Mobile Music Store

M-Muze

By

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[Matric No: 3044]

Dissertation submitted in partial fulfillment of

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(Supervisor: Miss Emy Elyanee Mustafa)

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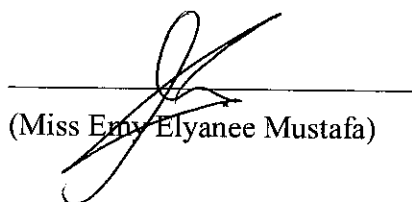
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CERTIFICATION OF APPROVAL

Mobile Music Store
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Farah Nurshazreen bte Shuib [3044]

A project dissertation submitted to the

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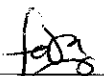
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CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and the original work contained herein have not been undertaken or done by unspecified sources or person

Farah Nurshazreen bte Shuib

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ABSTRACT

The introduction of the mobile devices into the electronic commerce arena has allowed the user to go on the Web as well as shopping on the Web using their cell phones, Personals Digital Assistants (PDAs) or combo devices without needing a wired Internet connection and stationary desktop or a laptop computer. In order to give customer's convenience, service providers and also value-added services include easy, timely access to information in a way enable customer to make purchase from whenever they are whenever they are ready. The author here will develop an instant music CD purchasing via mobile phone application by using Wireless Markup Language (WML) as a programming tool. The technique that has been adopted is based on Wireless Application Protocol (WAP) as global standards for mobile solutions. The result of the study has proven that in order to captivate users' attention towards legal music CD purchasing through the web via mobile, design of the interface has given an impact towards the adaptation of content presentation by implementing HCI elements. Therefore, the design of the interface and content according to one's preference plays an important role in enhancing users' "browse and buy" experience at any desired time and needs. The study done towards the implementation of design guidelines for wireless application which is in general, interface design flaws are platform independent has also proven that the design best applied depends on the form factors of the wireless mobile phones.

The system URL: http://www.ideashoppe.com

ACKNOWLEDGEMENT

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CHAPTER 1

INTRODUCTION

1.1   Background of Study

The explosive growth of penetration and usage of mobile devices is frequently noted in research studies [Barnes and Scornavacca 2004; Dholakia et al 2004; Massoud and Gupta 2003]. By 2009 the number of mobile telephone subscribers is estimated to outstrip that of fixed-line subscribers [ITU 2000, cited in Dholakia et al. 2004]. The widespread availability of mobile phones that can handle digital data and that are connected to digital communications infrastructure means that the scene is set for the widespread adoption of m-commerce (defined as the use of mobile, wireless (handheld) devices to communicate and conduct transactions through public and private networks [Balasubramanian et al. 2002]).

The introduction of the mobile devices into the electronic commerce arena has allowed the user to go on the Web as well as shopping on the Web using their cell phones, Personals Digital Assistants (PDAs) or combo devices without needing a wired Internet connection and stationary desktop or a laptop computer. While, e-commerce is defined as shopping using internet, a desktop or laptop computer and a desktop-based operating system, but the Mobile Muze is defined as instant shopping music CD using the internet or the Web, a mobile device such as a cell phone, a PDA or a combo device and its operating system, using a dedicated wireless network. Shopping online is highly but several additional means of shopping are being added to the overall shopping experience on an irregular basis. A new significant addition to the online shopping experience is the use of mobile devices in e-commerce.

This study will focused on how the music CD purchasing can be developed in the mobile phone as an electric commerce via handheld devices and proof the concept of mobility, broad reachability, ubiquity, convenience and localization of product and services attributes. Mobility refers to the ability to initiates an e-commerce transaction at any desired time. Broad reachability refers to everyone using the cell phone with minimum internet access requirements being able to take part of Mobile Muze. Ubiquity can be described as the absence of geographical obstacles in m-commerce. Convenience represents the device being always at the user's disposal and increasingly easy to use. And finally, m-commerce can localize services and product's by determining the user's physical location and giving the user location-based shopping capabilities. The main advantages of Mobile Muze include widespread availability and affordability of devices and the lack of need for a generally more expensive computer device. Additionally, mobile handset is a new and highly accepted culture for the young population, and high-bandwidth data transfer is getting close to been mainstream.

Even though there are many limitations of mobile phones compared with personal computers (such as small display screen, low processing power, small keypad and much more), but mobile phones own two very important advantages over the pc which are mobility and small in size. These criteria are vital especially for music lover's user by enabling them to carry it around. Therefore using mobile phone as the platform is the best option.

Why not using PDA, laptop or other handheld devices? They are mobile gadgets too. The reason is not many students or tourists own PDA and laptop is too bulky. The use of handheld devices such as mobile shopping would cost them more. Why need to spend money to buy PDA or handheld devices when you already own a mobile phone? Why need to carry a bulky laptop wherever you go when mobile phone can be easily slipped inside your pocket?

1.2 Problem Statements

1.2.1 Problem Identification

Availability of e-commerce in World Wide Web, PDA, handheld devices (specifically Mobile shopping) and mobile phones is deniable. In fact, with the tremendous advances in hand-held computing and communication capabilities, the rapid proliferation of mobile devices, and decreasing device costs, its envision many new commerce applications that will be possible and significantly benefit from emerging wireless and mobile networks. Eventually, consumer and businesses will be able to conduct all information transaction from mobile devices. These applications are termed "mobile commerce".

Mobile commerce is expected to be the next big wave of business. A number of mobile commerce applications has been developed and are already in use, covering a wide range of business functions from advertising, banking, ticketing, and games to shopping. Mobile internet access will become a primary tool for completing daily information transactions (e.g. e-mail, retail shopping, and receive news). In Malaysia, there is no mobile commerce applications that has been develop for the mobile shopping via mobile phones that will passionately gives the users or customers great content and good user experience of the "browse and buy" via mobile phones.

The customer base of mobile phones is already larger than that of Internet users and market penetration will increase in the foreseeable future. Furthermore, the customers are already used to paying mobile phone services which is not the case for Internet user.

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Thus, with the explosive growth of the wireless telecommunications has taken mobile computing to another level is offering a new way of access to information and online shopping on handheld devices as the mobile is becoming a one device that seems to be doing everything. With cell phone use getting highly popular and reaching over most of the Malaysian users, a new alternative is emerging for cell phone owners in the form of accessing web. This mobile shopping will enable customer's convenience, service providers and also value-added services include easy, timely access to information in a way enable customer to make purchase from whenever they are whenever they are ready.

The problem arise when user found difficulty to access the web with the connected wired internet in any time they are desired to access music information, find out the songs titles, check price and CD details, upcoming new releases album, upcoming concert details and then swiftly make any purchase. The distribution and delivery information and especially that of music as a product has always been subject to significant changes due to technology shifts. There is tremendous pressure on the music industry for change. Music in non-physical product and can thus be delivered entirely over internet shopping. Recent inventions in audio compression, increasing the network bandwidth and the lack of law enforcement have led to an explosion of largely illegal distribution of music content over the internet especially by downloading music. Music listeners have not only learnt to like over-the-net distributed music because it is free, but also because it provides easier and more flexible access to larger volume of music titles that can be found in conventional records shops. The questions arise on what will happen to the convenient records shops and the sales of the music cassettes or compact disc legal distribution over the internet?

Thus, the music shoppers seem to be lack of awareness especially regarding issues of the pirate copying and selling of CD has been the biggest source of loss in the music industry in Malaysia. In order to overcome this, the emerging mobile commerce technology of "browse and buy" will give impact to music listeners in experience to browse and access from the attractive distribution channel with shopping music CD via mobile phone in a pocket and at any desired time with extravaganza benefits.

From here, comes the idea of developing the instant music CD purchasing via mobile phones that will focus on music purchasing in a legal distribution over the wireless internet. Mobile phone is chosen since it will ease the targeted users better than stand alone system as it is being considered as a must have item by 90% of Malaysia's population.

1.2.2 Significant of the Project

The final product will be able solve the problem with existing illegal music distribution and purchasing though the internet that give a bad impact to the Malaysia current music industry. Apart from that, the project will also emphasize the presence of various mobile shopping content accesses that will become a primary tool for completing daily information transactions. It also able to assist targeted people mostly teenagers, students and music lovers. By access the mobile internet shopping will passionately give the users great content and a good user experience for purchasing behavior through mobile phone.

1.3 Objectives

- To give an opportunity to the mobile users to access the e-commerce website via hand phone. The explosive growth of the wireless telecommunications has taken mobile computing to another level is offering a new way of access to information and online purchasing on handheld devices as the mobile is becoming a one device that seems to be doing everything.

- To give will enable customer's convenience, service providers and also value-added services include easy, timely access to information in a way enable customer to make purchase from whenever they are whenever they are ready.

- To develop a mobile commerce application that satisfies the Human Computer Interaction (HCI) to the mobile contents, layout and design in a dynamic way to improve users' navigation as desired and to improve the usability of the wireless Mobile Muze of instant music CD purchasing via mobile phones.

- To provide an immediately purchase opportunity to the mobile users, the customer will make the purchasing decision on the spot and not to go to the other alternate source with the "buy and browse" technology to browse a huge array of official, artist approved content especially tailored for mobile.

- To provide a state of art user experience and easy customer purchase of paid for content. This will give opportunity for the mobile user anywhere in the world pay for the Mobile Muze content on their phone bills, by credit/debit card or PayPal.

1.4   Scope of Study

Interest in mobile commerce is growing tremendously in the research and development community. Mobile commerce may require significantly different approaches in design, development, and implementation of applications due to the inherent characteristics of wireless networks and mobile devices. Many important challenges include design and development of m-commerce applications, networking requirements, transactions and security issues, business models and strategies.

1.4.1   Application-Level Issues

- *Seek Killer Application(s).*

For the mobile commerce to success, one or more killer applications must be developed to compel individuals to purchase and use mobile devices in their daily commercial activities. The killer application(s) for mobile commerce should make full use of mobility, provide services directly relevant to mobile needs and benefit users in immediacy and efficiency.

- *Enhance Usability of Mobile Devices*

As previously discussed, the usability of mobile devices is poor due to the various limitations of mobile terminals. Future mobile devices are expected to be smaller and more wearable, but they will also possess larger processing and storage resources. Screens for cellular phones also will be made larger, making them easier to use and more visually appealing. Meanwhile, offline methods without direct connection of mobile devices to the network can also help to minimize the technical limitations.

Future mobile devices will also be able to integrate Bluetooth technology, allowing them to access nearby appliances such as vending machines and televisions using very low-cost, short range moderate bandwidth connection. With such capabilities, mobile devices will have a combination of different communication connections to conduct mobile commerce.

- *Design User-Friendly Interface*

Unlike the wired computing environment where large screens are available, mobile commerce applications have to operate on small and often wearable mobile devices that can only include small screens.

- *Build Business Models for Mobile Commerce*

Although mobile commerce has the potential to improve the performance of organizational supply chain systems, business models unique to mobile environment need to be built. Business models introduced within the e-commerce environment require further refinement to suit the mobile environment. It is vital to ensure that all the related applications and services can be accessed with ease and minimal cost.

1.4.2 User Infrastructure Issues

- *Consolidate Network Infrastructure*

Bandwidth and coverage are major issues for the network infrastructure. The former allows more data to be exchanged between servers and the mobile devices, thus supporting multimedia content delivery. The latter minimizes the complications of connection losses when a mobile device moves beyond a network boundary or crosses from one network to another. These two issues directly affect the quality of mobile data transfer and, therefore, are critical for the further development and future deployment of mobile commerce applications.

- *Address Security Issues*

Research on how to improve security in mobile commerce must be carried out due to the vulnerability of mobile devices and wireless networks. To meet security requirements including authentication, integrity, confidentiality, message authentication, and no repudiation in mobile commerce, additional security software and information (e.g., certificate, private, and public keys) will have to be installed on mobile devices. Nevertheless, due to the limited computing resource of mobile devices, at some point it will be necessary to establish additional servers to store information, perform security checking, and conduct electronic payment on behalf of mobile devices.

1.4.3 Middleware Issues

- *Develop Content Delivery and a Format for Mobile Commerce*

At present, much of the attention has been given to providing visual access to Web content. As a result, WML and compact HTML (cHTML) are widely used now.

- *Improve Mobile Access to Databases*

To allow users to run applications on their mobile devices without having to maintain constant connection with the servers and pay expensive connection time, at least part of the database systems must be able to reside on the mobile devices. These mobile database systems require little memory and are able to transfer their databases to the centralized database systems or to synchronize their databases with those at the centralized database systems. In some cases, a mobile database system may only manage a portion of a large central database, pulling in additional data on demand and pushing back data that are not required. In a mobile environment where databases are on the move and little computing resources are available, the database location, query processing, and data recovery capabilities of the mobile database systems will have to be further improved.

- *Explore Agent Technologies*

The relatively high cost of connection time and data exchange for mobile devices discourages the adoption of mobile commerce by cost-sensitive organizations. Agent technologies can alleviate this problem. Mobile commerce users can contact agents to look for products and services, to locate merchants, to negotiate prices, and to make payments. All of these activities can be performed without having the mobile devices constantly connected to the network. In an agent-based mobile commerce framework, agents can be envisioned as merchants, consumers, and other brokering services, interacting with one another to enable electronic transactions.

CHAPTER 2

LITERATURE REVIEW

2.1   Mobile Technology

"...we believe that after the desktop, the handheld device is probably the most important critical piece of equipment, more than a cell phone or laptop, and could become the second most prevalent piece of IT equipment in and out of the office...the introduction of wireless handheld devices will lower the total cost of ownership of IT equipment, increase productivity, and lead to an increased ROI for enterprise technology." [Sachs, Goldman (August 7, 2005)]

The statement proved that mobile technology inventions extend the daily activities boundary far beyond before. When talking about mobile technology, it would relate to things such as PDA, Laptop, and mobile phones. As approximately 90% of Malaysia's population owns their own mobile phone [Azlyn Abd Rahman (August 5, 2005)], this gadget is something that considered as must-have item. Today mobile phones are not just for makes or receive calls. Many features have been integrated with mobile phone, including dictionary itself.

2.1.1 Mobile Phone Market in Malaysia

Mobile phone usage in Malaysia keep on increasing as technology expands. Research study conducted by NST [Yuen (2004)] stated that there is a huge number of Malaysian carrying mobile phone i.e. 12.3 million users which is almost half the total population. Those up to 19 years of age accounted for 12.3 percent of the total mobile phone subscribers while adults (users from 20 to 49 years of age) accounted for 78.8 percent.

Majority of the students and working adults agreed that they "cannot live without their mobile phone". They always bring mobile phone just to make sure that they did not miss any calls. This shows that mobile phone has the highest preference over other mobile gadgets since it is considered as a part of people's daily lives.

Figure 2.1 on the next page illustrates the percentage of mobile phone ownership in Malaysia conducted by Yahoo [Yahoo! (July, 2005)]. The chart highlighted that almost 90% respondents currently own hand-phone and only 11.6% respondent do not own mobile phone.

Almost 90% of the respondents currently own mobile phones

11.6 %

88.4%

☐ Do not own
mobile phones
☐ Own mobile
phones
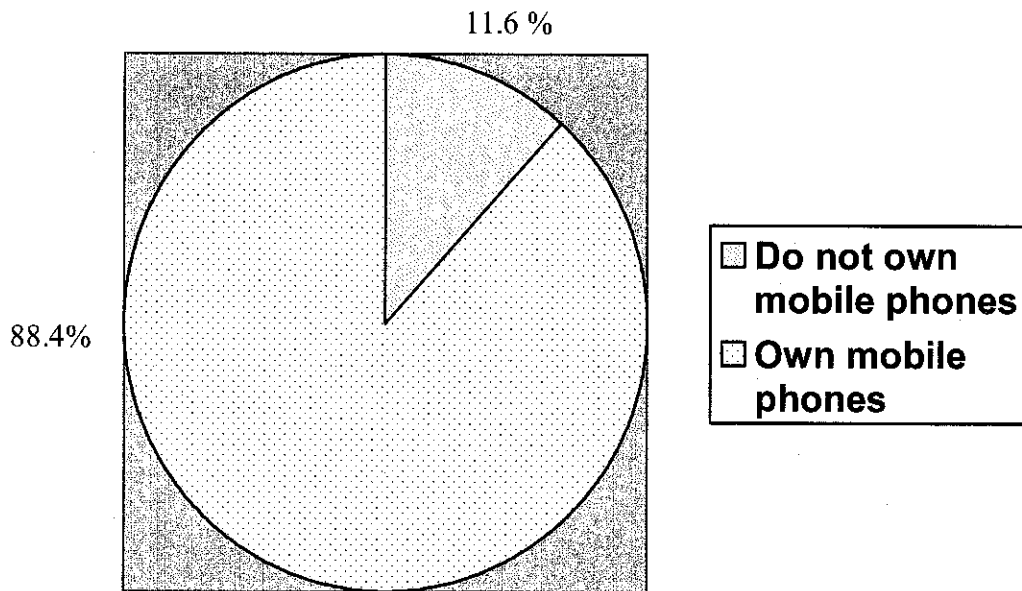
Figure 2.1 Mobile Phone Ownership in Malaysia

2.2.2   Mobile Phones are Portable

One of the advantages of having features in mobile phones is because of its convenience small size and portability. [Al-Baker, A, 2004 Mobile E-mail] With access at your fingertips anywhere you go, you can do many things and not be entirely dependent of your PC to manage your activities. It gives you the convenience of carrying only your hand phone, not your bulky laptop. In short, having a dictionary feature in mobile phone gives convenience on the move.

2.2.3 Mobile Platform Limitations

Designing application on mobile platform differs from an application that works well on the bigger systems. In designing a mobile shopping as mobile platform, there are few things to be considered with regard to the platform issues. The following issues will look at the mobile platform issues [J.Wells, Martin (2004)].

- **Screen Limitations**

MID screens are small LCD-based displays typically in the range of 100-200 square pixels. This makes screen real estate a scarce commodity [J.Wells, Martin (2004)]. So, in designing this dictionary application, we cannot expect the interface to look as interesting as in the desktop-based. All that is needed is just a simple interface that can be easily navigated.

- **Processor Power**

Due to size and power consumption constraints, MIDs typically have low-end CPUS. [J.Wells, Martin (2004)] The slow performance is accentuated by the lack of floating-point hardware because extra time is needed to be spent to do that work as well. Corresponding to this, the users cannot expect to have an application which has faster performance than high-end CPUs. From designing perspective, the only possible way to encounter this issue is through minimizing the requirements and having some methods to reduce the CPU requirements for code.

- **Storage Limits**

Memory constraints play a big role and the first to encounter in developing mobile application. Modern MIDS can have quite a range of memory capabilities, anything between 100KB and 500KB is common [J.Wells, Martin (2004)]. Another type of storage called, non-volatile RAM used by the RMS (Record Management System). Unlike PC hardware, it has a virtually unlimited space in which to store perhaps saved games or other state information. However, corresponding to this essential limitation, this dictionary application is not expected to have a list of all possible words in this world. Due to this, common words used in daily lives only are selected to be listed.

2.2 Mobile Commerce Technologies

2.2.1 Definition of Mobile Commerce

The rapid growth of mobile telephony has fueled the expansion of the mobile Internet as a foundation for mobile commerce (mobile commerce). M-commerce refers to "e-commerce activities via mobile devices, such as phone or Personal Digital Assistance (PDAs)" [Mennecke, B. & Strader, T. 2002]. The mobile Internet has unique strengths over the stationary Internet, because users can connect to the Internet wherever and whenever they want [Kakihara, M. & Sorensen 2001]. Given the enhanced features available on the mobile Internet, proponents claim that m-commerce will surpass the e-commerce in growth and scale [Kalalota, M. & Robinson, and M. 1999].

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The view of mobile commerce as the use of wireless technology, particularly handheld mobile devices and mobile internet to facilitate transaction, information search and user task performance in consumer, business-to-business, and intra-enterprise communication [Chan&Fang2001 ;Kannan ,Chang & Whinston 2001; Varshney & Vetter2001].

2.2.2   The Evolution of e-Commerce and M-commerce

Electronic commerce has attracted significant attention in the last few years. This high profile attention in significant progress towards strategies, requirements, and development of e-commerce applications [R. Kalakota and M. Robinson, Addison Wesley 1999]. The growth forecast from both business-to-business and business-to-consumer aspect of e-commerce is phenomenal by any standard. One point that should be made here is that nearly all e-commerce applications envisioned and developed so far assume fixed or stationary user with wired infrastructure, such as browser on a PC connected to the Internet using phone lines or a Local Area Network (LAN).

The envision of many e-commerce applications significantly benefit from the emerging wireless and mobile networks. The terms of this application "wireless e-commerce" or "mobile commerce". Wireless and mobile networks have experienced exponential growth in terms of capabilities of mobile devices, middle ware development, standards and network implementation, and user acceptance [R. Kalakota and M. Robinson, Addison Wesley 1999].

2.2.3 Distinguish M-commerce from E-commerce

[Bottomley, A. (1999, November 22)]. There are two user-oriented core dimensions on which m-commerce has advantages over e-commerce: "mobility" and "locatibility". CIP devices offer mobility. Mobile data networks that employ geographical positioning systems offer locatibility. Taken together, these two range of distinctions between m-commerce and conventional e-commerce (see Table 1).

Dimension	E-Commerce	M-Commerce
Core Dimensions		
Mobility	**Limited:** User can transact from locations with Internet access.	**Ubiquitous:** User can transact from anywhere in mobile network area.
Locatability	**Client-specific:** Client computer locatable via IP address.	**User-specific:** User, device, and geographic location can be identified.
Behavioral, Strategic, and Leadership Dimensions		
Key customer concern	**Money:** Because of "free Internet" culture, e-commerce users are money conscious.	**Time:** Evolving from mobile telephony culture, m-commerce users are time conscious.
Customer location and market served	**Fixed Locations:** Customers can be served at locations where they have Internet-linked computer access.	**Ubiquitous and Global:** Customers can be served anywhere within the mobile network coverage area.
National and regional leadership	**USA-centric:** E-commerce evolved in USA.	**Europe and Asia-centric:** Scandinavia and Asian nations (Japan) lead in m-commerce.
Industry leadership	**New Players:** Newer companies such as Yahoo, AOL, Amazon.com, Dell, Cisco, and FreeMarkets have emerged as E-commerce leaders	**Transformed Old Players:** Older players such as Telcos, Mobile Device Makers, Mobile Network Operators, and Banks have chance to grab leadership

Table 2.1 Distinction between M-Commerce and E-commerce

2.3   System model for Mobile Commerce

2.3.1   Mobile Commerce System Structure

[Chung-wei Lee, Wen-Chen Hu & Jyh-haw Yeh 2003] The mobile commerce system is much more complicated because components related to mobile computing have to be included. Figure 2 shows the structure of a mobile commerce system which consists of six components:

(i)   mobile commerce applications

(ii)   mobile stations

(iii)   mobile middleware

(iv)   wireless networks

(v)   wired networks

(vi)   host computers

In mobile commerce systems, the network infrastructure consists of wired and wireless networks. The wired networks components have the same structured with the electronic commerce system.

2.3.2 Features of Mobile Commerce

The essence of mobile commerce revolves around the idea of reaching customers, suppliers, and employees regardless of where they are located. Mobile commerce is about delivering the right information to the right place at the right time. It gives users the ability to access the Internet from any location at any time, the capability to pinpoint an individual mobile terminal user's location, the functionality to access information at the point of need, and a need-based data/information update capability. Mobile commerce has features not available to traditional e-commerce [Liebmanm, L (2000)]:

(1) *Ubiquity*

- Ubiquity is the primary advantage of mobile commerce. Users can get any information that they are interested in, whenever they want regardless of their location, through Internet-enabled mobile devices. In mobile commerce applications, users may be engaged in activities, such as meeting people or traveling, while conducting transactions or receiving information. In this sense, mobile commerce makes a service or an application available wherever and whenever such a need arises.

(2) *Reachability*

- Through mobile devices, business entities are able to reach customers anywhere anytime. With a mobile terminal, on the other hand, a user can be in touch with and available for other people anywhere anytime. Moreover, the user might also limit his/her reachability to particular persons or at particular times.

(3) *Localization*

- The knowledge of the user's physical location at a particular moment also adds significant value to mobile commerce. With location information available, many location-based applications can be provided. For example, with the knowledge of the user's location, the mobile service will quickly alert him/her when his or her friend or colleague is nearby. It will also help the user locate the nearest restaurant or ATM.

(4) *Personalization*

- An enormous number of information, services, and applications are currently available on the Internet, and the relevance of information users receive is of great importance. Since owners of mobile devices often require different sets of applications and services, mobile commerce applications can be personalized to represent information or provide services in ways appropriate to a specific user.

(5) *Dissemination*

- Some wireless infrastructures support simultaneous delivery of data to all mobile users within a specific geographical region. This functionality offers an efficient means to disseminate information to a large consumer population.

2.4 Usability Research for Mobile Commerce

Usability studies on wireless applications have centered on design constraints imposed by a bandwidth limitation and small display of handheld devices. Researchers found that directed access methods were more effective for retrieval tasks with small screen display [Jones, Marsden, Mohd-Nasir, Boone, & Buchanan 1999].

Novice WAP phone users showed better performance under two conditions: (1) when using links instead of the action screen for navigation among cards, and (2) when using lists of links instead of the selection screen for singlechoice lists [Chittaro & Cin 2001]. Automatic conversion of HTML-based into WML (Wireless Markup Language)-based Web contents was feasible by following certain guidelines [Kaasinen, Anltonen, Kolarie, Melakoski, & Laakko 2000]. These studies did not test handheld devices based on appropriate m-commerce tasks, and they did not validate any framework or guidelines. Many WAP usability problems resemble issues identified during the early stage of Web site development for PC computers [Ramsay & Nielsen 2000].

However, good user interface design can alleviate some of the usability problems for WAP phone users. Drawing from their experience in developing WAP access to an information system for tourists, Colafigi, Inverardi, and Matricciani [2001] recommended several design guidelines for WAP applications, including:

(1) Use short links,

(2) Include backward navigation on every card,

(3) Minimize the level of menu hierarchy, and

(4) Include headlines for each card.

In their usability research of WAP phones, Buchanan, Farrant, Jones, Thimbleby, Marden, and Pazzaini [2001] identified similar design guidelines:

(1) Provide direct, simple access to focused valuable content,

(2) Use simple hierarchies,

(3) Reduce the amount of vertical scrolling, and

(4) Reduce the number of keystrokes.

These studies focused solely on WAP phones. However, several studies were also undertaken on other platforms such as PDA and Pocket PC. Buyukkokten, Garcia-Molina, and Paepcke [2001] investigated various methods of text summarization for Web browsing on handheld devices and found that keyword/summary was the best method. Sugimoto [1999] studied single hand keys input schemes for pocket computers. Diverse form factors offer different functionalities and have different interface requirements. Studies that compare the usability issues for multiple platforms will help researchers and designers gain insights into content conversion and presentation for interface design in diverse contexts.

The context in which a user accesses the wireless sites also affects usability. Kim, Kim, Lee, Chae, and Choi [2002] identified three use context factors – hand, leg, and co-location – related to different usability problems. Problems of site structure were more likely to occur when participants used wireless sites with one hand instead of two hands. Those who accessed the wireless sites while moving rather than stopping experienced more difficulty with site representation. Those who were stopping or were alone reported more usability problems with content. Therefore, the design of wireless applications also needs to consider the use contexts.

2.5   Emerging M-Commerce Applications

In M-commerce applications first in a consumer context and thereafter in a business context. The following diagram indicates when applications will be commercially available and which technology is the particular enabler [Durlacher Research Ltd].
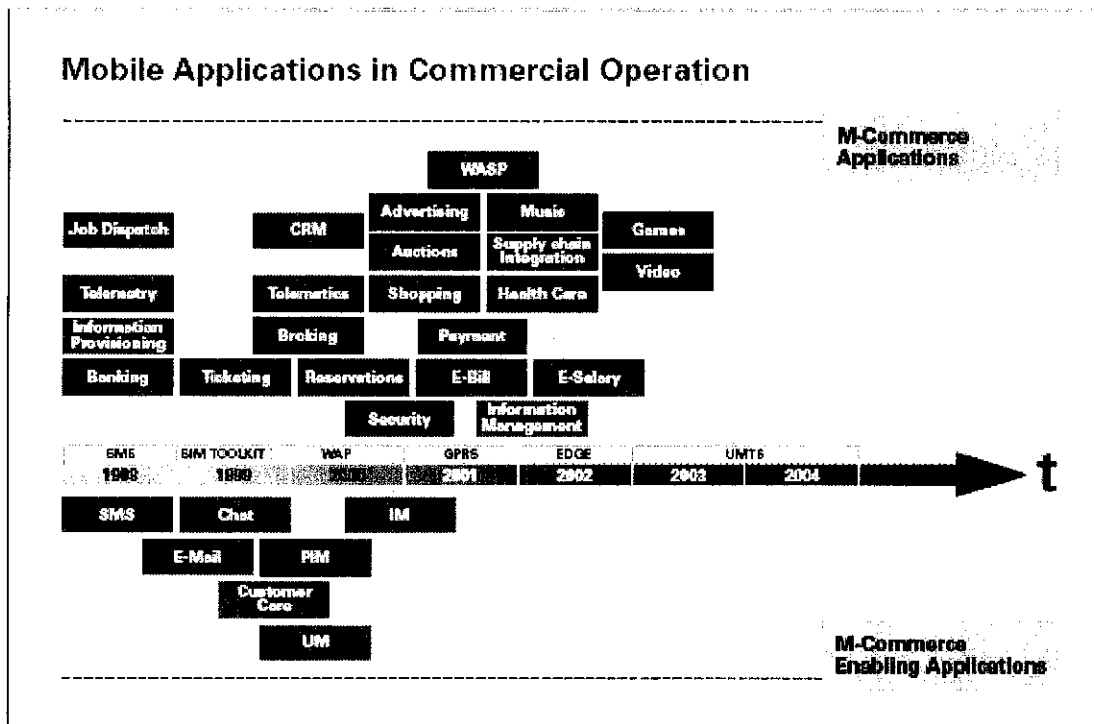

Figure 2.2   Mobile Applications in Commercial Operation

2.5.1 Mobile Shopping

2.5.1.1 Definition of Mobile Shopping

Mobile extends your ability to make transactions across time and location and creates new transaction opportunities. It is important to note that only a part of the purchasing process is conducted with the mobile terminal. The basic point is that you need to know what you want in advance of making a mobile purchase. Moving forward, it seems most likely that a shopping list might be created with a web interface, which may then be executed from a mobile. At the current stage of technological development the customer must ideally be faced with a one-button purchase experience for mobile shopping. The purchase suggestions will often be based on the user's past behavior patterns.

2.5.1.2 Characteristic for Mobile Shopping

There are similarities and differences among physical shopping, electronic shopping (via PC browser), and mobile shopping (via handset microbrowser). In an electronic or mobile shopping environment, the familiar layout of a physical store becomes a maze of pull-down menus, product indices, and search features [Shin, G. and Shim S.S.Y (2004)]. Online shopping will depend to great extent upon the interface and how people interact with the web [Lohse, G. L. and Spiller, P. (1998)]. Although mobile devices are limited in screen size, memory size and user interaction compared with the wired e-commerce [Shin, G. and Shim S.S.Y (2004)], the mobility, Net-access convenience, ubiquity, personalization, flexibility, and the dissemination are the advantages of the mobile devices. Equipped with microbrowser and other mobile applications, the new

range of mobile technologies offers the Internet "in one's pocket". For this, the consumer possibilities are endless, including banking, booking, or buying tickets, shopping and real-time new [Barnes, S. J. (1969)].
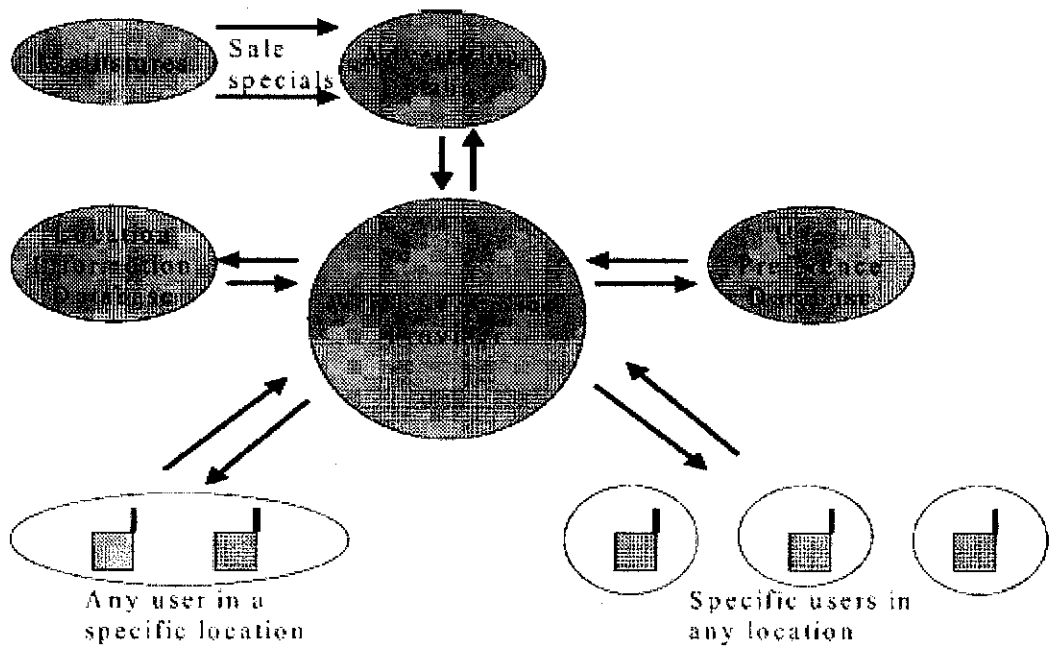
2.5.1.3 Scenario for Mobile Shopping

[Varshney, U. (April 2000)] and [Varshney, U. and Vetter, R. (2002)] portrayed a possible scenario for mobile advertising and mobile shopping. Using demographic information collected by wireless service providers and information on the current location of mobile users, many targeted advertising and shopping information can be sent by the mobile shopping sites. The shopping messages can be personalized based on information provided by consulting the user at the earlier stage from the user's habit history. Message sent to user of various on-going special surrounding areas. Shopping messages can be sent to all the users located within a certain area or sent independently of the user's current location.

2.5.1.4 Scenario for Mobile Advertising and Shopping

[Varshney, U. and Vetter, R. (2002)] Mobile advertising is also a very important class of commerce applications. Using demographics information collected by wireless service providers and information on the current location of mobile users, much targeted advertising can be done. The advertising messages can be personalized based on information provided by consulting the user at an earlier stage or by the history of user purchasing habits. Advertisements sent to a user can also be location-sensitive and can inform a user about various on-going specials (shops, malls, and restaurants) in surrounding area as shown in figure 4. This type of advertising can be performed using

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Short Messaging System (SMS) or by using short paging messages to mobile users. The messages can be sent to all users located in a certain area (geographic region can be identified by advertisers or even by users in advance), a user-specific message can sent independent of the users current location.

Figure 2.3   Possible scenarios for Mobile Advertising and Shopping

2.6   Mobile Payment

[Durchaler Research LTD] Confinity, a Silicon Valley start up, is building a service called Pay-Pal, which allows users with handheld device to make payments to anyone else with a similar handheld device that allowing the settling of debts, borrowing of cash or splitting of bills without exchange of cash. In order to use the service the user of Pay-Pal has to register his credit card details on the Confinity web page and download the software. The free service allows the beaming of money from one mobile terminal via infrared to another. Only when the sender goes back online again, the amount is actually dispatched.

2.7   WML Language

WML stands for Wireless Markup Language used by the WAP devices, and is what HTML is to a web browser. WML is based on XML; or rather it is an XML application. Just like HTML and XML, WML is read and interpreted by a browser built into the WAP devices. For WAP devices, the browser is commonly called a micro browser, indicating that its capabilities are somewhat limited.

2.7.1   Using WML Technology in Mobile Commerce

Following the requested content back to the WAP device, the contents, if they are in so called textual WML code (the human readable type), the WAP gateway compiles the textual WML into so called tokenized WML, or WMLC, where basically the code is "compressed" down into binary data (the machine readable type). This tokenized WML is then passed back to the WAP device. If the contents from the web server are already in tokenized WML format, the WAP gateway skips this operation. The reason for the conversion from textual WML to tokenized WML is to reduce bandwidth usage and also WAP device's WML browser can only read tokenized WML [Ghosh, Anup, & Swaminatha, Tara (February 2001)].

Finally, back at the WAP device that requested the URL, the WML browser, when receiving the tokenized WML code renders the contents on the WAP device's display to present a card for the user. This is how the majority of WAP devices are connected to the Internet. If the content provider wants total control over the stream of data sent back and forth between the web server and the WAP device, they would install something called a WAP server. This device is merely a web server and a WAP gateway on the same computer and it is usually located inside a recall on the content provider's network. One major security breach that can happen in mobile commerce transaction using WAP is when the user details are transferred from one mobile network to another. When this transformation occurs, any encrypted data needs to be decrypted for transparency.

In mobile commerce, when mobile devices make requests to web pages of a network server, a four-stage process is followed [Kothapalli, S. & Agarwal, P.]:

- The requests arise from the originating Wireless Transport Security Layer (WTSL) protocol.

- The requests are translated at the originating Wireless Application Protocol (WAP) gateway.

- They are sent to the standard Session Security Layer (SSL) protocol of the destination network.

- The translated information reaches the Hyper Text Transfer Protocol (HTTP) modules in the network on the merchant's side in order for the requests to be processed.
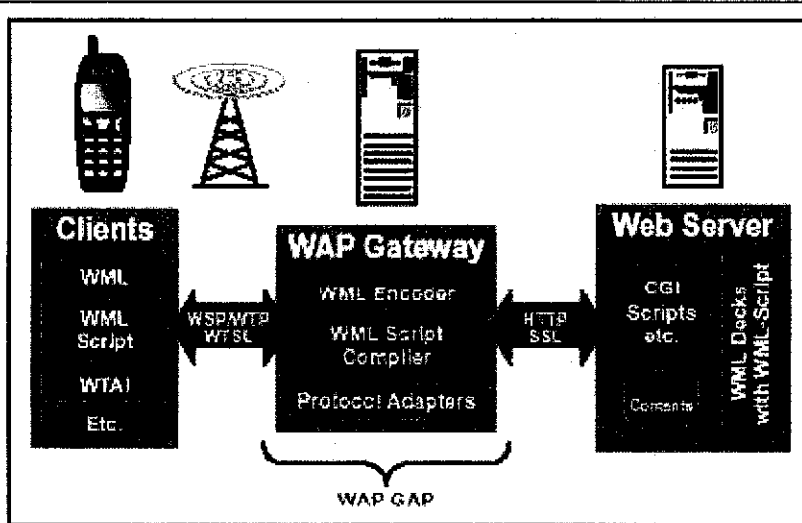
Figure 2.4 WAP Model

CHAPTER 3

METHODOLOGY/PROJECT WORK
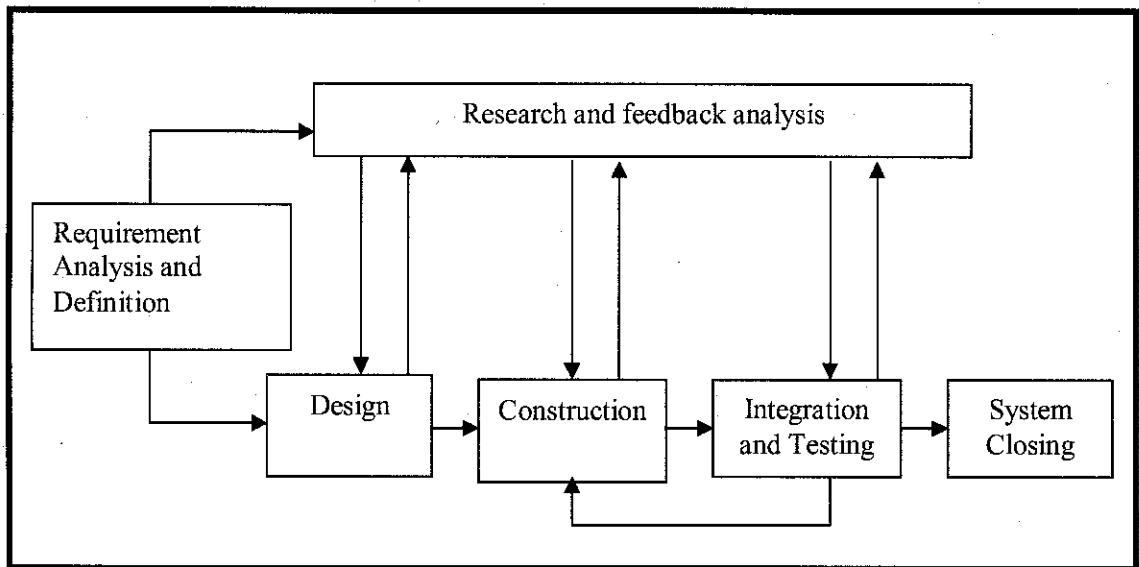
3.1   Procedure Identification

Methodology is defined at the early stage in order to maintain consistent system development life cycle of the proposed system. Several methodologies have been adopted and mostly used in various software environments, such as waterfall model, formal systems development, evolutionary development and reuse-based development.

Since methodology plays an important role, it has to be carefully chosen. An initiative to develop a wholly own methodology are also encouraged. For this project, several researches have been done in order to decide what kind of methodology is the best for this Mobile Shopping project.

The methodology that is used for this project is based on available methodology and is combined to best suit the requirement and time constraint of the project. Basically, it consists of two parts, which are research methodology as well as development methodology. Research methodology comprises of all research-based work, ranging from questionnaire, observation as well as literature study. Research methodology is essential in determining requirements of the system and obtaining the required functionality based on observation, questionnaires for respondents and literature study. Research will be done concurrently with development of the project. The development methodology consists of all the phases involved with designing the system, actual development of the system, the integration and the testing.

Figure 3.1 Project Methodology

Based on Figure 3.1, there are five procedures identified earlier in a form of diagrammatic flow. After the requirement analysis and definition phase, it will feed to the design phase as well as research and feedback analysis. The research and feedback analysis will be an on-going phase along the development of the project and works concurrently with other phases.

This is done in order to revise and re-evaluate the system so that the functionalities and efficiency can always be improved from time to time. By having concurrent activities development as well, the time frame on developing the system can be reduced and any redundancy or flaws in any significant procedures can be avoided.

The integration and testing phase will be several times going back to the previous phase. This is because the system will be divided into sub systems, and each sub system will be constructed individually. After the sub system is developed, it will be tested and integrated. This process will be on-going until the system is finally completed. System closing deals with the deployment of the final product. In this phase, the system is officially closed and any attempt for enhancement will be made in later version.

3.2 Research Methodology

Research methodology involves with two phases in the project methodology described in Figure 3.1, which are requirement analysis and definition phase as well as research and feedback analysis.

3.2.1 Requirement Analysis and Definition

This phase concentrates more on analyzing and obtaining better understanding on the problems encountered. During this phase, studies have been conducted extensively to gather information on the requirement and defining the system scope. This includes technical and theoretical aspect of the proposed system. In this phase as well, research areas and hardware and software requirements have been identified, objectives of the projects and scopes of project are clearly stated through considering time and other constraints.

In addition, functional and non-functional requirements are also identified in the early stage of the project life cycle. This is done in order to further clarify the requirements of the proposed system. Questionnaires are one of the tools that are used to gather those requirements. It will then be supported with observations and literature study that will be conducted throughout the research process. Functional requirements will be emphasized more towards the technical and functionalities of the system, whereby non-functional requirements will highlight the quality and performance desired by the system.

Functional requirements of the system include

- Able to be transferred to enabled mobile phones
- Able to be installed and run effectively in enabled mobile phones
- Simple navigation menu.

Non-functional requirements of the system include

- Simple and user friendly interface for ease of use.
- Fast response time to users during "buy and browse".
- System will not be suspended and able to give appropriate results if no match is found and continue operation to handle another request.
- Provide easy navigation and appropriate help/assistant menu

3.2.2 Questionnaires

Questionnaire is used to gather requirements from the users regarding the project. There will be two stages of questionnaires that will be distributed, which are pre questionnaire and post questionnaire. Pre questionnaire will be distributed before development of product occurs. The data that will be gathered through this questionnaire will be based on:-

1) Mobile phone usage

   - This section will ask the users on the usage of mobile phones and their preferences on having dictionary in mobile phones.

2) Current usage

   - This section will gather responds from the users with regard to their preferences of e-commerce application via mobile phone.

   - It also gathers several responds which dealt with either functional / non-functional requirements.

From this, all of the gathered data will be served as specification for design and construction phase. It also will feed to the research and feedback analysis phase. Post questionnaire will be distributed after the product is developed in order to evaluate the effectiveness of the system and whether it meets the objectives.

3.2.3   Research and Feedback Analysis

On-going research will be conducted concurrently with the development of the system. The idea of having concurrent activities along with the development phase is to cut down the development time as well as having the ability to revise the content of research. Feedback analysis also is carried out throughout the development phase to gain feedbacks on how to enhance the system, based on the integrated sub-systems.

The research and feedback analysis include findings from internet, published journals, questionnaires, magazines and books. Most of the published journals are downloaded from digital library websites such as ACM Digital Library and IEEE Electronic library. Several articles which are relevant to the system are also being identified and are referred.

During this phase, feedbacks from several users are collected and re-evaluated regularly to increase the efficiency of the system. For example, after the system is showed to a bunch of friends (students), they suggested that the system should have a simpler navigation than the existing one. Corresponding to this, the sub-system is identified and is enhanced to have a simpler navigation and interface and integrated back.

Extensive research along the development phase also plays an important role. On-going questions asked in forums, reference to several WML Programming books make sure that the system can be running efficiently.

3.3 Development Methodology

3.3.1 System Design

Proper design needs to be made before constructing the actual system. The design will facilitate the construction phase by providing the grid for the proposed system. For this phase, the focus is more towards designing system architecture and flow in order to identify and describe the fundamental software system abstractions and their relationships. The system is intended to help the user to navigate with the mobile web applications to "browse and buy" via handheld devices. Due to this, a proper system design has been made based on the recommended design guidelines that can be used in designing interfaces for PC-based Web applications. A good database design also needed to be done in this phase. Poor database design may result in poor processing time and sometimes may introduce to redundancy and flaws.

3.3.2 System workflow

In designing the system workflow, few actors and corresponding activities involved in the system need to be identified. For this system, the actor involved is only the user of the Mobile Shopping.
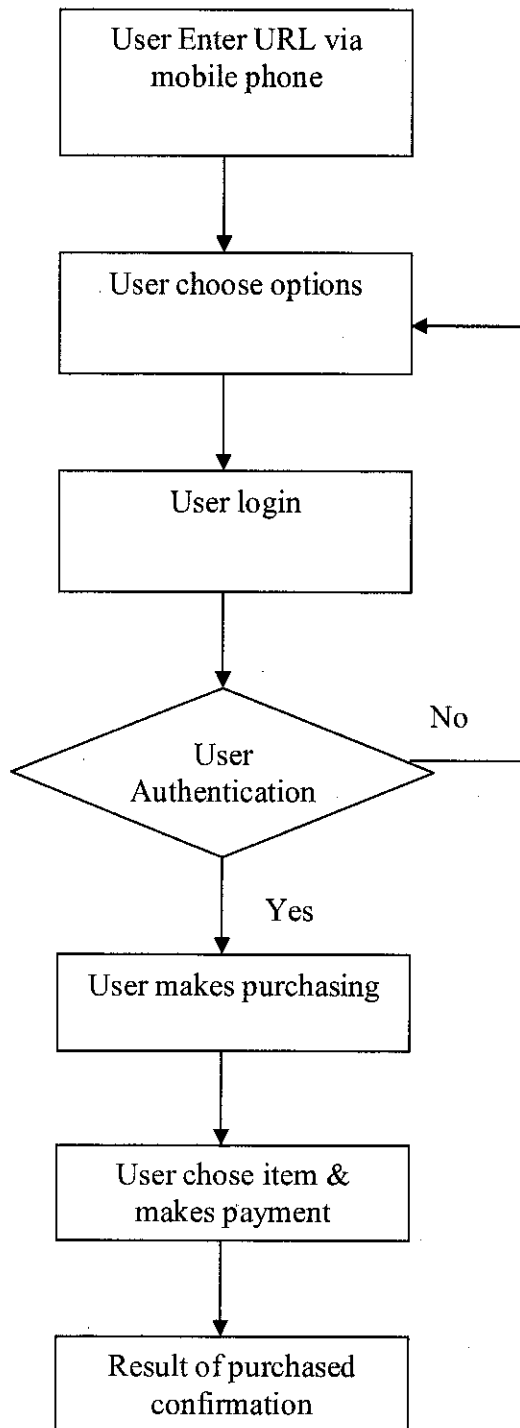
Figure 3.2   System workflow

In the system workflow, the first task that occurred is user have to enter a URL via mobile phone and connect the dialogues which shows the site of the music shopping. After the selection, the user has to choose the menu options to start browsing to find CDs and other information. With one further selection and accept click the ordering, the user have to log in to proceed to the purchasing process. If the user has not register as a member in the system, the purchasing process can't be executed and have to go back to the options to select a registration process. If the user is a member, the purchasing process can be executed and proceed to the payment process. After make purchasing and payment methods has been selected and confirmation of the purchasing, the user will get the details and result of the purchasing confirmation. The transaction is successful.

3.3.3   System Architecture

Figure 3.3 shows the system architecture with main modules of Mobile Muze instant music CD purchasing via mobile phone. The system architecture shows the structure of a mobile commerce system, which consist of six components: (i) mobile stations, (ii) mobile commerce application, (iii) mobile middleware, (iv) host computers, and example of such a system that is currently possible based on existing technology. An in depth review had been conducted on the tools that are available in order to select the most appropriate tools for the development of Mobile Muze system as a mobile commerce application. Since the music CD shopping needed to be implemented in mobile phones as a WAP application. The most important technology applied by WAP is the WAP Gateway, which mainly responsible for interfaces between the internet and the network. It function as follows in the system- requests form mobile stations are sent as a URL through the network to the WAP Gateway in HTML and are translated in WML and sent to the mobile stations. WML language is identified to be chosen for the development of Mobile Muze as the mobile middleware. By using WML, all of the

development and testing can be done in personal computer using Openwave SDK emulator. Using this, the system doesn't need to be exported to mobile phones just for testing purpose. All of the main modules or subsystems recognized for this project are developed using WML language. There will be no interaction with the server or external communication medium for the retrieval of the results. More details on other uses of hardware and software will be stated in Section 3.3.9 in this chapter.
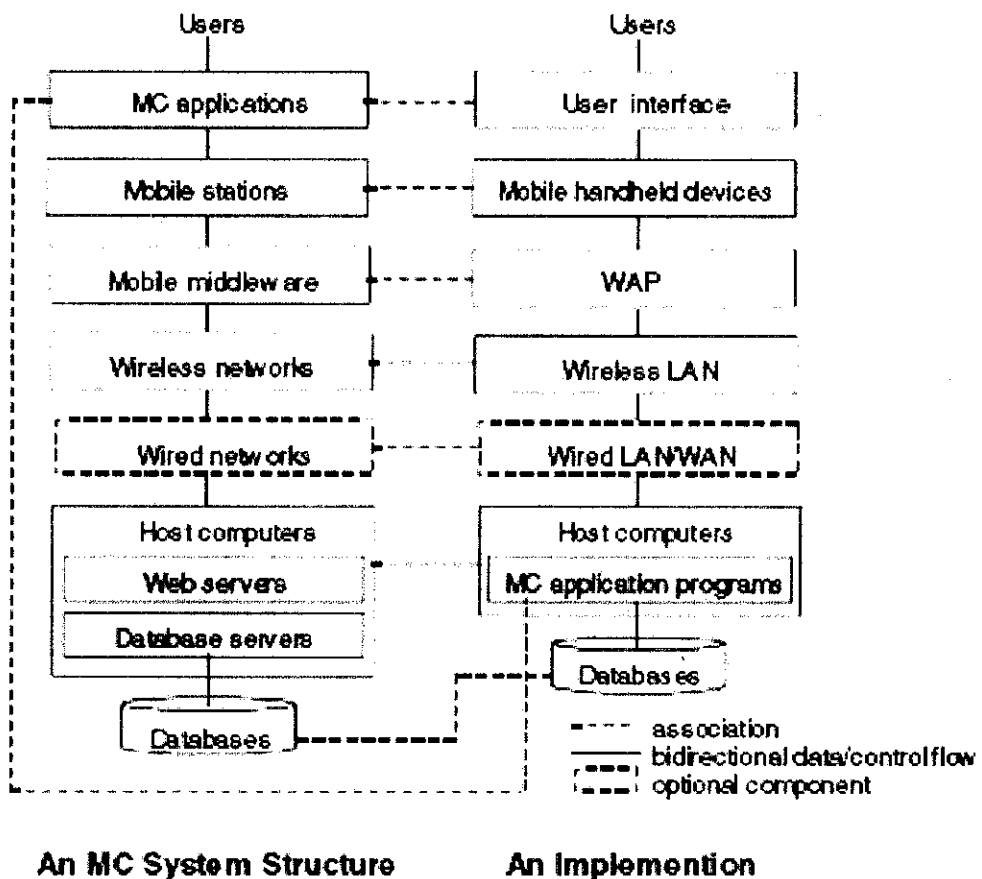

An MC System Structure   **An Implemention**

Figure 3.3 Mobile Muze System Architecture

3.3.4 Designing Database Record

Proper database design needs to be done before constructing the database in the system. In designing the database, the activities that have been done in plan the objects and attributes to be used in the system which collaboration of design basic database structure and relationship. Review on data mining and warehouse topic is done to get more information on construction of database in this phase.

3.3.5 Designing user interface

Designing user interface also is a part of software design phase. In designing user interface, a number of elements needed to be considered since the application is to be developed in mobile phones. Some considerations that need to be highlighted here are, processing power of mobile phones, small keypad and small display screen. These constraints demands a very good interface for mobile shopping, especially mobile phones only provided small keypad to press, and thus resulting to difficulty of multiple keystrokes.

Based on the requirements collected on the earlier phase, the users preferred the interface for Mobile shopping system to be simple and have easy navigation. Responding to this, the interface designed for the system is simple and very straightforward to navigate. The system is kept at a beginner level, as it is difficult to navigate a complex interface especially when the system is implemented in mobile phones. Help and about menu is also added as one of the features in the mobile music store. .

3.3.6   System Construction

During this phase, the actual construction of the system will begin. The implementation of database/text file, construction of interface based on the designed interface and the actual coding of the system will start. Since this task requires a bit tedious job, it tends to consume most of the time along development phase. In case of any problems or difficulties faced during actual coding process, research and asking feedback from other users in the forum on some websites help much.

3.3.7   Integration and Testing

This phase will work closely with the previous phase in the project methodology, which is system construction. Subsystem will be developed one by one during construction phase and every time the subsystem is completed, it will undergo the testing phase first. Any errors during this phase will be resolved. After it is successfully completed, it will be integrated and this process will be ongoing until all the subsystems developed have been integrated. After the full integration, the system is tested again as a whole to ensure it works correctly as expected. In addition, a group of 20 users will be selected to evaluate the output of the system and test whether the system is able to provide functionality as being specified in objectives of the project. If the system is unable to perform as expected or producing error while testing, the system will need to be debugged and refined.

3.3.8 System Closing

During this phase, the project is finally completed. This phase will be dealt with preparing and delivering final project report as well as presenting the system. Any enhancement to be made to the system will be made in later version.

3.3.9 Tools Required

3.3.9.1 Hardware

- Enabled mobile phone (GPRS).

3.3.9.2 Software

- Macromedia Dreamweaver
- MySQL
- Mobile Phone Simulator : Openwave SDK

CHAPTER 4

RESULTS AND DISCUSSION

4.1   Introduction

Mobile Muze, mobile music store prototype performs as expected. On this chapter, the result of the functional testing of the system over the personal computer and hand phone will be discussed. Finally, the screen captures of the system will be included as the result. Each of the results presented will be discussed and justified.

4.2   Functional Testing

As being highlighted earlier, the system will need to go through functional testing in order to detect if there any bugs in the system upon each function provided by the system. Upon doing this, the system needs to be tested in development platform, which is Personal computer since the testing results are intended to be showed in command prompt window. Thus, the functional testing also being done over the hand phone of the mobile music store content. The module or components being tested are described as at the next page:

Module/Component	Expected Test Result	Actual Test Result
Start Button (Splash screen)	To ensure that the screen will be directed to Main Menu screen without waiting Splash screen to finish initializing	Screen successfully redirected from Splash screen to Main Menu screen.
Select list (Main Menu screen)	To ensure that the screen will be directed to each screen depending on users' selection from the list in Main Menu.	Screen successfully directed to Home page main menu : • Search • Member Login • Registration
Search button	- Detect input word as a single word - Detect input word as multiword based on spaces	- Successfully detect single word - Successfully detect multiword
Back Button	- To redirect the screen to Main Menu Screen.	- Successfully redirecting to screen Main Menu and Sub Main Menu for Search.
OK Button	- To redirect the screen to Enter.	- Successfully redirecting to selected screen.
Menu Button	- To redirect the screen to Main Menu Screen.	- Successfully redirecting to screen Main Menu
Next Button	- To redirect the screen to	- Successfully redirecting

	selected screen as a link.	to selected screen.
Back Button	- To redirect the screen to previous Screen.	- Successfully redirecting to screen previous screen.
Done button (Help screen)	To ensure the screen will be redirected to Main Menu back	- Successfully redirecting to screen Main Menu
Done button (About screen)	To ensure the screen will be redirected to Main Menu back	- Successfully redirecting to screen Main Menu
Exit Button	- To ensure the system is closed	- The system is successfully close

Each of the modules listed above are functioning as expected. Overall, during the testing, the system was performing well without much redesign has been made.

After the functional testing has been completed, the overall functionality needs to be test in the real device, which is enabled mobile phone.

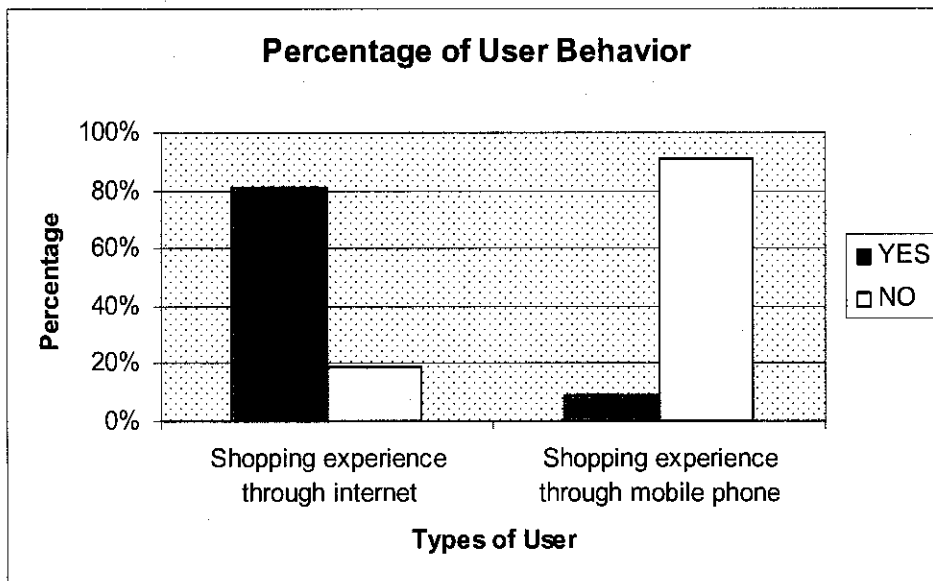## 4.3   Evaluation

4.3.1 Users Evaluation

User's evaluation that is used here is type of intrinsic evaluation, in which it is a subjective evaluation. The criteria in judging the system is based on whether the system able to working on the functioning of the Mobile Muze shopping application successfully.

In doing this, a number of 20 users are chosen to evaluate on the system. The users are given a set of questionnaire and the application is displayed to the users so that they are able to do hands-on evaluation to the system. Each user who performs the evaluation is mainly from students, which consists of local students as well as foreign students. The users need to grade the system by responding to the questionnaires given.

4.3.2   Findings

From the evaluation conducted, all of the feedbacks and data collected were analyzed to get the results. The findings are based on the user data collected from the given questionnaires before and after the implantation of the system. The followings are the results of the findings:

Percentage of User Behavior

Figure 4.1 Percentage of User Behavior

Based on the evaluation and questionnaire that has been done through all range of user, it is found out that 81% of the users that have the buying experience through internet (World Wide Web) shopping and 19% is not an experience internet shopping user. Therefore, 9% of the users have shopping experience through mobile phone such as downloading ring tones, wallpapers, images and songs. In that, 91% of them do not have any experience shopping through their mobile phone. The reasons given including there are not familiar with the shopping behavior through mobile phone and it is new emerging technologies that are adopted from the traditional e-commerce. This technology is most adopting in Europe and Japan. From the findings result, it shows that the introduction of the new Mobile Muze system will give a new experience with a great content to the mobile subscribers to shopping through their handheld device.
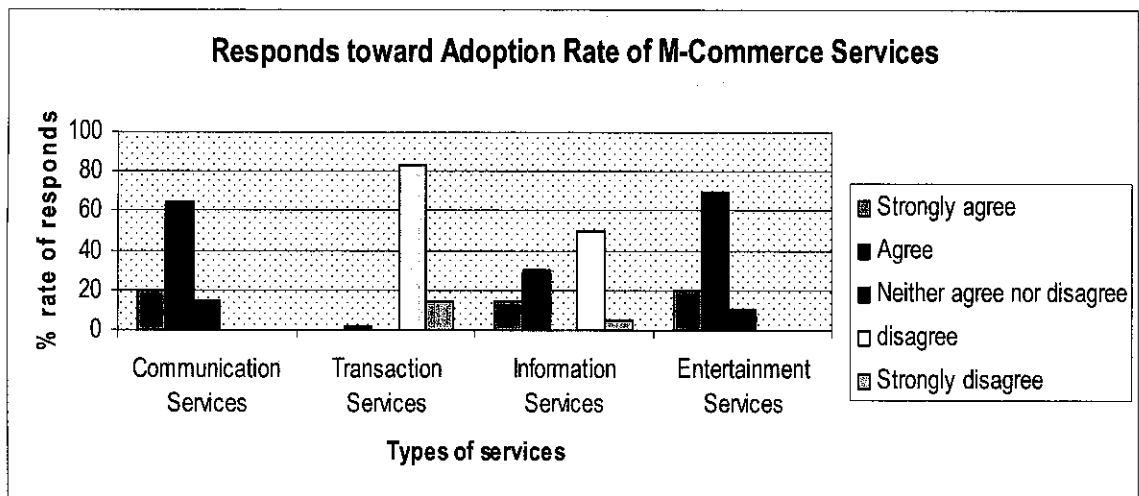
**Figure 4.2 Responds towards Adoption Rate of m-Commerce Services**

Figure 4.2 shows the result from the evaluation of the respondents towards the adoption rates of the various mobile commerce services, grouped into the four categories of communication, transaction, information and entertainment. The adoption rates of communication services are the highest of the four categories from the collected survey from the users. The communication services include the Voice, SMS, MMS, Video and E-mail. The lowest responds in on the transaction services because mobile phone users in Malaysia don't have any experience of m-commerce services especially on the ticket purchasing, small payment, banking services and purchasing via mobile. The information services and the entertainment show an average. From the findings, its conclude that the mobile subscribers should be serve more services as nowadays mobile phone are seem to doing everything from baking transaction, ticket purchasing and wireless internet shopping trough handheld device. The user should be exposes to the new environments in mobile commerce applications. The results of the user current experience have bring the new emerging technology of e-commerce to mobile commerce of music CD purchasing over the air via mobile phone.
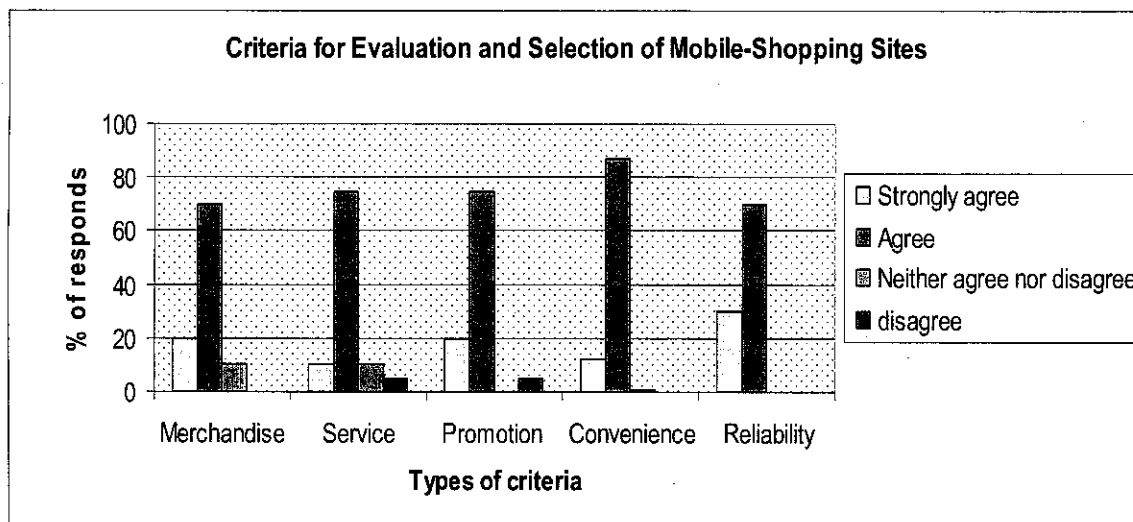
Figure 4.3 Criteria for evaluation and selection of mobile-shopping sites

Figure 4.3 shows the result from the evaluation of the respondents towards the criteria that the user needs from the evaluation and selection of mobile-shopping sites. There are grouped in for types of criteria that are merchandise, service, promotion, convenience and reliability. The result showed that most of the user preferred recommendation criteria to be included in the online shopping application in order to aid their purchase decision making and selecting the sites. Thus, the development of the system will focus more on the effectiveness and efficiency of the recommendation criteria. Overall, the majority of the respondents chose the answer 'Agree' with all the statements. From the survey, the possible consumer criteria are collected on their consumer criteria for selecting mobile-shopping sites. For instance, this include the following criteria: a light screen presentation, providing personalized shopping information, provides more decision-support functions to shorten browsing time and uncertainty (e.g. comparison information about shopping, the function for product-information search and recommendation).

But most of the reasons are related to information needed by the consumers to enable them to make the purchase decision on the selecting sites for internet shopping via handheld devices and make it remembered by the users and customers on buying decision.
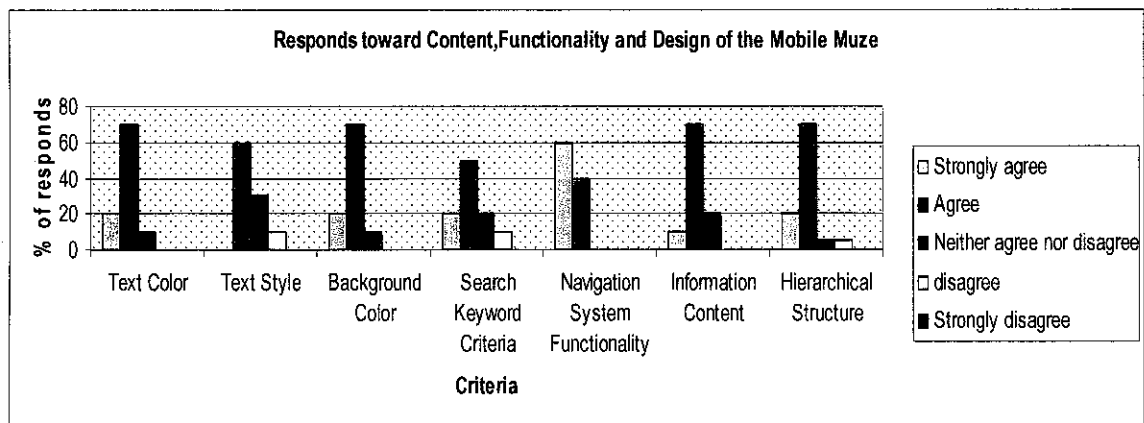

Figure 4.4 Responds toward Content, functionality and Design of the Mobile Muze

Figure 4.4 shows the result from the evaluation of the respondents towards the questionnaires which is to evaluate the perceptions of Mobile Muze from the respondent's point of view. Overall, the majority of the respondents chose the answer 'Agree' with all the statements. Statement saying Mobile Muze suits preference and enhance HCI shows the highest number of users who chose this answer represent 70% of the total respondents. Simply stated, majority of the users agree that the system place great emphasis on content presentation and the design guidelines for wireless application. Thus, the system has met the objectives of the user criteria on selecting the shopping site for their buying behavior. As a conclusion of the user evaluation on the Mobile Muze system for instant music CD purchasing via mobile phone, most of them are satisfied with the system contents, functionality and includes all the criteria that the

user needs on selecting the shopping site for their buying decision. Thus, the user findings have concluded that the system shows all the factor of its mobility, broad reachability, ubiquity, convenience and localization of product and services attributes.

4.3   Screen Captures and Description

The following section will describe what would be each interface does in Mobile Muze instant purchasing music via air system.
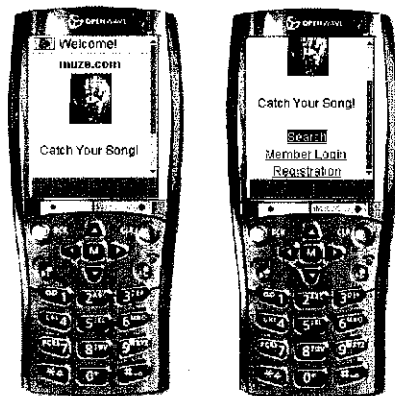
Figure 4.5 Mobile Muze Splash Screen and Main Menu

This is the Mobile Muze splash screen. Splash screen here refers to the first screen that is usually being displayed when user launch a mobile application. A good splash screen is necessary to attract user to use the application. This first screen includes the Main Menu screen of the Mobile Muze system.

This is the main access to the application. In main menu this is a several links:

- Search

- Member Login

- Registration

- Help

**Figure 4.6 Mobile Muze Advanced Search Screen Main Menu**

Figure 4.6 shows the advanced search screen from the main menu. The advanced search on this screen includes several links:

- Browse by category

- Music News

- Artist Spotlight

- Sneaky Peaks

- Gigs and Events

- Win-win stuff here
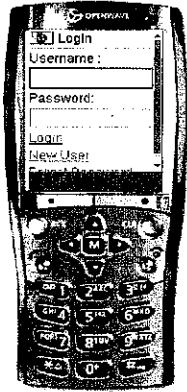
Figure 4.7 Mobile Muze Member Login Screen

Figure 4.7 shows the Login screen in the system. The user have to login to the system by enter the username and password to make purchasing and ordering process in advanced. If the user I not a member, he/she have to completely the registration process to navigate with system.
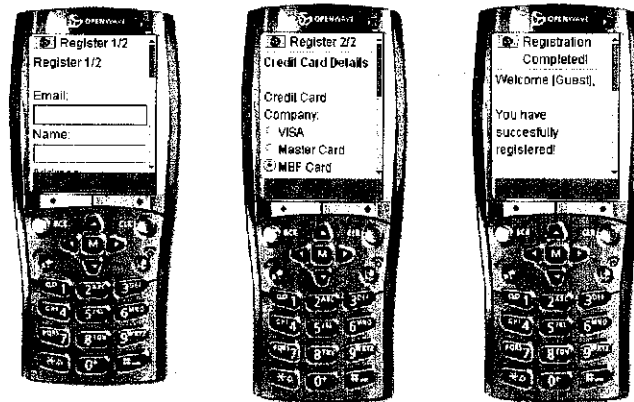
Figure 4.8   Mobile Muze Registration Screen

Figure 4.8 show the register process in the system. In the registration process, there two types of registration which is the user detail information and the payment methods registration which is the credit cards details registration. After all the details and payment details have been registered, the result of the registration is appearing on the registration screen. This means that the registration is successfully and the user can start purchase the selected item.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1   Conclusion

As a conclusion, there is a need to build this Mobile Muze as a mobile shopping as through a thorough research and study. The idea of producing e-commerce as mobile shopping applications in mobile phones is not just simply striving to deliver product by coping with the latest technology. The idea is initiated with the goals of easing the targeted users. Mobile phones are considered as basic necessities by most groups of people. Having an extra dictionary function would add an extra advantage to people owning a mobile phone.

This system project has identified many issues surrounding the current implementation of wireless solution for mobile consumers. All this solution was designed preliminary to support existing customers or subscribers. Through the wireless channel, these users can continue assessing a small set of internet services and content available at the regular sites. This system has indicated a strong relationship between e-commerce and m-commerce.

5.2 Suggested Future Work for Expansion and Continuation

There are a few suggestions and recommendations that can be done to this project and the system, so that it can be expanded in the future to produce more reliable and practical.

5.2.1 Expansion of Features

For the future work, the expansion of the system should be done to support the integrity of the mobile application for user effectiveness. Therefore, the system should be expansion of the features of demo the music selected by the user in a limit time of period for user satisfaction before making a purchases.

5.2.2 Mobile Portal

Since the project only focuses in Mobile phone, the future expansion of the system is to develop a mobile portal for both mobile user and wired internet user to enjoy the ability and integrity of the system for widely user.

5.3 Relevancy of the Objectives

The Objectives of the project was to determine on the earlier stage of the project which is at analysis phase whereby the objectives are define as the following:

- To give an opportunity to the mobile users to access the e-commerce website via hand phone. The explosive growth of the wireless telecommunications has taken mobile computing to another level is offering a new way of access to information and online purchasing on handheld devices as the mobile is becoming a one device that seems to be doing everything.

- To give will enable customer's convenience, service providers and also value-added services include easy, timely access to information in a way enable customer to make purchase from whenever they are whenever they are ready.

- To develop a mobile commerce application that satisfies the Human Computer Interaction (HCI) to the mobile contents, layout and design in a dynamic way to improve users' navigation as desired and to improve the usability of the wireless Mobile Muze of instant music CD purchasing via mobile phones.

- To provide an immediately purchase opportunity to the mobile users, the customer will make the purchasing decision on the spot and not to go to the other alternate source with the "buy and browse" technology to browse a huge array of official, artist approved content especially tailored for mobile.

- To provide a state of art user experience and easy customer purchase of paid for content. This will give opportunity for the mobile user anywhere in the world pay for the Mobile Muze content on their phone bills, by credit/debit card or PayPal.

APPENDICES

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Appendix III   : Questionnaire 2 [User Requirements on Mobile Shopping Sites]

Appendix IV   : Questionnaire 3 [User 's Satisfaction on Final Product]

Appendix V   : References

Appendix I : List of figures and tables

LIST OF FIGURES

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Appendix II   : Questionnaire 1 [Preliminary Investigation]

1.0   Survey Questionnaires

Section 1: Demographic and Socio-Economic Profile

1. What is your age range?

    a. Teens (18 years and under)
    b. Students (19-25 years old)
    c. Young business-people (25-36 years old)
    d. 36 above

2. What is your gender?

    a. Male
    b. Female

3. What is your profession?

    a. Student
    b. Employed
    c. Unemployed
    d. Undergraduate
    e. Postgraduate

4. If you are employed, what is your annual income (myr)?

    a. 300 under
    b. 300-500
    c. 500-1000
    d. 1000 above

Section 2: Behavioral User Profile

1. Number of mobile phones held currently?
    a. 1
    b. 2
    c. 3
    d. 4 or more

2. Type of mobile phone technology?

    a. WAP-enabled mobile phone
    b. GPRS
    c. 3-G
    d. PDA's
    e. Pocket PC

3. Number of service providers used currently?

    a. 1
    b. 2
    c. 3
    d. 4 or more

4. Length of usage of current mobile phone?

    a. Less than 1 year
    b. 1-2 years
    c. 2-3 years
    d. More than 3 years

5. Shopping experience through internet?

    a. Yes   b. No

6. Shopping experience through mobile phone?

    b. Yes   b. No

Appendix III   : Questionnaire 2 [User Requirements on Mobile

Shopping Sites]

Section 3: Criteria for Evaluation and Selection of Mobile Shopping Sites

Merchandise

1. It is important to provide product that I need?   Yes
   No
2. It is important to provide attractive products?   Yes
   No
3. It is important to provide branded products?   Yes
   No
4. It is important to provide accurate product information?   Yes
   No
5. It is important to provide function for the product information search?   Yes
   No
6. It is important to provide the function for the product preview?   Yes
   No
7. It is important to provide reasonable product-price?   Yes
   No

Service

1. It is important to provide comparisons information about shopping?   Yes
   No
2. It is important to provide on-line help functions?   Yes
   No
3. It is important to have call center?   Yes
   No
4. It is important to provide good post purchase service?   Yes
   No

Promotion

1. It is important to provide instant and latest product news?   Yes
   No
2. It is important to provide promotion activities?   Yes
   No

Convenience

1. It is important to have alluring screen presentation?   Yes
   No

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2. It is important to have concise and light screen presentation?   Yes
   No
3. It is important to have quick response time?   Yes
   No
4. It is important to provide personalized shopping-information?   Yes
   No
5. It is important to have multiple payment alternatives?   Yes
   No
6. It is important to provide reasonable delivery time?   Yes
   No

Reliability

1. It is important to have good reputation?   Yes
   No
2. It is important to have assurance a transaction security?   Yes No
3. It is important to have commitment for privacy protection?   Yes
   No
4. It is important to have flaw product return guarantee?   Yes
   No
5. It is important to have refund guarantee?   Yes
   No

Appendix IV   : Questionnaire 3 [User 's Satisfaction on Final

Product]

Questionnaires

Mobile Muze- Instant Music CD Purchasing via Handheld Devices

1. **Overall shopping convenience**

   1   2   3   4   5

2. **Shopping for every wished location**

   1   2   3   4   5

3. **Shopping at any time**

   1   2   3   4   5

4. **Shopping with convenience interface**

   1   2   3   4   5

5. **Shopping with convenience screen**

   1   2   3   4   5

6. **Shopping with a convenience input interface**

   1   2   3   4   5

7. **Shopping for customized products**

   1   2   3   4   5

8. **Shopping for large product variety**

   1   2   3   4   5

9. **Shopping for large content variety**

   1   2   3   4   5

10. **Getting customer service**

    1   2   3   4   5

11. Getting variety of Internet services

    1   2   3   4   5

12. Seeing picture of products

    1   2   3   4   5

13. Seeing animation of the products

    1   2   3   4   5

14. Shopping via secure environment

    1   2   3   4   5

15. Being able to give credit card number

    1   2   3   4   5

Appendix V: References

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