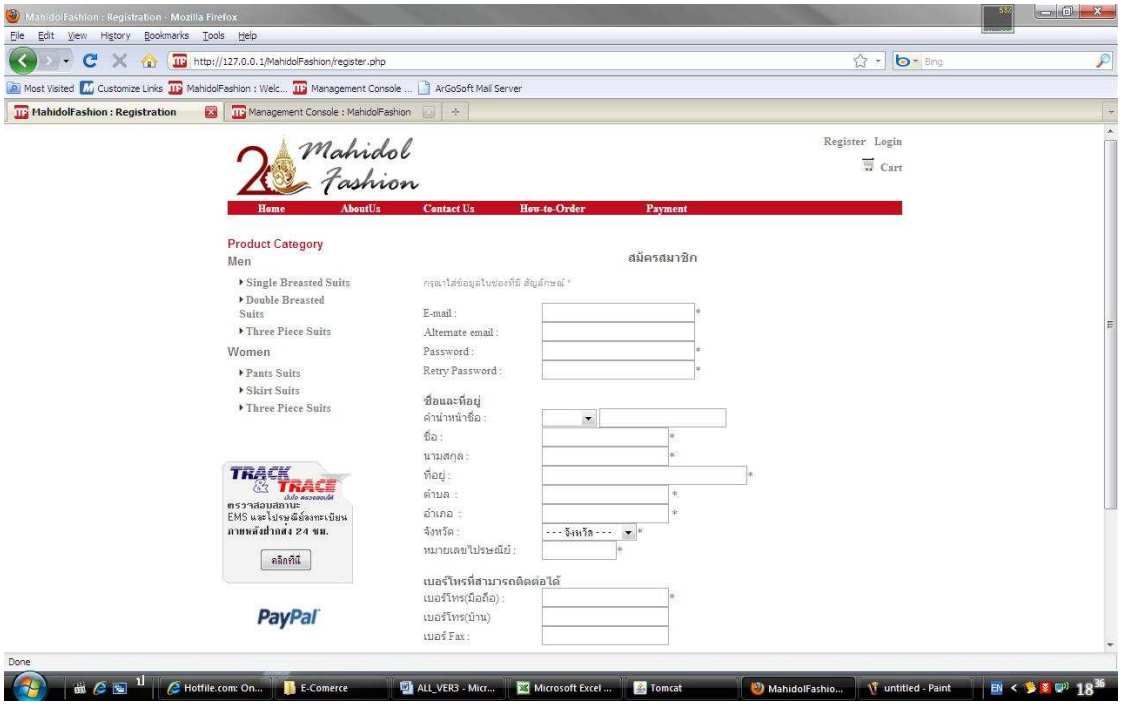


Figure 4.19 Customer Register Screen

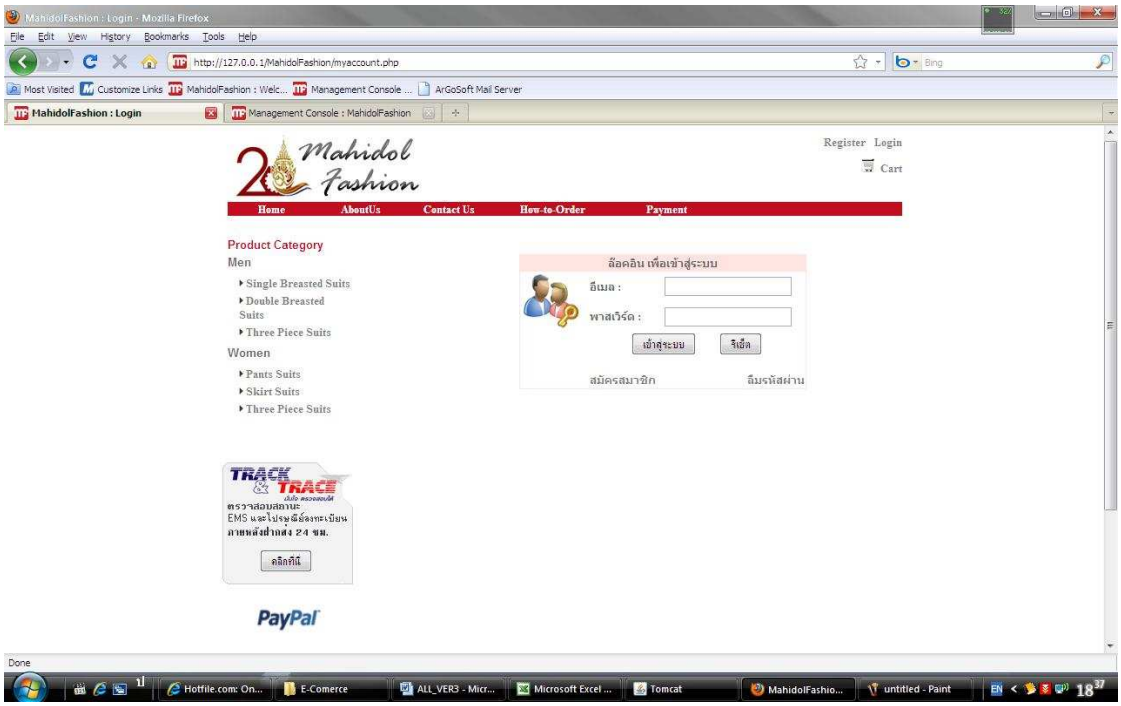


Figure 4.20 Customer Login Screen

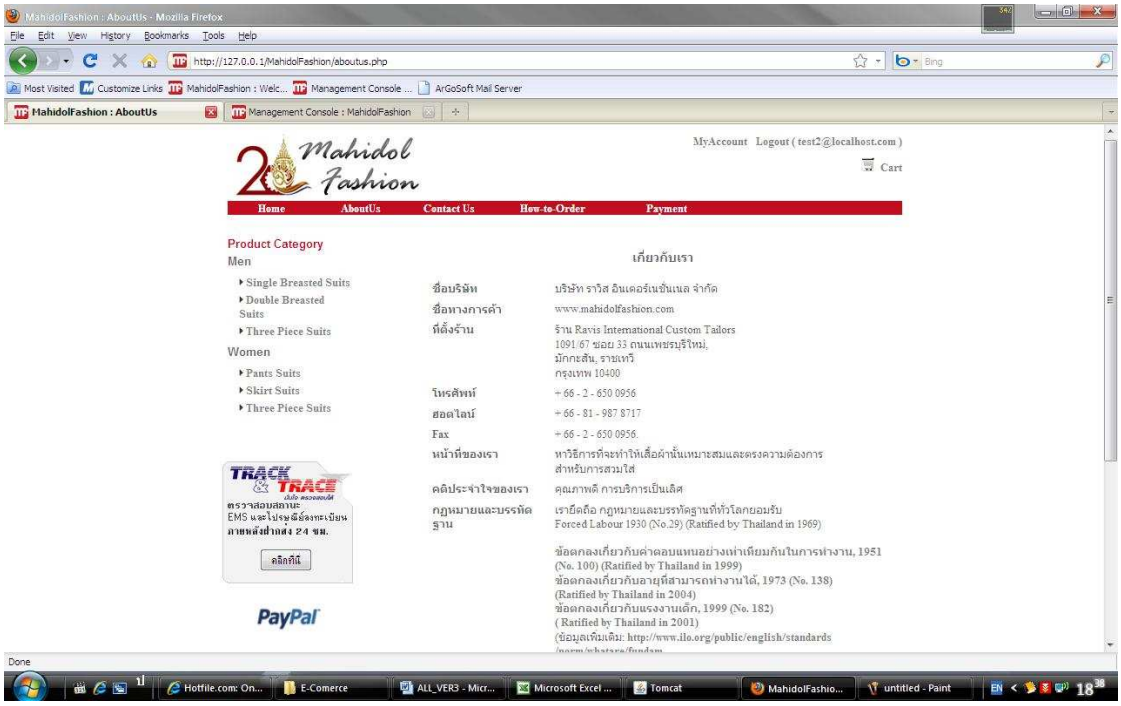


Figure 4.21 About Company Information Screen

Figure 4.22 Contract Company Information Screen

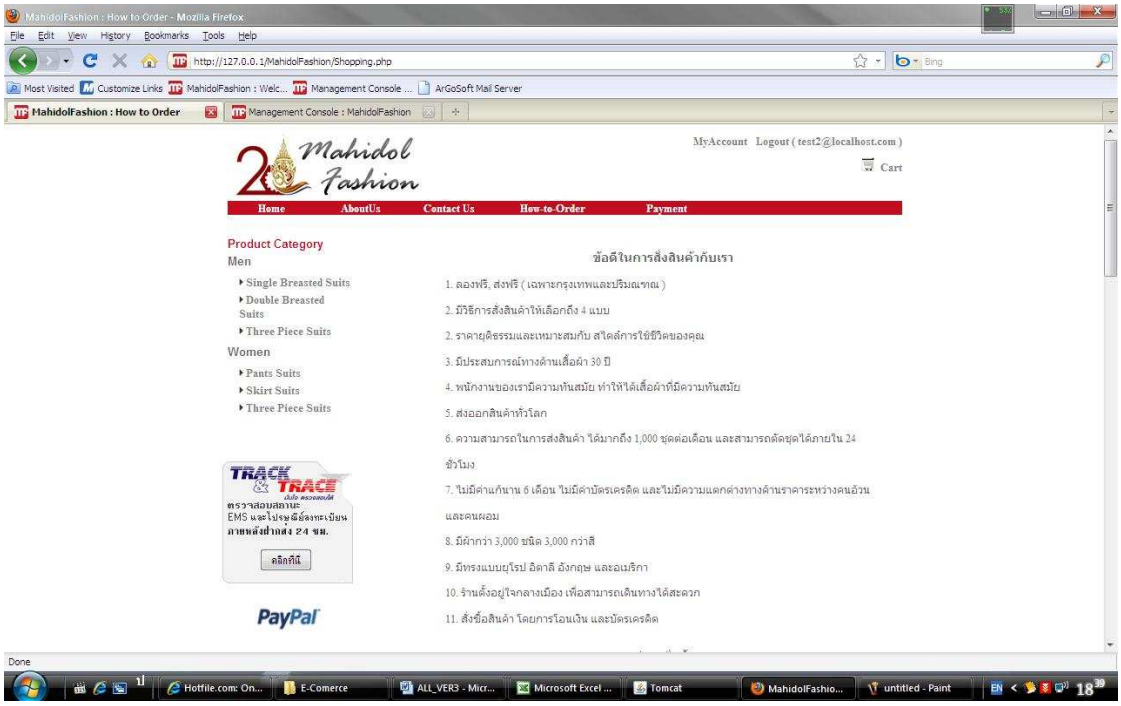


Figure 4.23 Description of Order Method Screen

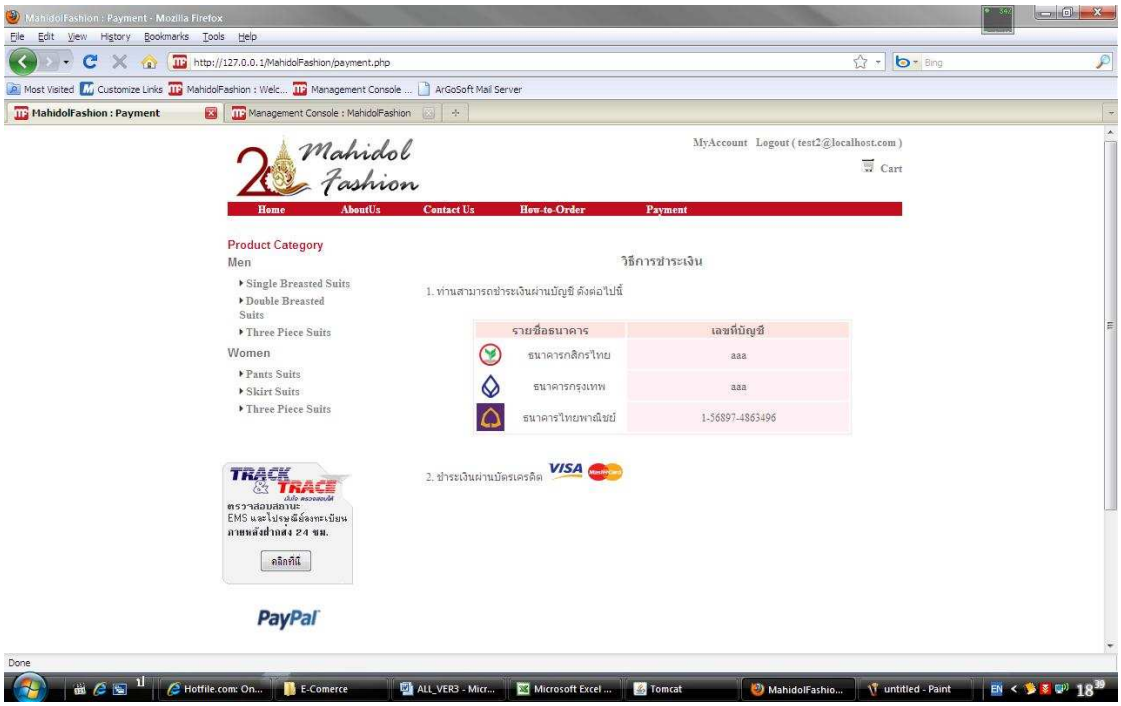


Figure 4.24 Description of Payment Method Screen

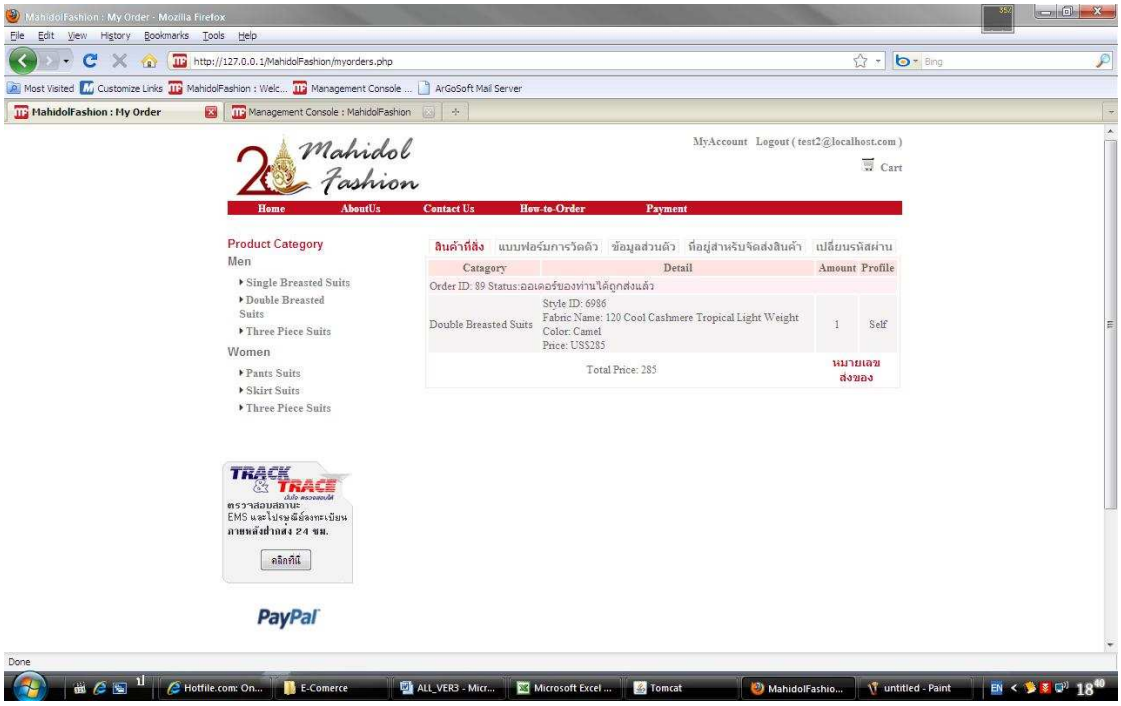


Figure 4.25 Purchase Order Display Screen

Figure 4.26 Customer Size Form Screen

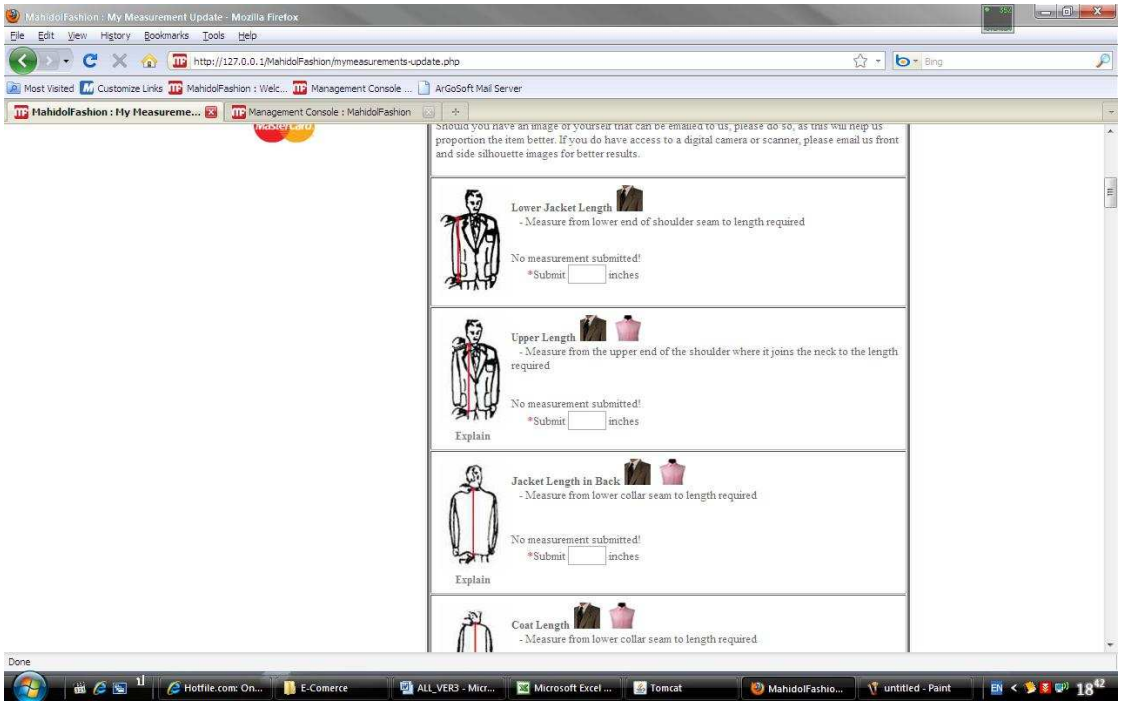


Figure 4.27 Customer Fill in a Size Form Screen

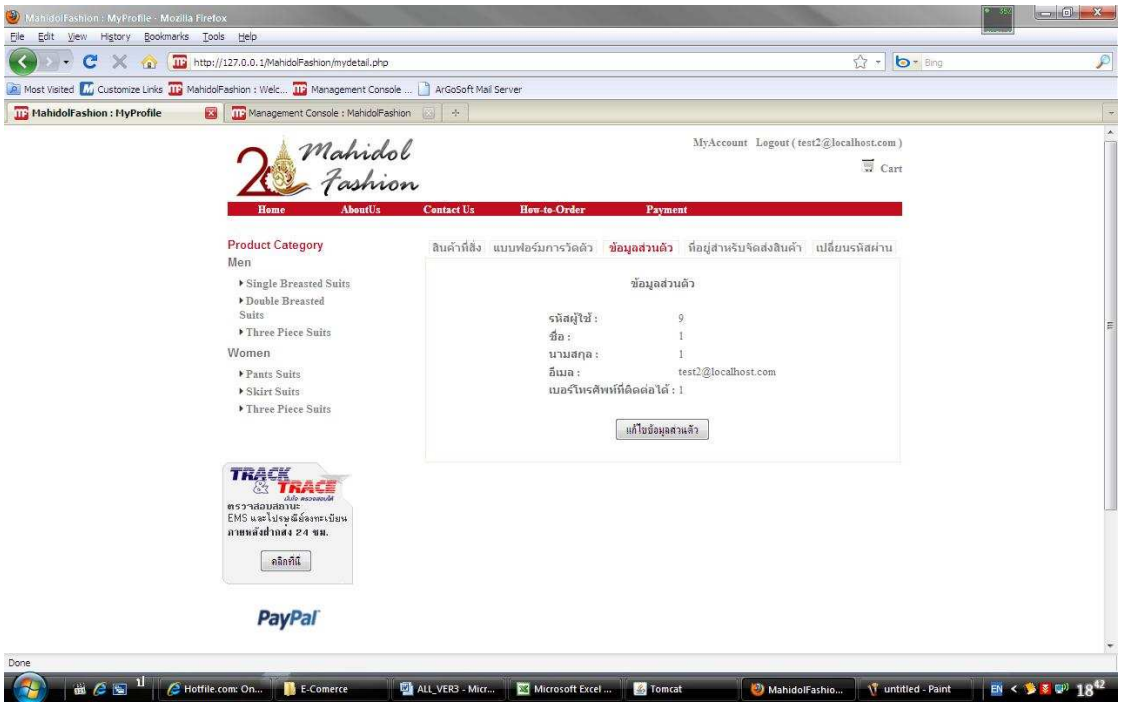


Figure 4.28 Customer Profile Screen

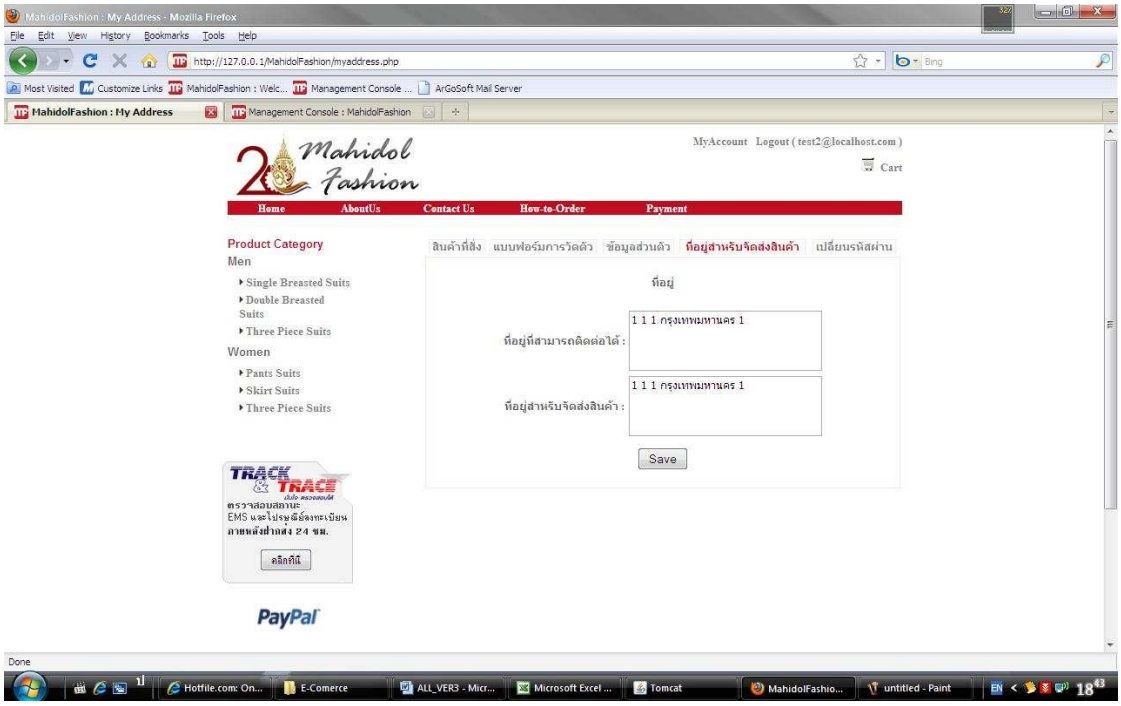


Figure 4.29 Customer Address Screen

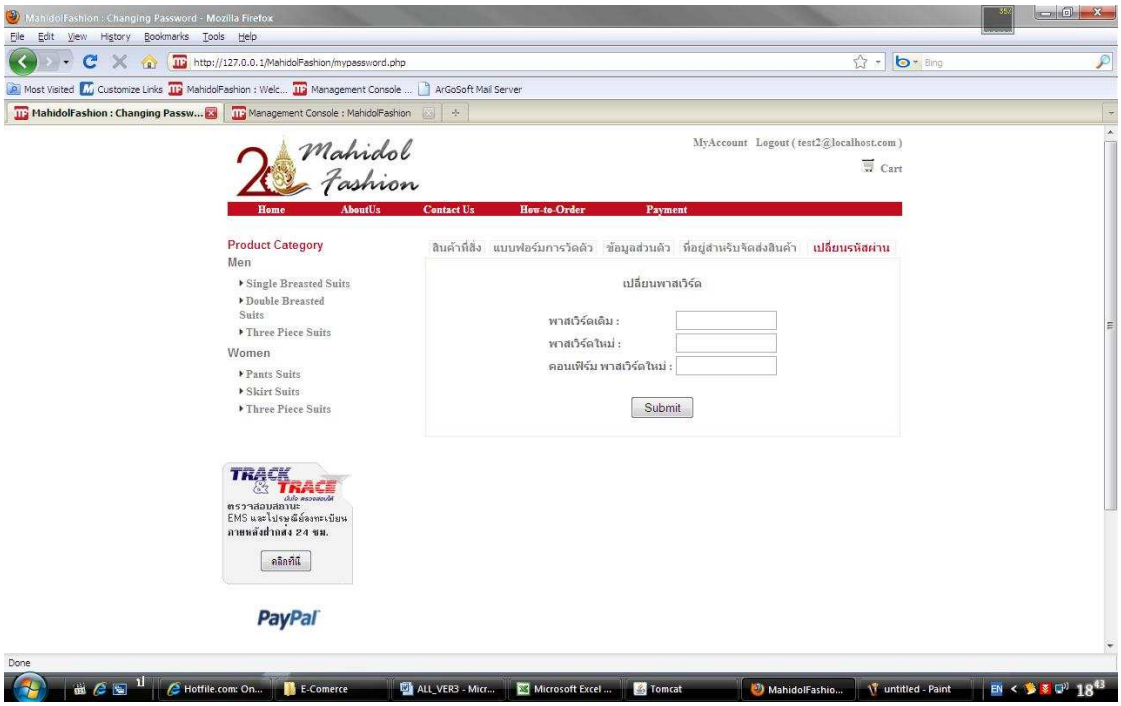


Figure 4.30 Customer Change Password Screen

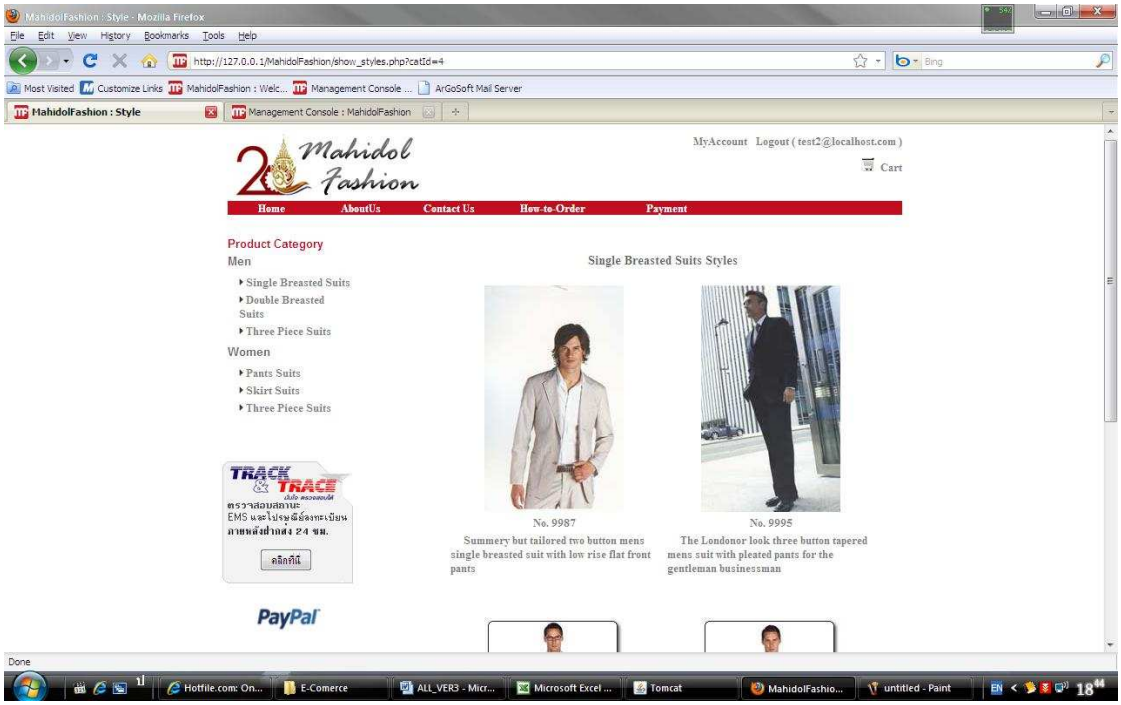


Figure 4.31 Product Category Selection Screen

Figure 4.32 Product Fabrics and Colors Selection Screen

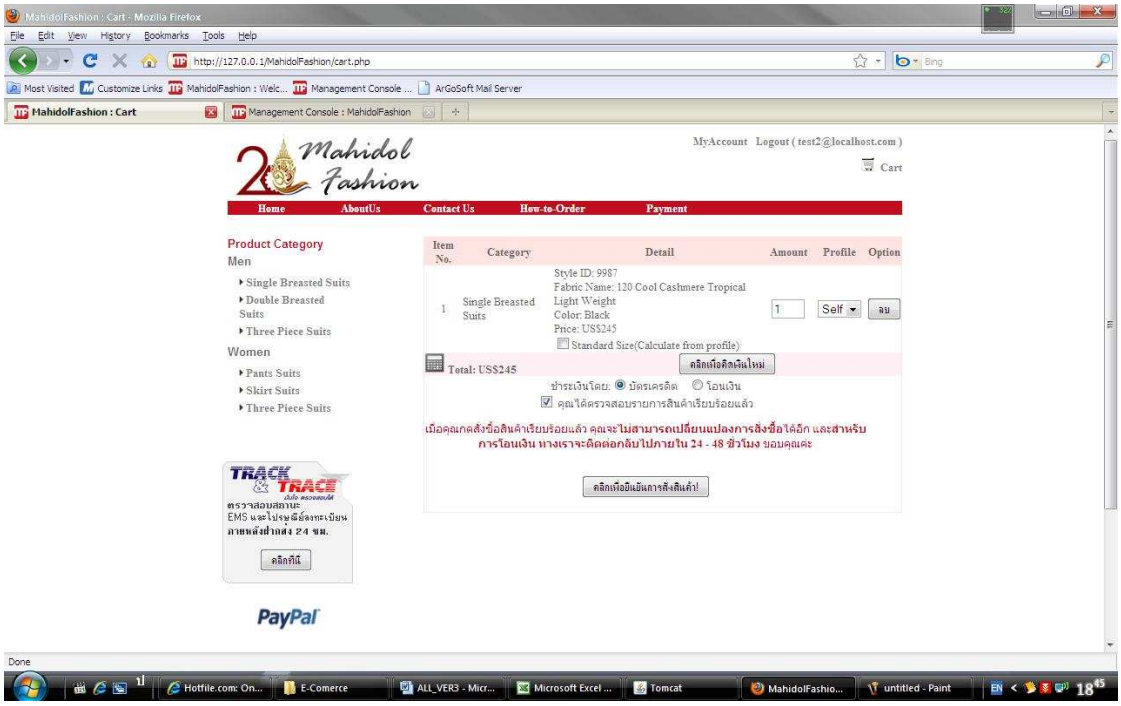


Figure 4.33 Purchase Order Detail and Confirm Screen

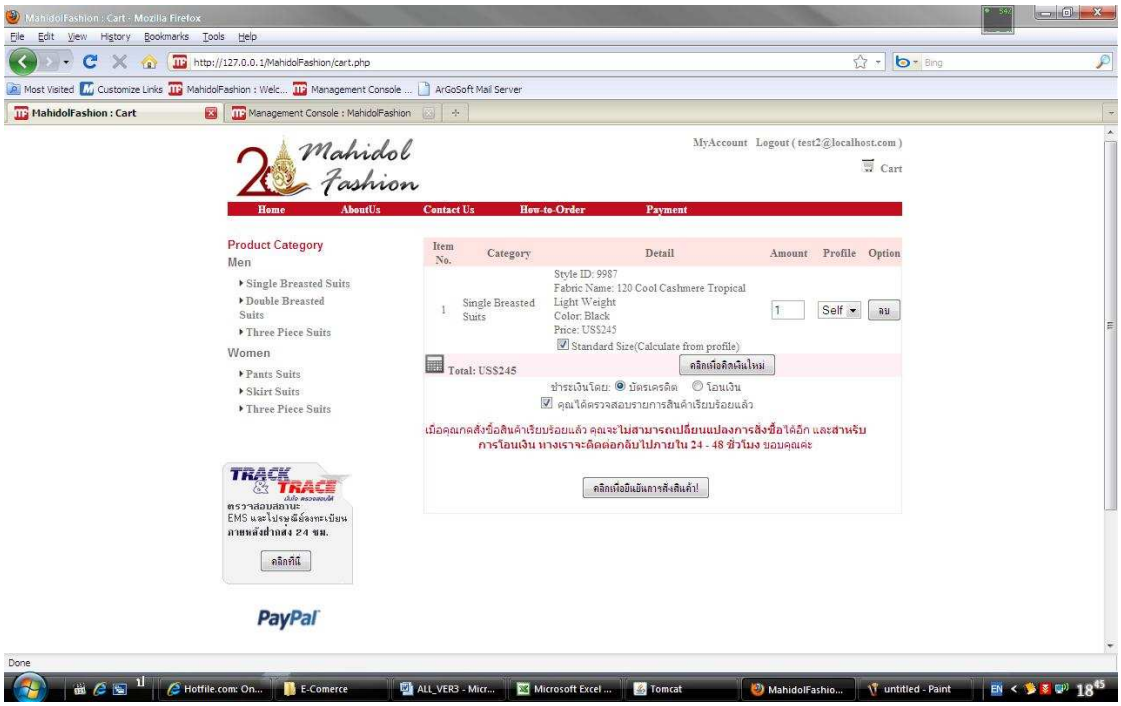


Figure 4.34 Purchase Order Detail and Confirm for Readymade Product Screen

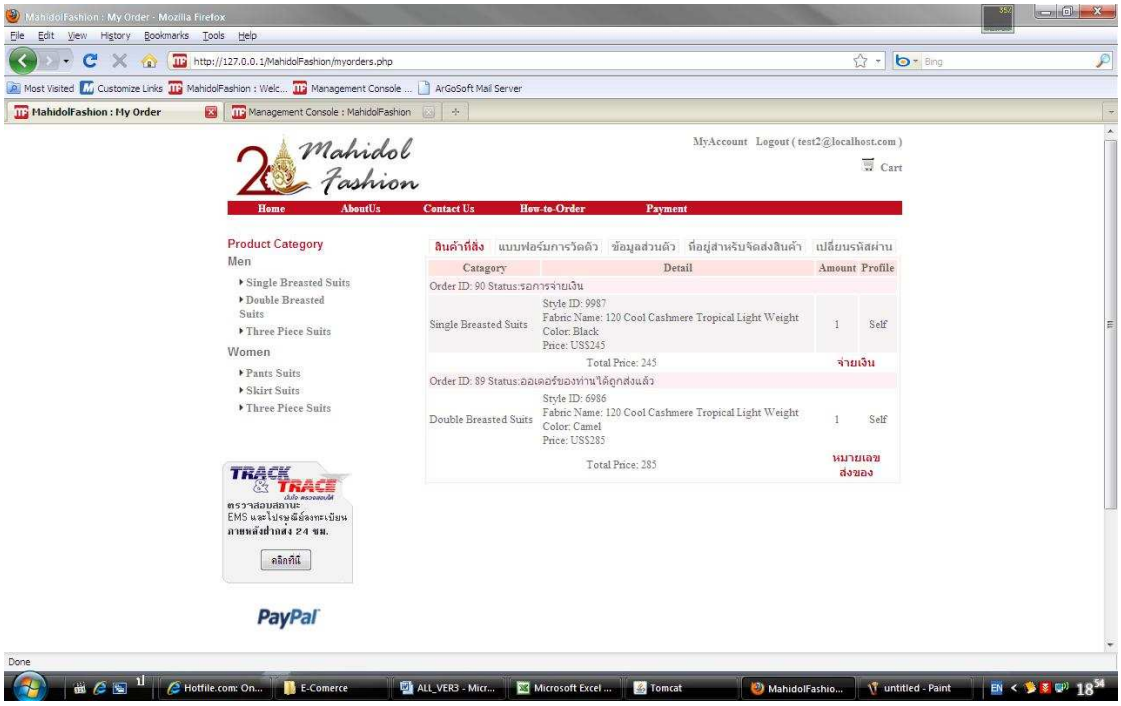


Figure 4.35 Payment Button for Credit Card Screen

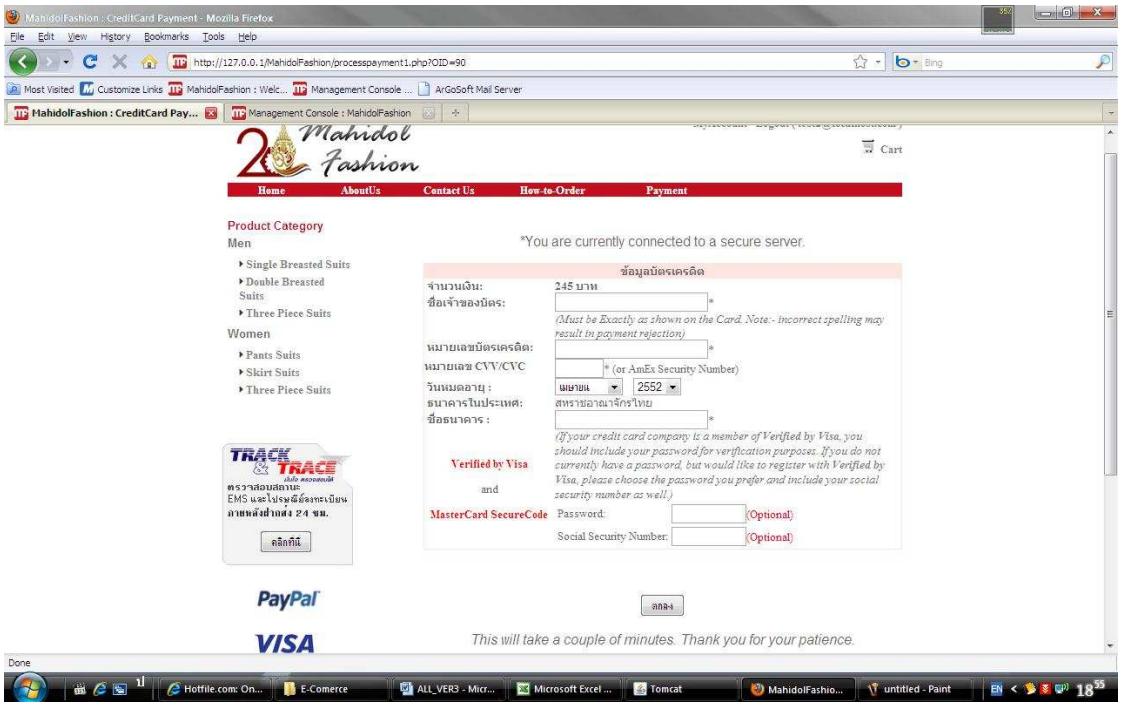


Figure 4.36 Payment Page for Credit Card Screen

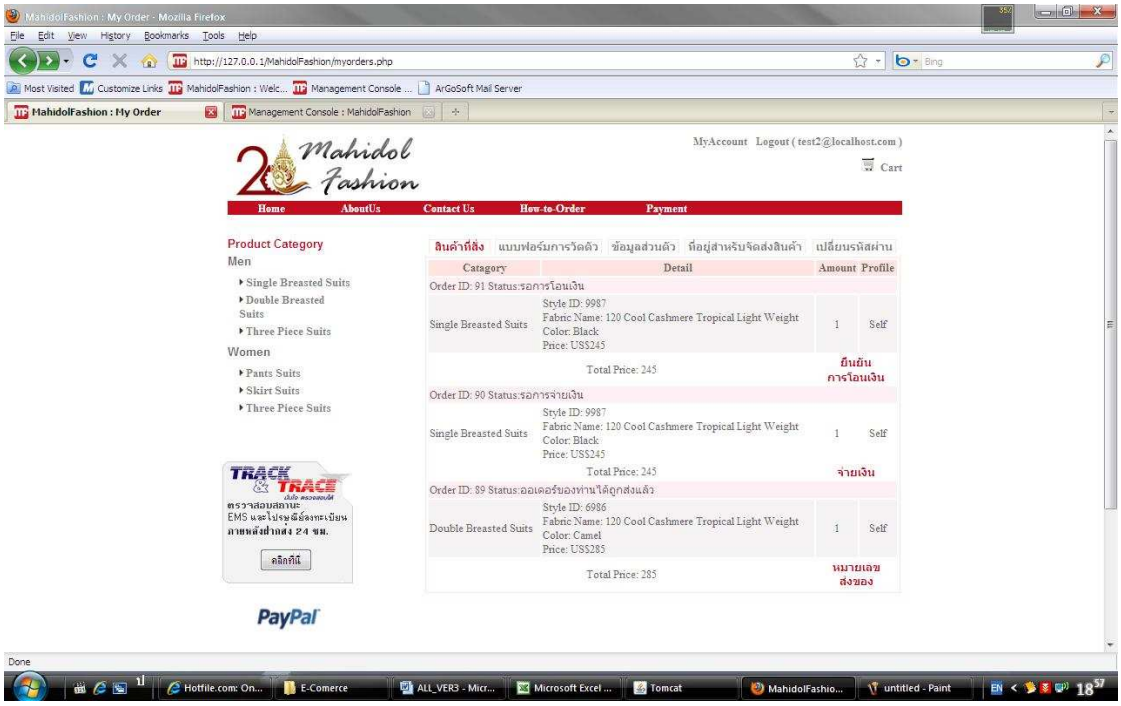


Figure 4.37 Cash Transfer Confirm Button Screen

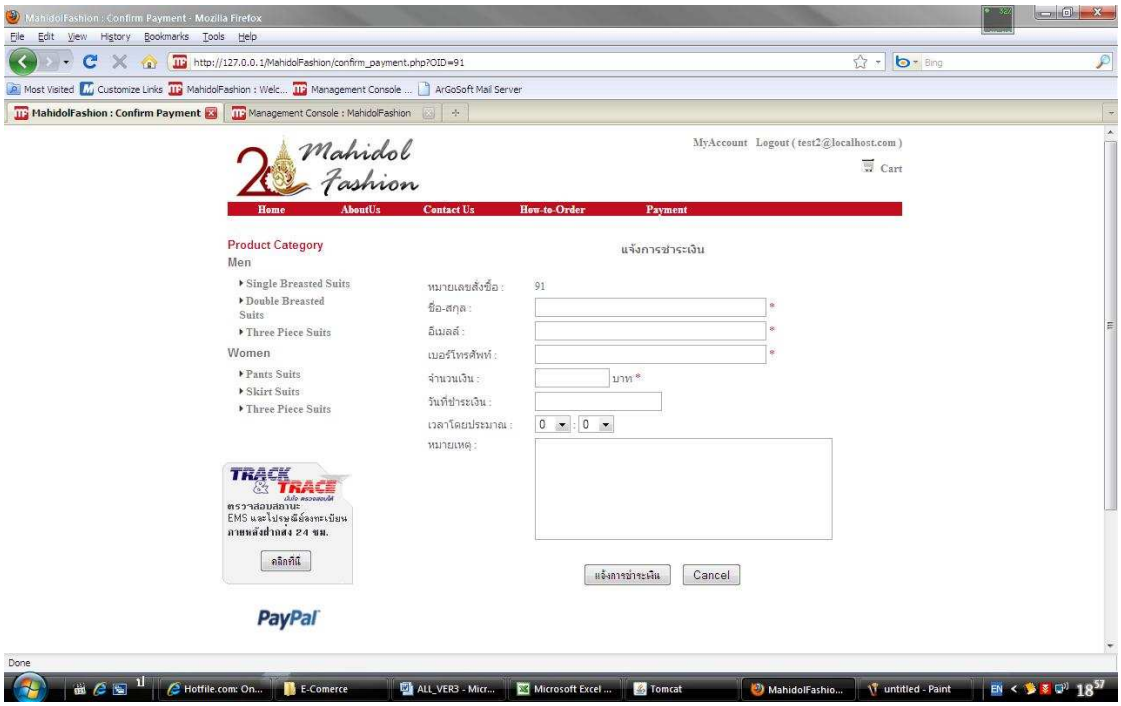


Figure 4.38 Cash Transfer Confirm Page Screen

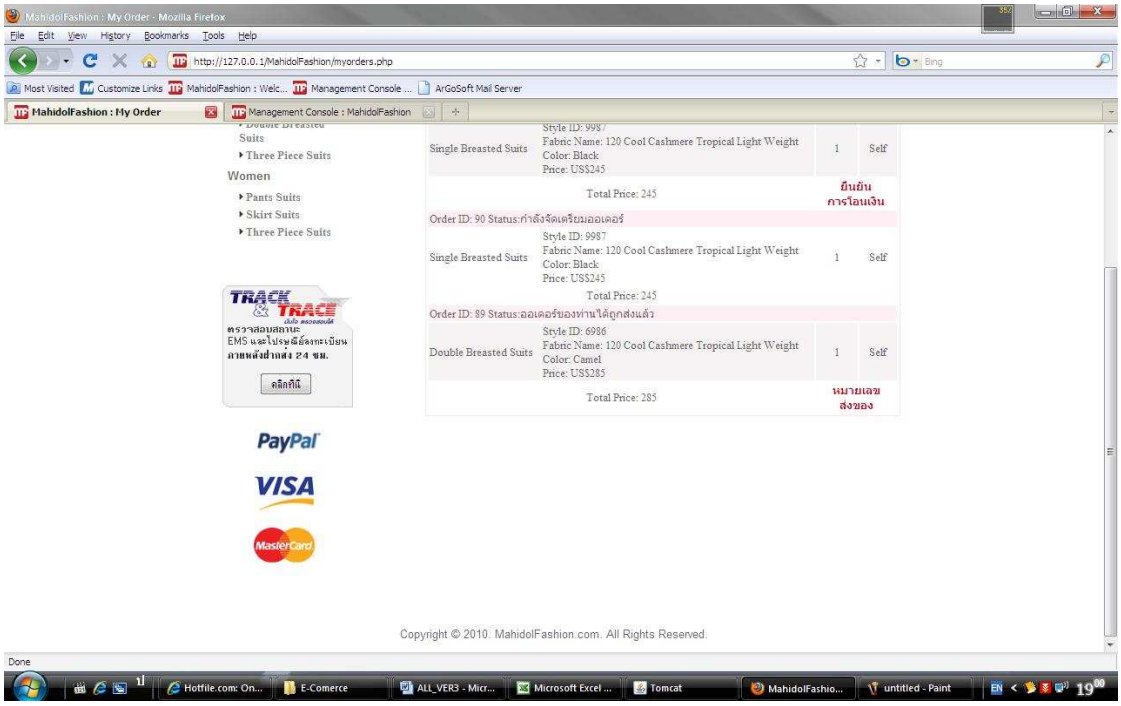


Figure 4.39 Product Sending Status Display Screen

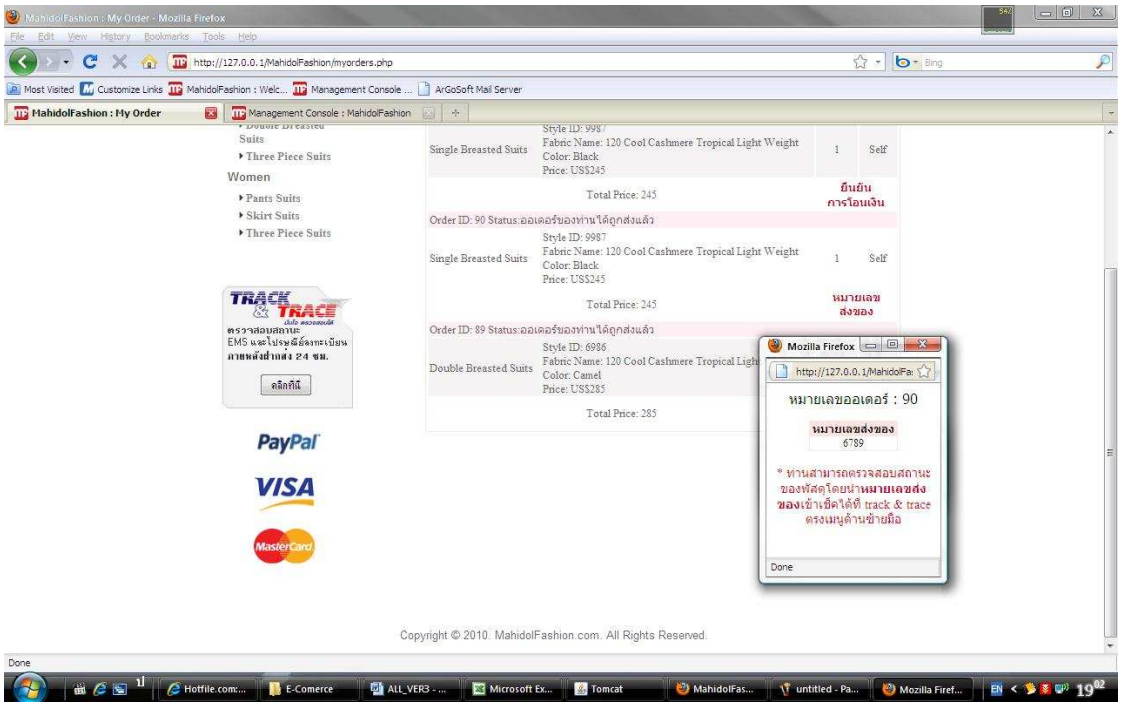


Figure 4.40 Product Send Complete Status Screen

4.3.5.2 Back Office Interface Design

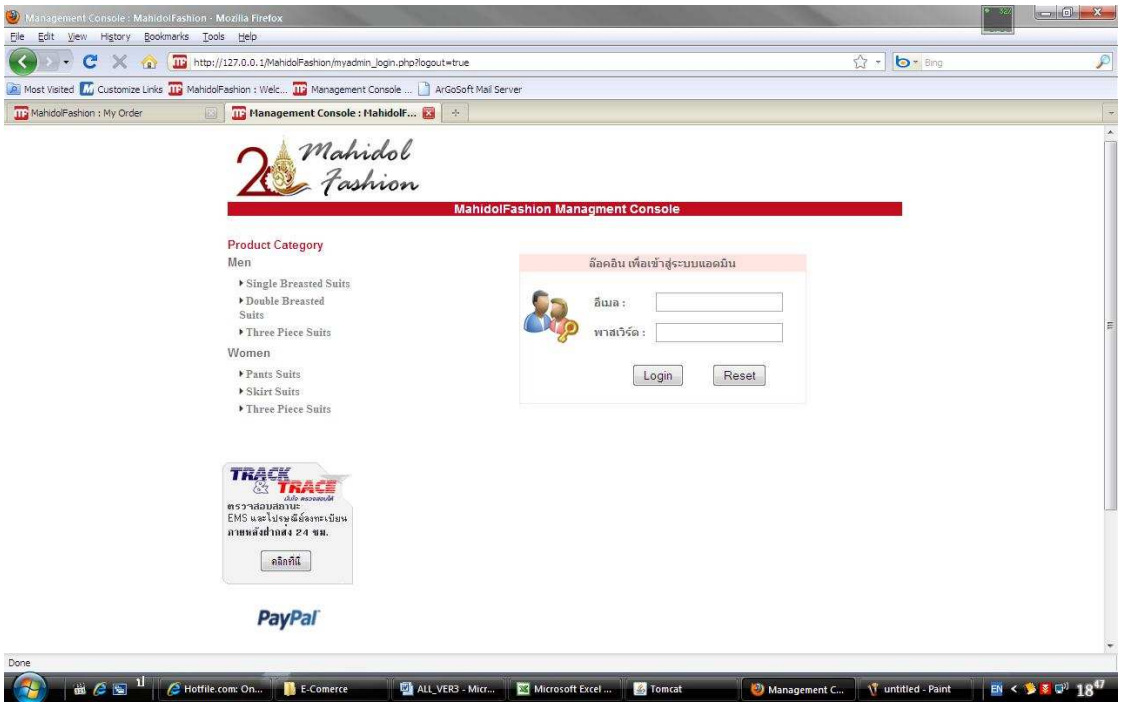


Figure 4.41 Main Web Application and Administrator Login for Back Office Screen

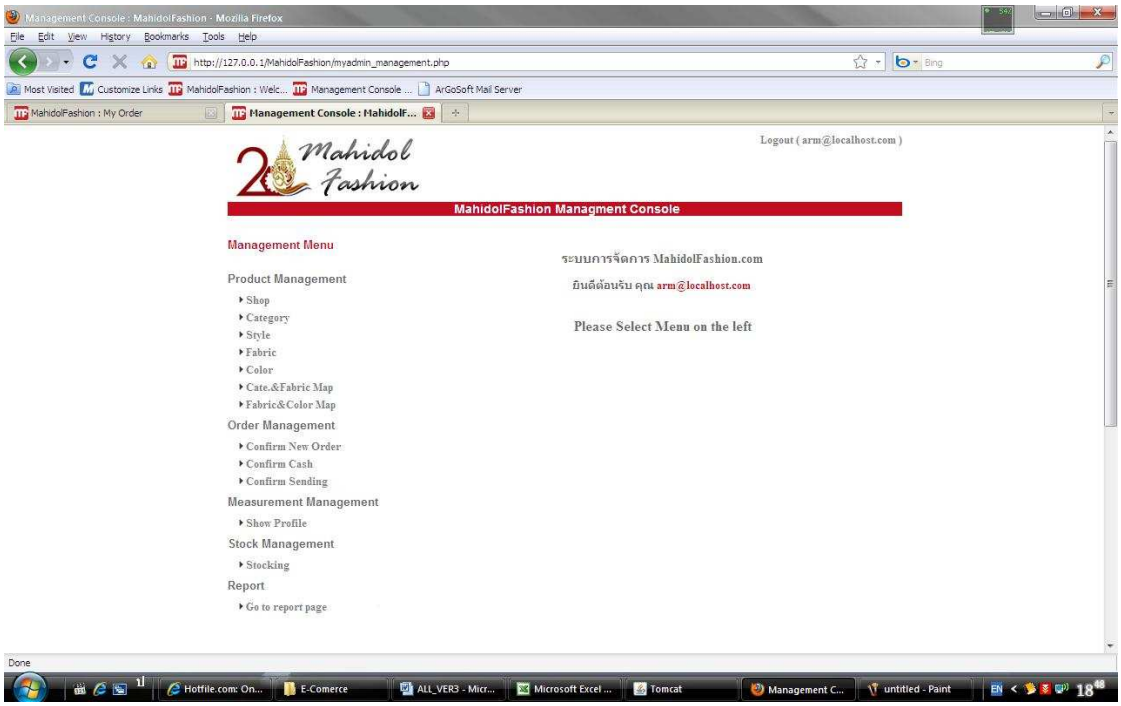


Figure 4.42 Show All Menu After Administrator Login Screen

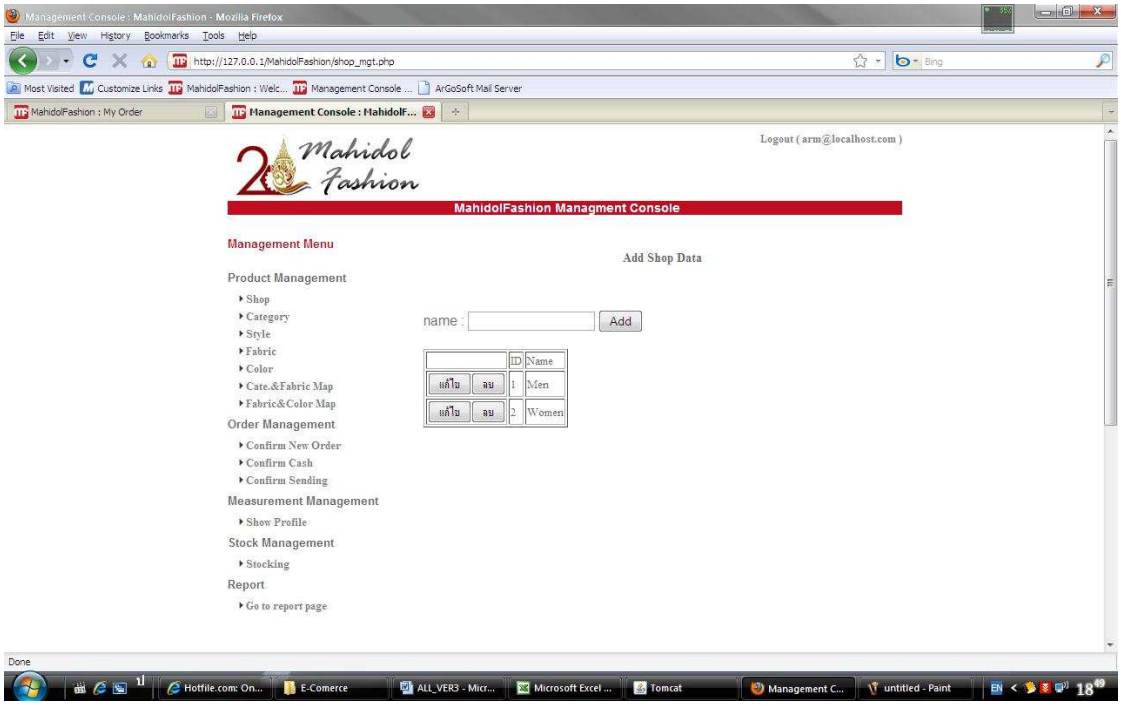


Figure 4.43 Add/Delete and Edit Shop Data Screen

Figure 4.44 Add/Delete and Edit Category Data Screen

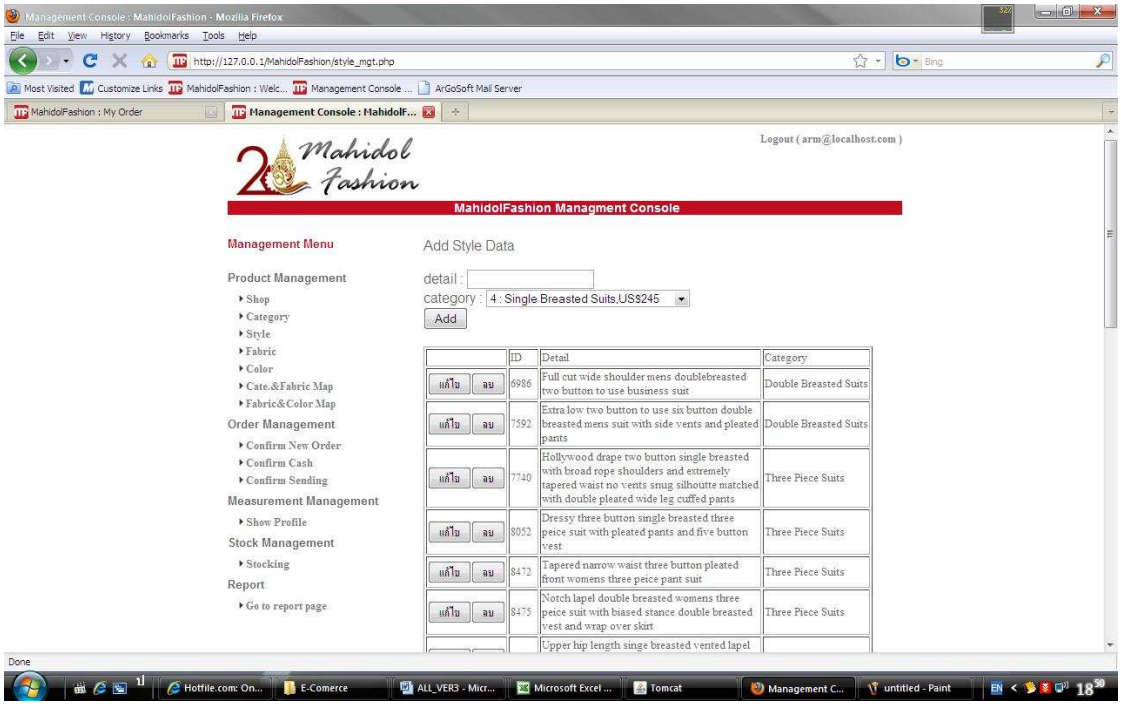


Figure 4.45 Add/Delete and Edit Style Data Screen

Figure 4.46 Add/Delete and Edit Fabric Data Screen

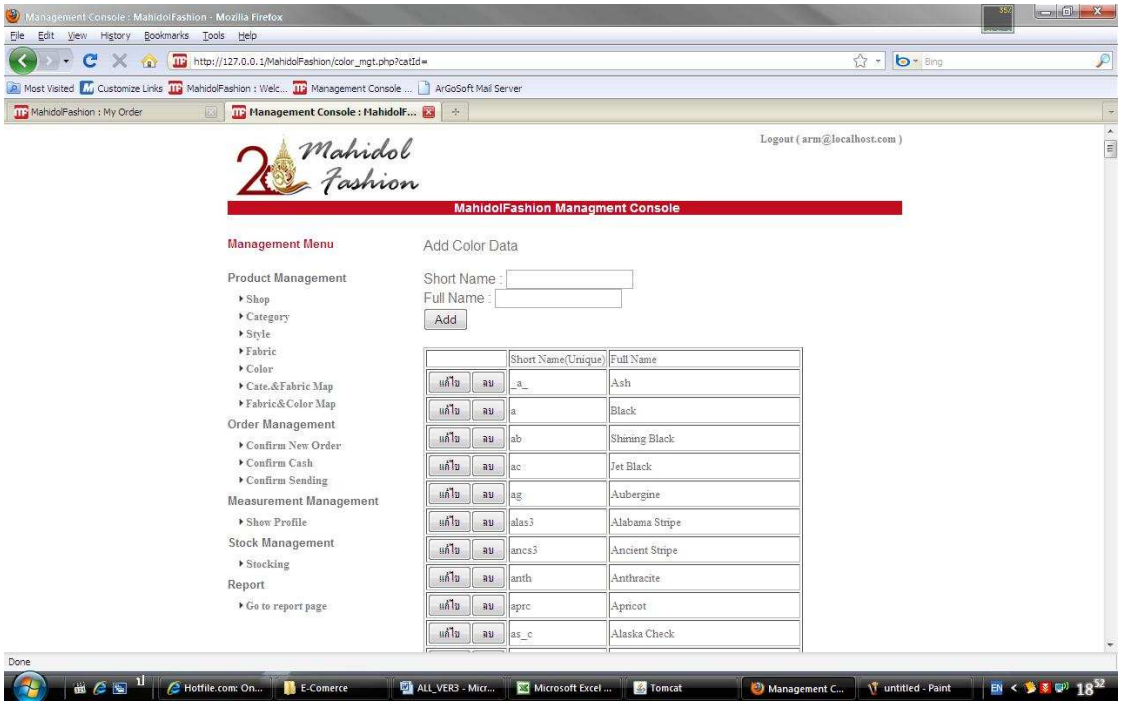


Figure 4.47 Add/Delete and Edit Color Data Screen

Figure 4.48 Add/Delete and Edit Cate.&Fabric Map Screen

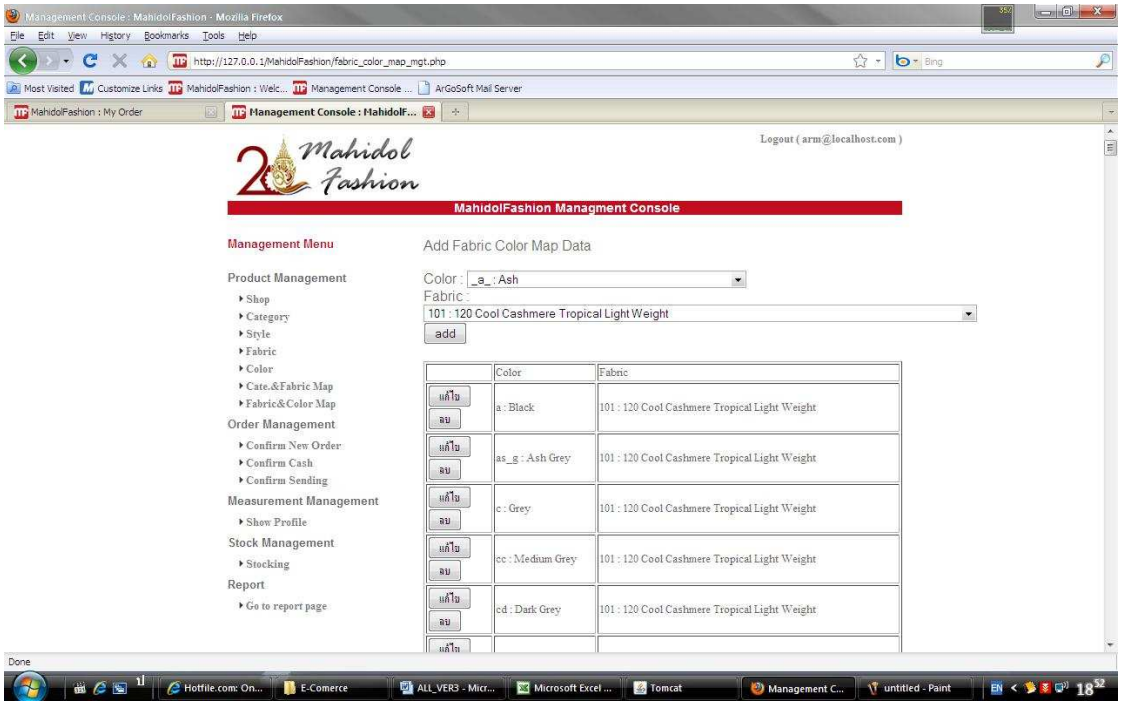


Figure 4.49 Add/Delete and Edit Fabric&Color Map Screen

Figure 4.50 Confirm New Order Screen

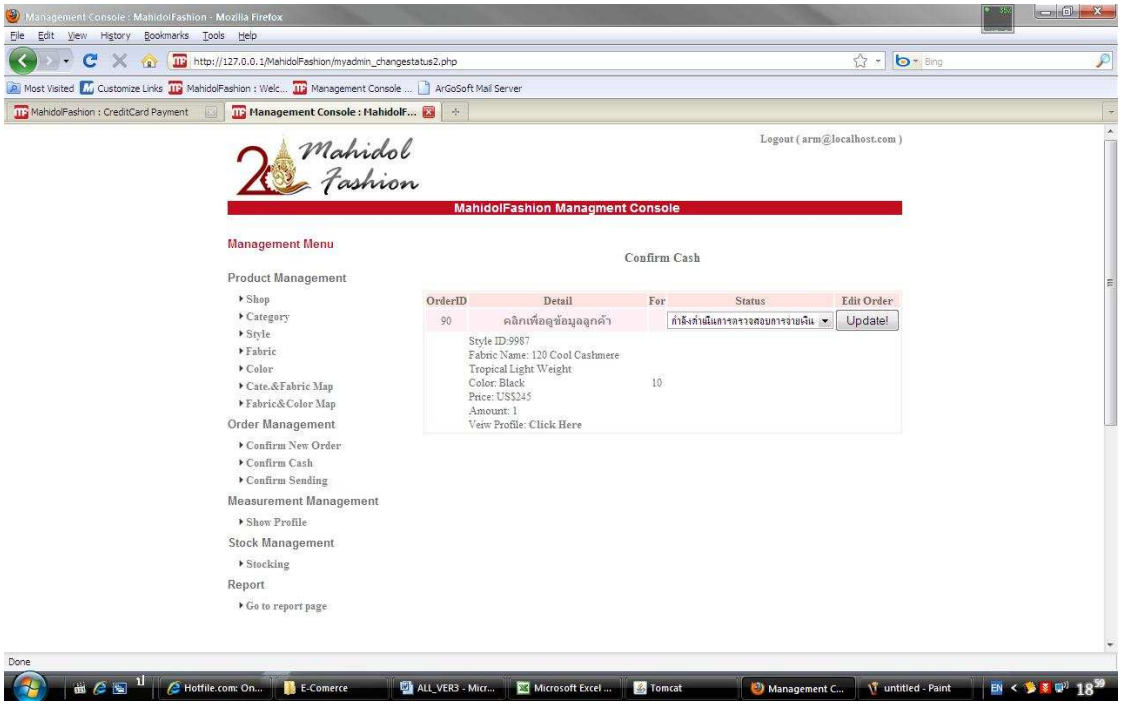


Figure 4.51 Confirm Cash Screen

Figure 4.52 Confirm Sending Screen

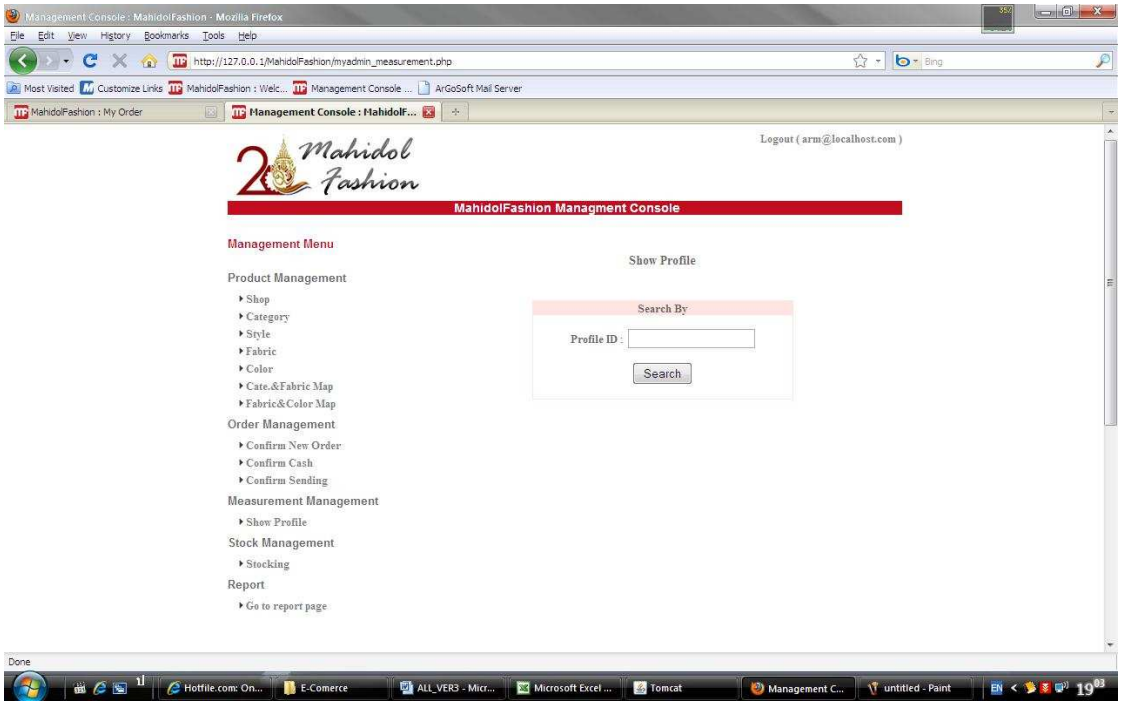


Figure 4.53 Customer Profile Search Screen

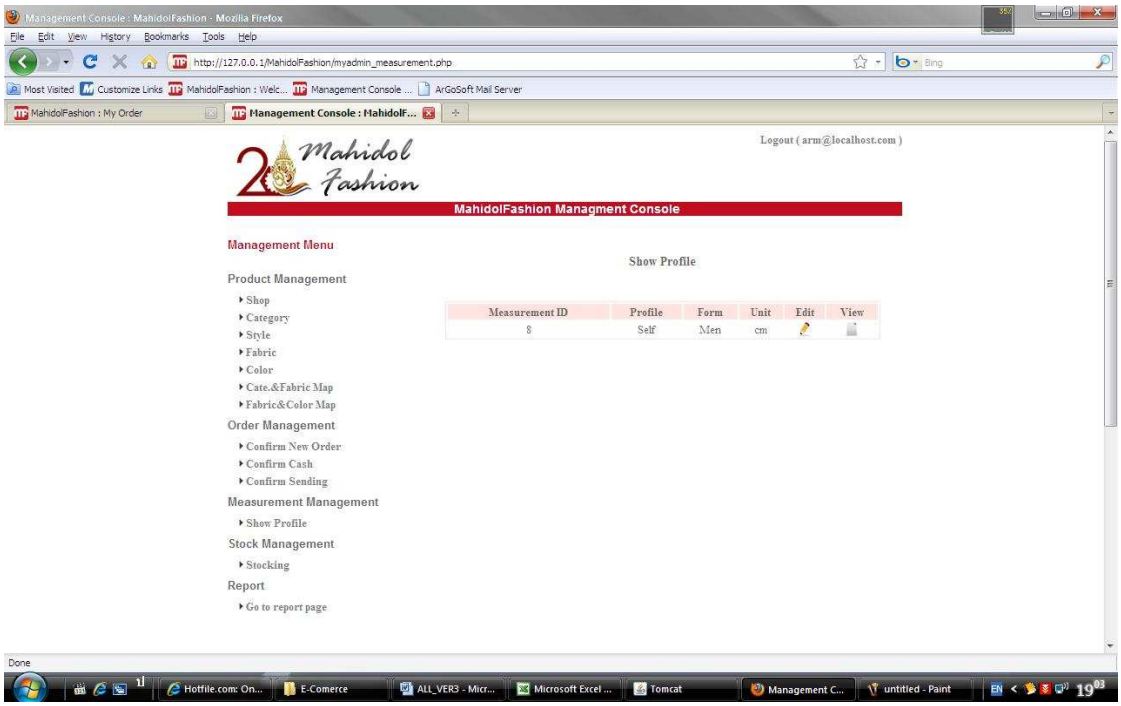


Figure 4.54 Customer Profile Edit and View Button Screen

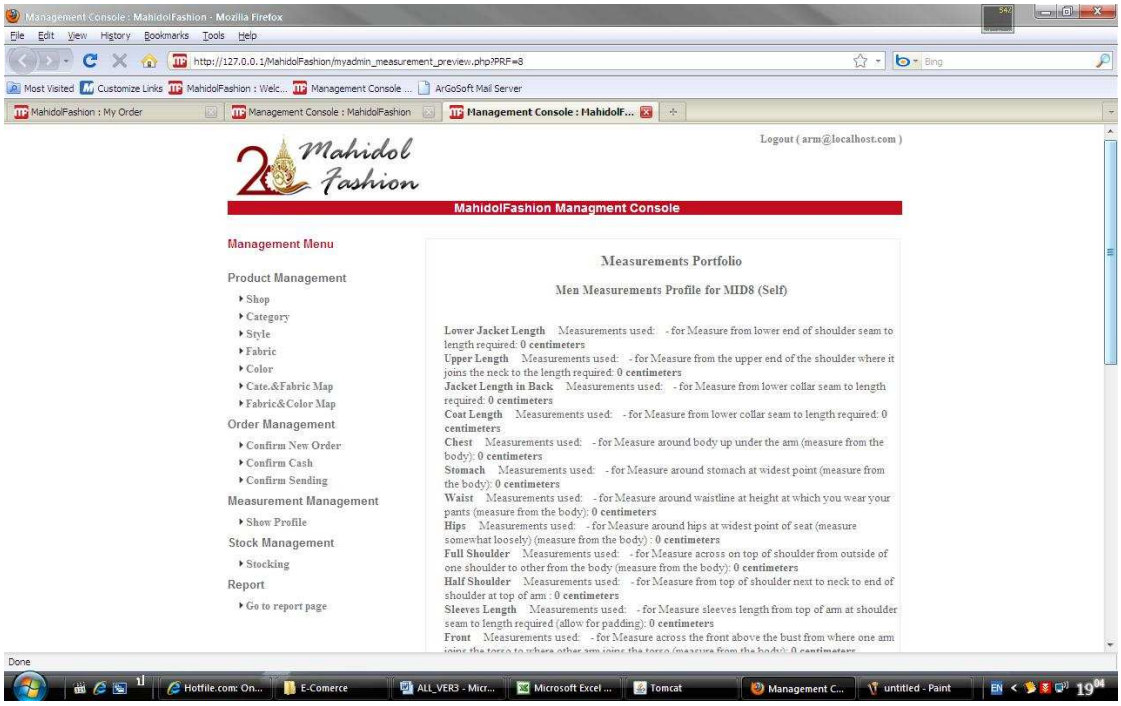


Figure 4.55 Customer Profile Preview Screen

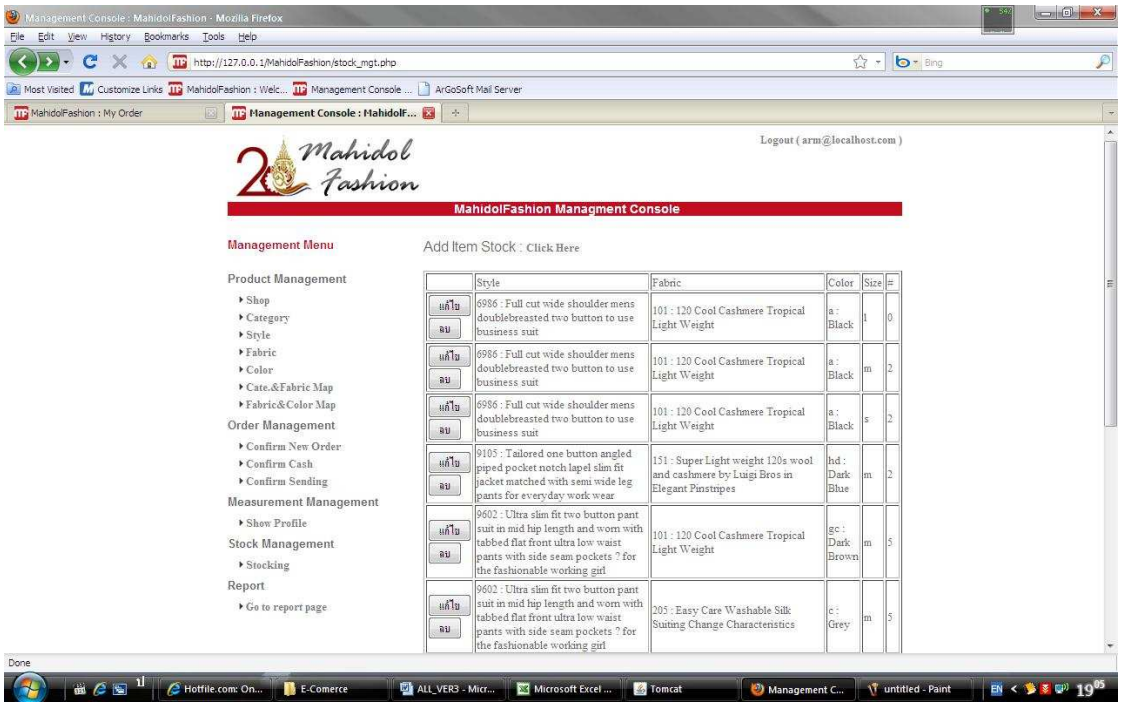


Figure 4.56 Stock Management Screen

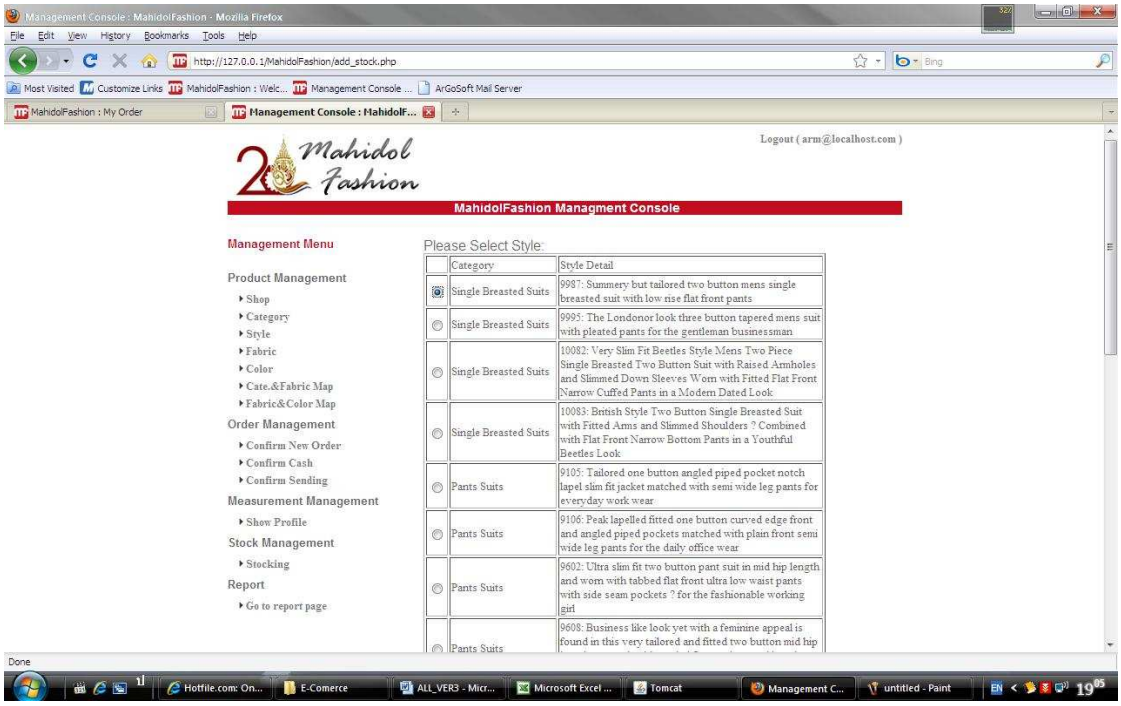


Figure 4.57 Selection Product Style to Stock Screen

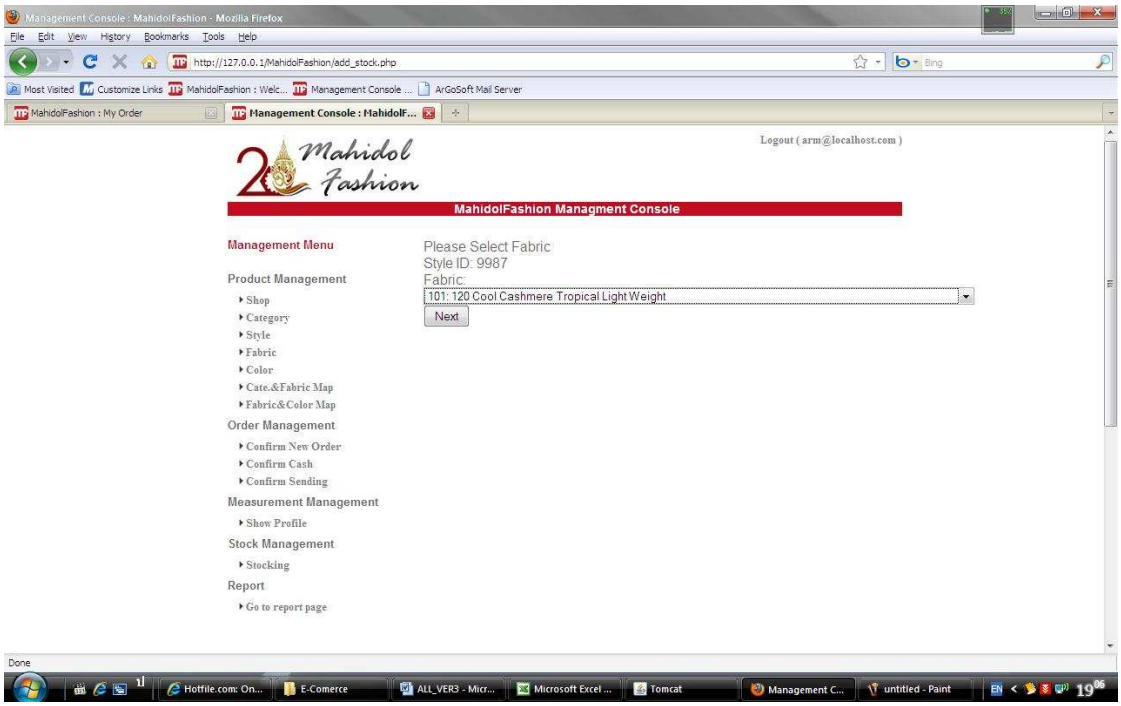


Figure 4.58 Selection Product Fabrics to Stock Screen

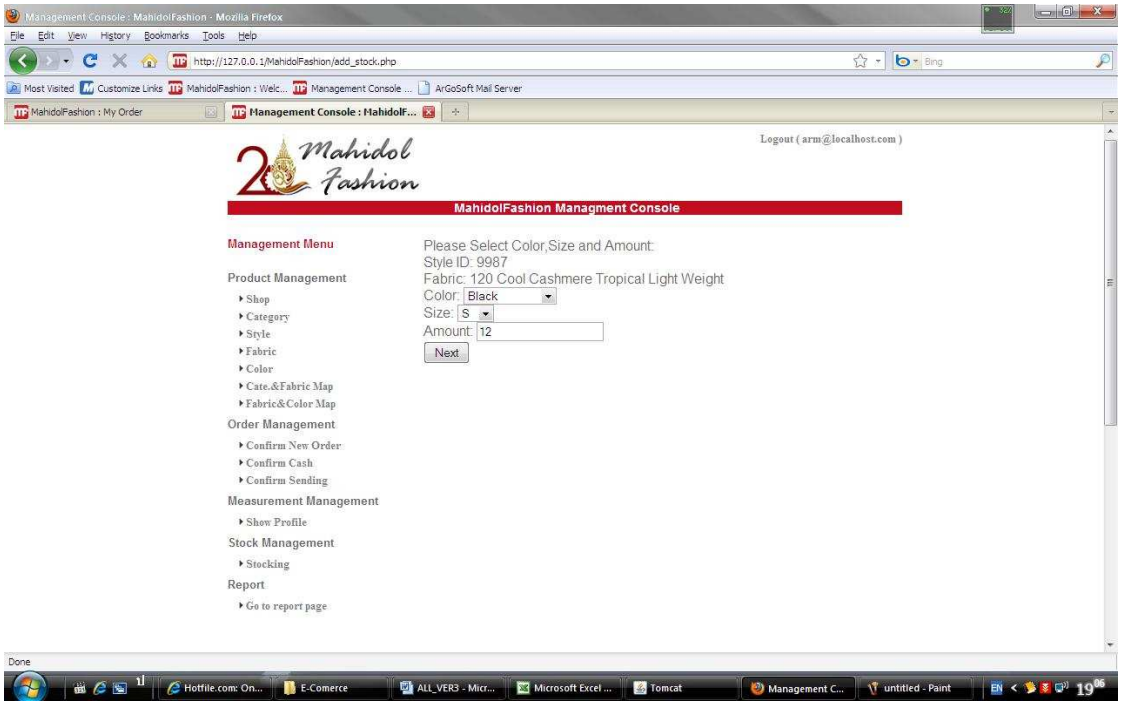


Figure 4.59 Selection Product Color, Size and Amount to Stock

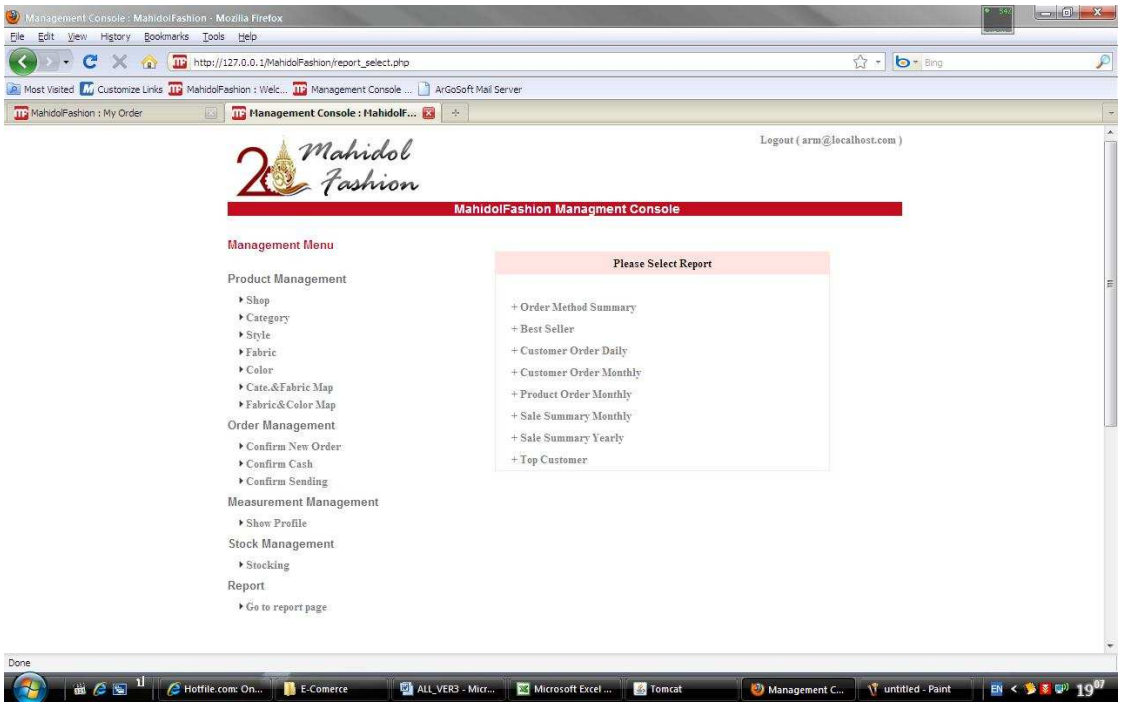


Figure 4.60 Report System Screen

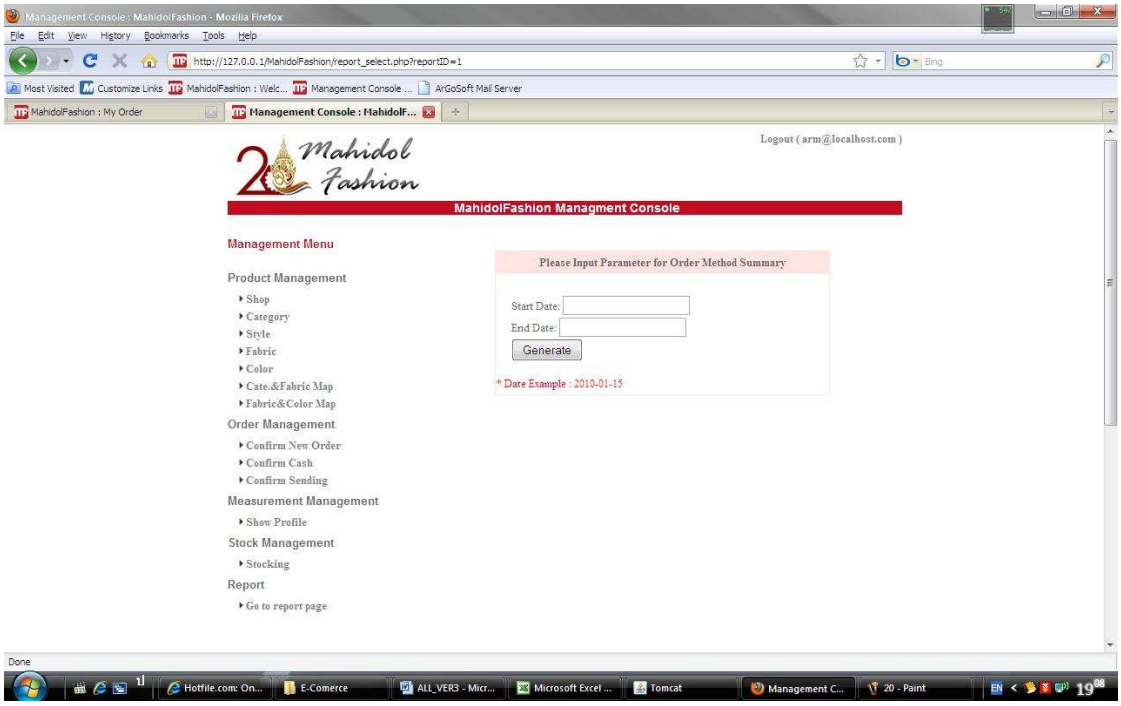


Figure 4.61 Report Criteria and Generate Screen

4.4 System Implementation

This software system is developed under the concept of the system design which is translated into the actual development of the database system and web application, according to the system requirements. In this phase, the Electronic Commerce System for a sale system of coat tailor processing business is coding by PHP language and JAVA language, and developed by using tools which are specified in research tools. Apache and Tomcat Server in the Windows XP is the web server and MySQL database is used for managing the database. This web application is implemented for the front office and back office of a sale system of coat tailor processing business.

4.5 System Testing

System testing was included program testing and program validation. Program testing was done parallel with program coding. Bottom-up testing was used. Program testing consists of testing each module separately in the system, tests the functioning of the system as a whole and tested to review requirement specifications. Testing of each module and functioning was tested by researcher. When errors were discovered, the source was found and eliminated through a process. A review requirement specification was tested by expert users. When requirement specifications were unexpected, program was corrected to consistent.

Program validation was tested by researcher and expert users. This testing was prepared a case data. The results from the program were verified by comparing with the expected result. If both result are not the same, the errors were discovered, the source is found and eliminated through a process.

4.5.1 System validation

Validation is a process of ensuring the system that has been build to meet requirement. In addition to unit testing during implementation, integrated testing was done as well.

The demonstration is done by simulating the business process on e-Commerce. There are generated input to the system that similar to the real doing

business. Scenario-Based testing is used for integration test of the Electronic Commerce for a sale system of coat tailor processing business. For bank process which involves with bank in approve the credit card and payment process, the demonstration is done by creating one module to check and approve credit, then send status to the system for throughout doing business. The detail of testing and results are shown in Table 4.3.

Table 4.3: The scenario-based testing and the results of testing

Process 1: Register member	
Scenario-Based Testing	Result
1. Request to register to be the member 2. Enter the information 3. Click on the register button 4. Display message to the non-member customer	Can register to be the member

Process 2: Log on the system	
Scenario-Based Testing	Result
1. Input the user name and password 2. Click on the log on button 3. Verify data input and display list of products	Can log on the system, check data input and display list of products

Process 3: Profile member	
Scenario-Based Testing	Result
1. Request to update the profile 2. Edit member information 3. Click on the update button 4. Display the successful process	Can update correctly member customer profile

Process 4: List product	
Scenario-Based Testing	Result
1. Request to product information 2. View product information 3. Display product information	Can view product information

Process 5: Order product	
Process 5.1: Add Item	
Scenario-Based Testing	Result
1. Request to add the product otem to a cart 2. Enter quantity of product 3. Click on Add to cart button 4. Display message the product is added to a cart	Can add product item to a cart correctly

Process 5.2: Remove Item	
Scenario-Based Testing	Result
1. Review the order in a cart 2. Uncheck product code checkbok of item to be removed 3. Remove the items from the cart	Can remove product item from the cart correctly

Process 5.3: Change Quantity	
Scenario-Based Testing	Result
1. Review the order in cart 2. Input new quantity of each items to be changed 3. Click on check out button 4. Display the new information of a cart	Recalculate quantity of product correctly

Process 5.4: View cart	
Scenario-Based Testing	Result
1. Click on the view cart menu 2. Display the cart datail	Can view a cart datail and display information correctly

Process 5.5: Check Out	
Scenario-Based Testing	Result
1. Review the order in a cart 2. Display the summary order detail 3. Input member and payment datail 4. Confirm or cancle order 5. Display message that order received/canceled	Can buy or cancle order correctly

Process 6: Back office log on thesystem	
Scenario-Based Testing	Result
1. Input the user name and password 2. Click on the log on button 3. Verify data input and display list of orders 4. Stock can be automatic delete from database 5. Review reports	Can log on the system, check data input and display list of orders, automatic delete stock and report reviewed

Process 7,8,9: Order management system, confirm order and stock checking	
Scenario-Based Testing	Result
1. Select order from list 2. Display the datail of order 3. Checking for available products in stock 4. View. Confirm, Pending or Cancle order	Can view, confirm, pending or cancel orders correctly

Process10: Customer management system	
Scenario-Based Testing	Result
1. Select customer from list 2. Click on the edit link 3. Display customer detail 4. Edit customer detail	Can view or edit customer detail correctly

Process11: Payment system	
Scenario-Based Testing	Result
1. Input date range 2. Click on the "view report" button 3. Display report and payment information	Can view report and payment information by input date correctly

CHAPTER V
DISCUSSION

This research work can be applied to the Business to Customer (B2C) business model.

The result show that the web-based applications of Electronic Commerce System for a sale system of coat tailor processing business online fulfills user requirement. Researcher can solve the electronic commerce problem.

5.1 Strength of Research

5.2.1 This system can be applied to the other Business to Customer (B2C) business model for doing business.

5.2.2 This system can be increase sale channel for business.

5.2.3 Customers can be using web application online on internet every place.

5.2.4 Database is convenient manage.

5.2.5 The web application is easy to use with graphic user interface.

5.2.6 This system can be gather customer data to report for executive.

5.2.7 The stock system can be automatic cut off when customer purchase product.

5.2.8 Security system is used SSL (Secure Socket Layer) for transfer data between client and server.

5.2 Limitation of this Research

This system is developed for a sale system of coat tailor processing business. It is not sufficient for full electronic commerce system, because coat ordering different from other business. There are many conditions such as a size form

of customer that can be flexible by customer requirement that could not accept the customer's ordering on time, but the company can be solve product later.

5.3 The comparison between old system and new system

With old system operates with manual but the new system work in automatics and online service so it is more efficiency than old system. The new system process more rapidly than the manual operation because customer can order 24 hour and every place, and it has report system that can gather customer data to report for executive and takes the decision making. The new system has the stock system can be automatic cut off when customer purchase product. It increases efficiency for managing finish products. After implement the new system, the company will be increase sale channel, customers and decrease sale cost, management cost and processing business.

5.4 Evaluation Results

Sale systems of coat tailor processing business with electronic commerce system are tested and evaluated by 20 users by the mean of questionnaire. Questionnaire's example is show at the appendix.

The summarized results of the questionnaire founded that 26.67% of the users were satisfied to the highest level, 52% of the users were satisfied to a high level, and 18.33% of the users were satisfied to a moderate level and 3% of the users were satisfied to the less level. The results show that the top two levels consist of 78.67% of users, can be concluded that users are satisfied with the system. The summarized results are show in Table 5.1

Table 5.1 Summary of Questionnaire Result

Questions List	I	L	M	G	B
- The size and style of the system fronts and buttons is appropriate and is convenient to use.			3 (15%)	10 (50%)	7 (35%)
- The system needs usage learning time.		3 (15%)	4 (20%)	6 (30%)	7 (35%)
- The fixed data that are input into the system is enough and appropriate.		2 (10%)	8 (40%)	8 (40%)	2 (10%)
- Convenience in data input.			4 (20%)	10 (50%)	6 (30%)
- The categories of usage menu are appropriate.		2 (10%)	4 (20%)	12 (60%)	2 (10%)
- Your satisfaction level of the overall data input of this system.			6 (30%)	8 (40%)	6 (30%)
- The fastness of process time.			7 (35%)	9 (45%)	4 (20%)
- The correctness of retrieval system.			3 (15%)	11 (55%)	6 (30%)
- Appropriate and convenience in accessing the needed data.			10 (50%)	8 (40%)	2 (10%)
- Correctness of retrieval and saving data.				14 (70%)	6 (30%)
- Your satisfaction for overall system process.			1 (5%)	16 (80%)	3 (15%)
- The results style of the system is easy to understand.		2 (10%)	4 (20%)	8 (40%)	6 (30%)
- The system display by screen, report and output data is appropriate and serves the needs.				11 (55%)	9 (45%)
- Appropriate error description.				10 (50%)	10 (50%)
- Your satisfaction of security system level.			1 (5%)	15 (75%)	4 (20%)

Note: I stand for Improvement, L stand for Less, M stands for Medium, G stands for Good and B stand for Best.

CHAPTER VI
CONCLUSION AND RECOMMENDATION

The Electronic Commerce system is a web application for the front system and back system of a sale system of coat tailor processing business: a case study of Ravis International Custom Tailors Company which focuses on the system of doing business in terms of ordering and purchasing on the internet. This system is developed under software development life cycle which contains five phases: requirement analysis, analysis, design, development and testing. It can solve the user requirements that are based on electronic commerce problem.

This software system is developed by Apache Web Server and Tomcat Web Server in Windows XP are the web server and MySQL is used for managing the database while PHP Development tool, Jasper Report tool by JAVA language is tool for creating the user interface. Security system is used SSL (Secure Socket Layer) for transfer data between client and server.

The result of this research is a web application system for a sale system of coat tailor processing business: a case study of coat tailor business with 2 parts, the front system and back system, and 6 processes that consist of 1) Customer Register 2) Purchase Order System 3) Stock Management 4) Report System 5) Payment System 6) Product Management.

The 2 main parts are

1. The Front system compose of 2 sub systems

1.1 The first sub system; all user in the system can be access to all a sale system of coat tailor processing business's information. If the non-member customers who want to access a sale system of coat tailor processing business's information, customers register for membership first.

1.2 The second sub system; the online shopping is available only for member customers.

2. The Back system.

It provides for administrator to log on the Back system in product management, order management, confirm order, confirm cash, confirm sending, measurement management, stock management, and to view report.

The testing result is fulfillment user requirement and expected result. Data output and data transfer are correctly. Button and page link are usable. This application can work properly. This system can be applied to the other Business to Customer (B2C) business model.

The evaluation of the system found that 26.67% of the users were satisfied to the highest level, 52% of the users were satisfied to a high level, and 18.33% of the users were satisfied to a moderate level and 3% of the users were satisfied to the less level. The results show that the top two levels consist of 78.67% of users, can be concluded that users are satisfied with the system.

In conclusion, this prototype is an efficient system that can support working purpose of the coat tailor processing business. Finally, this prototype development completes through the expected result of this study and it is a guideline to develop the extension functions and also integrated in the future.

Recommendation

To increase the capability of the system of a web application for a sale system of coat tailor processing business with electronic commerce system, the following recommendation will guide for further development is should be focus on

1. For useful program, it should increase integrate with other system such as raw material stock system, purchasing raw material system, barcode system, production planning system.

2. For further development, program should develop database to data mining that it can be increase report efficiency.

3. Program should be increasing other information for back system such as supplier information, staffs information.

4. For further development, program should develop new security system for credit card payment if a new security system has more efficiency than old system.

5. Developers should register SSL Certificate with reliable venders.

6. Developers should register the credit card payment system with commercial bank.

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APPENDIX

แบบประเมินผลการใช้ระบบงานขายสินค้าของกระบวนการธุรกิจตัดเย็บชุดสูทด้วยระบบพาณิชย์อิเล็กทรอนิกส์

ชื่อและนามสกุล :	วันที่ :				
รายการคำถาม	ควรปรับปรุง	น้อย	ปานกลาง	ค่อนข้างดี	ดี
- ขนาดและรูปแบบของตัวอักษรและปุ่มคำสั่งต่างๆในหน้าจอมีความเหมาะสมและสะดวกต่อการใช้งาน					
- คุณต้องใช้ระยะเวลาในการเรียนรู้ระบบมากน้อยเพียงใด					
- ข้อมูลที่กำหนดให้ป้อนเข้าสู่ระบบมีความเพียงพอและเหมาะสม					
- การป้อนข้อมูลเข้าสู่ระบบมีความสะดวก					
- การจัดหมวดหมู่การใช้งานมีความเหมาะสม					
- ในส่วนของการป้อนข้อมูลเข้าสู่ระบบ โดยภาพรวมแล้วคุณรู้สึกพึงพอใจเพียงใด					
- ในการประมวลผลข้อมูลของระบบมีความเร็ว					
- การสืบค้นข้อมูลของระบบมีความถูกต้อง					
- การเข้าถึงข้อมูลที่ต้องการมีความสะดวกและเหมาะสม					
- การค้นคืนและบันทึกข้อมูลทำได้อย่างถูกต้อง					
- ในส่วนของการประมวลผลของระบบ โดยภาพรวมแล้วคุณรู้สึกพึงพอใจเพียงใด					
- รูปแบบการแสดงผลลัพธ์ของระบบง่ายต่อการทำความเข้าใจ					

- การแสดงผลลัพธ์ของระบบในรูปแบบหน้าจอ รายงานและข้อมูลส่งออก ตรงต่อความต้องการและมีความเหมาะสม					
- โดยภาพรวมแล้ว คุณรู้สึกพอใจกับการแสดงผลลัพธ์เพียงใด					
- ด้าน Security ของระบบ ท่านมีความพอใจเพียงใด					

หมายเหตุ: 1= ควรปรับปรุง, 2= น้อย, 3= ปานกลาง, 4= ค่อนข้างดี, 5= ดี

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