Information Quality in Web-Based eCatalogue

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Information Quality in Web-Based eCatalogue

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By Ali Bassil Alsarhan

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ABSTRACT

Catalogues are important business strategy as they can provide customers with product descriptions and assist who have buying interest to not go through the floor areas and shelves, browsing aimlessly, trying to locate items that are of interest. Printed catalogue are cumbersome to use, require large storage areas, become dated soon after publication, and make search and comparison activities very difficult. The situation is further worsen when the quality of information provided is not regularly updated and is below customers' expectations. eCatalogue has the potential to offer assistance to customer, and improve information quality. Therefore, an eCatalouge was developed in this study where 30 potential customers tried the proposed eCatalogue for a certain period. Nine information quality dimensions, which are Accuracy, Precision, Currency, Timeliness, Reliability, Completeness, Conciseness, Format, and Relevance, were used to measure the eCatalouge. Based on a three point scale (where 1= disagree and 3= agree), respondents agree that the information in the eCatalouge are somewhat current (mean =2.27), precise (2.20), accurate (2.17), reliable (2.17), and concise (2.17). However, they are not sure about the timely (2.00) and relevant (2.07) dimensions. Also they agree to some extent, the eCatalogue format is satisfying (2.20). Overall mean of quality measure is (2.15), which is indicates that the quality of information in the developed eCatalogue should be improved.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter provides a general idea about the background of the study, problem statement, objectives, expected contribution, scope of the study, research framework, and structure of thesis.

1.2 Background

Electronic catalogues (eCatalogues) are rapidly becoming an increasingly important part of electronic commerce (Georgantis et al, 2002) and is the means by which the user views and interacts with the supplier's information (Baron et al., 2000). eCatalogue, in simple terms provides an electronic equivalent of an empty paper catalogue that can then be populated with your own product details, allowing customers to make purchases on-line using a shopping basket (Opportunity Wales, 2001).

The BNet Business Dictionary defines eCatalogue as a listing of available products that can be viewed in an electronic format, for example, on a Web site, and can include information such as illustrations, prices, and product descriptions. eCatalogue is also about showcasing products or services online, via the web, through websites (BDigital, 2003). Even a company's web page that provides a short list of its products is an eCatalogue. Also in eCatalogue web site there is a concentration on information

quality evaluation. Information quality (IQ) is seen as the information that is *fit for use* by information consumers (Huang, Lee, Wang, 1999), and it is the characteristic of information that meets or exceeds *customer expectations* or impression about the services using information quality assessment (Kahn & Strong ,1998).

eCatalogue offers efficiency and capabilities (Gartner Research, 2001). For example, consider the paradigm of the printed catalogue model. It may seem as a very popular and widely used solution, but printed catalogue are cumbersome to use, require large storage areas, become dated soon after publication, and make search and comparison activities very difficult (Baron et al, 2000). In general, costly and time-consuming processes are used, in order to check availability and price of a needed item, not to mention the manual burden of the requisition cycle (receipt, invoice, payment) (Georgantis et al, 2002). In short, the benefits of eCatalogue for both suppliers and retailers include drastically reduced production costs, expanded markets, and reduced processing costs.

This new development allows organizations the ability to publish catalogue details quicker and easier than if they were manually selling the products. The buyers can now easily locate the newest version of the catalogue. They can also search and retrieve their desired item information faster and simpler by using computer-assisted search mechanisms, instead of the printed catalogue index.

Other benefits of eCatalogue include:

1. Displaying products or services 24 hours a day.

   An eCatalogue website will eliminate the time constraints of high-street shop.

2. Offering a wider variety of products.

   An eCatalogue website removes any limitations of shopping floor space, allowing organizations to display and offer a wider variety of products.

3. Reducing promotional and printing costs considerably.

1.3 Problem Statement

Catalogues are important business strategy (BDigital, 2003) as they can provide customers with product descriptions and assist who have buying interest to not go through the floor areas and shelves, browsing aimlessly, trying to locate items that are of interest. Often, no shop helper is able to provide assistance, thus creating an unwelcome atmosphere. The situation is further worsen when the quality of information provided is not regularly updated and is below customers' expectations. Most importantly, merchandise point of reference in the form of printed catalogues or pamphlets, which is one of the primary marketing strategies, is not provided due to cost constraints (Astralys.com, 2008).

eCatalogue as discussed earlier has the potential to offer assistance to customer, and improve information quality.

1.4 Objectives

Based on the problem statement, two objectives are formed:

a. To develop a web-based eCatalogue that allows items and their details (i.e. product descriptions, price, location, and related images) to be input into the catalogue and up-dated regularly

b. To determine the information quality of the developed eCatalogue

1.5 Expected Contribution

The expected contribution of this three-month project would be as follows:

- A working prototype of the web-based eCatalogue, which can be further enhanced and fully implemented in any Small and Medium Enterprises
- A list of dimensions to measure information quality of eCatalogue design. The deduction made from analyzing the data can be used as useful design guidelines of future eCatalogues.

1.6 Scope of the Study

The Dynamic eCatalogue web site is developed as a dynamic web-based system for electronic shop store. It offers information about the shop itself, the services, and the existing items. The web site displays image for each item with the ability to minimize and maximize that photo. The eCatalogue does not include audio video or 3D objects.

Such capabilities and advantages, the eCatalogue concept has introduced, have lead to a wide adoption and recognition of the need for eCatalogue. In fact, this concept has been quite elaborated, driven mainly by market requirements, so as to include, more or less two different eCatalogue types, which is static eCatalogue and intelligent eCatalogue.

Static eCatalogue just provides a short list of products and requires constant and specific effort to assure currency. Another type of eCatalogue is intelligent catalogue. Intelligent catalogue are dynamic, active, and capable of learning (BDigital, 2003). The eCatalogue developed in this project does not cover the intelligent component.

1.7 Framework of Study

Figure 1.1 shows the Framework of study.

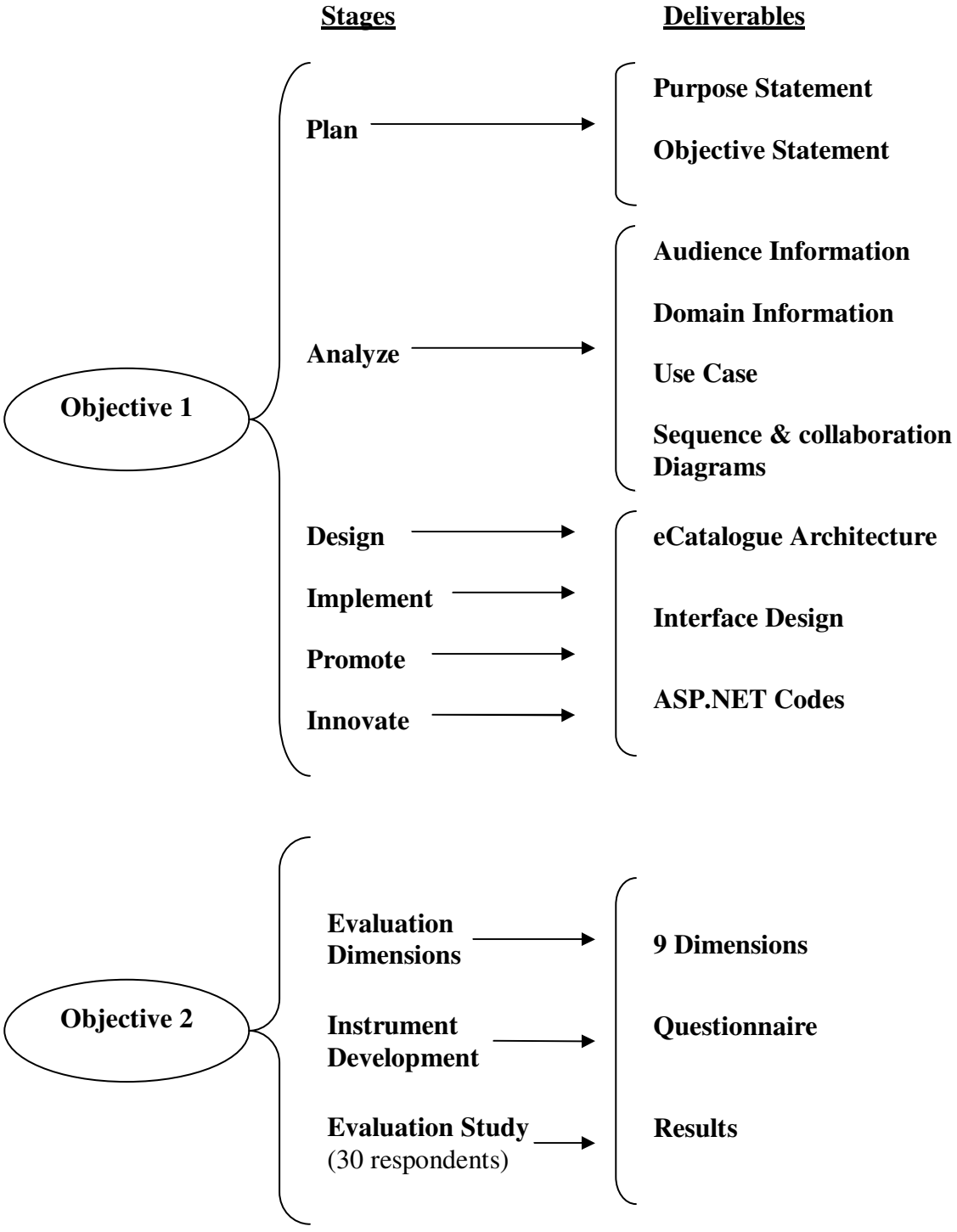


Figure 1.1 Framework study

1.8 Structure of Thesis

The chapters in this thesis are arranged as follows:

Chapter Two

The literature review which represents the previous related work to this thesis, and existing works that have been conducted on the same area.

Chapter Three

The research methodology which is adapted in this study. It discusses the steps in this methodology, and how they help researcher to accomplish the goals of thesis.

Chapter Four

This chapter discusses the system that had been developed in a web based environment.

Chapter Five

This Chapter provides the findings of the evaluation conducted in this project.

Chapter Six

The final chapter gives the conclusion to the study. Recommendations and directions of future work are also discussed**.**

1.9 Summary

This chapter gives an insight of the project by describing the background of the study, the problem statement and the motivation factors that lead to the selection of the area studied. It also explains the objectives of conducting the study, as well as its contribution, scope, and research framework.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a highlight on the literature review according to the area of project. It conceptually gives an insight or reviews on the previous and existing works that have been conducted on the same area. According to the title of the project Information Quality in Web-Based eCatalogue, this chapter is organized into three subsections. The first section reviews on the overview and definition of the electronic catalogue in today's life and the business use as well as those existed in previous days. Moreover, the second subtopic will shed light on the technology used, eCommerce and other eCatalogue examples. The third subtopic reviews on the related works which is the main concern of this chapter.

2.2 eCatalogue

eCatalogue simply presents the effective way to view and sell products and services. Furthermore, eCatalogue can enhance and improve the sell performance through the power of the internet (eCatalogue, 2009). Hence, eCatalogue is seen as able to improve the business.

eCatalogue is an innovative and effective technique to promote or advertise the product range of a company. It is a Digital Brochure of information on products

(with images and salient features mentioned) that are offered by an organization (Sabbata, 2000).

Astralys (2008) is one of the companies specializing in eCatalogue. They claim to be skilled in specific eCatalogue with detailed technical specifications, retail specific catalogue coupled with sales enquiry, and art related eCatalogue with interactive product photo zooming. Like most others, Astralys (2008) also argues that eCatalogue has the following benefits:

- Reduces marketing cost with no traditional catalogue printing expenses.
- Reaches out to regional customer markets without distribution costs.
- Improves customer service level with instant catalogue availability and updated information.
- Reduces time and cost in maintaining an updated and accurate product catalogue.
- No need for multiple catalogues or dedicated catalogue storage area in office.
- Allows rapid searching of your catalogue to locate specific product information.

This electronic service generally employs three different index schemes, to improve and support the search of goods by:

- The processing way for the alphanumeric relational query.

- The processing way for contents-based image query, which exploits automatically computed low-level image features (such as color and texture).
- The processing way for the textual similarity query that provides users with appropriate searching for their enquired products.

2.2.1 Formats of eCatalogue

Today different formats of the eCatalogues have been developed to use through the Internet such as:

- HTML Catalogue

According to Adamczak (2003), HTML catalogue allows selection of tools as means of interaction. Figure 2.1 shows an example of this format of catalogue.

Figure 2.1: HTML eCatalogue

- FTP Catalogue

This kind of catalogue is in the form of an application that can be transferred in the form of an installable data file into the local computer by means of the File Transfer Protocol (FTP). According to Mursec (2000) the FTP is a protocol for transfer of data through Internet. After the transfer usually the installation of the programme is necessary. Refer to Figure 2.2

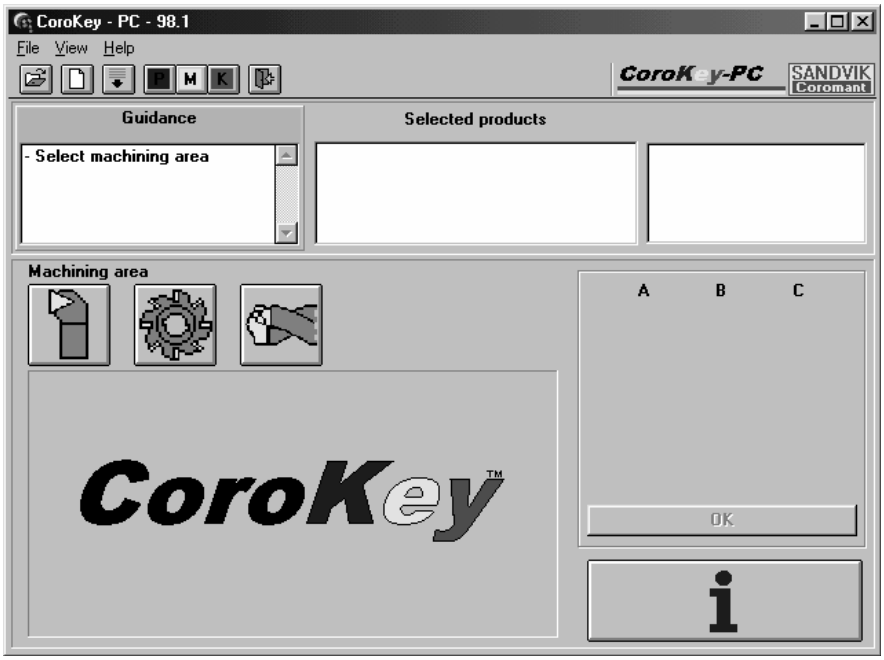


Figure 2.2: FTP eCatalogue

- PDF Catalouge

This kind of eCatalogue is in the form of PDF documents. Thus, the requirements for the installation of the programme called Adobe Acrobat Reader are necessary. (Mursec & Ploj , 2001).

2.2.2 eCatalogue Disadvantages

The advantages and benefits of using the eCatalogue have been described in section 2.1. The following are some of its disadvantages:

- Requires hardware, power, and maintenance which might result in being more costly that printed catalogue.
- Can not be freely distributed except for customers who are technology savvy.
- Requires heavier cognitive load for customers compared to printed catalogue.

2.3 eCatalogue in E-Commerce

The internet nowadays is the most important communication, marketing and business medium in the world. It presents a collection of new ways to reach the customers as marketing and advertising medium.

E-Commerce is an example which describes how the internet can be used as a marketing, and business medium. While continuing to evolve in information technology, producers and consumers now do most of the business transactions over the internet. Additionally, internet commerce continues to grow rapidly, with growing customers (Faloutsos, 1994).

There are many definitions of the E-Commerce, according to Hesterbrink, (1999), e-Commerce is the enterprise designed for success in the Information Economy. E-Commerce does business online, typically via the Web (DZNet, 2007).

According to Choi et al. (1997) that states that the e-Commerce refers to the use of electronic means and technologies to conduct commerce, including within-business, business-to-business, and business-to-consumer interaction. Hoffman and Novak (1996) and Fairchild (1997) found that e-Commerce provides an effective channel for advertising, marketing and distributing goods and information services. It lets people purchase goods and exchange information on business transactions on-line (Brody, 1999). According to Digitsmith (2005) e-Commerce can be divided into four main categories: B2B, B2C, C2B, and C2C.

1. B2B (Business to Business): in this case two businesses exchange the products, services, or information rather than between businesses and consumers.
2. B2C (Business to Consumer): It is a business that exchanges the information, products or services with a consumer – as opposed to (B2B). One of the best examples of B2C e-commerce is Amazon.com, an online bookstore that launched its site in 1995.

3. C2B (Consumer to Business): Consumer to Business is where the consumer requests a specific service from the business. This business

model is a complete reversal of traditional business model where companies offer goods and services to consumers.

4. C2C (Consumer to Consumer): It is the oldest form of e-business (Giancarlo, 2000; Gill, 1999). Commerce-to-commerce can be defined as individuals doing business in an online environment, typically utilizing the Internet in one way or another (Sami, 2006).

The websites of e-Commerce or e-Commerce applications consist of electronic publishing and advertisement, real-time information delivery, product ordering, transaction processing, galleries for the photograph, digital libraries, web newspapers and magazines, network video and audio and personal communication. eCatalogue plays an important role in e-Commerce (Kwok, Yang, & Tam, 2004).

Wired (2008) is an example of eCatalogue that showcases products and services via the web. Wired engine provides and supports customers to view and browse flexible, user friendly interface overlaying a database of product information.

However, the Wired eCatalogue can simply be responsive to what customers and users require by viewing the latest changing market conditions any time the customers enquire about their question via online. Moreover, the developed

eCatalogue allows customers to create and manage their own group of unique user profiles (Wired, 2008).

Wired's e-catalogue has the following features:

- User and profile management
- Promotions and pricing
- Shopping cart management
- Order status updates and history
- Security and scalability
- Integration with other enterprise applications

Figure 2.3 depicts the concept of how wired eCatalogue treats customer individually.

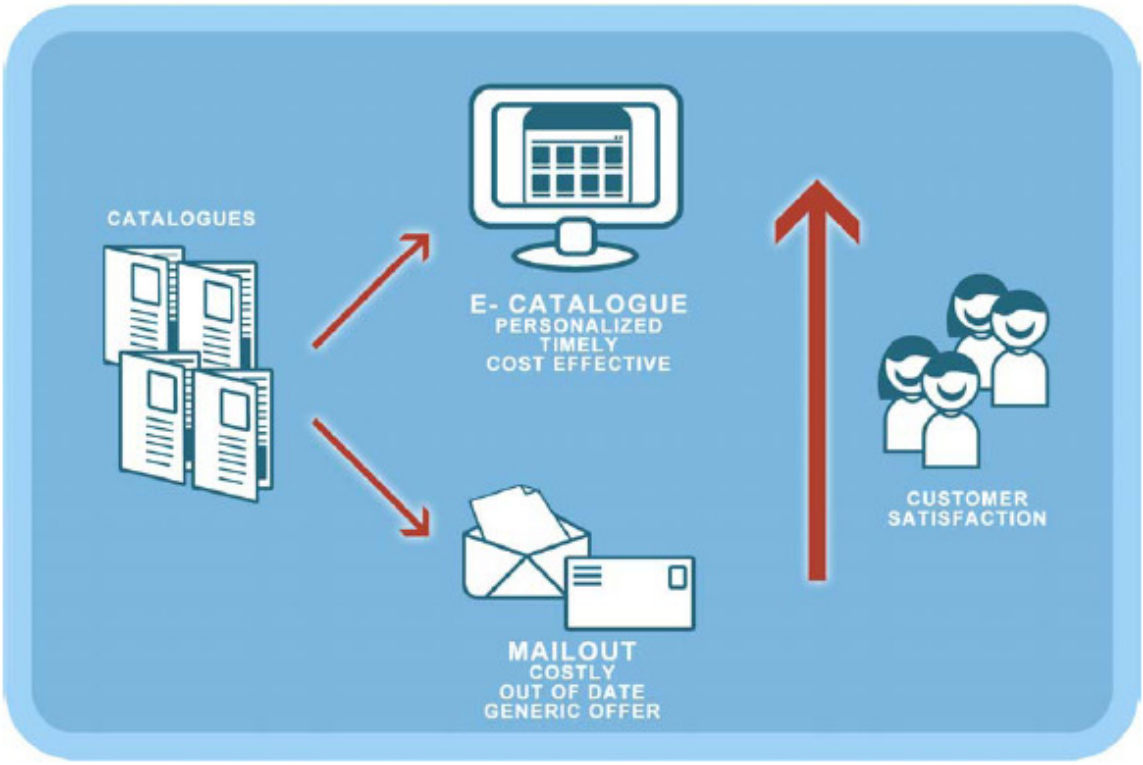


Figure 2.3: eCatalogue for Treating Customers as Individuals

Eng Hup Seng is the biggest producer and provider for the sesame Oil & Sauce products, this factory has been incorporated in 1988 in Malaysia. The factory supports the eCatalogue service to provide customers with the appropriate browsing for the factory products. The eCatalogue of this factory provide customers to view products price and more details about the selected products. Refer to Figure 2.4

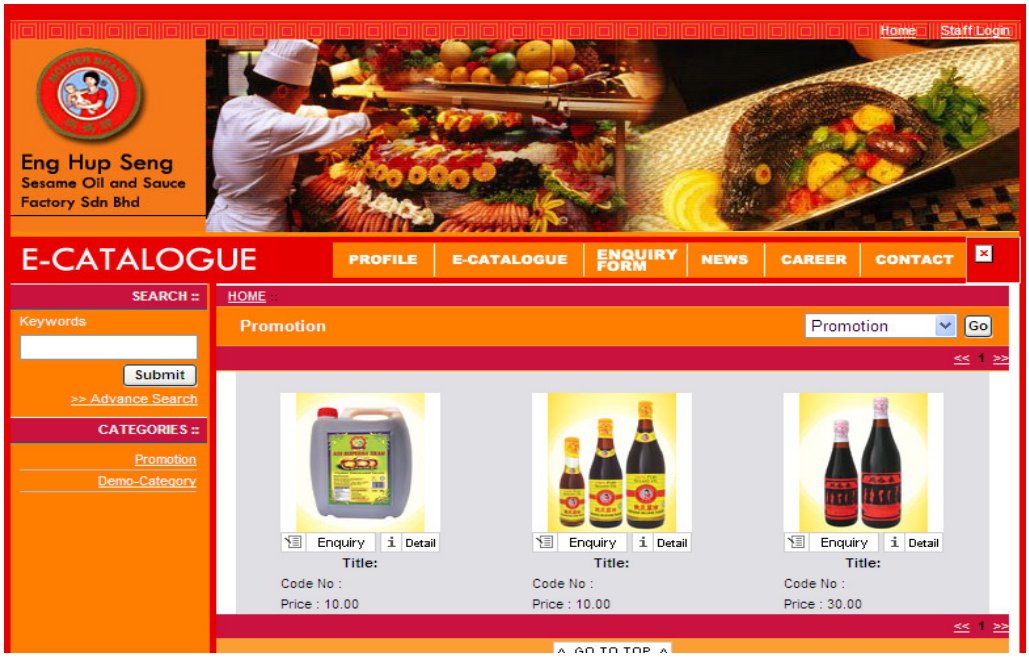


Figure 2.4: Eng Hup Seng eCatalogue

Maria (1998) stated that eCatalogue, can be constructed on-the-fly by a system with a specific person's needs in mind. This virtual eCatalogue supports and provides users with information which might be constructed for a variety of domains, including on-line shopping guides, virtual museums, encyclopedias, tourism guides and so on (Mood, 1988). Furthermore, the developed eCatalogue can automatically adapt to the individual user's knowledge and needs. eCatalogue could also be presented with multimedia contents (Petrelli, 1997) and illustrations (Milosavljevic, 1996; Pass, 1998).

Sabbata (2000) and Stokes (1996), point out that integration of interactive features as search facilities is highly required in eCatalogue. To prove their point Gill and Salton (2004) developed a new method to compute the query called query

processing. However, the query processing formulates a new type of data to match the selected data query that better represents the images of interest to the user (Ciocca , 2003). Refer to Figure 2.5.

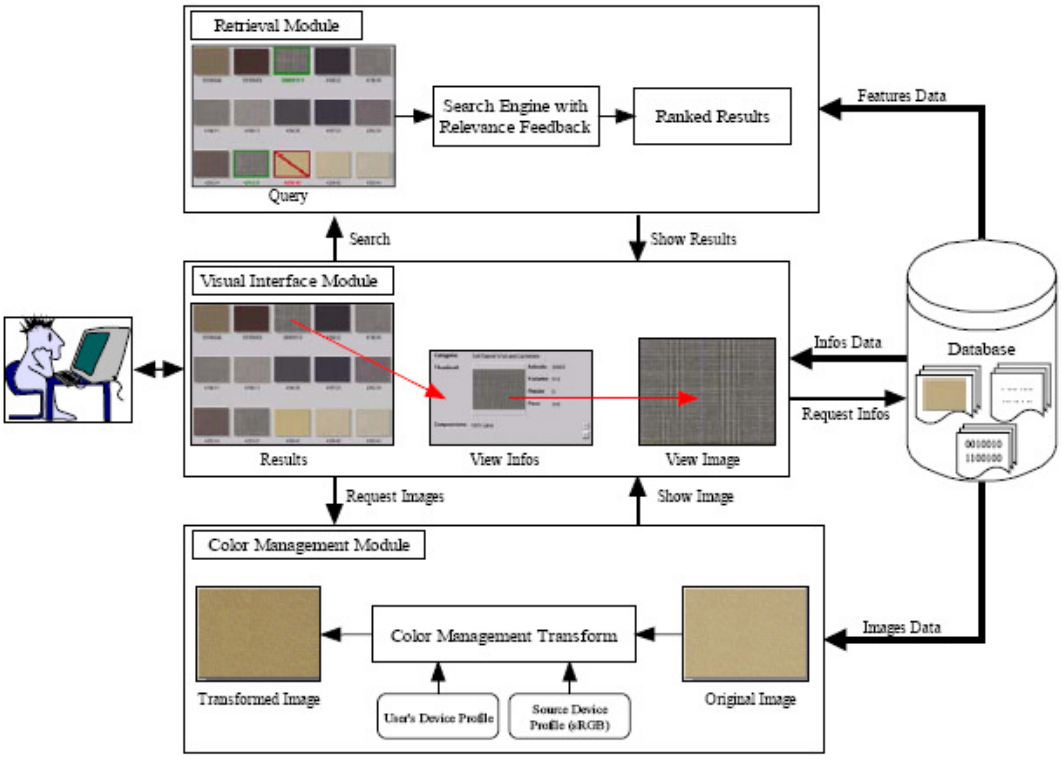


Figure 2.5: High Quality Image Catalogues

In another example of eCatalogue implementation, Ng (2001) developed a prototype of e-travel catalogue application for tourism in Malaysia. The catalogue provides full reservation online services to customers and includes three main functional modules in the business model. These are view information module, online reservation module, and advertisement module.

E-Business Technology Institute (2005) took the eCatalogue concept to another level (refer to Figure 2.7) when they produced Mobile eCatalogue System. Some benefits of the Mobile eCatalogue System include:

- Small Medium Enterprises (SME) can use every opportunity to Promote their products.
- SME products are featured in vivid display through the use of MMS messages.
- The system eliminates the need and the associated costs of using traditional catalogues.
- Potential customers can receive SME catalogues right away.

Figure 2.6: Mobile eCatalogue System (E-Business Technology Institute, 2005)

2.4 Features Comparison

In this section we compared the features of printed catalogue (pCatalogue) with features of (eCatalogue). This comparison is used to help in converting the pCatalogue to eCatalogue, and to specify the advantages and features of eCatalogue. Refer to Table 2.1

Table 2.1: Feature Comparison of Printed Catalogue and eCatalogue

Features	pCatalogue	eCatalogue
User Friendly Interface (GUI)	Yes	Yes
Text	Yes	Yes
Product Catalogue Manager	No	Yes
Picture	Yes	Yes
Product Import	No	Yes
Audio	No	Yes
Product Map	No	Yes
Animation	No	Yes
Search Products	No	Yes
Print Out	No	Yes
Free Google Web Search Built-In	No	Yes
Portable	Yes	Yes and No
Google Translation Built-In	No	Yes
Hyperlink	No	Yes
Relate Products	No	Yes
Customizable	No	Yes
Products Attachments	No	Yes
Multi Access	No	Yes
Image Manager	No	Yes
Easy Random Access	No	Yes
File Manager	No	Yes
Easily Update	No	Yes
Enquiry Manager	No	Yes
Good Legibility	No	Yes
Newsletter	No	Yes
News Manager	No	Yes

From the comparison analysis, eCatalogue indicates that it provides outcomes with more features that should give outcomes more satisfaction.

2.5 **Information Quality in eCatalogue**

Information quality (IQ) is seen as the information that is *fit for use* by information consumers (Huang et al., 1999), and it is the characteristic of information that meets or exceeds *customer expectations* or impression about the services using information quality assessment. Information that meets the *specifications* or *requirements* and has *high value* in their forms and contents are said to be of good quality (Kahn & Strong, 1998).

2.5.1 Dimensions of IQ

IQ like any product has characteristics, features and dimensions. Ballou and Pazer (1985) state the dimensions as follows:

1. Accuracy

2. Completeness

3. Consistency

4. Timeless

Then, Holmes (1996) added 6 new dimensions to the previous ones because he believed that 4 are not enough to evaluate the information quality.

1. Relevance

2. Format

3. Conciseness

4. Completeness

5. Reliability

6. Timeliness

7. Currency

8. Precision

9. Accuracy

10. Security

Some other researchers (Wang and Strong 1996; Strong & Lee, 1997; Wang 1998; Huang, Lee et al. 1999) come up with 15 dimensions of IQ which are Accuracy, Objectivity, Believability, Reputation, Relevancy, Value-Added, Timeliness, Completeness, Amount of information, Interpretability, Ease of understanding, Concise representation, Consistent representation, Accessibility, and Access security.

2.6 Implications of the literature review

The subsections of this chapter implicate the study in the following way:

- Providing insight on eCatalogue benefits, definition of eCatalogue, and purposes of eCatalogue. Also it presents examples on types of eCatalogue such as HTML and PDF eCatalogue.

- Providing information on the role of the internet in e-Commerce, and how eCatalogue can be utilized as the marketing strategy.

- Giving features that should be included in the design of the eCatalouge.

- IQ is an important element in content presentation, especially web-based contents, in determining visitation and satisfaction (Peng, 2002). Due to this, evaluating IQ in this study is seen as necessary to measure the content of the developed eCatalouge.

2.7 Summary

This chapter presents and defines the eCatalogue, type of eCatalogue, and identifies the advantages and disadvantages for using or browsing eCatalogue. eCatalogue is an effective way to view and sell products via online services that supports and includes multimedia contents to motivate the users for different kinds of browsing. Also it provides the customer with the appropriate tools that could be used for products enquire. Furthermore, the most important element in eCatalogue provides interactivity to the users.

In addition to the many different types of eCatalogue, a number of tools associated with the development of eCatalogue are also elaborated. Finally, some examples of the eCatalogue are described.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

Methodology is more than just collections of method to perform a research project; it is a systematic way to solve the research problem. The research methods refer to the methods and techniques used by the researchers in performing the research. This chapter will give an overview of the methodology phases that were used in this study.

The methodology consists of 2 main phases:

(a) eCatalogue development and

(b) Evaluation of the quality of information provided by the eCatalogue.

3.2 eCatalogue Development and Elements

In the first phase, since the aim is to develop a dynamic web-based application, December's (2008) web development methodology was followed. It comprises of six processes as shown in figure 3.1. The methodology is selected due to its high applicability of the last 2 processes (Promotion and Innovation) with the purpose of eCatalogue production.

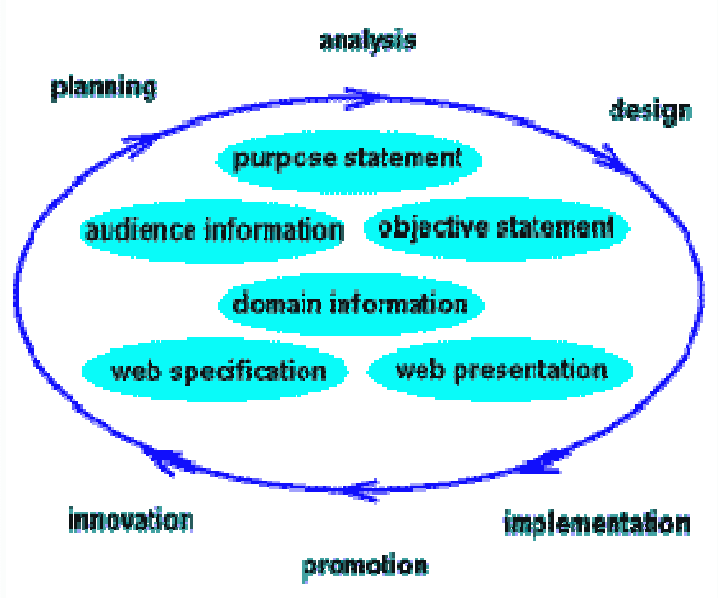


Figure 3.1: December's Methodology December's (2008)

Element 1: Audience Information

This element presents the ways and the techniques for helping planners shape the whole information content of the web, as well as its "look and feel". The purpose of this element, is to allow planners to systematically determine exactly who the target audience is, and also explore any relevant characteristics of the audience. This kind of elements were used in this study to determine the customer requirements for the proposed eCatalogue.

Element 2: Purpose Statement

The purpose statement is defined as "this is what the web will do", and is a very useful element within the development of a web. It helps developers choose what information about the audience must be gathered and maintained and it enables web analysts to evaluate whether or not the web is operating effectively.

Furthermore, the purpose statement of the proposed eCatalogue is to provide different customers with the appropriate information about products.

Element 3: Objective Statement

This element is a specific statement of web objectives. The objective statement tends to be longer than the purpose statement, and although the purpose statement stays the same.

However, the objectives statements for the study are:

- To develop a web-based e-Catalogue that allows items and their details (i.e. product descriptions, price, location, and related images) to be input into the catalogue and up-dated regularly.

- To determine the information quality of the e-Catalogue.

Element 4: Domain Information

This kind of elements presents the online and offline knowledge about the subject area of the web. This domain information has been including not only what the user will eventually see, but all relevant knowledge the developers need to know in order to create a successful web. The domain information of this study focused on products information such as (electrical devices, mobile phones, laptops, and etc).

Element 5: Web Specification

This is similar to the objective statement, but is web-specific and should completely identify all resources. Like the objective statement, the web specification may change over time if the objective statement itself changes or if web resources are added, removed or change location.

Element 6: Web Presentation

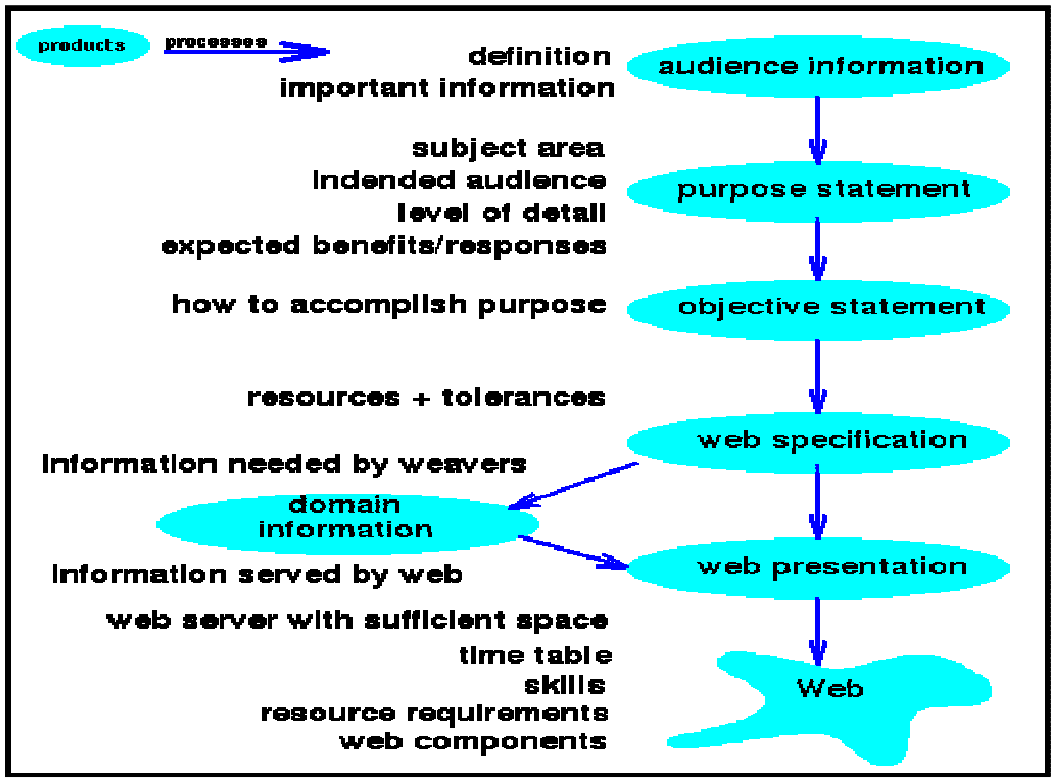
The web presentation is concerned with the web's "look and feel", and the details of the web's implementation. It is based heavily on the web presentation. The web presentation involved the following;

- Generated sample pages based on the web specification.
- Planning the work schedule necessary to implement and test the web.
- Created a pool of generic web components, which included page layouts.
- Created rapid prototypes of the web based on the web specification.
- Checked that the web server is available and has enough space for the expected size.

All these elements are the outcomes of the 6 phases of this part of the methodology. Next sections discuss these 6 phases.

3.2.1 Planning

In this phase all the work planning are identified. This includes the process of understanding why (eCatalogue) must be built and determining how the researcher will go about building it. Figure 3.2, presented the planning representation for December's Methodology based on the elements above. The failure of doing a good plan is a hazard to the whole process of implementing the project for the beginning; a comprehensive study has to be in order to get the clear idea of what will be achieved at the end of the project (Kothari, 1995). Literature reviews conducted in this phase provide the ideas, information, issues, and the related works in order to identify the proposed solution.



. **Figure 3.2:** Planning Representation, December's (2008)

As far as this project is concerned, the idea of developing eCatalogue was ignited from the realization of the benefits that customers would have, by implementing eCatalogue specifically a web-based application into their life and also to the environment. It would create a technology-oriented environment to spread out the advantages of information technology into the social life.

The elaboration of problem statement in the introduction chapter has already explained on the situation derived from the idea to develop eCatalogue. With the purpose of making the nature of information gathering become easier, the development of the eCatalogue system is actually a fulfillment of the desire to perform additional tasks for better solution. In the case of this project, the application of the web-based eCatalogue web based is an opportunity to facilitate the human to browse different information in a more convenient yet practical way.

3.2.2 Analysis

The aim of this phase is to identify the requirements from the users towards the application of eCatalogue, to know what criteria and functions have to be applied in the application considering the requirements from the target users prior to developing it.

This stage determines and analyzes facts and document fully how the system should work better to support the requirements.

Figure 3.3, illustrates the analysis phase based on December's Methodology elements (starting from point A, ending with point F). The basic approach to defining requirements is interviewing the shop customers. It is the most commonly used information-gathering technique . The interviews focused on how the consumers foresee the use of eCatalogue.

The following are summaries of the interview findings conducted in this study:

- The eCatalouge website needs to support the user interactivity such as comments, item rating, and news sharing.
- The eCatalouge website GUI has to be attractive and user friendly.
- Depending on the customers who have an IT background the eCatalouge website has to give the users some of privacy through customer login page.

- The basic information about the items has to be trustworthy. It should publish in the website depend on the marketing principles and it should be in details.
- eCatalouge should provide customer flexibility.

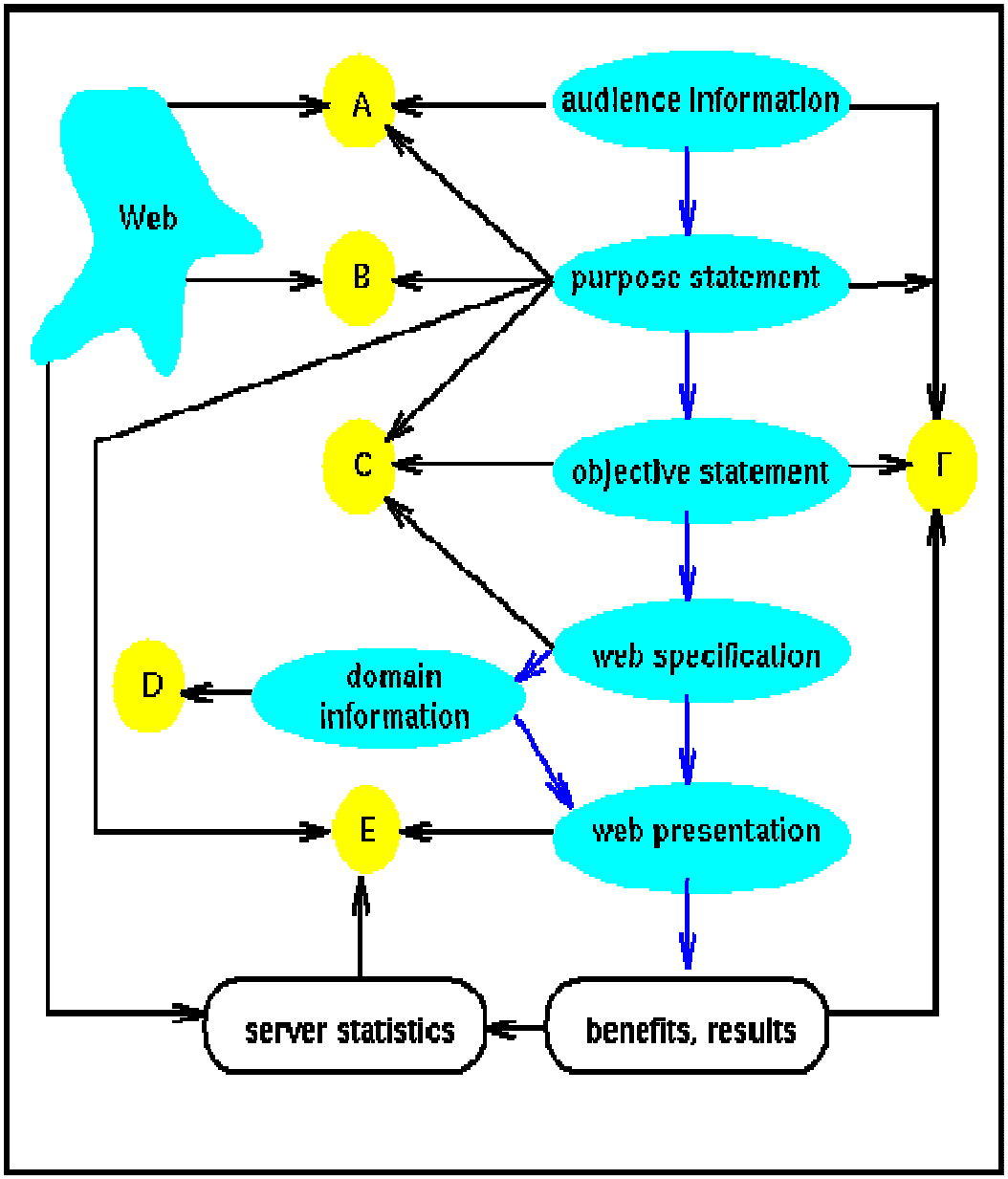


Figure 3.3: Analysis Representation, December's (2008)

3.2.3 Design

Prototyping is a physical model or sample end product that users can see, modify and use. The purpose is to capture the essentials data of a later system. Prototype is a system or a partially complete system that is built quickly to explore some aspects of the system requirements and that is not intended as the final working system. A prototype system is differentiated from the final production system by some initial incompleteness and perhaps by a less resilient construction.

Figure 3.4, presents the design phase based on December's Methodology elements. Moreover, prototype might be concerned with determining the efficacy of a particular language, a database management system or a communications infrastructure. In the case of this study, object oriented approach was implemented in the system's requirement design by the representation of use case diagram, sequence diagram and class diagram (Ravden & Johnson, 1989). The Rational Rose 2000 was used as a tool to draw these diagrams.

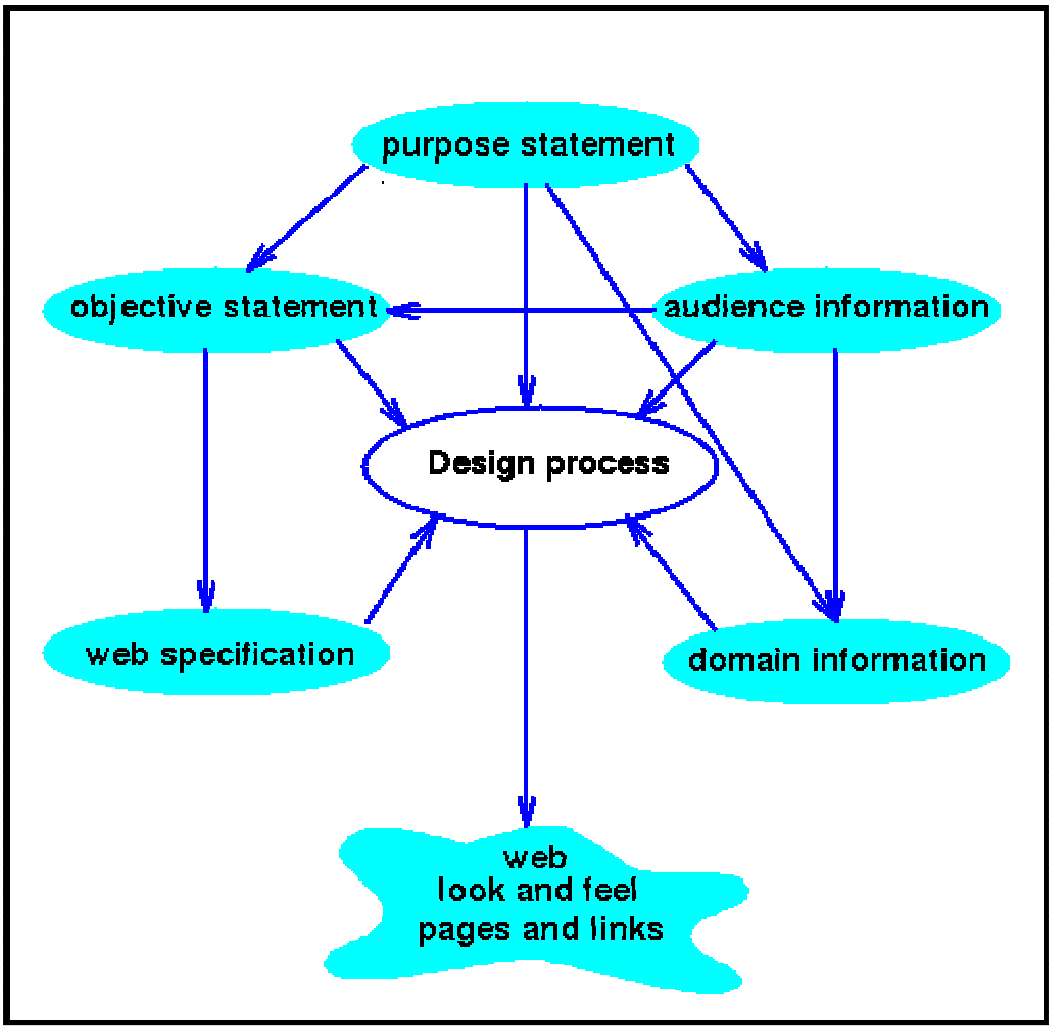


Figure 3.4: Design Representation, December's (2008)

3.2.4 Implementation

This phase concerns with the development tools that were used to build and implement the proposed eCatalogue, Furthermore, ASP.NET has been used to design and build the proposed eCatalogue, also SQL server has been used for the database relation between the eCatalogue data tables. Figure 3.5, presents the implementation phase based on December's Methodology elements.

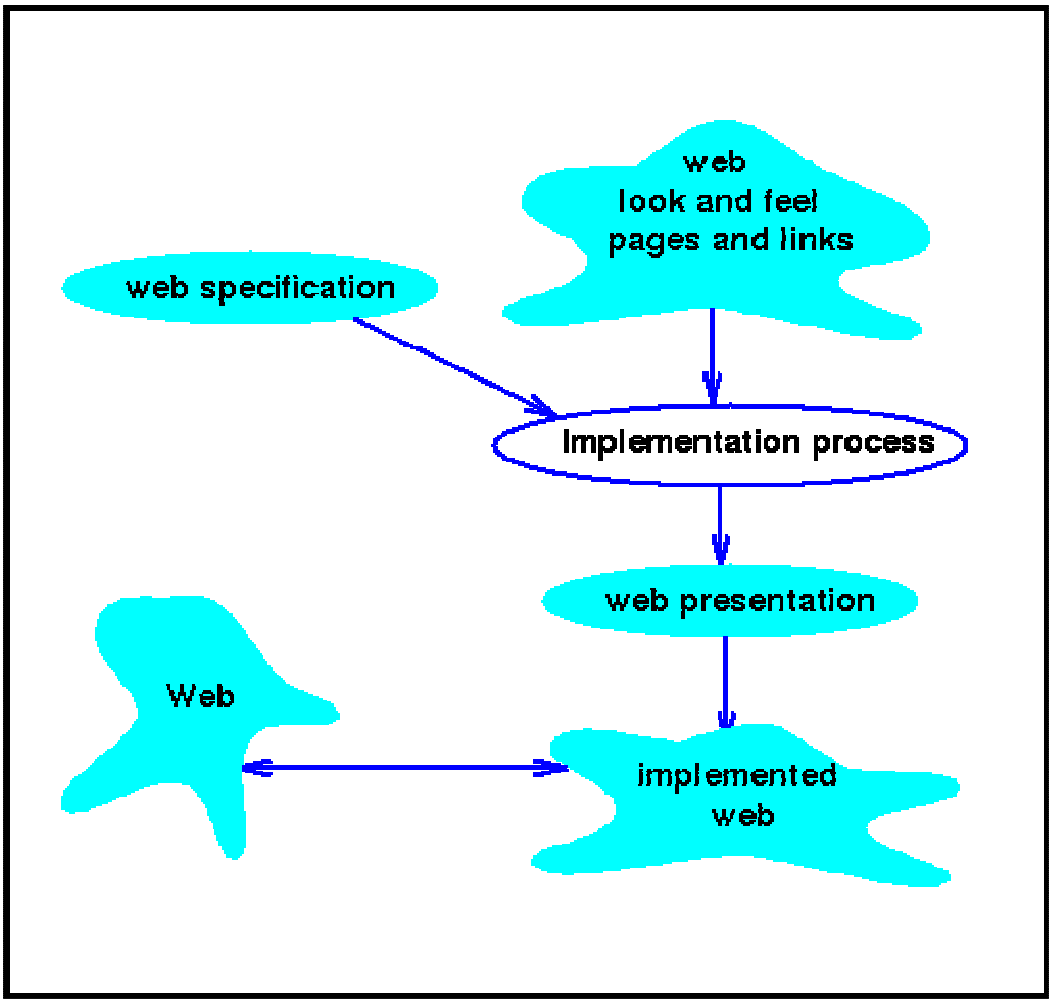


Figure 3.5: Implementation Representation, December's (2008)

3.2.5 Promotion

The main aim of this phase is to provide publicity releases for general Web audiences, potential users, and current users. Furthermore, the promotion considered in this study introduced eCatalogue for browsing information other than advertising that call attention to other browsing product information in electronic device store.

3.2.6 Innovation

Innovation is the process of continuously and creatively working for improvement in the web to meet user needs. However, the aim of the innovation over the proposed system is the creation, exchange, evolution and application of new ideas into the eCatalouge for the success of electronic marketing. These include dynamic functionalities such as user description, online order and user comments, which are made available 24 hours a day.

3.3 Quality of Information

In the second phase, nine dimensions of information quality as identified by Bailey and Pearson (1983) were utilized to measure the quality of information of the eCatalogue. The dimensions are:

1) Accuracy

According to Valarie et al., (1999) accuracy explains the relations of information used for different purposes require at various levels of accuracy.

2) Precision

Holmes (2009) states that precision is an important element of information quality.

3) Currency

Currency of information related to the frequency of information being updated (Holmes, 2009).

4) Timeliness

Bailey and Pearson (1983) identified the importance of the timeliness in information quality. Implicit in this definition is a dynamic process where new information arises to replace the old. Information has a cycle time which depends on how quickly new information can be processed and communicated to its customer.

5) Reliability

Bailey and Pearson (1983) associate reliability of information as being true and reliable**.**

6) Completeness

Completeness of information quality results how through the information are being presented (Bailey & Pearson, 1983; Holmes, 2009).

7) Conciseness

Conciseness presents the patterns of information. Information can become incoherent through irrelevant details, confusing measures or ambiguous format which can confuse information customers and cause them to not receive or even reject the information's message (Holmes, 2009).

8) Format

Information format refers to how the information is presented to the customer. Two components of information format are (a) its underlying form and (b) its context for interpretation, which is sometimes referred to as its frame (Bailey & Pearson, 1983).

9) Relevance

Finally, the relevance of information also determines the quality of information addresses to its customer's needs. If not, that customer will find the information inadequate regardless of how well the information rates along other dimensions that have been discussed above.

An instrument (see Appendix A) based on these 9 dimensions was developed to measure the quality of information of the eCatalouge. 30 respondents were involved.

3.4 Summary

December's Methodology has been carefully chosen in order to develop the proposed eCatalouge for this study. The sequence of the six steps in this methodology carrying out the development of an eCatalogue is as follows:

- Planning is the process of defining and gathering information about the web's audience, purpose, objectives, and policies for information development and use.

- Analysis involves evaluating information consistency and correctness as well as checking the technical makeup of the web.
- Design is the process of creating a map of the relationships among pages of the web and the look and feel of individual pages.
- Implementation: is the process of creating files of ASP.NET.
- Promotion: involves providing publicity releases for general Web audiences, potential users, and current users.
- Innovation is the process of continuously and creatively working for improvement in the web to meet user needs.

CHAPTER FOUR

ANALYSIS AND DESIGN

This chapter briefly discusses the system that was developed in a web based environment. The results of the study bring together the functionalities, interface, and generalized design principles for developing the eCatalogue.

4.1 Requirements of eCatalogue

Identifying the requirements for any application supports the development and the implementation steps (Bahrami, 1999; Bennett et al., 2002; Dennis et al., 2005).

Listed below are the functional and non-functional requirements of the system. In the priority column, the following short hands are used:

- M – Mandatory requirements (something the application must do)
- D – Desirable requirements (something the application preferably should do)
- O – Optional requirements (something the application may do)

A. Functional Requirements

Requirement ID	Requirement Description	Priority
eCatalogue_01	**Customer/ View News**	
ECATALOGUE_01_01	• Customer can view the different type of electronic device news.	M
ECATALOGUE_01_02	• Customer can view the different model of products such as mobile devices and laptops with description about the products such as price and product information.	M
ECATALOGUE_02	**Customer/ Submit Comment on Products**	
ECATALOGUE_02_01	• eCatalogue system provides customers to post their comments about the selected products.	M
ECATALOGUE_03	**Customer/ Contact us, the Supplier**	
ECATALOGUE_03_01	• The proposed eCatalogue system provides customers with the facilities to enquire about any details that he/she wants to enquire about.	M

ECATALOGUE_04	Customer/ Search for Products	
ECATALOGUE_04_01	• The proposed eCatalogue system, allows customers to search about the different kind of mobile and laptops devices.	M

ECATALOGUE_05	Administrator/ Login	
ECATALOGUE_05_01	• eCatalogue provides Administrator to login through his/her pages by the username and password.	M

ECATALOGUE_06	Administrator / Manage Products	
ECATALOGUE_06_01	• Administrator has the ability to manage the product details by adding, updating, and deleting the product information.	M

ECATALOGUE_07	Administrator / Manage Comments	
ECATALOGUE_07_01	• eCatalogue system provides Administrator with the ability to manage the customers comments by updating and deleting the customers comments in order.	M

B. Non-Functional Requirements

ECATALOGUE_9	Requirement for Performance	
ECATALOGUE_9_01	• The eCatalogue performs Performance according to hardware & software used.	M

ECATALOGUE_11	Performance issues	
ECATALOGUE_11_01	• The eCatalogue should response in an optimal time, without any delay or non-consistency in database.	O

4.1.1 Use Case Diagram

The use case is made up of a set of possible sequences of interactions between systems and users in a particular environment related to a particular goal (Eriksson & Penker, 1998; Hoffer et al., 1999). Furthermore, use case diagrams (a) organize functional requirements of eCatalogue system (b) model the goals of system/actor (user) interactions for eCatalogue system, (c) record paths from trigger events to goals that eCatalogue is aimed to and (d) describe main flow of events and the contents actions) (Hoffer et al., 2002; Jacobson et al., 2004; Schmuller, 2002).

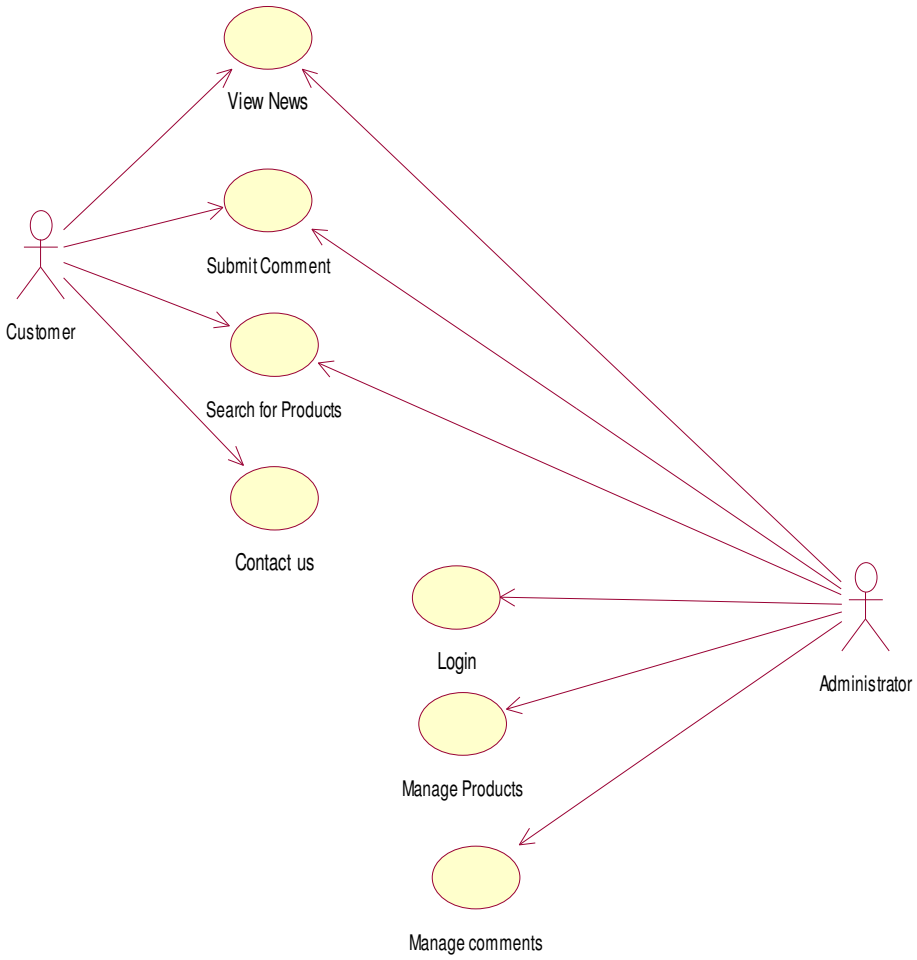
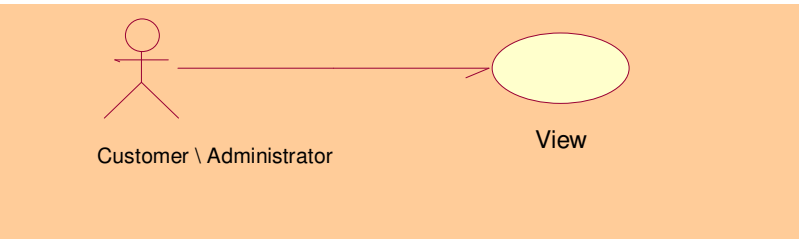


Figure 4.1: eCatalogue System Use Case Diagram

Figure 4.1, presents the eCatalogue use case diagram that illustrates the customers and the Administrator functionalities. Furthermore, the proposed eCatalogue supports the customers to view, comment, search, and contact shop. Moreover, the Administrator manages products and comments.

4.1.2 Use Case Specification

4.1.2.1 Use Case: VIEW NEWS



BRIEF DESCRIPTION

— This case is initiated by a customer and Administrator who would like to view product news, description and price details.

PRE-CONDITION

— Not Applicable

THE CHARACTERISTICS OF ACTIVATION

— Execution depends on customer demand (Event driven). If the customer desires to view product news, description, and price, he/she should chose this use case.

FLOW OF EVENTS

Basic flow

— The use case begins when a user presses the view button from the eCatalogue main menu.

— System will respond to the customer request and will get the product news, description, and price.

— The system will display product news, description, and price.

Alternative flow

A—1: Home Page

— The system will go back to the main eCatalogue home page.

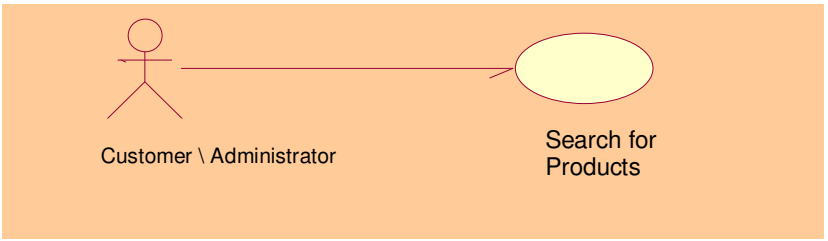
Exceptional flow

— Not Applicable

POST-CONDITIONS

— View posted news

4.1.2.2 USE CASE: SEARCH FOR PRODUCTS



BRIEF DESCRIPTION

— This case is initiated by a customer or Administrator who would like to search about certain product details from the proposed eCatalogue; the customers will get a brief description about the product.

PRE-CONDITION

— Not Applicable

THE CHARACTERISTICS OF ACTIVATION

— Execution depends on customer demand (Event driven). If the customer desires to view a brief description about a certain product, he/she should select this use case.

FLOW OF EVENTS

Basic flow

— The use case begins when a customer select search product form the eCatalogue main page.

— Customer inserts the product name.

— Customer presses the search button.

— The system will respond to the customer request and will view the product details.

Alternative flow

A—1: Home Page

— The system will go back to the Catalogue home page.

Exceptional flow

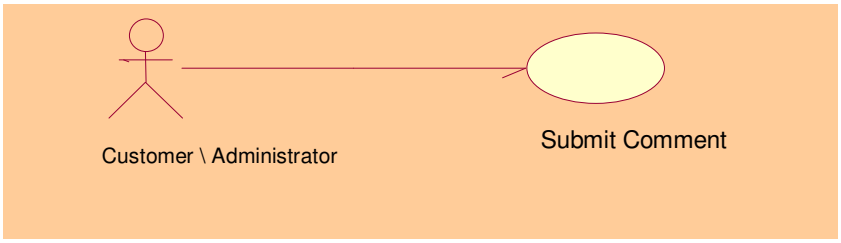
E—1: UNAVAILABLE PRODUCT

— System will verify the selected product in database. If the product is not found, the system shall display “Unavailable Product”.

POST-CONDITIONS

— View search products.

4.1.2.3 Use Case: SUBMIT COMMENT



BRIEF DESCRIPTION

— This case is initiated by customers or Administrator who would like to comment on a certain products from the proposed eCatalogue system.

PRE-CONDITION

— Customer selects product

THE CHARACTERISTICS OF ACTIVATION

— Execution depends on customer demand (Event driven). If the customer desires to comment on products, he/she should select this use case.

FLOW OF EVENTS

Basic flow

— The use case begin when user click comment button.

— The customer will insert his/her name details.

— The customer will insert his/her comment on the selected product.

— The customer will press submit.

— The system will respond to the customer request and will save the comment details.

Alternative flow

— Cancel

Exceptional flow

E-1-: INSERT NAME

System will verify the customer comment process. If the customer does not enter his/her name, the system shall display “Insert Name”.

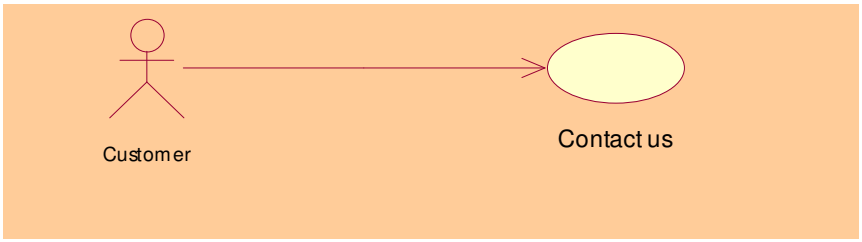
E-2-: INSERT COMMENT

System will verify the customer comment process. If the customer does not enter his/her comment, the system shall display “Insert Comment”.

POST-CONDITIONS

— View Customer Comment

4.1.2.4 Use Case: CONTACT US



BRIEF DESCRIPTION

— This case is initiated by customers who would like to enquire about other information related to eCatalogue system.

PRE-CONDITION

— Not Applicable

THE CHARACTERISTICS OF ACTIVATION

— Execution depends on customer demand (Event driven). If the customer desires to contact Administrator, he/she should select this use case.

FLOW OF EVENTS

Basic flow

— The use case begin when user click contact us button.

— The customer will get the details of contact information

— The customer can click on the e-mail address to send the enquiry.

Alternative flow

— Cancel

Exceptional flow

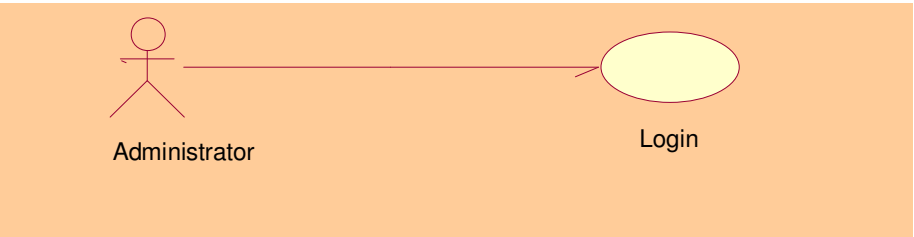
E-1-: INCORRECT INFORMATION

System will verify the customer entries. In case of incorrect information the system should display “Incorrect Information”.

POST-CONDITIONS

— Send success

4.1.2.5 Use Case: LOGIN



BRIEF DESCRIPTION

— This case is initiated by Administrator who would like to access to his/her page. Administrator will be able later to manage the product and comment details.

PRE-CONDITION

— Administrator has username and password

THE CHARACTERISTICS OF ACTIVATION

— Execution depends on Administrator demand (Event driven). If the Administrator desires to login to his/her eCatalogue page, he/she should select this use case.

FLOW OF EVENTS

Basic flow

— The use case begin when Administrator presses login button.

— Administrator will insert the username and password.

— Administrator presses the login button.

— The eCatalogue system will respond to the Administrator request and will view his/her page.

Alternative flow

— Not Applicable

Exceptional flow

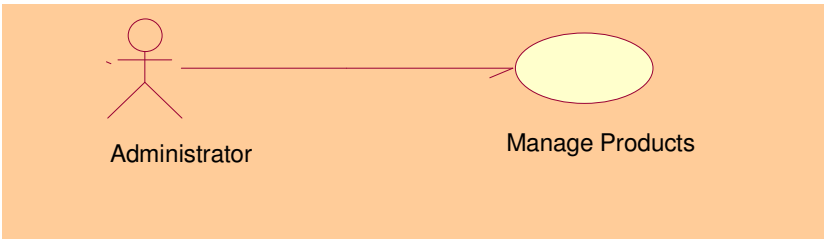
E-1-: WORNG USERNAME AND PASSWORD

System will verify the Administrator login details. In case of incorrect information the system should display “Wrong Username and Password”.

POST-CONDITIONS

— Login Success.

4.1.2.6 Use Case: MANAGE PRODUCT



BRIEF DESCRIPTION

— This case is initiated by Administrator who would like to manage the product details by adding, updating, and deleting the eCatalogue product details.

PRE-CONDITION

— Administrator has username and password

THE CHARACTERISTICS OF ACTIVATION

— Execution depends on Administrator demand (Event driven). If the Administrator desires to manage the product details, he/she should select this use case.

FLOW OF EVENTS

Basic flow

— The use case begin when Administrator clicks manage product button.

— Administrator will fill the product details form.

— Administrator will press submit.

— The eCatalogue system will respond to the Administrator request and will save the new product information.

Alternative flow

— Edit product

— Delete product

Exceptional flow

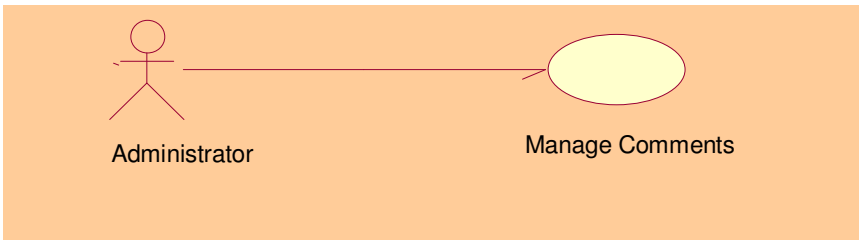
E-1-: INVALID PRODUCT DETAILS

System will verify the Administrator add product request. In case of incorrect information the system should display “Invalid Product Details”.

POST-CONDITIONS

— Save product details.

4.1.2.7 Use Case: MANAGE COMMENTS



BRIEF DESCRIPTION

— This case is initiated by Administrator, when Administrator like to manage the comments details by editing and deleting the eCatalogue comments product details.

PRE-CONDITION

— Administrator has username and password

THE CHARACTERISTICS OF ACTIVATION

— Execution depends on Administrator demand (Event driven). If the Administrator desires to manage the comments details, he/she should select this use case.

FLOW OF EVENTS

Basic flow

— The use case begin when Administrator clicks manage comments button.

— Administrator will modify the comments details.

— Administrator will press submit.

— The eCatalogue system will respond to the Administrator request and will save the new comments information.

Alternative flow

— Delete comments.

Exceptional flow

— Not Applicable.

POST-CONDITIONS

— Save comments details.

4.1.3 Sequence and Collaboration Diagrams

The sequence diagram is a unified modeling langue (UML) diagrams that shows the processes that are executed in sequence (Rountev & Reddoch, 2006; Refsdal, 2008), the sequence of messages which are exchanged among roles that implement the behavior of the system, arranged in time (Silva & Paton,2003; House of Representative, 1999). There are three kinds of objects:

a) Boundary: it is the boundary the user and it actors (interface).

b) Entity: it's the information a system uses (date).

c) Control: it's the control logic of the system (who does what).

4.1.3.1 View News Sequence and Collaboration Diagrams

Figure 4.2, shows the sequence diagram for view use case. The proposed eCataogue supports the customers to view the product news, description, and price posted by the Administrator. Refer to Figure 4.3 for its collaboration diagram.

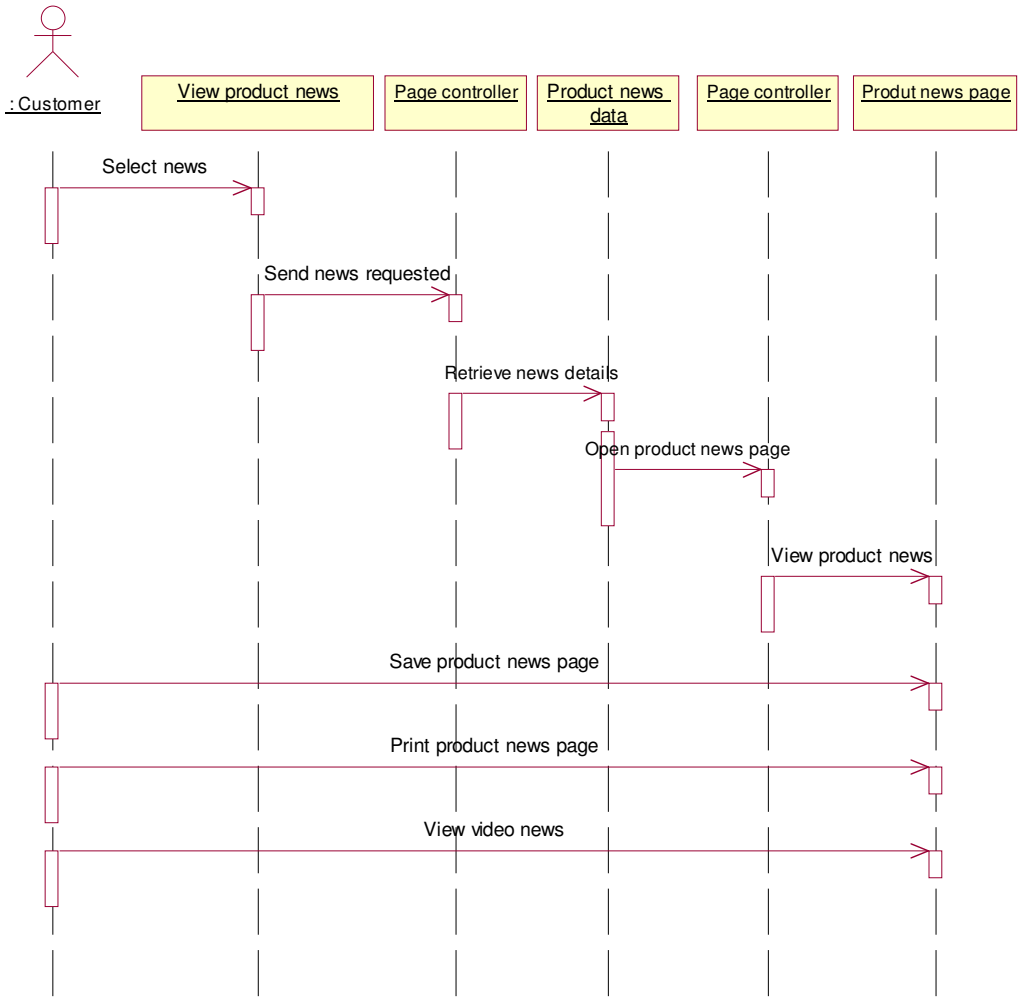


Figure 4.2: View News Sequence Diagram

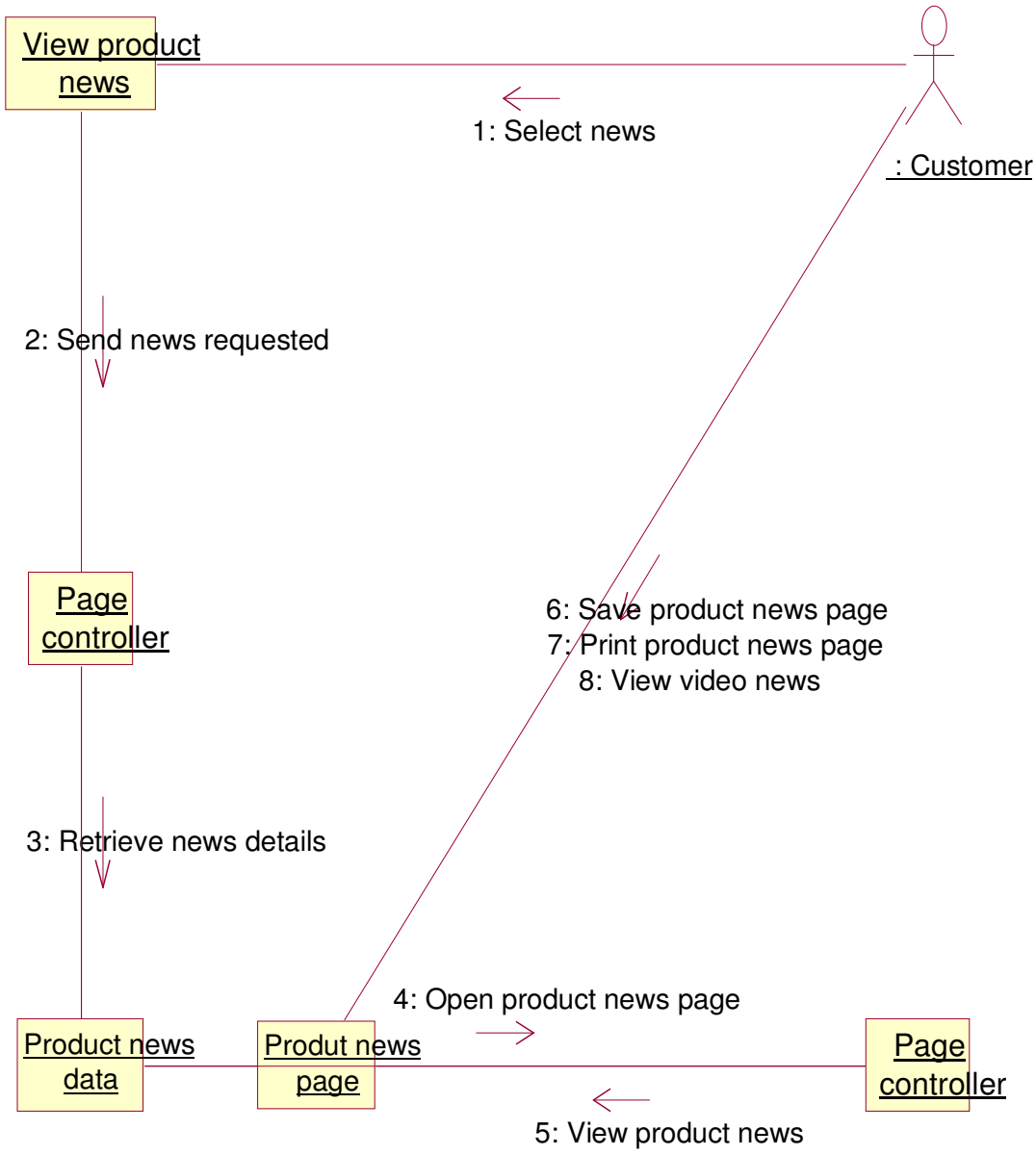


Figure 4.3: View News Collaboration Diagram

4.1.3.2 Submit Comment Sequence and Collaboration Diagrams

Figure 4.4, shows the sequence diagram for Submit comment on eCatalogue Products use case. The proposed eCatalogue supports the customers to provide their comment on the selected product. Figure 4.5 shows its collaboration diagram.

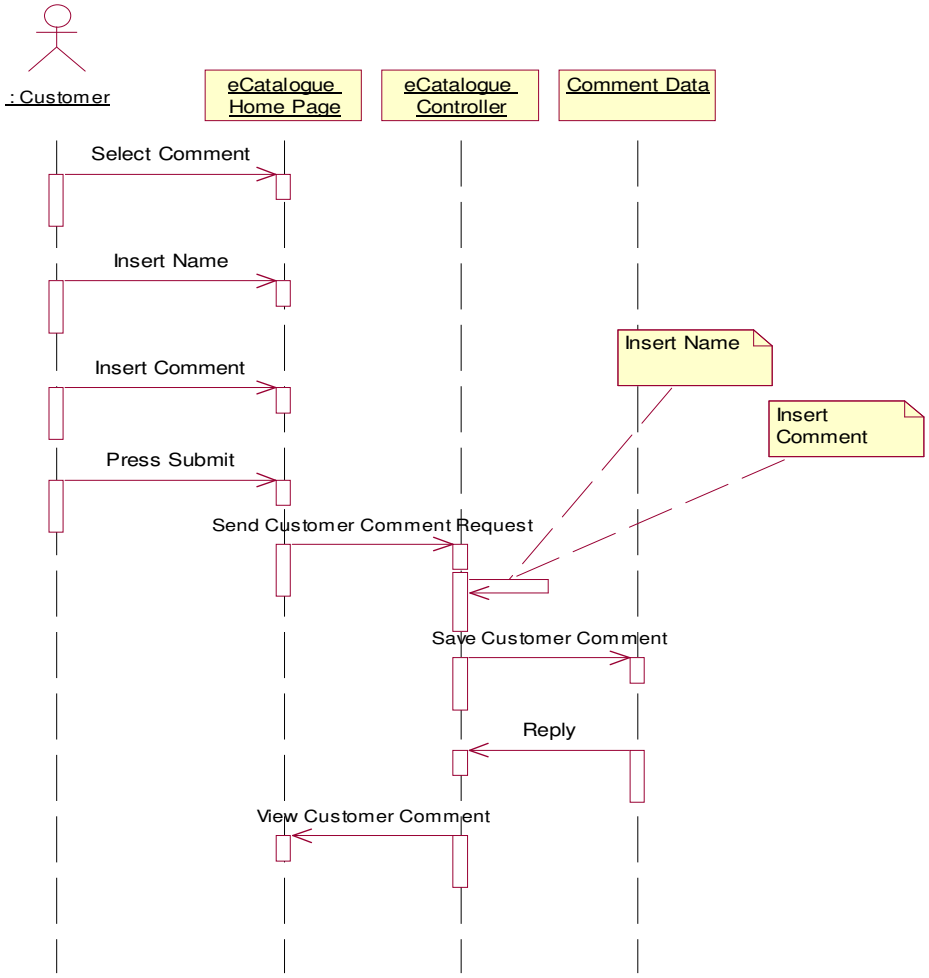


Figure 4.4: Submit Comment Sequence Diagram

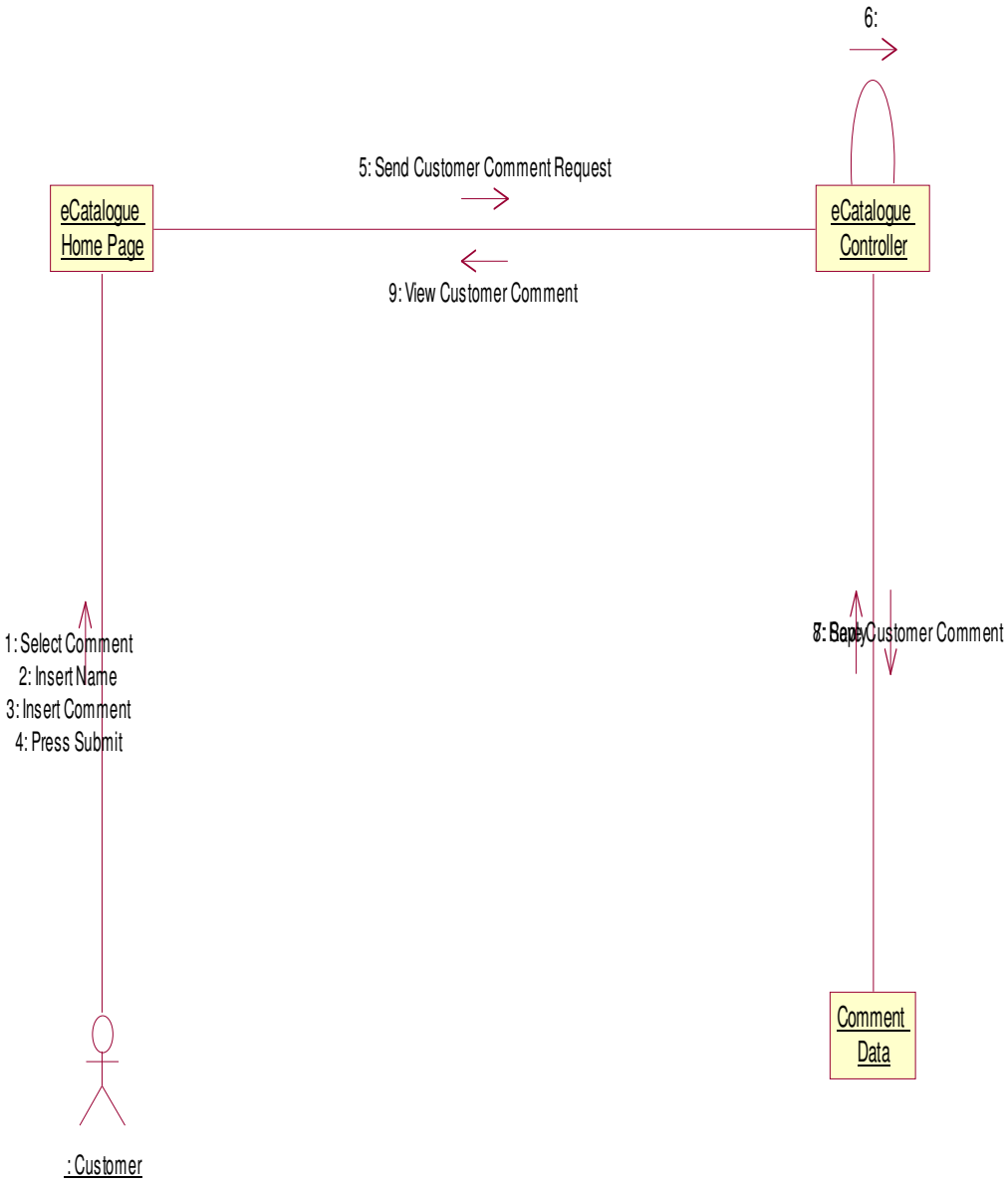


Figure 4.5: Submit Comment Collaboration Diagram

4.1.3.3 Search for Product Sequence and Collaboration Diagrams

Figure 4.6, shows the sequence diagram for search for product use case. The proposed eCatalogue support customers to search about their products by inserting the product name. Refer to Figure 4.7 for its collaboration diagram.

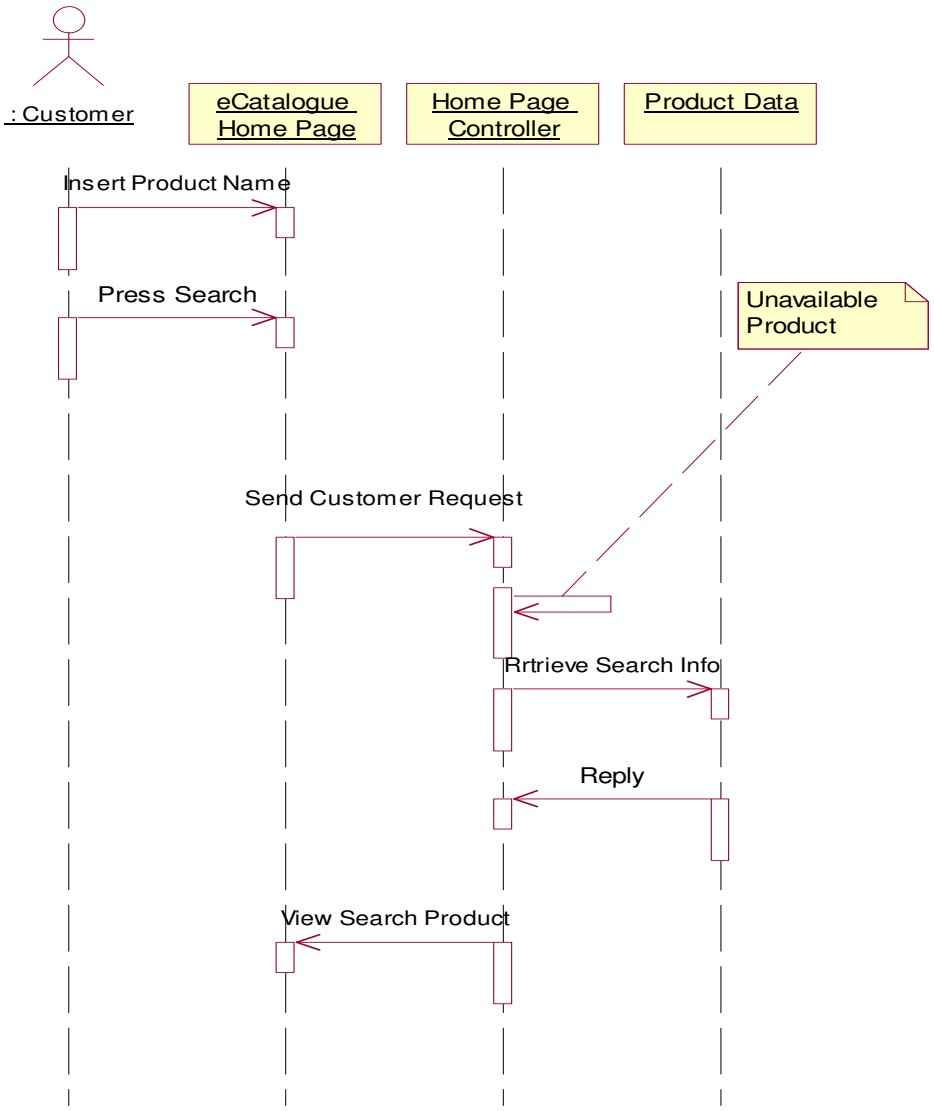


Figure 4.6: Search for Product Sequence Diagram

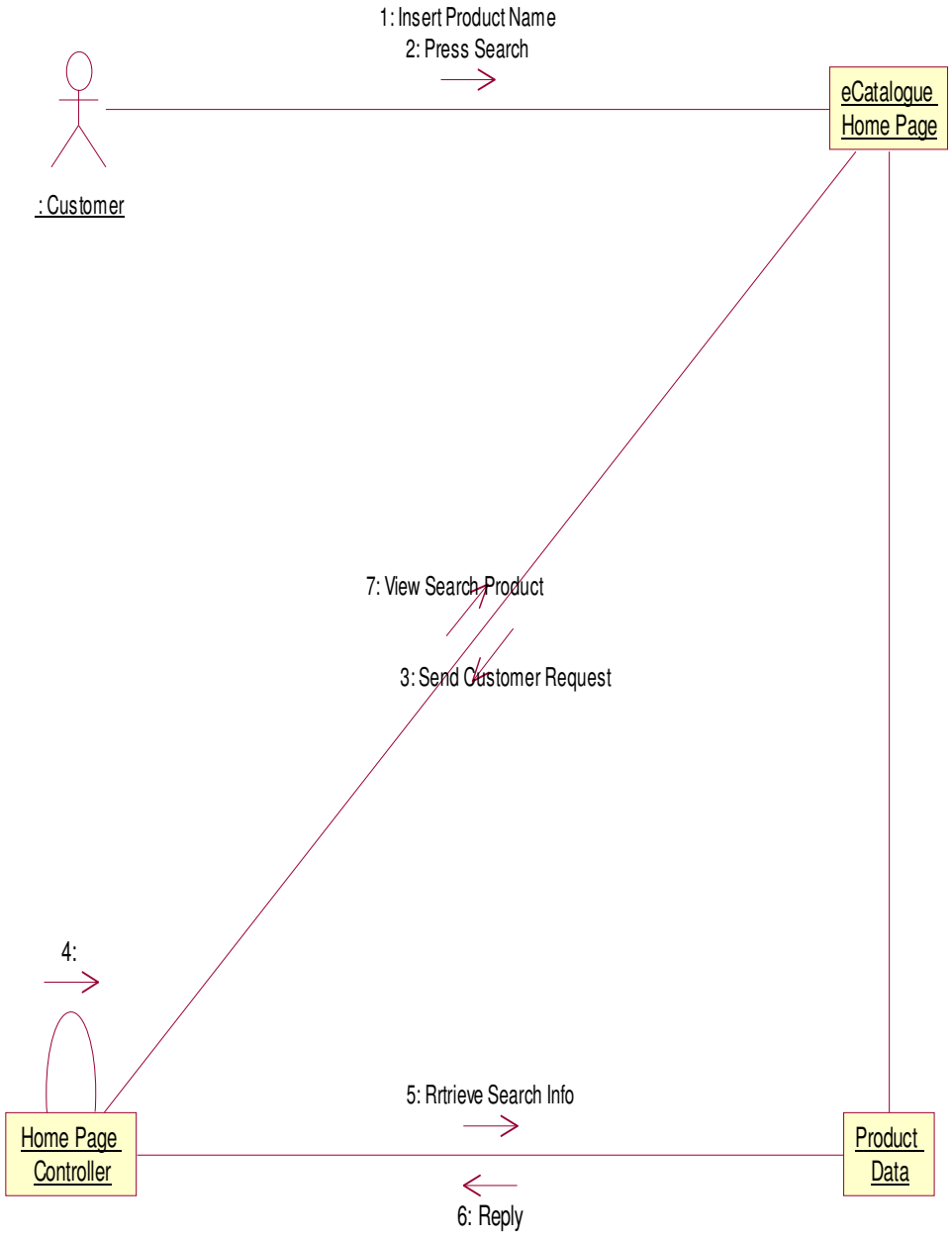


Figure 4.7: Search for Product Collaboration Diagram

4.1.3.4 Contact us Sequence Diagram

Figure 4.8, shows the sequence diagram for contact us use case. The proposed eCatalogue supports the customers to enquire about their questions that related to eCatalogue contents. Figure 4.9 depicts its collaboration diagram.

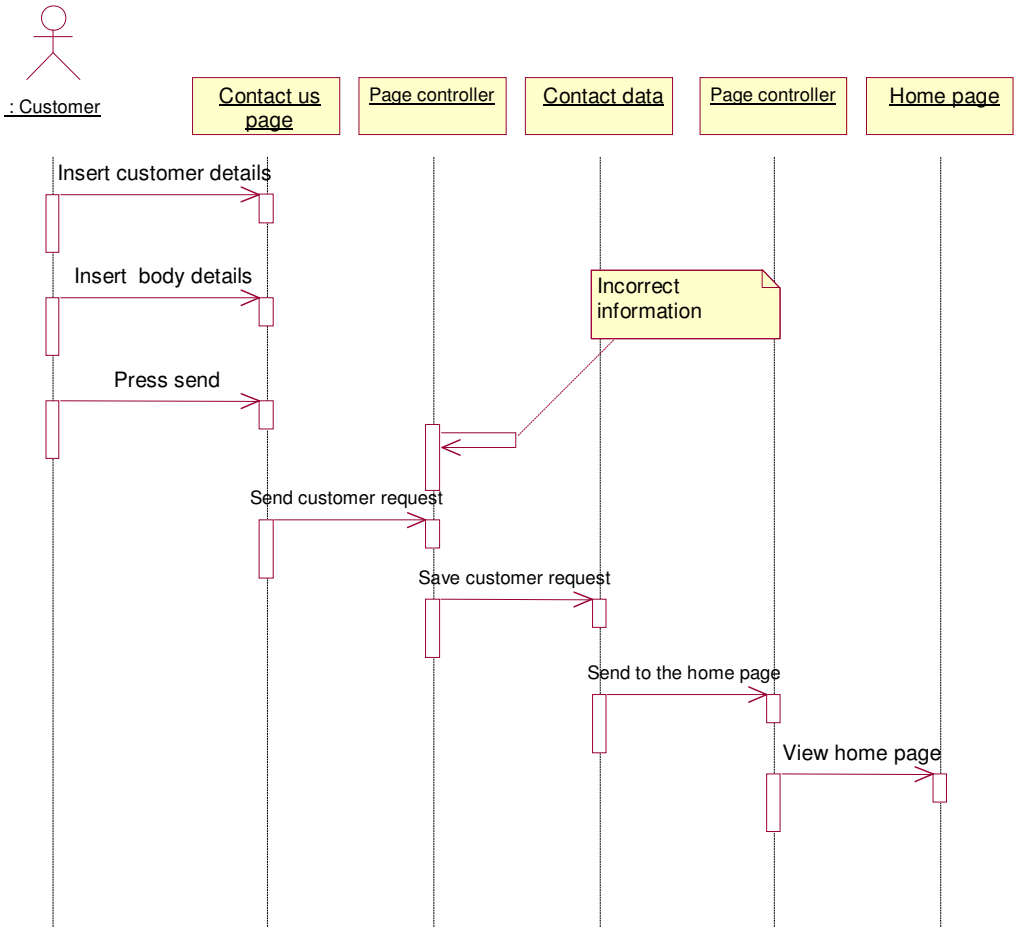


Figure 4.8: Contact us Sequence Diagram

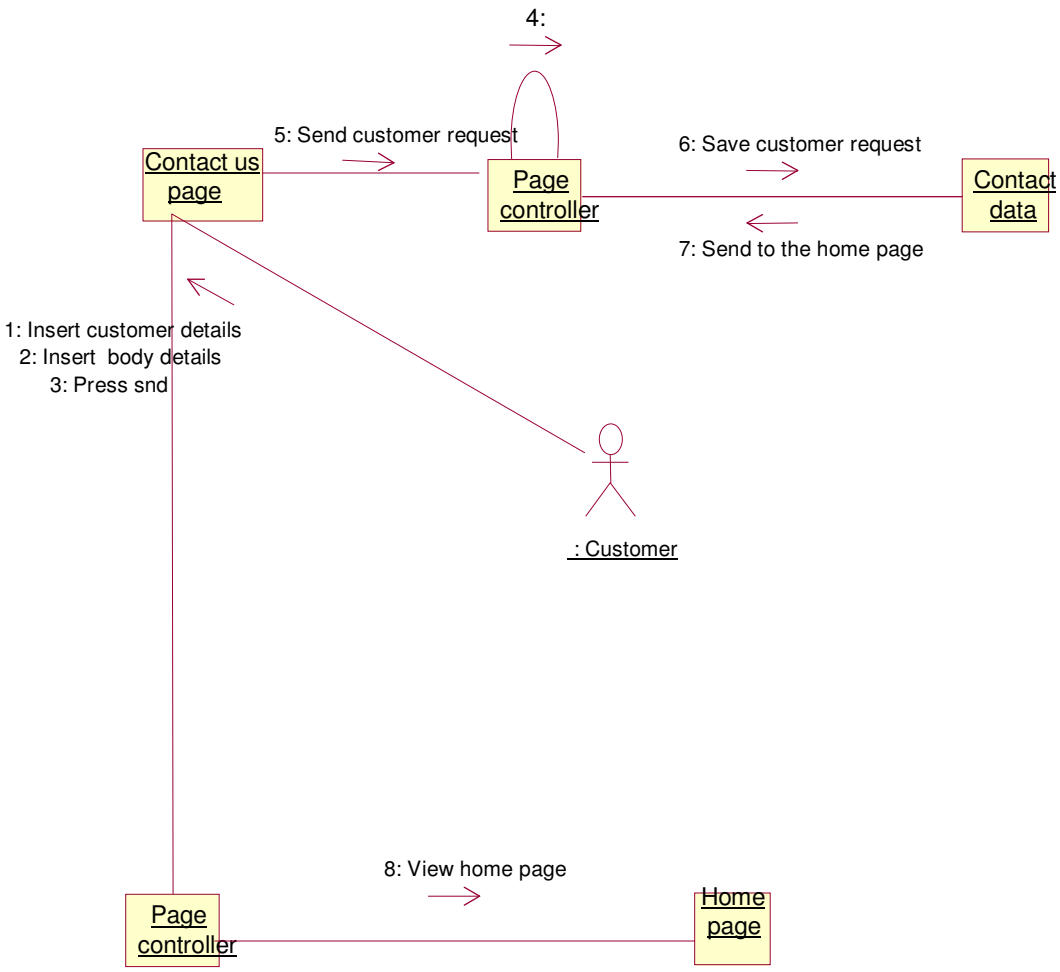


Figure 4.9: Contact us Collaboration Diagram

4.1.3.5 Login Sequence and Collaboration Diagrams

Figure 4.10, shows the sequence diagram for login use case. The proposed eCataogue supports the Administrator to login though his/her username and password to his/her eCatalogue pages. Refer to Figure 4.11 for its collaboration diagram.

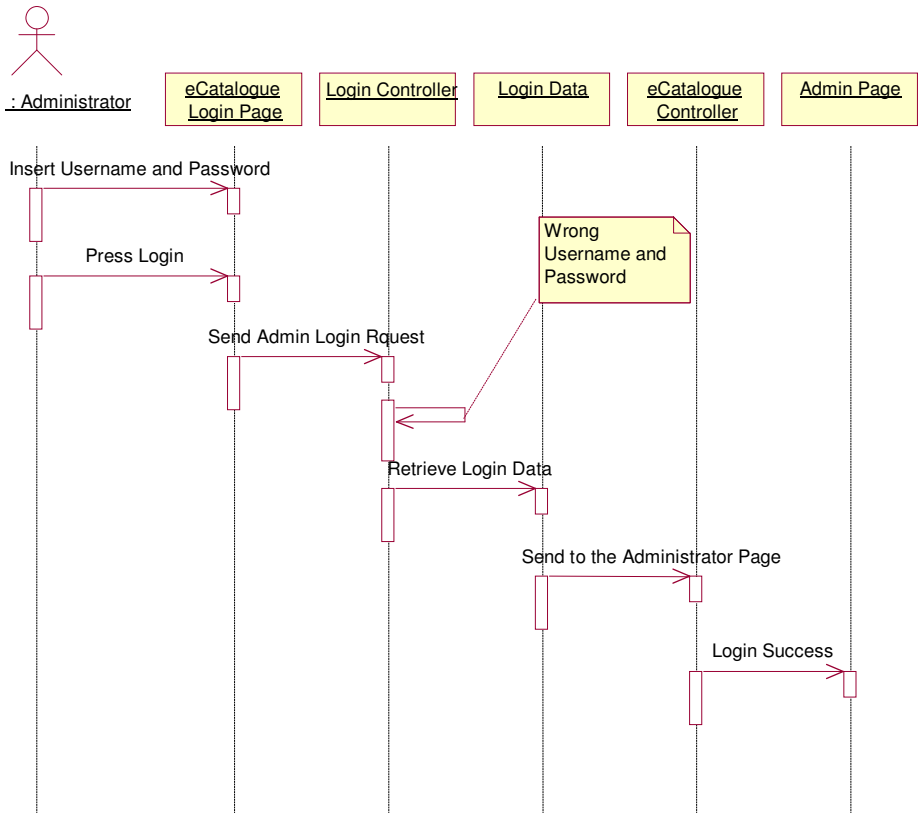


Figure 4.10: Login Sequence Diagram

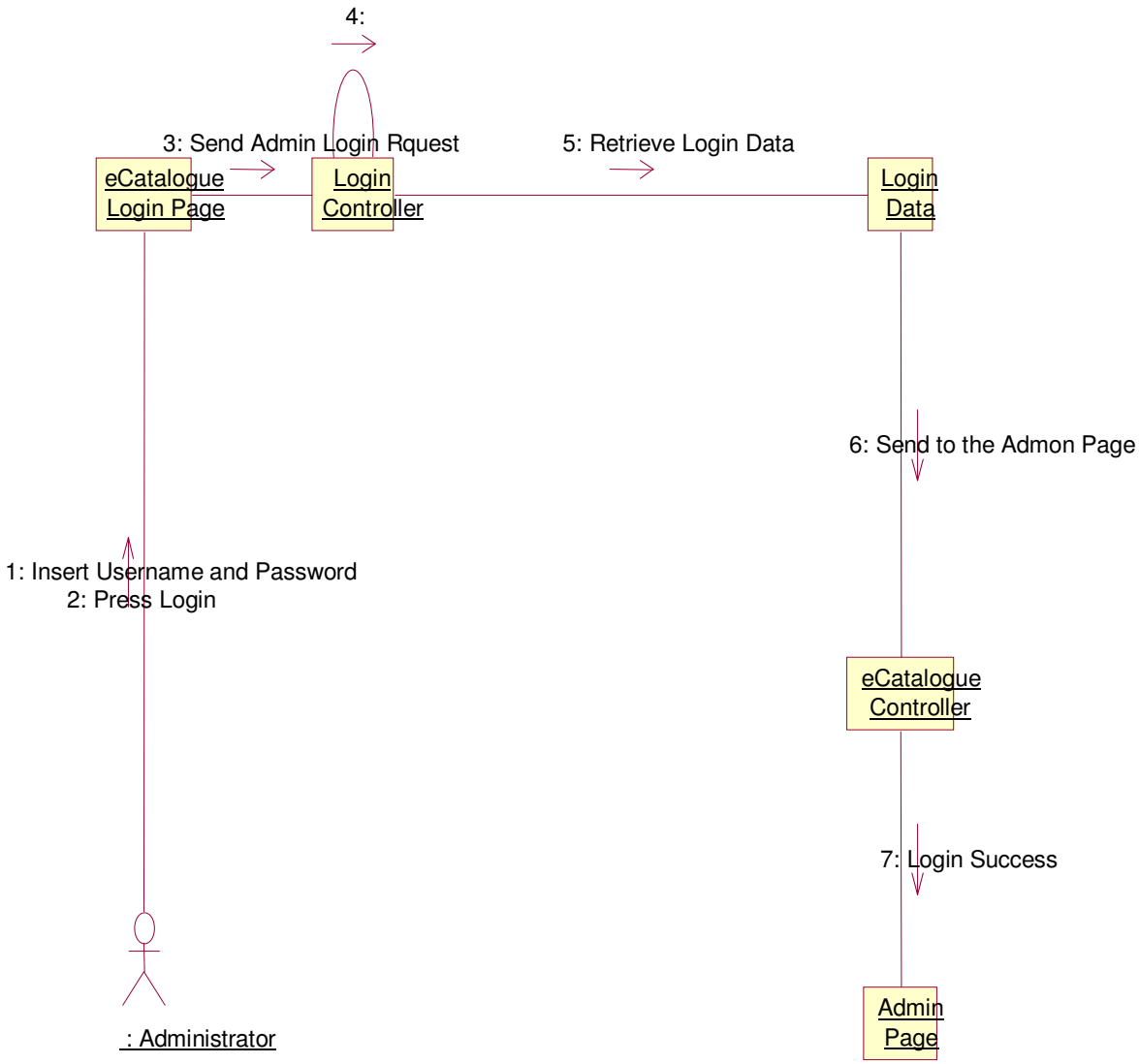
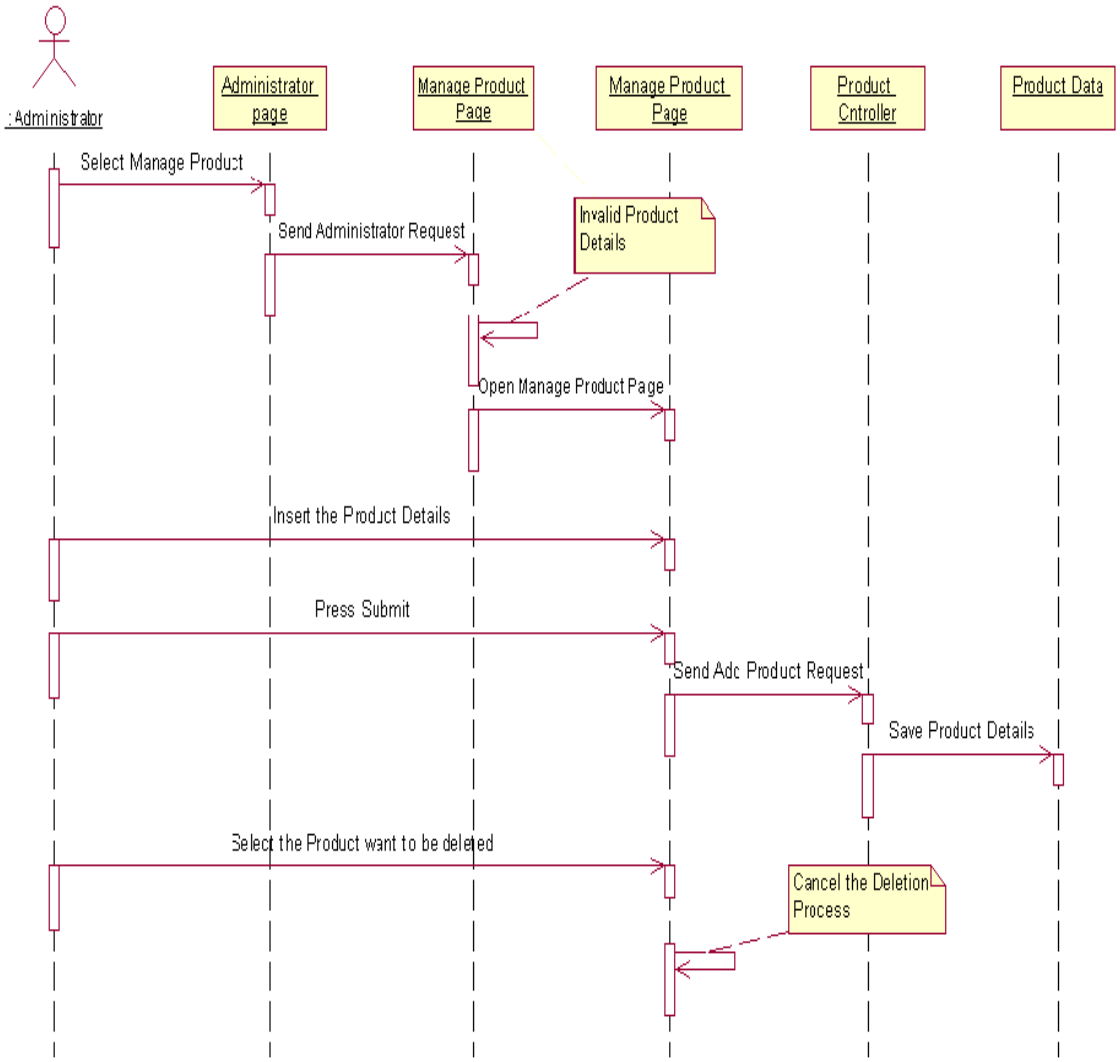


Figure 4.11: Login Collaboration Diagram

4.1.3.6 Manage Product Sequence and Collaboration Diagrams

Figure 4.12, shows the sequence diagram for managing the product use case. The proposed eCatalogue supports the Administrator to manage the product details by adding, updating, and deleting the product details. Figure 4.13 depicts its collaboration diagram.



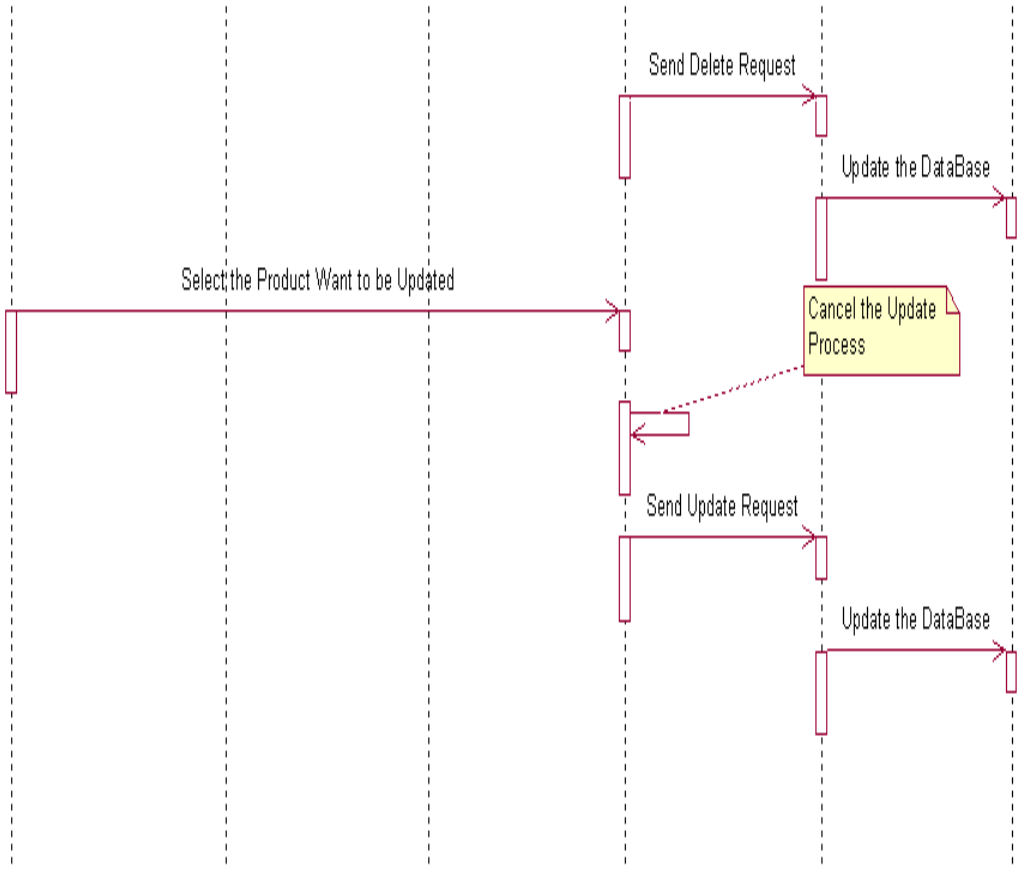


Figure 4.12: Manage Product Sequence Diagram

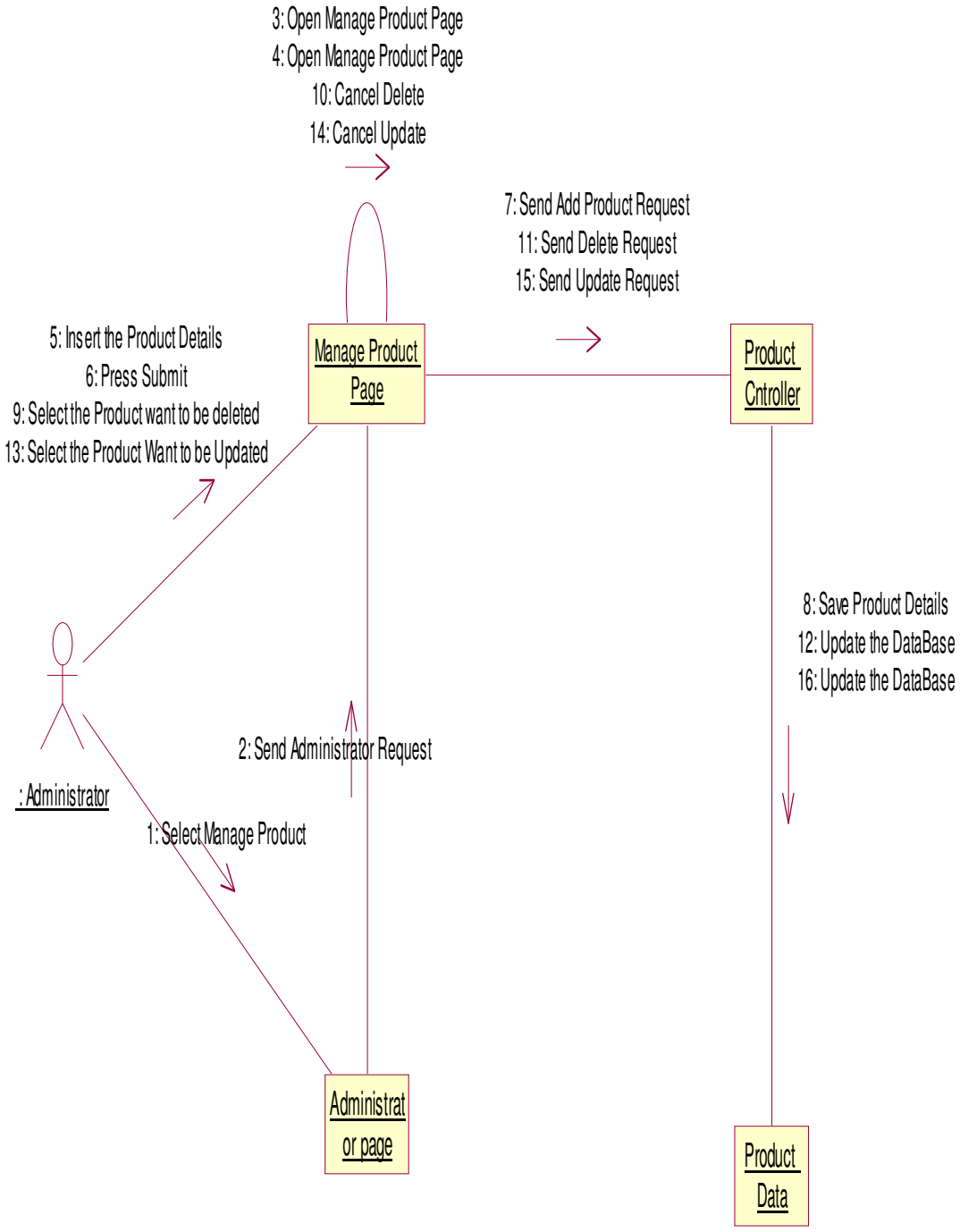


Figure 4.13: Manage Product Collaboration Diagram

4.1.3.7 Manage Comment Sequence and collaboration Diagrams

Figure 4.14, shows the sequence diagram for managing the comments use case. The proposed eCatalogue supports the Administrator to manage the comments details by editing, and deleting the comments details. Refer to Figure 4.15 for its collaboration diagram.

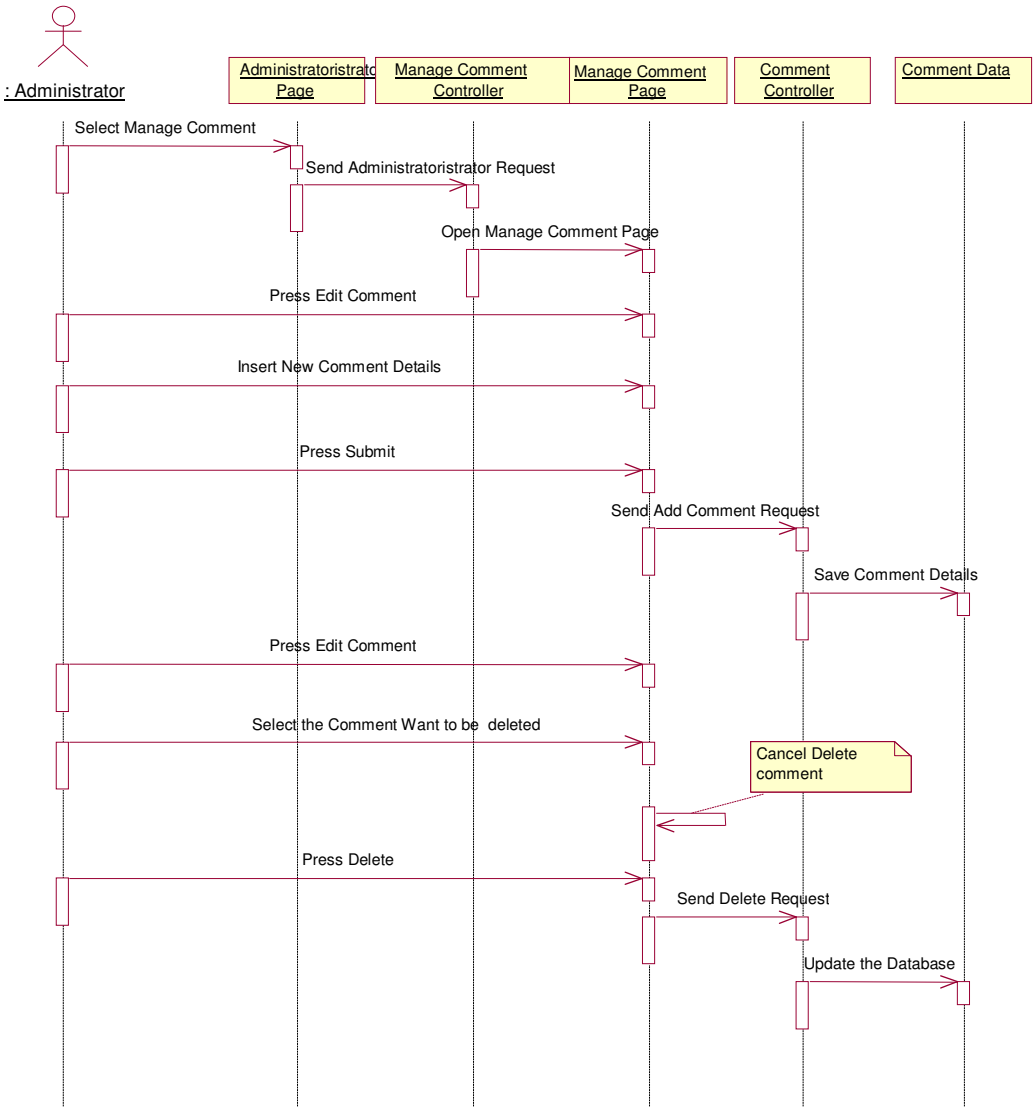


Figure 4.14: Manage Comment Sequence Diagram

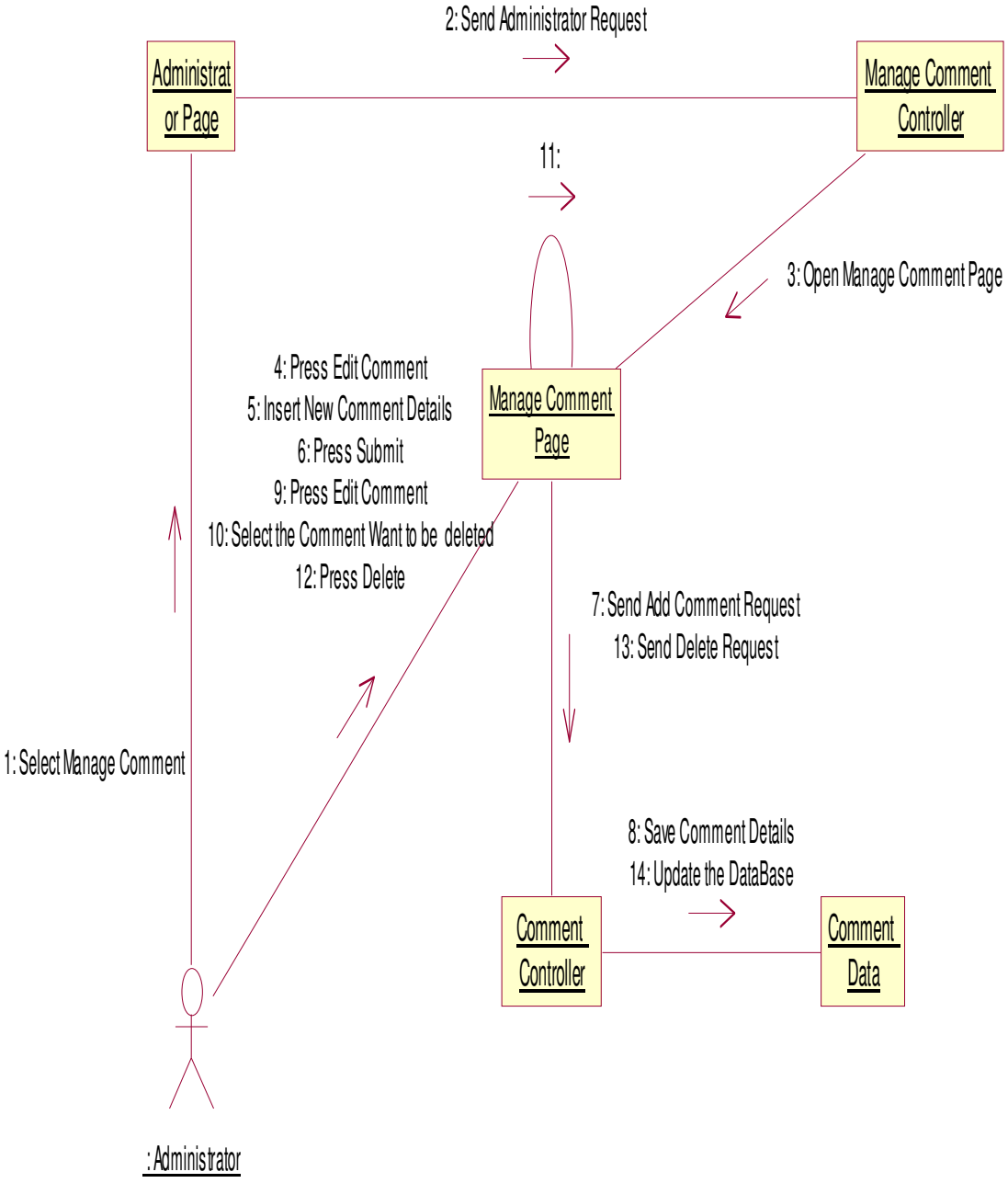


Figure 4.15: Manage Comment Collaboration Diagram

4.2 System Development

The eCatalogue was developed using ASP.NET technology, which is device independent (Kalata, 2003), provides security and compatibility features (Zerzelidis & Wellings, 2005), and is supported by windows 2003 server (Zacker, 2004).

4.3 Architecture of the eCatalogue

The presented figure 4.16 shows the architecture of the eCatalogue request process by the Administrator and customers.

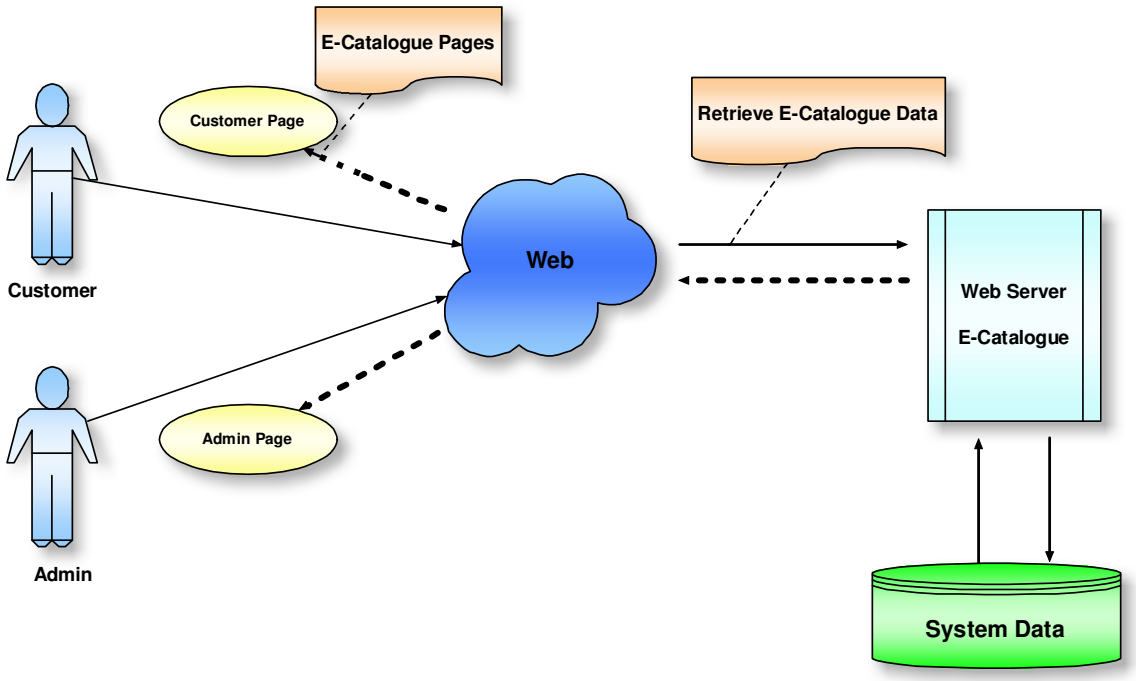


Figure 4.16: eCatalogue Architecture

As shown in Figure 4.16, the customer and Administrator initiate the request to the eCatalogue system database. The proposed eCatalogue system communicates with the Web Gateway Server. The function of the Web gateway is to route requests from the Web user or client to a web server (System database). Web gateway translates the user request. The server accepts the request, then gets the information from the eCatalogue database and builds a dynamic page. Finally, web server responds by sending acknowledgement. If there are any references included within the document, the Web browser will request these from the servers on which they are located. At last the Web browser will display all of the information on the screen fro customers and Administrator.

4.4 User Interface Of eCatalogue

The presented eCatalogue below presents the page layout for the cover page and subsequent pages. The cover page layout was split into three sections. These are:

(a) Header

This section contains the titles of the eCatalogue system.

(b) Cover display

The eCatalogue cover provides recognition of the prototype title, which would be updated, based on every eCatalogue issue. There are different options for the customers such as:

1. View product news, description, and price.
2. Comment on the available products.
3. Search on certain product.
4. Contact the Administrator.

(c) Headlines

This provides for customers to enable them to decide quickly whether the content is of interest to them without having to browse through all the products inside the eCatalogue that could help customers to select a certain product.

Refer to Figure 4.17, 4.18, 4.19, 4.20, 4.21, 4.22, 4.23, 4.24 to see the customer and the Administrator interface.

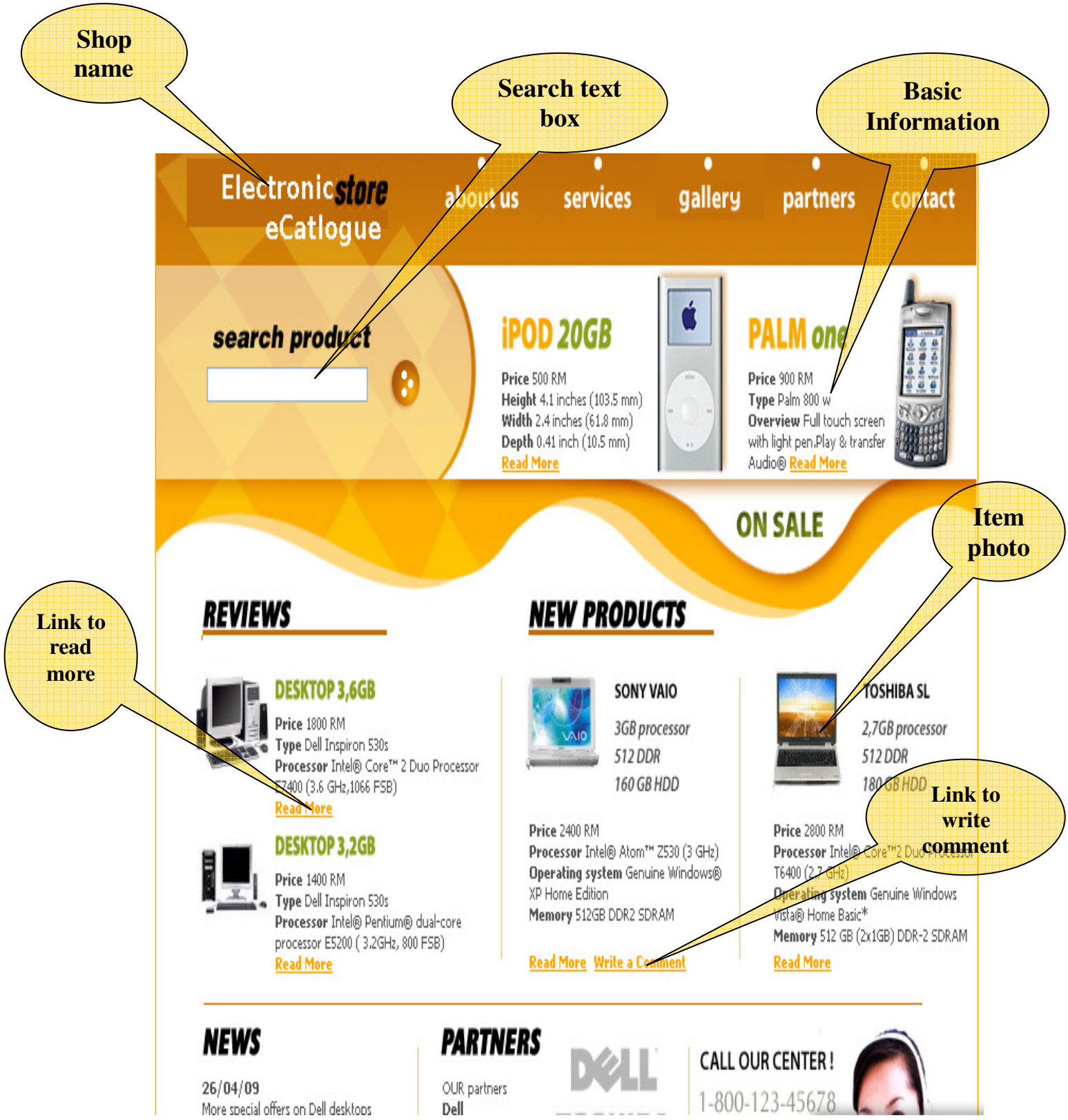


Figure 4.17: Home Page Layout

Figure 4.18: Comment Page Layout

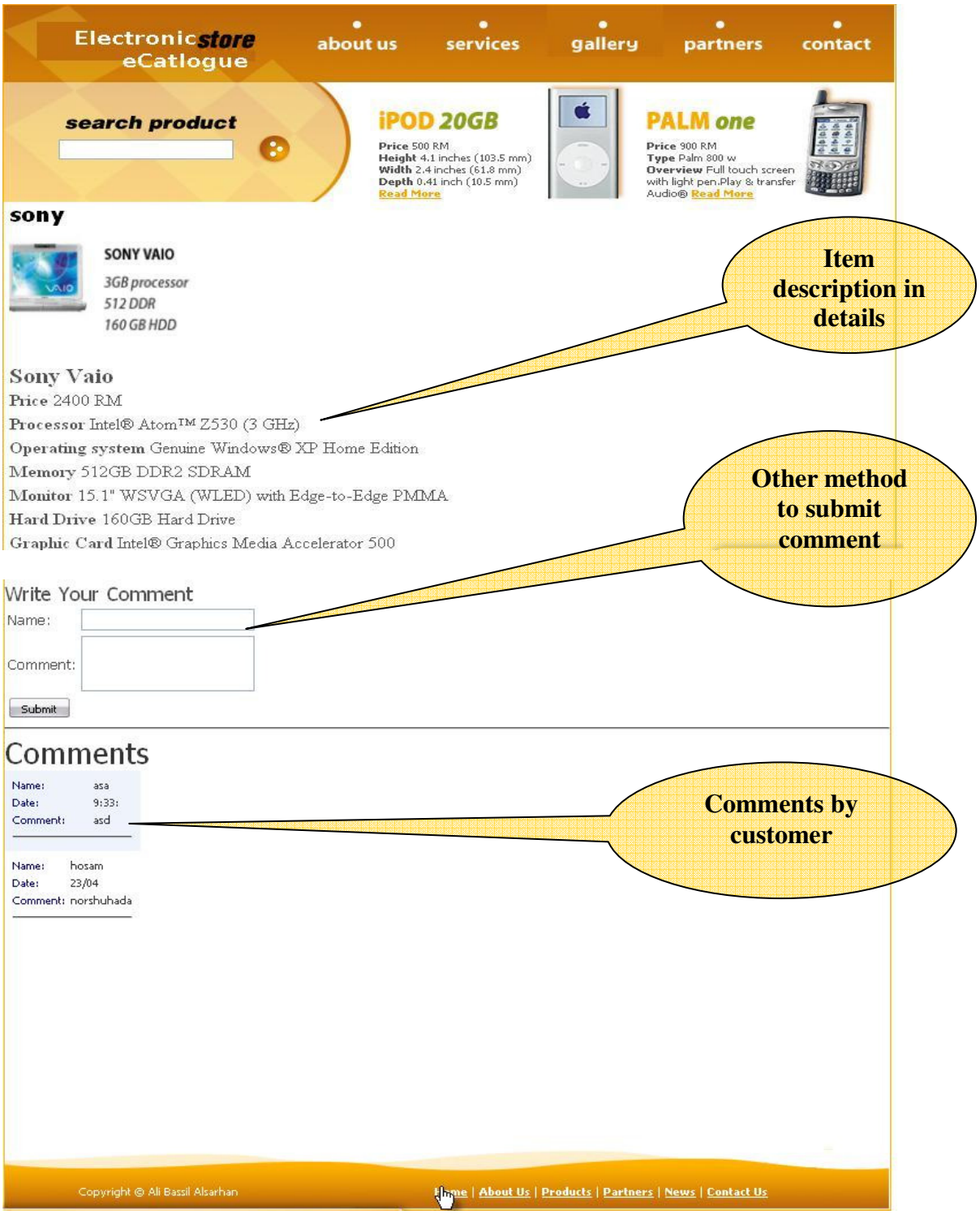


Figure 4.19: View Page Layout

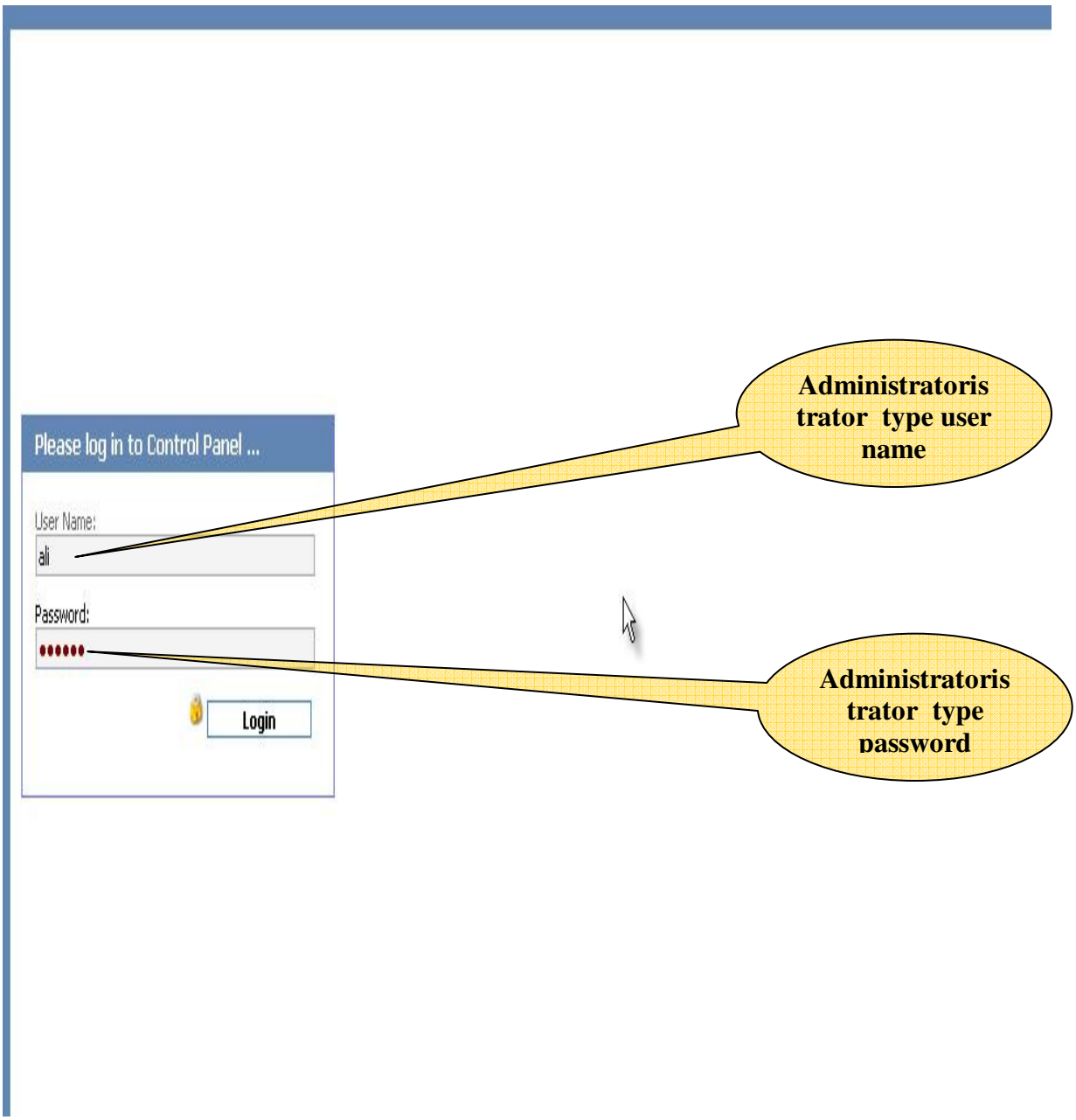


Figure 4.20: Login Page Layout

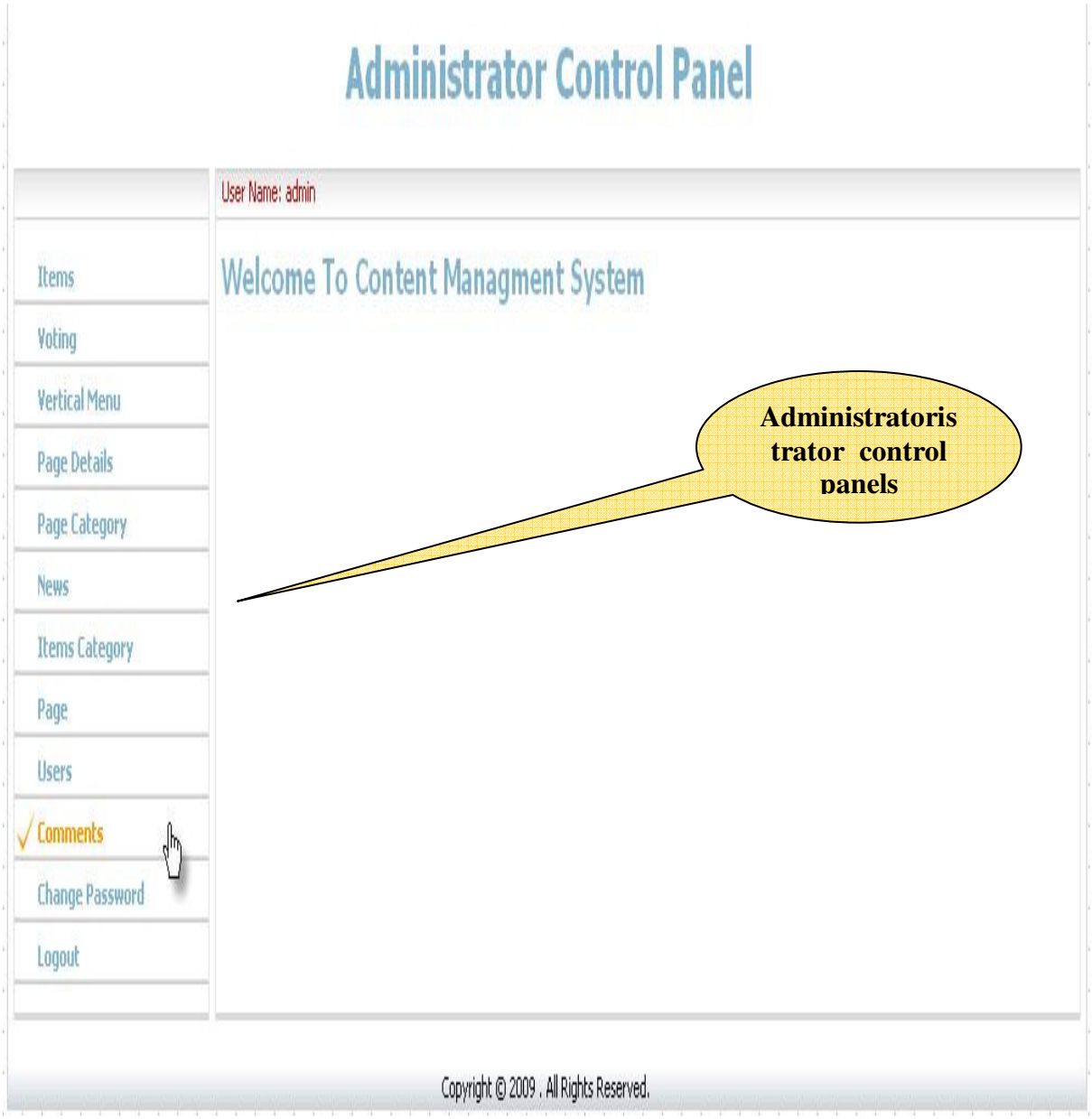


Figure 4.21: Control Panel Page Layout

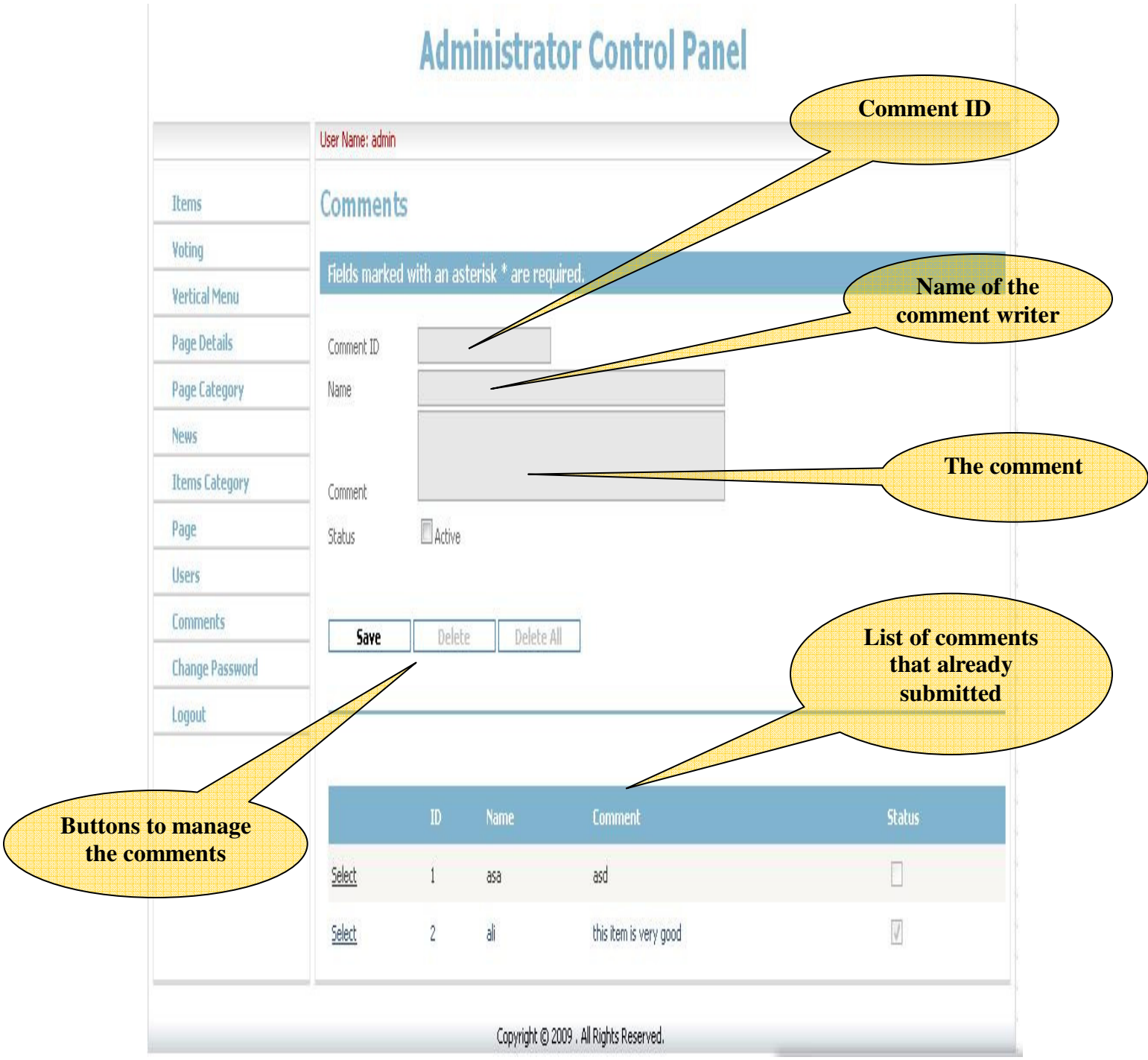


Figure 4.22: Manage Comments Page Layout

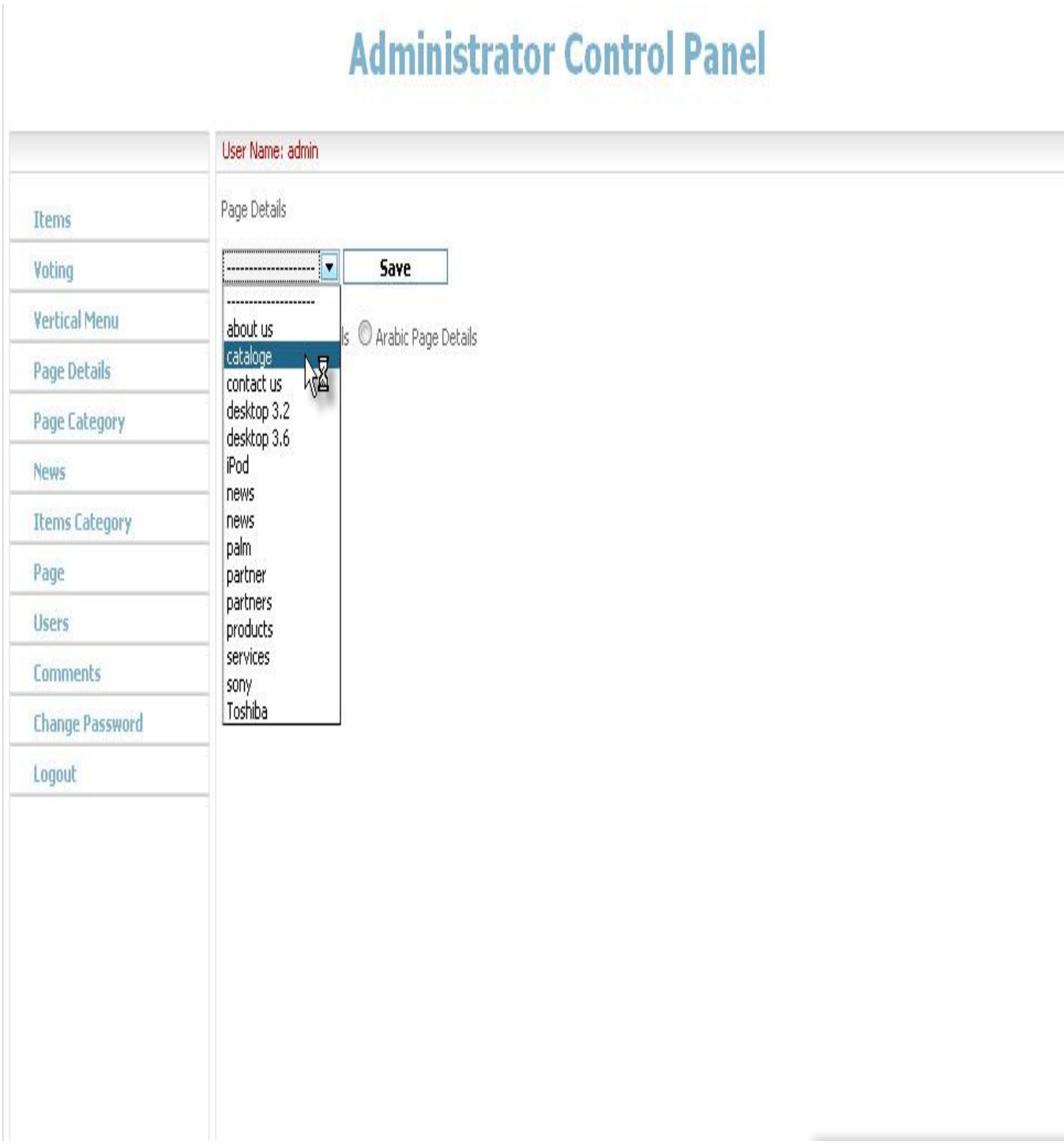


Figure 4.23: Manage products information Page Layout

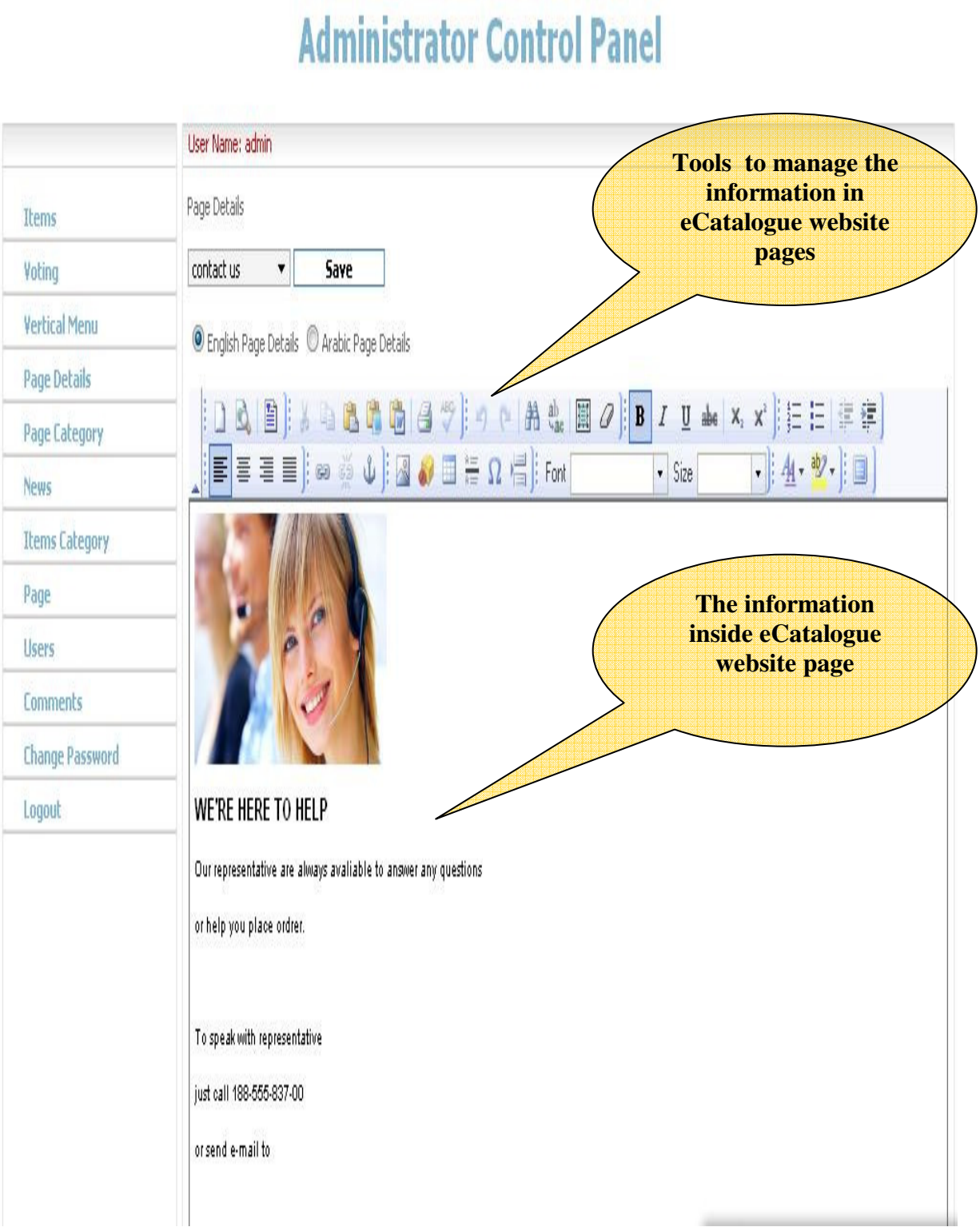


Figure 4.24: Manage eCtalogue website information Page Layout

4.5 SUMMARY

This chapter illustrates the eCatalogue functionality for customers and Administrator, UML diagrams have been presented such as use case diagrams, sequence diagrams, and collaboration diagrams. Moreover, the eCatalogue interface and contents have been explained.

CHAPTER FIVE

eCATALOGUE EVALUATION

5.1 Introduction

This study focused on developing an eCatalogue for providing and supporting the customers with the browsing functions of the products. Furthermore, execution of this project was motivated by the intention of providing more flexible and enhanced method of presenting information to the customers. The user evaluation of the eCatalogue prototype was conducted on 30 potential customers. Moreover, dimensions of information quality as identified by Bailey and Pearson (1983) have been used covering nine dimensions (Accuracy, Precision, Currency, Timeliness, Reliability, Completeness, Conciseness, Format, and Relevance). Refer to Appendix A.

Respondents were randomly selected, they were leaded to view the eCatalogue, after which they were required to answer the questionnaire. Three scale values are used (1= Disagree, 2= Not sure, 3= Agree).

5.2 Profiles of Respondents

Table 5.1 shows, there are 30 respondents involved in this study. The respondents of the study consist of 36.6.0 % male (11 respondents) and 63.3 % female (19 respondents). Most of them are students. Moreover, the majority age of the respondents (66.6%) are between 18-25 yes all.

Variables	**Item**	**N**	**%**
Gender	Male	11	36.6
	Female	19	63.3
	Total	30	100
Age	18-25 years	20	66.6
	25-40 years	7	23.3
	40-6 years	3	10.0

Table 5.1 Profiles of Respondents

5.3 User Evaluation

Table 5.2 presents the average values covering the nine dimensions (Accuracy, Precision, Currency, Timeliness, Reliability, Completeness, Conciseness, Format, and Relevance).

Respondents agree that the information in the eCatalouge are somewhat current (mean =2.27), precise (2.20), accurate (2.17), reliable (2.17), and concise (2.17). However, they are Not sure about the timely (2.00) and relevant (2.07) dimensions.

Also they agree to some extent the format is satisfying (2.20). Overall mean of quality measure is (2.15), which indicates that the quality of information should be improved.

	N	Minimum	Maximum	Mean	Std. Deviation
Accurate	30	1.00	3.00	2.17	.74664
Precise	30	1.00	3.00	2.20	.71438
Current	30	1.00	3.00	2.27	.82768
Timely	30	1.00	3.00	2.00	.78784
Reliable	30	1.00	3.00	2.17	.69893
Complete	30	1.00	3.00	2.10	.84486
Concise	30	1.00	3.00	2.17	.79148
Relevant	30	1.00	3.00	2.07	.78492
Format	30	1.00	3.00	2.20	.71438
Valid N (list wise)	30				
Overall mean				2.15	

Table 5.2: Descriptive Statistic for eCatalogue Evaluation

5.4 Summary

The quality of the information in the eCatalogue was evaluated. 30 respondents participated where the results seem to suggest that the information quality can be further improved.

CHAPTER SIX

CONCLUSION

6.1 Discussion

Catalogue is a vital part of business strategy. It informs customers of the detailed description of products that are on sale in the business entity. In this current business scenario, when internet and technology play a crucial role, introduction of eCatalogue is seen as an alternative approach to satisfying customer needs.

As discussed in Chapter 1, the objectives of this study are:

a. To develop a web-based e-Catalogue that allows items and their details (i.e. product descriptions, price, location, and related images) to be input into the catalogue and up-dated regularly.

b. To determine the information quality of the developed e-Catalogue.

The outcome of the first objective has been discussed in chapter 4, where the main functionality, actors and use case of the eCatalogue are described. The chapter then further illustrates the design of the eCatalogue including its interface.

To support the final objective, the evaluation of the eCatalogue prototype was conducted by asking 30 customers based on nine dimensions (Accuracy, Precision, Currency, Timeliness, Reliability, Completeness, Conciseness, Format, and Relevance). Results of this evaluation are discussed in chapter 5.

Though absolute attributes are important, it is how those attributes are perceived, now and in the future, that defines information quality in this study. Furthermore, identifying quality information involves two stages: (a) highlighting which attributes are important and (b) determining how these attributes affect the customers in question.

6.2 Future Studies

There are several recommendations for future studies as follows:

1. The proposed eCatalogue system should be upgraded with more useful functions such as customizable and intelligent agent components. Additionally, the use of advanced media such as 3D objects or virtual reality integration can add to improve information quality.

2. Evaluation of the quality of information should be a comprehensive process with a larger number of respondents. However, in this study, due to limited time and resources, only a handful of 30 respondents participated. A future study should take into account more respondents, or

utilize different evaluation technique. These could provide more significant findings.

3. Develop security mechanism to secure and safe the information about the customers account. Currently this feature is not included in the prototype.

6.3 Conclusion

eCatalouge is an online business strategy. This study has shown that it is crucial to consider the design features of eCatalouge in order to provide quality information to customers. This conclusion is made by accomplishing both objectives of this study, which are discussed in chapter 4 and 5.

References

Adamczak, S. (2003). *copmuter-aided systems for manufacture and measurment of machine elements.* kielce: project PL-1. Pages 301-310.

Astralys. (2008). Retrieved May 25, 2009, from Astralys: (http://www.astralys.com.sg/services/e-catalogue.asp).

Bahrami, A. (1999). *Object Oriented System Development*, McGraw-Hill, United States of America.

Bailey, J. & Pearson, S. (1983). Development of a Tool for Measuring and Analyzing Computer User Satisfaction, Management Science, Vol. 29, No. 5, 530-545.

Baron, J., Shaw, M., & Bailey, A. (2000). Web-based E-catalog Systems in B2B Procurement. *Communications of the ACM,* Vol.43, No.5.

BDigital (2003). eCatalogue. Retrieved on 16 Mei 2005 from http://www.bdigital.biz/index.php?pageid=376

Bennett, S., McRobb, S., & Farmer, R. (2002). *Object-oriented System Analysis and Design 2 Edition.* UK, McGraw Hill.

Brody, F. (1999). On risk, Convenience, and Internet Shopping Behavior, *Communications of the ACM*, vol. 43, no. 11, pp.98-105.

Ciocca, G., Gagliardi, I., & Schettini, R. (1999). A content-based image retrieval system with learning capabilities, *IEEE Multimedia Systems 99, IEEE Computer Society*, Vol. II,1028-1029.

Ciocca, G. Schettini, R.& Zuffi S. (2003). Open-Ended Search in High Quality Image Catalogues. *Istituto Tecnologie Informatiche Multimediali Consiglio Nazionale delle Ricerche Via Ampere 56*, 20131 Milano, Italy.

Choi, S., Stahl, D., & Whinston, A. (1997). The Economics of Electronic Commerce. Indianapolis. Retrieved 2 Feb. From http://scholar.google.com/scholar?q=Meanwhile,+ecommerce+can+be+defined+as+a+subset+of+e-business&hl=en&um=1&ie=UTF-8&oi=scholart.

December, J. (2008). Developing Information Content for the World Wide Web http://www.december.com/web/develop/overview.html

Dennis, A., Wixom, H., & Tegarden, D. (2005). *System analysis and design with UML version 2.0: an object-oriented approach with UML, 2nd edition*. Hoboken, NJ: John Wiley and Sons, Inc.

Digitsmith. (2005). Ecommerce definition and types of ecommerce. Retrieved Feb, 3, 2009, from (http://www.digitsmith.com/ecommerce-definition.html).

DZNet. (2007). E-Commerce. Retrieved March 13 2009. From (http://dictionary.zdnet.com/definition/e-commerce.html).

E-Business Technology Institute (2005). Retrieved on 27 March 2009, from (http://www.eti.hku.hk/eti/web/waec/ecatalog.html).

eCatalouge (2009). eCatalouge, retrieved on 20 March 2009, from (http://ecatalogue.com.au/about.htm).

Eriksson, H., & Penker, M. (1998). *UML Toolkit. USA*, John Wiley & Sons, Inc.

Fairchild, M. (1997). *Color Appearance Models*, Addison Wesley, USA.

Faloutsos C., Barber R., Flickner M., Hafner J., Niblack W., & Petrovic D. (1994) Efficient and effective querying by image content, *Journal of Intelligent Systems*, 3.231-262.

Gartner Research (2001). Procurement: An Overview of Electronic Catalog Commerce. In The Cardonet Exchange. http://www.gartner.com/webletter/cardonet/index.html

Georgantis, N., Koutsomitropoulos, A., Zafiris, A., & Papatheodorou S. (2002). A Review and Evaluation of Platforms and Tools for building e-Catalogs. *Proceedings of the 35th Hawaii International Conference on System Sciences, Hawaii.*

Giancarlo, L. (2000). Types of e-commerce: B2B, B2C, C2C, C2B. Retrieved Feb, 3, 2009. From (http://gandalf.it/offline/off26-en.htm).

Gill J. & Salton G. (1999). *Introduction to modern Information Retrieval*, McGraw-Hill. United States of America.

Gill M. & Salton G. (2004). *Introduction to modern Information Retrieval*, McGraw-Hill. United States of America.

Hesterbrink, C. (1999). E-Business and ERP: Bringing two Paradigms together. Retrieved May 15,2009, from PriceWaterhouse Coopers website: http://www.pwc.com/

Hoffer, A., George, F. & Valacich, S. (1999). Modern *Systems Analysis and Design (2nd Edition)*. United Kingdom : Addison Wesley Longman.

Hoffer, J. A., George, J. F & Valacich, J. S. (2002). *Modern Systems Analysis and Design (3rd Edition)*. Upper Saddle River, New Jersey: Prentice Hall.

Hoffman, L. & Novak, P. (1996). Marketing in Hypermedia Computer-Mediated Environments: Conceptual Foundations, *Journal of Marketing*, 60, (3), 50-68.

Holmes, M. (2009). The Multiple Dimensions of Information Quality. Muhlenberg College Allentown, PA 18104, retrieved on 3 April 2009. From (http://www.muhlenberg.edu/depts/abe/business/miller/mdiqual.html).

House of Representative (1999). *Systems Development Life Cycle*, pp. 1-12.

Huang T., Lee W., & Wang Y. (1999) *Quality Information and Knowledge*. New Jersey: Prentice Hall.

Huang T., & Lee W., et al. (1999). *Quality Information and Knowledge*. Upper Saddle River: NY, Prentice Hall PTR.

Jacobson, I., Christerson, M., Johnsson, P. & Overgaars, G. (2004). *Object-oriented Software Engineering: A Use Case Driven Approach (revised)*. Harlow, England: Addison-Wesley.

Kalata, K. (2003). *Introduction to ASP.NET*. Course Technology. New Delhi, India.

Kahn, K. & Stong, M. (1998) Product and Service Performance Model for Information Quality: *Proceedings of the 1998 Conference on Information Quality*, Cambridge, MA: Massachusetts Institute of Technology.

Kothari, C. (1995). *Research Methodology, Methods and Techniques*. Delhi: Wiley Eastern Limited.

Kwok, S., Yang, C., & Tam, K. (2004). Intellectual property protection for electronic commerce applications. electronic commerce research, 5(1). Retrieved Feb 10, 2009. From (http://www.csulb.edu/web/journals/jecr/issues/20041/Paper1.pdf).

Maria, M. (1998). Electronic Commerce via Personalised Virtual Electronic Catalogues. Intelligent Interactive Technologies Group.retreieved on 20 March 2009, from (http://www.cmis.csiro.au/I2Tech/Projects/DDD/).

Milosavljevic, M., Tulloch, A. & Dale, R. (1996). Text generation in a dynamic hypertext environment. *In Proceedings of the Nineteenth Australasian Computer Science Conference*, pp. 417--426. Melbourne, Australia.

Mood, M., Graybill A., & Boes, C. (1988). *Introduzione alla statistica*. McGraw-Hill.

Mursec, B. & Ploj, A. (2001). Expert system OPTIS for optimization of cutting conditions and modern information systems of selection of tools and cutting conditions in cutting processes, Strojarstvo, 43, no. 4/6, 169-175.

Mursec, B. (2000). Integral model for the selection of optimal cutting conditions in the computer aided tool management system, doctor's thesis, University of Maribor, Faculty of Mechanical Engineering, Maribor.

Ng, S. F. (2001) e-Travel catalogue application for tourism in Malaysia.
Masters thesis, Universiti Utara Malaysia.

Opportunity Wales (2001). eCatalogues: What is an eCatalogue? Retrieved on 16 Mei 2005 from www.opportunitywales.co.uk/txt/0-0-0/8-0-0/glossary/glossary_a.htm.

Pagegangster (2009). Pagegangster PDF Converter, retrieved on 21 March 2009, from (http://www.pagegangster.com/eng/).

Pairin, K. & Keng, S. (1999) Measuring information quality of web sites: development of an instrument , *Proceedings of the 20th international conference on Information Systems*: 279 – 285.

Pass G., Zabih R., & Miller J. (1996). Comparing Images Using Color Coherence Vectors. Proc. *Fourth ACM Multimedia 96 Conference*.

Peng Y. (2002). Information Quality of the Jordan Institute for Families Web Site. A Master's paper for the M.S. in I.S. degree. July, 2002.

Petrelli D., Stock O., Strapparava C., & Zancanaro M. (1997). Augmented space: Bringing the physical dimension into play. In Proceedings of the Flexible Hypertext Workshop, *held in conjunction with the 8th ACM International Hypertext Conference*. pp. 24-29. Southampton, UK.

Ravden S., & Johnson G. (1989). *Evaluating Usability of Human Computer Interfaces: a Practical Method*. UK: Ellies Horwood Ltd Chicheste.

Refsdal, A. (2008). *Extending UML Sequence Diagrams to Model Trust-Dependent Behavior with the Aim to Support Risk Analysis*. 197(2): 1529

Rountev, A. & Reddoch, M. (2006). *Static control-flow analysis for reverse Engineering of UML sequence diagrams*. 31(1): 96 – 102.

Sabbata P., Zuffi S., Correia A.I., Benatti G., Fantin S. (2000). An architecture for a high-quality electronic catalog on the Internet. Proc. of the SPIE vol. 3964 Internet Imaging, San Jose.

Sami, I. (2006, May). From B2C to C2C e-commerce. Retrieved Feb, 3, 2009, from http://www.groundswell.fi/sim/academic/(sim)%20From%20B2C%20to%20C 20e-commerce.pdf).

Schmuller, J. (2002). SAMS teach your self UML in Hours. SAMS Publishing, Indiana.

Silva, D. & Paton, W. (2003). UML: The Unified Modeling Language for Interactive Applications. Retrieved from: http://scholar.google.com/scholar?q=UMLi:%20The%20Unified%20Modeling%20La

Stokes M., Anderson M., Chandrasekar S., & Motta R. (1996). A Standard Default Color Space for the Internet – sRGB, http://www.w3.org/Graphics/Color/sRGB.

Strong M. , Lee W. (1997). "Data quality in context." *Communications of the ACM 40(5)*: 103-110.

Valarie, Z., Parasuraman, A. & Leonard, B. (1990). *Delivering Quality Service: Balancing Customer Perceptions and Expectations*. The Free Press, New York.

Wang, Y. and Strong M. (1996). "Beyond accuracy: What data quality means to data consumers." *Journal of Management Information Systems 12(4)*: 5-34.

Wang, Y. (1998). "A product perspective on total data quality Management." *Communications of the ACM 41(2).*

Wired (2008). Powerful e-Catalogue Tool: Treating Customers as Individuals. Retrieved on 25 March 2009. From (www.wired.co.nz).

Zacker, C. (2004).*Managing and Maintaining a Microsoft Windows Server 2003 Environment*. Microsoft Press. United States of America

Zerzelidis, A. & Wellings A. (2005). *Requirements for a real-time .NET framework. Sigplan Not*, pages = 41-50. http://doi.acm.org/10.1145/1052659.1052666.

APPENDIX (A) QUESTIONNAIRE

Web-based eCatalogue Evaluation of Information Quality

SECTION A: Background of the Respondents

eCatalogue is a Digital Brochure of information on products (with images and salient features mentioned).Please visit out eCatalouge website at www.st704805.bizhostnet.com website and try to use the services. After trying, please answer these questions.

1. Gender:

☐ 1. Female

☐ 2. Male

2. Your Age?

☐ 18-25

☐ 25-40

☐ 40-60

SECTION B: Information Quality Dimensions

This part is planned to get your opinion on evaluation of information in the eCatalogue. Please tick [√] where appropriate to your opinion.

1 = Disagree **2 = Not sure** **3 = agree;**

1.	**Information provided in the eCatalouge to describe products is;**	**Scale** **1**	**2**	**3**
	Accurate	□	□	□
	Precise	□	□	□
	Current	□	□	□
	Timely	□	□	□
	Reliable	□	□	□
	Complete	□	□	□
	Concise	□	□	□
	Relevant	□	□	□
2.	**Format of information is satisfying;**	□	□	□

Further comments:

_____

_____

_____

_____

THANK YOU