Mobile Order Tracking System

By

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First Draft submitted in partial fulfillment of
the requirements for the
Bachelor of Technology (Hons)
(Business Information System)

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CERTIFICATION OF APPROVAL

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Final Draft (Supervisor & External Examiner)
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MAY 2006

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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 that the original work contained herein have not been undertaken or done by unspecified sources or persons.

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Certification of FYP Final Draft Submission

Hereby I, Mohammad Arifiriazul Bin Paijo (3486), certify that I am responsible for the work submitted in this project, and I have done all the modifications according to my supervisor's advice.

Thank you.

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ABSTRACT

The objective of the "Mobile Order Tracking System" is to build a restaurant or cafe ordering and sales tracking system prototype to improve the business process. One of the main problems of food ordering the problem with the restaurant business operation is the phases that need to be covered before the food can be prepared, the phases that need to be covered before the food can be delivered, and the phases that need to be covered before the transaction bill can be prepared. Prompt and fast service to customers is very important to increase the revenue of the business. With the system, all the integrated components in the business process can be done easily. The existing of this system will also improve the existing system that performs the same function which is the "Wireless Mobile Application for F&B Ordering System" with additional feature and improvement on the system framework. The important feature that has been added to the existing system is the sales tracking and analysis. In the future it is optimistically that this system will assist the flow of the business and could assist the corporate level to conduct the sales analysis as well as the sales projection. An addition to that the system is equipped with wireless technology and also still maintaining the ordinary wired technology. It is to show the capabilities and benefits of wireless technology that are available to smaller scale business operation particularly food and beverages industry without costing huge investment and possibility of allowing high ROI (return of investment).

Keywords: mobile application, Customer Relationship Management, m-commerce, e-commerce.

ACKNOWLEDGEMENT

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CHAPTER 1

INTRODUCTION

1.1 Project background

CRM is one of very important element in a business organization. CRM is strengthening with three main components. The components have been stated earlier. Two of the three components are *sales tracking* and *transaction support*. In a business organization those two components are most critical components to manage in order to have a better return [1].

Sales tracking is important for the business organization for business forecasting. The business organization should have a good tracking system and process in order to make sure that all the data are relevance. This will lead to a batter business analysis.

Transaction support is important for the business organization to conduct the transaction made by both customer and seller. An efficient transaction process can derive to a batter return earning to the business.

Based on the justification above, in order to operate the business effectively and in order to have a batter return earning to the business organization, both element should be handled very well.

As for specific industry, the food selling industry such as restaurant and café those two components are crucial element that should be taken care. Customer service includes the transaction processes and involves the transaction support. Beside that, the business forecasting is also important in order to mobile the business a step forward in the future. This will involve a good business tracking and analysis on the business operation. The potential products and services need more attention compare to other products and services. That is why CRM is so important in order to mobile any business organization

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forward, especially the business which relate directly with customers like the food industry.

In order to cater those elements for the industry, the most practical way is to improve the business operation itself. This means all components in the business operation should be improved. This includes from the order tacking process, food preparation process, payment process, and sale management and analysis. This required all processes need to be integrated and centralized.

With those reasons, a Mobile Ordering Tracking System need be implemented. The system need to be mobile in order to ease the waiter/waitress. Information captured from the mobile order tacking will be transmitted to the server and all other components in the operating area will retrieve the same data without having any manual data transmission. The study is initiated in order to develop a mobile commerce application by exploring the fundamental of wireless application design block. While wireless technologies are readily available and employed at certain industry, there is still lack of innovation in the services industry particularly food and beverage business. Thus the ultimate goal of this study is to make wireless mobile application for food and beverage ordering system a reality [16].

1.2 Problem statement

As stated earlier, the food industry relies on the customer relationship management. If the service that being delivered by the restaurant is poor, then the business will eventually fail. The problem with the restaurant business operation is the phases that need to be covered before the food can be prepared, the phases that need to be covered before the food can be delivered, and the phases that need to be covered before the transaction bill can be prepared. Those phases could be a barrier for the business organization to perform well in their business operation.

1.2.1 Problem Identification

This problem actually happened because each order or transaction will require several phases to be done; order taking phase, food preparation phase and payment phase. This

will actually reduce the pace of work from each section in the business operation. When the pace of work has been reduced the duration time in order to have the meal prepared will also increase. The common sections that involve are order taking section, food preparation section, and cashier section. Those three sections will rely on each other in order to make sure the completion of each transaction. In the real world, the integration between those three sections can not be fully coordinated. This has been reducing the efficiency of the business operation which affected the business organization image.

The uncoordinated integration between those three sections often happened during the peak hour for the business operations. During the peak hour, the numbers of customer will be high. In order to process all orders, will be kind of problematic to manage all order with high traffic of transaction.

1.2.2 Significance of the Project

The problem that has been raised is significant with the luxurious restaurant and café. Although other level of restaurant and café deal with the same problem and issue, but the effect to it business operation is minor.

That is why this industry required a good system to manage all transactions and business operations. A mobile system that can control the in-flow and out-flow of each order and transaction is also become necessary for the industry. The sales tracking component also need to be emphasized in order to build up an efficient system to mange the business operation. The sales analysis has become a vital element for the business forecasting. To integrate the transaction process and the sales tracking is the best idea to make sure the business operation can perform very well.
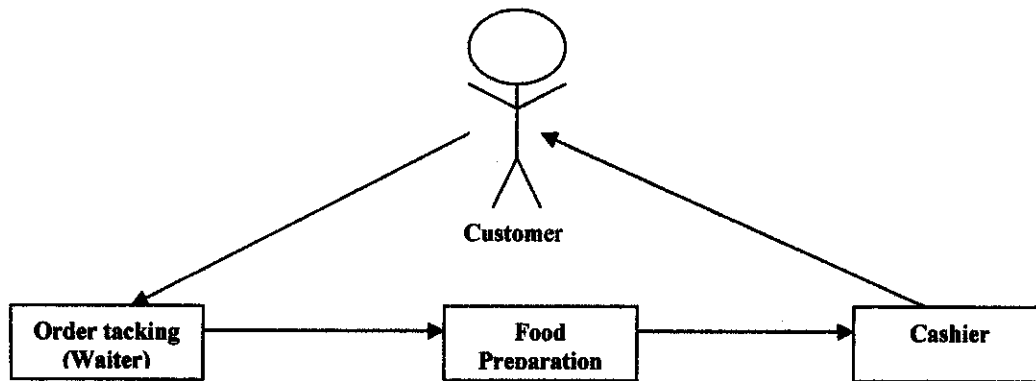
Figure 1.1: The workflow for restaurant business operation.

1.3 Objectives

As for this research, the author has defined two main objectives. The objectives are derived from the problem statement and the components of CRM that are *Tracking Sales* and *Transaction Support*.

☑ To improve sales tracking for better business analysis.

As stated, business analysis is one of the crucial parts in a business. In order to produce the best business analysis, the sales tracking should be well defined and structured. That is why, the sales tracking should be formed as an integrated system together with the transaction components.

The sub-objectives in order to accomplish the first main objective are;

 o To find best solution for sales tracking.

 o To find best method for business analysis.

☑ To improve business operation transaction flow.

As being practiced, the business operation is conducted manually. In a manual system, if there is any process problem at any sections in the transaction flows the whole transaction process will have problem. In order to reduce the possibility of the problem, the whole transaction sections should be integrated and centralized.

The sub-objectives in order to accomplish the second main objective are;

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o   To analyze the real case study on restaurant operation.

o   To develop a Mobile Order Tracking System that consists of several
    modules and feature.

- Develop a take order system
- Develop a sales analysis system

Based on existing system, the mobile system only focus on the implementation through the Personal Digital Assistant (PDA). The author has broad the project focus not only focus on the implementation through PDA but also focus on the normal web based services. This will expand the scope of user that may use this system and will eventually increase the sales and performance of the business.

1.4 Scope of study

The scope of this project is to build an F&B ordering submission and which also consist of the sales analysis and tracking function. Recently there is such application or system that can perform a service to the user to get the order mobile. In order to enhance the functionality of the existing system, the author has included several more features. This has lead to the expanding of the scope f study that not only focus on the order submission but also several other aspects. Among the aspects are;

☑ Research on the fast and effective mobile system for restaurant operation.
    The research will be more focus on the best mobile devices. This research will also focus on the system framework for mobile system.

☑ Study on the best sales tracking system.
    As part of the CRM, the sale tracking will be also being part of the research. The research will be more focus on the effective way to track the sales and also the efficient way to conduct sales analysis for the business.

☑ User friendly system.
    The systems that being develop will have the most user friendly features where by the first focus will b the most easy to use platform for the system. Among the focus platform are the PDA and the ordinary web based system.

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Apart from that, the focus is also on the benefits and challenges of implementing wireless solution for food and beverages industry. All the findings from the study will be further elaborated in the report and a prototype system will be developed to support the findings.

CHAPTER 2

LITERATURE REVIEW AND THEORY

2.1 Customer Relationship Management

First of all, it must be understood that at its core, Customer Relationship Management (CRM) is more than just a set of technologies: it is a process. This fact will be of significant importance to Information Technology (IT) professionals who will be asked to support CRM with information and applications. Furthermore, it is intended to be a repeatable process to ensure ongoing, continually improving, and consistent results. Simply stated, CRM comprises the acquisition and deployment of knowledge about customers to enable an airline to sell more of their product and service more efficiently [7].

CRM focuses on providing and maintaining quality service for customer, by effectively communicating and delivering product, services, information and solution to address customer problem, wants, and needs.

Component of CRM are call handling, sales tracking, and transaction support. Call handling is to maintain outbound and inbound calls from customer and service representative. Sales tracking is to track and record all sales made by the business. Transaction support is where technology and people used to conduct business transaction.

CRM has evolved since its earliest incarnation, originally driven by an inside-out focus, through three phases of evolution: technology, integration and process. Recently have we seen a major leap forward to a fourth phase: customer-driven CRM - an outside-in approach that has intriguing financial promise.

Customer Relationship Management (CRM), sometimes it is called customer management, customer value management, customer centricity, and customer-centric management [5]. The deeper the relationship the business organization holds with these customers, the more opportunities there will be for selling additional products and

services. The need to attract, acquire, leverage, and retain customers is still of primary concern to most businesses.

2.2 Technology Involve in CRM

There are several technologies being implemented in CRM. For example in e-CRM that being implemented in airline industry is Airline e-CRM System Model. Airline e-CRM model can be conceptualized as a system that is made up of components, linkages amongst the components, and dynamics-that takes advantage of the properties of the Internet to make money. It takes advantage of the properties of the Internet in the way it builds each of the components-value, scope, revenue sources, pricing, connected activities, implementation, capabilities and sustainability-and crafts the linkages among these components. It is what, preferably, enables an airline to have a sustainable competitive advantage. It includes three components (subsystem): Web Based Airline-Passenger Interaction subsystem; Airline Data Warehouse subsystem; and Airline e-CRM operation subsystem. Airline e-CRM model is an asset-based solution that includes best-of-breed components to build an e-CRM infrastructure and enable any-channel, any-time communication with customers [3].

In the IT industry today, the mobile technology and CRM has been integrated. The Mobile Reply mobile CRM is the example of the mobile technology which integrated with CRM. The Mobile Reply mobile CRM direct marketing platform offers retailers to benefit from its web based service (no need for any setup investments), supporting a wide range of SMS communication scenarios, and a strong emphasize on segmentation and analysis of the shoppers population [6].

2.3 E-commerce for CRM

Several findings that have been made, in order to increase the business revenue the business operation should be increased. In *"e-commerce e-business for Managers"*, a business organization should offer convenience, personalization and excellent service plays role in the success and differentiation of many other business [1]. Revenue growth through customer acquisition and retention remains a major requirement for competing

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successfully. Several studies document that the average company loses half its customers every 5 years and that it costs five to ten times as much to obtain a new customer as to keep an existing one [2].

2.4 Relationship between Malaysia Economy and Tourism

Currently tourism industry is one of the key industries for economic earning generator in Malaysia. As been stated by Ministry of Tourism more than 20% of Malaysia earning comes from tourism industry. For the year 2004 Malaysia has received 15 million visitors from all around the world. During the economic crises, the industry that still can give a good return to Malaysia was also the tourism industry, this is according to Shirley Yoong in her article entitle "*Ekonomi Malaysia*" [4]. Food industry is among the most significant industry with the tourism industry or can be called as a driven industry for tourism industry. With that fact and reason, it is important for the government to take a proactive effort to develop and maintain both industries especially the food industry.
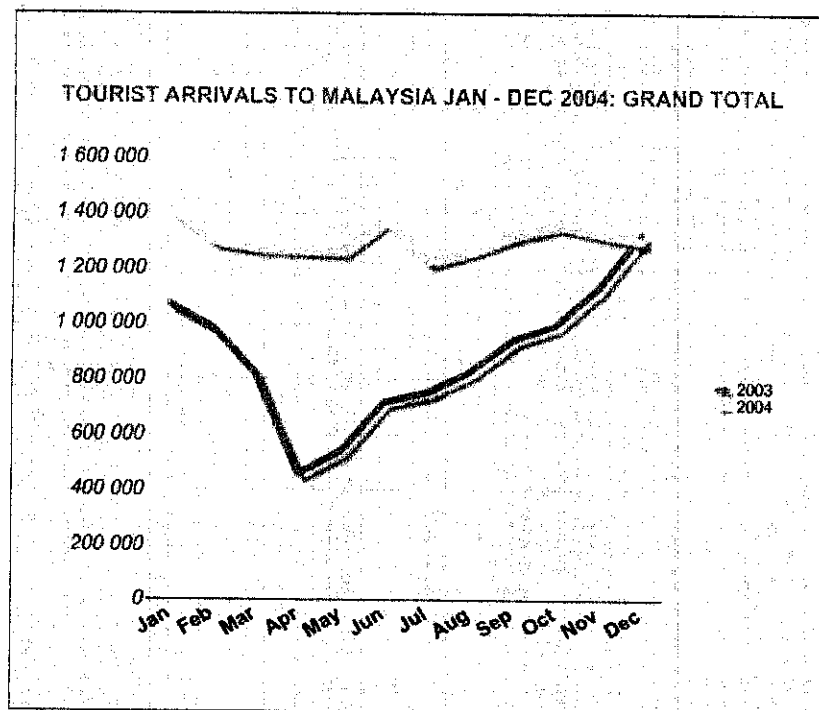
Figure 2.1: Statistic on tourist arrival to Malaysia in the year 2004

If further discussion is being made, the food industry has several driven force in order to support other industry. Among the strong factors that can affect the performance of food industry are the type of food, the location of the restaurant/café, and the customer

relationship. In term of management, the customer relationship is a very important point as has been discussed earlier. The most significant value with the customer relationship and food industry is how the process of serving the customer is being made; either the customer will have to wait few minutes or few hours to get their meal done. This is the main point where the business organization should look after very well.

2.5 Mobile Commerce

This also has been experienced by bigger company, such as McDonald. Customers today demand fast service. Long drive-thru lines and congested counter lines may push customers to your competition. McDonald's franchises and corporate-owned restaurants have overcome this challenge. Implement McDonalds Mobile Order Taking System [9].

Figure 2.2: A McDonald's waitress taking an order from their customer using mobile technology

Expertek developed MobileWorks, a business solution that enables salespeople to connect to the business system, retrieve information about customers and products, and store that information in a database residing on a mobile device. They can take orders in the field, and at the same time, send orders to the business system to be processed to completion [10].

Using MobileWorks, salespeople can now capture data on a Pocket PC running Microsoft SQL Server™ 2000 Windows® CE Edition (SQL Server CE). Then, at any point, with any connection to the Internet, they can synchronize the device. Using Web services, the

device connects to a SQL Server 2000 database on the Web server and transmits data to and from the Pocket PC. When an Internet connection is available, master file information is periodically downloaded to the Pocket PC, keeping it synchronized with the business system. Users can then upload the day's orders to the office back-end system for processing and fulfillment [10].
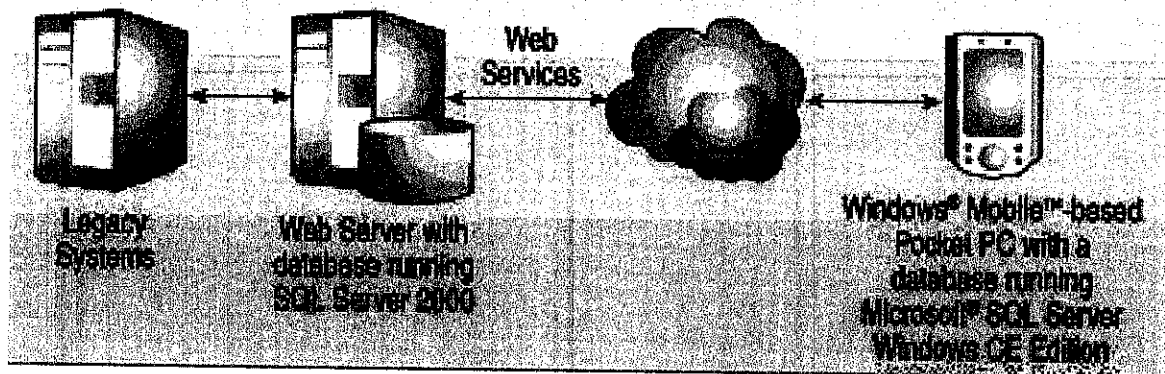
Figure 2.3: Mobile Works Architecture

2.5.1 Mobile Technology Platform

According to Expertek, with Windows Mobile software and Visual Studio.NET, Expertek was able to take advantage of comprehensive Microsoft resources and tools to develop a mobile business solution that not only extended its existing technology assets and infrastructure, but allowed the company to reuse code to develop a desktop version of MobileWorks and capture market opportunities much more quickly.

2.5.1.1 Access to Comprehensive Resources

The Expertek developers relied on Windows Mobile and Microsoft development resources. A Microsoft-sponsored .NET developer training course gave Expertek developers an introduction to developing with .NET connection software. Expertek's universal subscription to MSDN provided the development team with early access to the beta version of Visual Studio .NET 2003. For technical support, the team relied on the information-rich newsgroups on MSDN. In addition to relying on Microsoft's world-class resource for developers, Expertek found useful the error-reporting and error-handling tools in the .NET Compact Framework.

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2.5.1.2 Extends Existing Infrastructure

The addition of the MobileWorks application and a Web service extends Expertek's existing infrastructure. Using SQL Server CE on the Windows Mobile-based Pocket PCs was a natural choice because Expertek was already using SQL Server technologies with its other custom applications. SQL Server CE synchronizes directly with the SQL Server 2000 database used for back-end data. MobileWorks extends the rest of the company's infrastructure as well. "MobileWorks captures the same ordering information that our e-commerce sites capture, so adding the MobileWorks application and a Web service let us easily extend our existing infrastructure to the field," says MacGregor.

Developing a mobile solution helped customers extend their ERP systems to the field while eliminating manual, time-consuming tasks. With MobileWorks, salespeople can create orders at the client, and then synchronize their handheld at the end of the day. Developed with integration in mind, MobileWorks enters all orders sent to the back-end into the customer's ERP system. The solution pushes data effortlessly from handheld to front-end to back-end.

2.5.1.3 Quickly Captures Market Opportunities with Code Reuse

When another customer needed MobileWorks functionality in a desktop version, Expertek was able to deliver very quickly by leveraging its skills, code, and assets.
To port the Pocket PC edition of MobileWorks to a desktop edition, Expertek switched the data access code from SQL CE for the Pocket PC edition to the full-version of SQL Server for the desktop edition.

"Because we used the Microsoft .NET Framework, we were able to achieve over 90 percent code reuse for the desktop version of MobileWorks. In fact, both versions of MobileWorks are compiled from the same code base. As a result, we saved development time and were able to bring a new product to market quickly. Our customer couldn't have been more delighted," says MacGregor.

In addition, Expertek wanted to develop on a platform where they could use their existing development skills. They planned to migrate from Visual Studio 6.0 to Visual Studio .NET, and from Microsoft Active Server Pages (ASP) to ASP.NET. "Clearly with the platform transfer ability, we'd be able to use those same skills and same tool sets to develop a new application," says MacGregor.

AristoCraft Supply, one of New England's largest full service distributors of dry cleaning, laundry, and tailoring supplies, uses MobileWorks and another Expertek solution called CommerceLink.

"MobileWorks lets our sales people enter sales orders and query customer credit, pricing data, and inventory availability in the field. Using MobileWorks running on Windows Mobile-based Pocket PCs, our sales force is more productive and can handle substantially more accounts without increasing our headcount," says Doug Ross, President of AristoCraft Supply.

2.5.1.4 Windows Mobile Developer Customer Solution Case Study

Microsoft offers developers a rich, flexible platform to build innovative applications for Windows Mobile-based Smartphones and Pocket PCs. The Windows Mobile platform offers extensive API support, integrated development tools, and familiar Windows programming models, so developers can use existing code and skills to quickly build and deploy applications. Comprehensive technical support and marketing programs, such as Mobile2Market, also help developers reduce time to market and capture new market opportunities. For enterprise scenarios, the Windows Mobile platform helps developers extend their PC and .NET programming skills as well as existing business systems, conserving time and money.

2.5.2 Windows Mobile Platform

Microsoft provides developers with a rich, flexible platform, world-class tools and comprehensive resources to build innovative applications for Windows Mobile-based Pocket PCs and Smartphones. Windows Mobile developers can benefit from [13]:

- ✓ Powerful platform capabilities
- ✓ Reduced development time and costs
- ✓ Increased market opportunities
- ✓ Access to comprehensive developer resources and support

2.5.2.1 Flexible, Powerful Development Platform

The Windows Mobile platform offers:

- ✓ Seamless and secure data connectivity (XML support, built-in security features, encryption libraries)
- ✓ Rich API support (Configuration Service Provider, Telephony, Bluetooth, POOM, Gaming APIs)
- ✓ An extensive range of programming models (native code, managed code, mobile web development)
- ✓ Device resources (industry standard expansion interfaces, multithreading and multitasking)

2.5.2.2 Reduced Development Time and Cost

Windows Mobile developers can take advantage of a unified software platform, a familiar Window development environment, a consistent programming model and comprehensive technical resources to reduce development time and costs.

- ✓ Develop and test applications quickly with familiar development tools and free resources from Microsoft
- ✓ Use existing .NET programming skills (Windows Mobile is based on Windows CE and .NET Compact Framework)
- ✓ Reuse existing code to target new devices (85% of Windows Mobile-based Smartphone and Pocket PC APIs are identical)
- ✓ Reach new markets through multilingual support

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✓ Deploy mobile enterprise applications through Auto-run and remote management tools

2.5.2.3 Increased Market Opportunities and Reduced Time-to-Market

Mobile2Market, Microsoft's certification and marketing program for Windows Mobile applications, helps independent software vendors (ISV) increase revenue and reduce time-to-market by streamlining application development and logo testing and providing worldwide distribution channels.

2.5.2.4 Access to Comprehensive Developer Resources and Support

Microsoft provides comprehensive resources to help corporate and ISV developers stay abreast of mobile technologies. These resources include:

✓ Access to free tools at the MSDN Mobile and Embedded Developer Center

✓ Free web casts, chats and newsgroups

✓ Microsoft's world-class premier support offering (fees may vary)

2.5.3 M-Commerce Device

In most M-Commerce activities, the most common device that is being used is the Personal Digital Assistant (PDA). There are several reasons of using the PDA as the most usable device as the assistant in M-Commerce.

2.5.3.1 PDA's advantages

Aside from being cool, a PDA might make sense for the user as part of a personal navigation system for a number of reasons. Some of the advantages include [15]:

- **Larger screens:** PDAs have larger, higher-resolution, color screens compared with handheld GPS receivers. This is a big plus if the user eyesight isn't as good as it used to be and it's really important if the user are using the PDA while driving. Most user want to be able to quickly glance at a map on the screen, determine their location, and then get their eyes back on the road.

- **More maps:** Most of the maps that the user can upload to GPS receivers don't have a lot of detail; especially the topographic maps. These maps tend to be

vector line maps and don't have the resolution or detail found on paper maps that the user would use for hiking. Several mapping programs are available for PDAs that support all types of maps, and the user can even create their own custom maps. With a PDA, the user can use more detailed maps, like scanned, color 1:24,000 topographic maps. The extra feature that the PDA could provide to the user is the user may not locked in to using only a GPS receiver manufacturer's proprietary software and maps.

- **Expandable memory:** Unlike many GPS receivers, which have fixed amounts of memory, most PDAs support expandable memory with plug-in memory cards. The only limitation to the number of the maps and amount of data that you can store is the size of the memory card.

- **Usability:** Although handheld GPS receivers are fairly easy to use, the user interfaces found on PDAs are even simpler. Using a touch screen and stylus to enter data and commands is a lot faster and easier than using the buttons on a handheld GPS receiver.

- **Custom programs:** Developers can easily write custom programs for PDAs that access the data output from a GPS receiver. If the user are collecting information that's based on location data, this can make their job much easier than pressing buttons on a GPS receiver and then hand-writing remarks in a field notebook.

- **PDA features:** PDAs have all sorts of useful programs such as address books, contact lists, and databases designed for readily storing data. A fair amount of this information tends to be location based (like addresses), and having a single information/navigation device is the definition of practical.

2.5.3.2 PDA's disadvantages

After reading through advantages of using a PDA as the navigation system of choice, most user are probably sold on a using a PDA. Some of downsides that the user should aware of are:

- **Ruggedness:** Handheld GPS receivers are designed to take more abuse than PDAs, which often fail when they're dropped or knocked around. Although the user can buy *ruggedized* (with special enclosures that make them waterproof,

drop-proof, bear-proof, and kid-proof) PDAs, they are considerably more expensive than off-the-shelf models; expect to spend at least several hundred ringgits more.

- **Weather/water resistance:** Unlike GPS receivers, PDAs aren't designed to be waterproof or even weatherproof. This can be a major issue if the user plan on using their PDA navigation system outdoors in damp, rainy, or snowy weather, the user are around water, or the user have a leaky water bottle in your backpack.

- **Power considerations:** Most PDAs use internal batteries that are recharged through a docking cradle. If the user are away from a power source, this can be a serious issue because you can't swap out dead or dying batteries for a convenient set of spare AA or AAA batteries like you can with a handheld GPS receiver.

2.5.4 Key Mobile and Wireless Technologies

Below are the summarized key technologies available for usage in mobile and wireless services. Many of these technologies are available after its specifications become a standard and being adopted by group of companies that created them:

Table 2.1: Wireless Connectivity Technologies. Adapted from *IEEE International Workshop on Wireless and **Mobile Technologies** in Education. Raul Morales Salcedo. Universidad de las Americas.*

Third Generation Mobile Telephony (3G)	By liberating us from slow connections, cumbersome equipment and immovable access points, 3G enable new ways to communicate, access information, conduct business and learn. The 3G wireless network technologies are WCDMA, CDMA2000 and EDGE. UMTS is one of the Third Generation (3G) mobile systems being developed within the ITU's IMT-2000 framework. UMTS is a global 3G system implemented with WCDMA technology.
Wireless technology (Bluetooth)	Bluetooth wireless technology is a short-range radio technology. Bluetooth wireless technology makes it possible to transmit signals over short distances between telephones, computers and other devices and thereby

	simplify communication and synchronization between devices. It is a global standard that: i) eliminates wires and cables between both stationary and mobile devices ii) facilitates both data and voice communication iii) offers the possibility of ad hoc networks and delivers the ultimate synchronicity between all your personal devices The Bluetooth wireless technology comprises hardware, software and interoperability requirements. Beyond unleashing devices by replacing cables, Bluetooth wireless technology provides a universal bridge to existing data networks, a peripheral interface, and a mechanism to form small private ad hoc groupings of connected devices away from fixed network infrastructures. Bluetooth radio uses a fast acknowledgement and frequency-hopping scheme to make the link robust, even in noisy radio environments.
General Packet Radio Service (GRPRS)	A packet-linked technology that enables high-speed wireless Internet and other data communications. GPRS provides more than four times greater speed than conventional GSM systems. Using a packet data service, subscribers are always connected and always on line so services will be easy and quick to access.
Global System for Mobile Communications (GSM)	GSM, which was first introduced in 1991, is one of the leading digital cellular systems. It uses narrowband TDMA. Eight simultaneous calls can occupy the same radio frequency. GSM simplifies data transmission to allow laptop and palmtop computers to be connected to GSM phones. It provides integrated voice mail, high-speed data, fax, paging and short message services capabilities, as well as secure communications. It offers the best voice quality of any current digital wireless standard. Originally a European standard for digital mobile telephony, GSM has become the world's most widely used mobile system in use in over 100 countries. GSM networks operate on the 900 MHz and 1800 MHz waveband in Europe, Asia and Australia, and on the MHz 1900 waveband in North America and in parts of Latin America and Africa.

| IMS - IP Multimedia Subsystem | The telecom industry is currently shifting towards All-IP systems, driven by the fundamental need to reduce costs, create new revenue generating services and to protect the operator business model. All-IP service delivery is the goal for both fixed and mobile communications in both the operator and enterprise domains: the benefits in terms of service creation, integration and cost savings.

IMS - IP Multimedia Subsystem is defined by 3GPP/3GPP2 as a new core and service 'domain' that enables the convergence of data, speech and network technology over an IP-based infrastructure. It is the operator choice of control and service logic for IP/packet based person-to-person communication.

For users, IMS-based services will enable communications in a variety of modes - including voice, text, pictures and video, or any combination of these - in a highly personalized and secure way.

IMS is designed to fill the gap between the existing traditional telecommunications technology and Internet technology that increased bandwidth alone does not provide. This allows operators to offer new, innovative services that share holders and end users are expecting. |
|---|---|
| Internet Protocol (IP) | With the creation of the World Wide Web (WWW), the Internet has become the global network for business, research and personal use. As a result, IP, the core communications protocol for the Internet, has become the de facto standard for data networking.

Internet protocol specifies the format and address scheme of information packets sent over the Internet. IP allows you to label a package with the destination address of the receiver and have the network carry the packet to that destination, but there's no direct link between sender and receiver (IP is a 'connectionless' protocol). When combined with specific higher-level protocols - such as TCP (Transport Control Protocol) - a virtual connection is established between two hosts so that they reliably can send messages back and forth.

The current version of IP is IPv4. A new standard, IP version 6 (IPv6), is now increasingly being introduced in products and networks. IPv6 incorporates functions essential for building scalable and cost effective IP |

	networks. New services, such as interactive multimedia, require users to be 'always connected-always reachable'. IPv6, with its very large address space will guarantee a globally unique IP address for each connected device. Ericsson, a pioneer in IPv6, sees IPv6 as a key component, and a complement to IPv4, in evolving today's networks. Our vision is that all IP-based products eventually will be IPv6-enabled.
Multimedia Messaging Service (MMS)	Multimedia Messaging Service (MMS) makes it possible for mobile users to send and receive multimedia messages. MMS builds on the huge success of SMS usage and enhances the communication possibilities for mobile users further by adding multimedia. Multimedia Messaging (MM) can for example be a photo or video clip annotated with text and/or an audio clip or a synchronized playback of audio, text, video and/or photo. MMS enables an infinite number of applications covering communication, information and entertainment. In the area of communication, the Ericsson MMS solution simplifies the creation of multimedia messages, provides storage capacity for all types of multimedia and features media processing for an optimal user experience.
Short Message Service (SMS)	Short message service is a wireless service available on digital mobile networks. It enables the transmission of text messages between mobile phones and other systems such as electronic mail, paging and voice mail. Up to 160 characters can be sent and received through the network operator's message system to the mobile phone. SMS is an alternative to paging services, and can be used to provide reminder services, stock and currency quotes, airline schedules, and account information.
Wireless Application Protocol (WAP)	A free, unlicensed protocol for wireless communications that makes it possible to create advanced telecommunications services and to access Internet pages from a mobile telephone. Wireless application protocol is a de facto industry standard supported by a large number of suppliers. WAP supports most wireless network standards including CDMA, GSM, PDC, PHS, TDMA, FLEX, DECT, and Mobitex, as well as operating systems like EPOC. WAP devices understand the WML language (an XML application) that is optimized for small screens and navigation without a keyboard. WAP also supports

	WMLScript scripting language.
Wireless Local Area Network (WLAN)	Wireless Local Area Network (WLAN) technologies complement access technologies for cellular networks. WLAN enable higher data rates than UMTS - up to 54 Mbps - for coverage in in-door hot spots. WLAN is a short-range packet data communication between base stations and user terminals. Direct communication between terminals is possible. WLAN allows the business professionals to access their company's Intranet. There are several standards for the WLAN air interface. It is only in the last year that market developments have made it clear that IEEE 802.11b is the dominating standard. This is the technology used in almost all commercial products today. Other WLAN standards (existing/coming) are: - IEEE 802.11a; 5 GHz, only allowed in the US - IEEE 802.11g; 2.4 GHz - HIPERLAN/2; 5 GHZ - IEEE 802.11h; 5 GHz, will incorporate HiperLAN functionality

2.5 Case Study on Vertigo implement Pocket PC with .NET Compact Framework

Can Office applications really scale to handheld devices? Vertigo proved it's possible to quickly deploy Office functionality on powerful Pocket PC devices. Their application lets people control PowerPoint® presentations from a Pocket PC handheld. Taking only one developer two months to develop using the .NET Compact Framework, the application lets users view, annotate, and adjust live PowerPoint presentations, as well as track speaker time, display speaker notes, and preview slides before they are displayed.

"This app was the result of my own PowerPoint experience," says Scott Stanfield, Founder and CEO. "An old agenda slide had accidentally been inserted in my deck. I was embarrassed when the slide appeared during the presentation, but I realized later that a remote control application, running untethered from the laptop, would have let me catch the wrong slide, and jump over it without the audience knowing." [13]

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The Right Tool for the Task

Vertigo was able to leverage their existing development expertise with the .NET Framework to rapidly prototype and build the remote control application. "We would not have attempted to build this product if not for the .NET Compact Framework," says Stanfield. "Our development staff is already trained in the .NET Framework and Visual Studio® .NET. The jump to build .NET Compact Framework applications is much easier than, say, going to eMbedded Visual Basic® or eMbedded Visual C++®. So there's a lot more existing expertise that we can take advantage of to get the applications done more quickly." [13]

Pocket PC   Desktop / Laptop
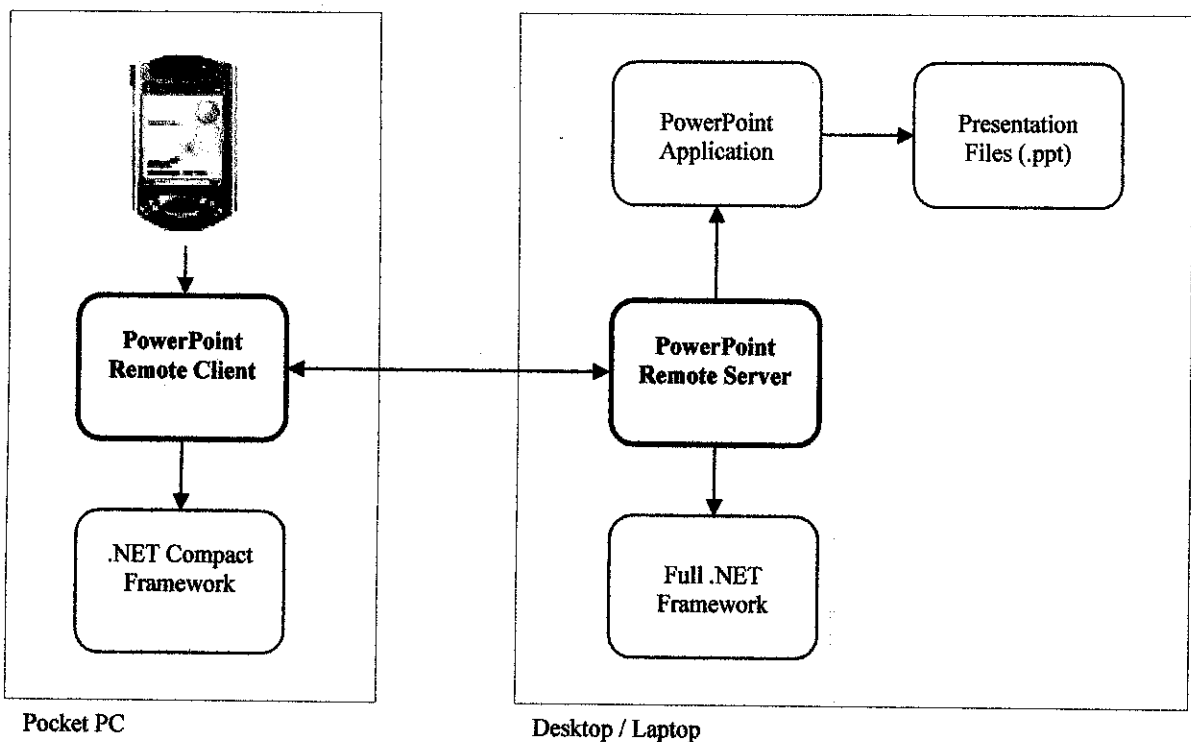
Figure 2.4: The mobile .NET framework system architecture implemented by Virtigo

High Technology, Low Cost

Vertigo was also able to save a lot of money by making use of the robust device emulators provided by the .NET Compact Framework. The development and testing cycle was augmented by testing and debugging on an emulator and then downloading to the real device when it was ready to go live. "That meant we didn't have to buy a handheld for everyone on our team," says Stanfield. [13]

Further, the .NET Compact Framework made quick work of the wireless networking and user interface aspects of the application. Wireless networking was necessary to communicate between the Pocket PC handheld and the laptop. "802.11 and Bluetooth are the ones we're using," says Stanfield. "We didn't have any problems with the network stack and that was something we were concerned about. "[13]

The .NET Compact Framework also made quick work of the user interface mechanisms associated with the Pocket PC handheld. "What kind of amazed me in the process is that we kept exploring how we could make this experience better for the mobile user. Every time we came up with an idea, we were able to easily integrate the user interface idioms (stylus, the joystick pad, etc.) and make a better user experience. Ultimately, we give the presenter complete control without letting the audience sees what they're doing." [13]

CHAPTER 3

METHODOLOGY/PROJECT WORK

3.1Methodology

Waterfall development has been chosen as the software process model. The waterfall model is a software development model (a process for the creation of software) in which development is seen as flowing steadily downwards (like a waterfall) through the phases of requirements analysis, design, implementation, testing (validation), integration, and maintenance. Thus the waterfall model maintains that one should move to a phase only when its preceding phase is completed and perfected. Phases of development in the waterfall model are thus discrete, and there is no jumping back and forth or overlap between them [11].
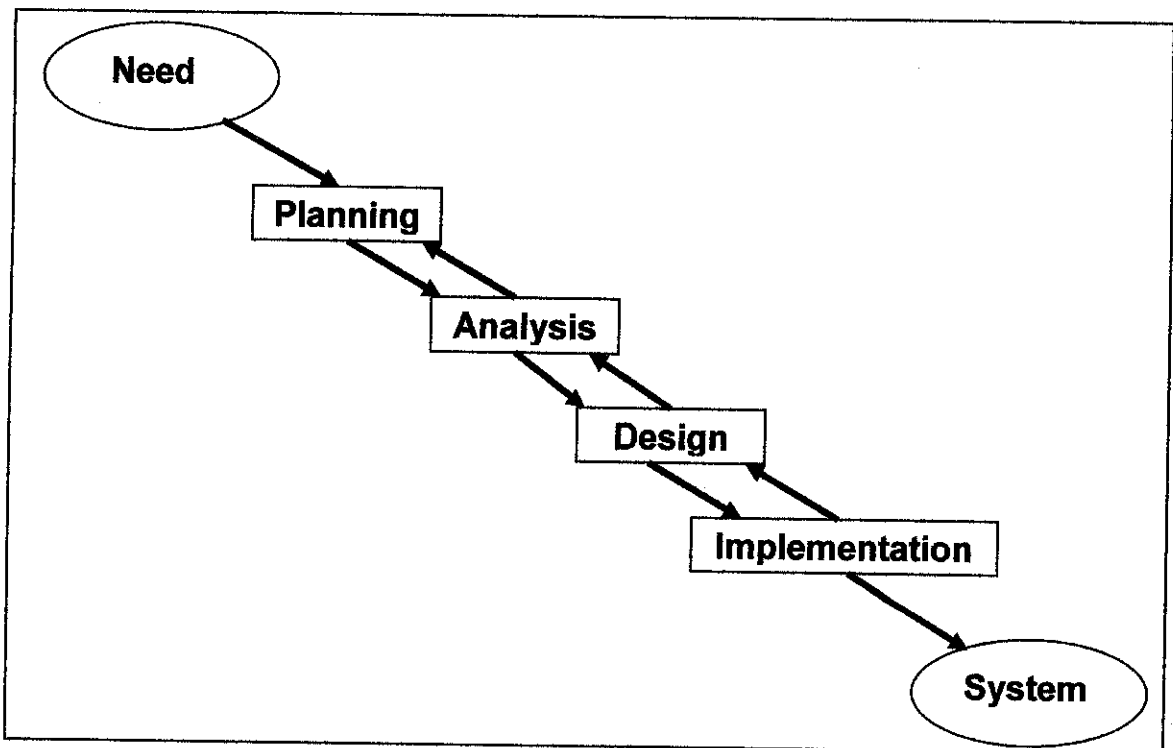
Figure 3.1: Software Process using Waterfall model.

For this project, the author will use waterfall model of system development life cycle approach. This leads to four phases in this project implementation:

3.1.1 Definition and Planning

In this phase, the author will define the underlying principle and scope of this project, the project timeline as well as the tools and the resources that will be used to produce the deliverables. This is the crucial part in this project development life cycle where by this stage will direct the project direction and become the base for this whole project. In order to have a successful result for this project all the elements in this stage need to be carefully defined and plan.

In order to get the proper definition and understand the generic integrated restaurant and café operation and also the business flow, an interview can be conducted with a few people that are related to the subject matter. Interview can be very crucial as the data can be retrieved directly from the interviewee. Thus, to get the accurate data, preplanning has to be done such as preplanning of the questions that going to asked either opened question or closed question or it can be both. As for the study, questions has being prepared in terms of basic business flows, pros and cons of available and new user requirements. The research also be done through paper research and survey made by the related organization.

Beside that the information and data are being collected through journals and findings that have been done by previous researcher. The reasons of getting the information through journals are not only because it is readily documented but also the results of the research are proven to be correct and success.

As been mentioned in the first paragraph of this section, in the earlier phase of this project the author have focus on the fundamental of this project and the principal of this project in order to bring this project to the proper direction. Among the elements that being consider as the fundamental elements in this project are the project background for

this project, the problem background that lead to the initiation of this project, and the project objectives and the scope of study. These are elements that need to be clarified and need for data gathering for a better development of this project. Those elements needed to be collect at this early stage.

Apart from that, the planning category requires identification of tasks and procedures that are necessary to complete the system. The tasks and procedures are apart of scope definition that defines the scale of the project. A Gantt chart (Please refer to the appendices) is produced as part of the scheduling plan to ensure it the feasibility of the project within the given time frame and within the scope of the project as well.

3.1.2 Analysis and design

In this phase, the author designs the framework for the mobile system. This includes analyzing the available techniques to implement the best mobile system. This will also include the techniques for analyzing and managing financial part in the organization. The software in question is designed and a "blueprint" is drawn for developmet phase. This design should be a plan for implementing the requirements given. When and only when the design is fully completed, then the implementation phase can take place. This shows how important the desinging phase for the development of the system and also the implementation of the system itself. Beside that the desininig phase is really rely on the planning and definitaion phase that has been completed earlier.

The purpose of the design phase is to transform the requirements statement into design specifications for system development. The designing category also addresses how technology will be used in the project. As for the purpose of this project several elements need to be design in order to have a good view of this system before the development phase take part. Among the elements that are needed to be included in the desgining phase are the system architecture and the system design document is necessary to ensure the development can be sustained during the project's progress. These design

requirements are a representation of system flow in terms of entities, attributes, relationships and rules.

3.1.2.1 System Architecture

The Mobile Order Tracking System consists of several modules and sections as shown in *Figure 3.2*. The modules are order taking module, food preparation module, cashier module, and management module. All those modules will be integrated and all information will be centralized in one server. In the system architecture it clearly represent the new business transaction flow where by the order can be made either using the mobile system or the web based system.

In the conservative system, the architecture of the system only included order taking, food preparation, and cashier. The information between those sections will only be delivered manually without any centralization on the information. The conservative system also excluded the management level, where by the information related to the sales will only be available at the end of the day. Different with the Mobile Order Tracking System, the information related to sales are always available for sales tracking analysis.
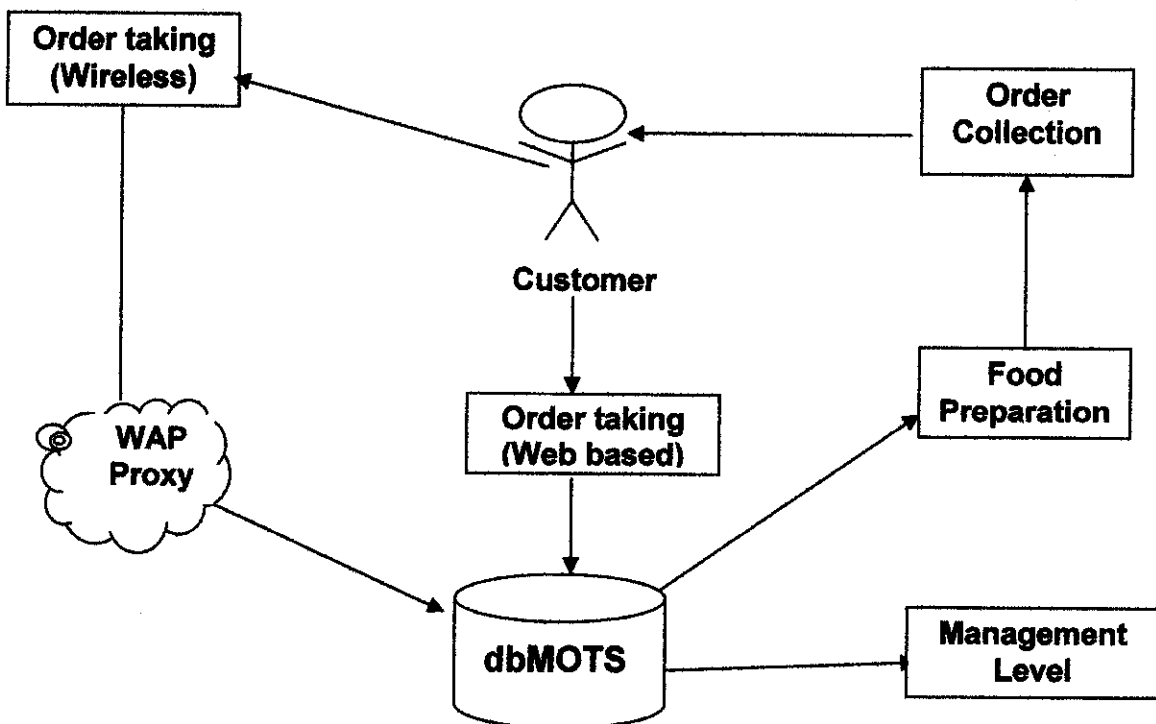

Figure 3.2: The architecture for Mobile Order Tracking System
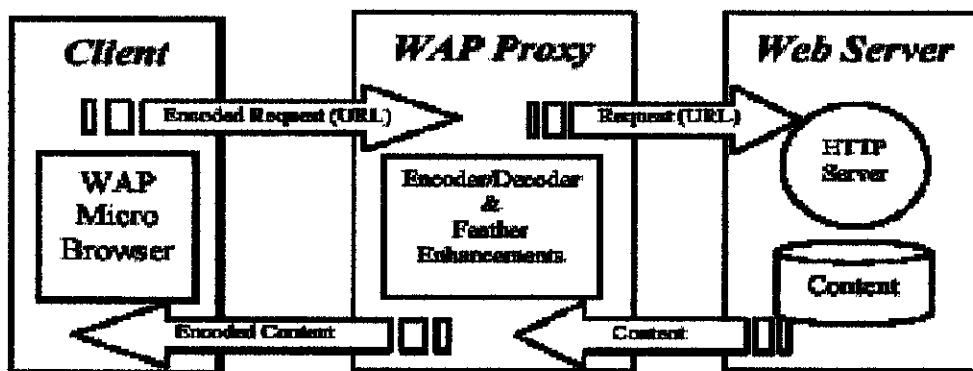
Figure 3.3: WAP Proxy Framework for Mobile Order Tracking System

The novel architecture for Wireless Application Protocol (WAP) 2.0 employing a proxy to isolate the wireless domain from the wired domain and an advanced data compression scheme to significantly reduce the wireless access time (WAT) while overcoming the WAP 1.x end-to-end security problem.

a. A novel proxy architecture employing an advanced data compression scheme is introduced for WAP 2.0. The compression scheme combines TCP content compression with Robust Header Compression (ROHC), which minimizes the air-interface traffic without protocol conversions and overcomes the end-to-end security problem in WAP 1.x.

b. The WAP programming model is the WWW programming model with a few enhancements such as Push model and Telephone Support (WTA).

c. WAP 2.0 does not require a WAP proxy, since the communication between the client and server can be conducted using HTTP 1.1.

d. However, deploying a proxy, as shown in *Figure 4.2*, can optimize the communication process and may offer mobile service enhancements, such as location, privacy, and presence based services.

e. In addition, a WAP proxy is necessary to offer Push functionality.

3.1.2.2 System Process Workflow
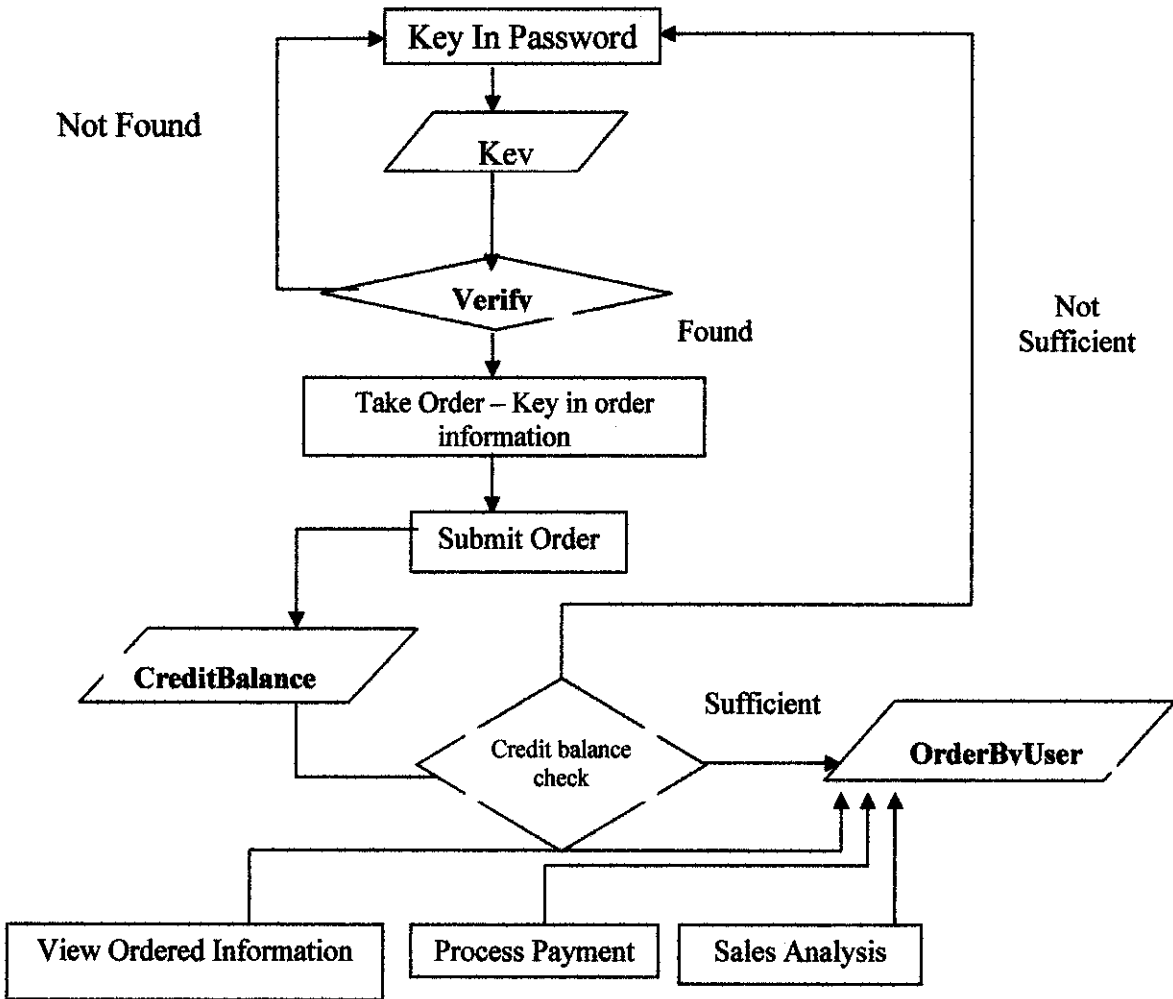
Figure 3.4: Mobile Order Tracking System process workflow

There are the process workflows for the Mobile Order Tracking System. *Figure 3.4* shows the general workflow for the system. The details for the workflow are as follows;

i. The user/client will take their order using the mobile order application. The process will be performed either using PDA or web based system. The order will be submitted to the server. For the security purposes the system is equip with the user verification function whereby only authorized user can key in the details into the order system.

ii. After the system have verified the user, then the user can have the access to the system which only to submit their order. In the ordering section the user will be displayed with the menus that give the user with sets of option on the menu.

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iii. After done with the menu selection the user simply submits their order and the system will once again check either the user has sufficient credit balance or not. The process and transaction can only be completed if the user has sufficient credit. If not the system will automatically logout from the system and the user is required to top up their credit balance.

iv. The submitted order will be stored in the server. The server will be a centralized server.

v. As the order being submitted, the information at the food preparation module will be updated. The person in charge will prepare the foods base on the updated information on this module.

vi. The cahier also can process the customer payment by accessing the cahier module. Transactions that have been submitted earlier will be processed in this module and the transaction will be completed as soon as the payments have been done.

vii. At the management module, the information regarding the sales will be processed into the sales analysis form to ease the management to make a sale analysis and to make any business decision.

3.1.2.3 UML Use Case Design

The Use Case in Figure 3.5 describes the actions that occur between the users and the system. Basically, there are three types of users, namely the customers, chef and manager. Customers are able to acquire menu that provide details of food and beverages that are available in the restaurant. Then they can choose and order the items that they want by submitting the order to the system. Apart from that, they can view ordered meal and subsequent able to cancel any ordered meal if they wish to. The system will store the order in the database while chef will retrieve order queue from the system. After delivering the order, chef has to delete the order queue. Manager has the authority to enter new product by creating new entry into the electronic menu and able to delete any entries in the electronic menu as well. Apart from that, manager can modify the menu details regarding the product name and description, and update product's price and availability. Once modified, the changes will be reflected instantly in the electronic menu

that is accessed by customers. The additional part that the manager can use in this particular system is the sales analysis part whereby the manager can evaluate their sales performance for a particular period.
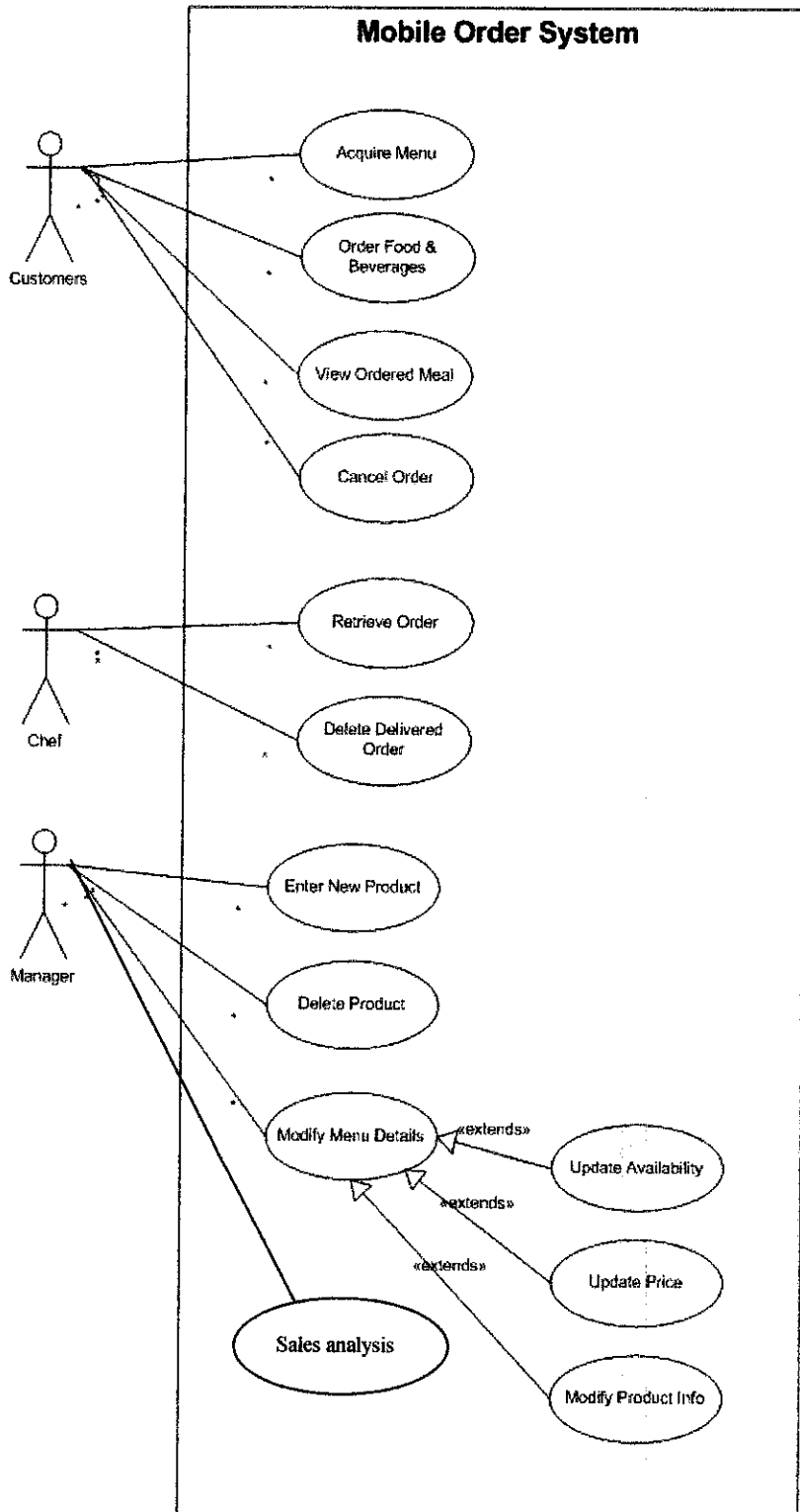

Figure 3.5: UML Use Case Diagram of the System

3.1.2.4 Database design

Table 3.1: The table consist the user information.

ID (PK)	String
Name	String
Address	String
Phone_No	Integer
Password	String
Registered_Date	Date/Time
User_Type	String

Table 3.2: The table consist the menu information.

Menu_Code (PK)	Integer
Menu_Name	String
Menu_Type	String
Price	Currency
Menu_Description	String
Registered_Date	Date/Time

Table 3.3: The table consist the credit value for user.

ID (PK)	String
Credit_Balance	Currency
Last_Update	Date/Time

Table 3.4: The table consist the sales history

Transaction_No (PK)	Integer
Sales_Value	Currency
Transaction_Date	Date/Time

Above are the tables that have been created by author. Basically in order to have the system full function, those are the table required by the system. All those tables are stored in one database. The database is dbMOTS.

3.1.3 System Development

With the designed specifications, system development phase is a stage where the modules can be constructed. The purpose of system development is to build a system that fulfills system requirements and design specifications and to implement the interfaces between the modules. Among the tasks to be implemented includes the databases, web application programs, and user interface. Please refer to Chapter 4: Results and Discussion for further details.

Actually before author manages to reach to this phase, the prototype development has to the picture based on the design. The prototypes were developed using VB.NET to represent all modules in the systems which are the mobile ordering modules and the financial management modules.

3.1.4 Testing and Implementation

For testing, several data samples will be used to test the efficiency and the effectiveness of the prototype in performing the order taking functions and managing the financial elements for the organization, whether the system is efficient enough for the organization or not. The parameter will be how fast the order made by the client received by the food preparation sections and how efficient is the finance management for the organization.

3.2 System tools

Basically there are two main categories of tools that are necessary in this project development work, there are software and hardware. These equipments are also necessary to simulate a real working environment of a running production system. However, some items are not available due to resource constraints, thus they are replaced by either emulated devices and assumed to work the same in real world.

3.2.1 Software

Among the software that I need in this project are:

- Microsoft Windows XP Professional Edition
- Microsoft Visual Studio .Net 2003
- Microsoft SQL Server 2000 Developer Edition/ Ms Access 2003
- Microsoft Internet Information Services 5.1
- Microsoft .Net Framework 1.1
- Microsoft Pocket PC 2002 Emulator
- Microsoft Internet Explorer 6.0

For the purpose of development work, Microsoft Windows XP Professional Edition is chosen because the platform offers more stability and reliability over other Windows platforms. Furthermore Professional Edition is bundled with Internet Explorer 6.0 and Internet Information Services 5.1 which is vital for the purpose of web hosting ASP.Net pages. For the purpose of database storage, Microsoft SQL Server 2000 Developer Edition is used because this edition allows developers to build any type of application on top of SQL Server. It includes all the functionality of Enterprise Edition but limited for the purpose of development and not production. Another important point is that it will install in workstation operating systems and not restricted to server operating systems, unlike Enterprise Edition.

As for the development environment, the tool that is necessary is Microsoft Visual Studio .Net 2003. It comes bundled with Microsoft .Net Framework 1.1 and Microsoft Pocket PC 2002 Emulator. Visual Studio .NET is a complete set of development tools for building ASP Web applications, XML Web services, desktop applications, and mobile applications. Visual Basic .NET, Visual C++ .NET, Visual C# .NET, and Visual J# .NET all use the same integrated development environment (IDE), which allows them to share tools and facilitates in the creation of mixed-language solutions. In addition, these languages leverage the functionality of the .NET Framework, which provides access to key technologies that simplify the development of ASP Web applications and XML Web services.

ASP.NET Mobile Designer extends ASP.NET and the .NET Framework, allows development of Web applications for mobile phones, PDAs, and pagers. This designer is integrated into the Visual Studio IDE. Thus to create mobile Web applications, the Mobile Designer is used to modify a mobile Web form. Then it can build and run the application, all from within Visual Studio. Emulator is a simulation of the hardware and software operation of mobile devices. Emulator software allows viewing of ASP.NET mobile Web Forms application as it might appear on the manufacturers' hardware devices. Developing and testing with emulators in addition to actual devices if it's available provides opportunity for me test the mobile Web application more easily before being deployed.

3.2.2 Hardware

A development machine is vital for the purpose of web hosting, database storage, system development, testing and simulation. The hardware that will be used are;

i) PDA or emulator.

This will be main component of this system since the main focus is to conduct a mobile order tacking system. The system is using PDA since that is the most compatible and stable mobile device. PDAs have all sorts of useful programs such as address books, contact lists, and databases designed for readily storing data. A fair amount of this information tends to be location based (like addresses), and having a single information/navigation device is the definition of practical [8]. Although the cost is quite expensive, but when comparing the cost of buying the PDA and the amount of profit that can be earned it much more reasonable. If the PDAs is available then the user PDA's user is required to have several specification on their PDAs in order to access to the system, that are;

- Pocket PC 2002 PDA with Wi-Fi capability to replace emulator
- Wi-Fi access point to replace simulation of wireless network using LAN

ii) Computer; Act as a server

The server will be used to store the database of the system. The system will basically have a centralized database. All the information will be stored inside the database. The server will be center of all the information related to the system. The computer that is dedicated as the server, will need to fulfilled several requirements. The requirements are;

- Pentium 4 1.4 GHz
- 384MB of RAM
- At least 15GB of hard disk space for operating system, relevant software installation, swap disk requirement and the system itself
- 10/100 MBPS network card with LAN connectivity available

iii) Computer; representing management side

The management level will also have an access to the system in order to conduct the sales analysis. In order to have access to the system, the management required to have a PC or laptop connected to the network since the system will be implemented on intranet basis.

3.3 Sales Tracking and Analysis

As for the sales tracking and analysis, several methods will be used in order to have a very effective and accurate analysis. The sales evolutions methods that will be implemented are;

- ➢ Benchmarking method
- ➢ Analysis method
  - Comparisons with the Forecasts
  - Comparisons with Previous Period

3.3.1 Benchmarking methods

Benchmarking is an on going measurement and analysis process that compares an organization's current operating practices with the best practices. It is also a tool for

evaluating current business practice and finding the way to do them better, more quickly and less expensive.

This method has been practiced by several giant companies. For example Hewlett-Packet has improved on-time delivery 150%, and one division of General Electric had a $54 million drop in inventory. Beside that XEROX also claims that benchmarking had allowed them to reduce costs by up to $1 billion [2].

3.3.2 Analysis methods

Sale is a key point in the profit oriented organization. In order to gain a huge amount of profit, the organization should have a good return on sales. In order to have good sales, the organization should practice a good sales analysis. Two way that is applicable to monitor sales and to improve sales are by analyzing through comparison with forecast and previous earning.

CHAPTER 4
RESULTS AND DISCUSSION

4.1 Findings

As been mentioned in the introduction part, the author has stated the objectives that the author need to achieve in order to have successful result for this research and project. As the result the author has come out with one big solution. The chronology of this solution has been explained in detail in the methodology section whereby the author has explained starting from the information gathering and until the development of the solution.

Basically the author has come out with an integrated solution or system for the café or restaurant operation. This action has been taken in order to reduce the gap period between the order taking process and the ordered being process. An addition to that, the author has made the solution or system as a prepaid ordering system due to some feedback on existing system and the prototype that have been developed earlier.

As part from that, the system has been also developed in two main platforms. The system is available in mobile platform and web based platform. This is to cater a superior coverage of customers. The customers can either made the order beforehand at their houses or their workplace. Beside that the business operators can also provide the same service to their customer by offering a serve service ordering system to their customer by providing their customer with a PDAs or a PC at their outlet. The business operators also have the option to provide their waiter with PDAs for order taking process.

The system that has been developed is built with three main sub-system, namely Mobile order sub-system, Web-based order sub-system, and system administration sub-system.

4.1.1 Mobile order sub-system

The Mobile Order Sub-System is being built as simple as it could be developed. In the Mobile Order Sub-System, it consist of five main pages or frames namely are Login page, Navigation page, Food Listing page, Beverage Listing page, Dessert Listing page, and Order Confirmation page. All of the pages are being integrated with the buttons and links available on each page.
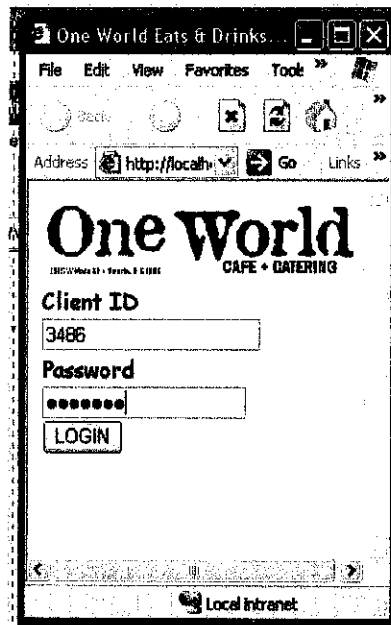
Figure 4.1: Login page for Mobile Order Sub-System

This sub-system is a being controls using the authorization system, whereby only authorized person can only access to the system. In *Figure 4.1* it shows the login page of the system where the user of the system is required to enter their client's id and the user's password. If the login success only then the user will be allowed to access to the system.
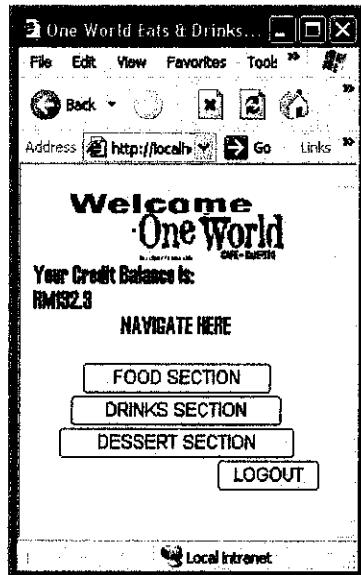
Figure 4.2: The navigation page of the mobile system which will help user to access to the system

As shown in *Figure 4.2*, the navigation page is the page whereby the user will find after they are successfully login to the system. In the navigation page it will assist the user of the system to access to the system. In this particular page, it will link the user to **Food Section page, Drinks Section page, Dessert Section page,** and the login page as being represented as the logout button. The user is required to click on any of those buttons in order to access to the system.
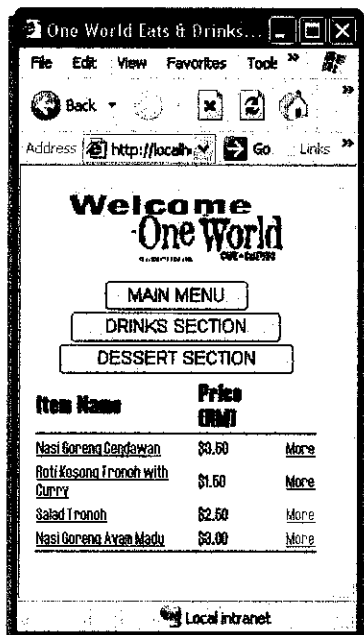

Figure 4.3: The food menu listing that being offered to the client of the business
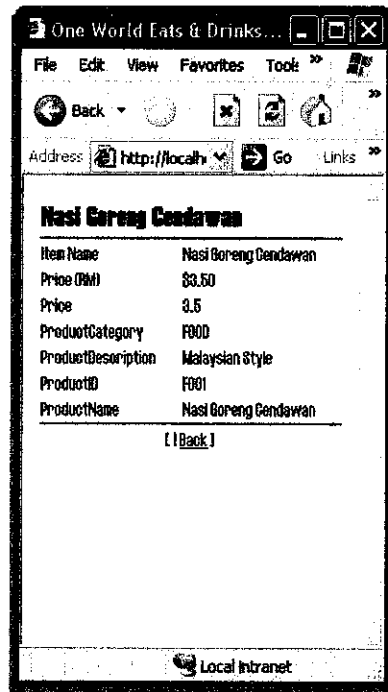
Figure 4.4: The description of particular menu offered by café.

As shown in *Figure 4.3*, this is the page whereby the clients can take their order. In those page, it will displays all the menu that being offered by the business operator based on the category given which are the food, beverage, and dessert. *Figure 4.4* is the description of an item in the menu listing. In order to have the page the user simply click "More" link on the menu listing page. The method of taking the order is simple whereby the client is required to check on the desired item. After that the clients simply click on a particular menu name in the menu listing to make an order for the particular item. Then the system will require the client to key in the desired quantity of the item bought as shown in *Figure 4.5*. After the desired quantity for an item to be bought have been keyed in, the system will prompt an option to the client either to complete, cancel, or make another selection on the menu listing as shown in *Figure 4.6*.

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Figure 4.5: The item description and the desired quantity required.
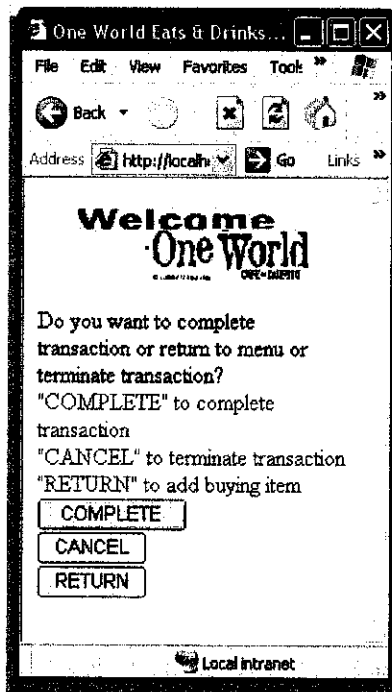
Figure 4.6: The option page either completing or making other transaction.
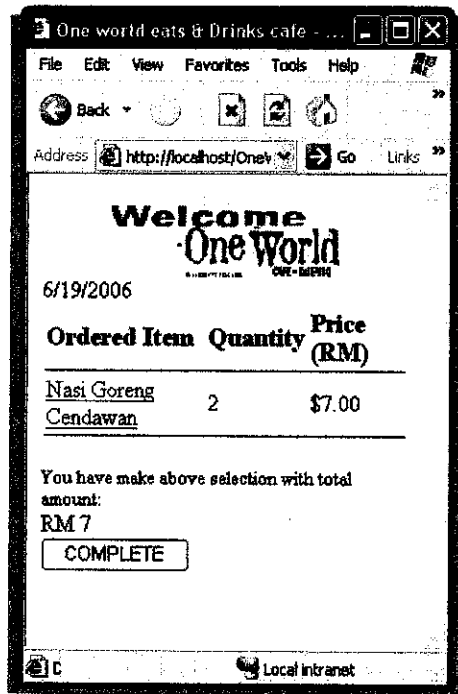
Figure 4.7: The confirmation page of the transaction/order made by the client (Shopping cart)
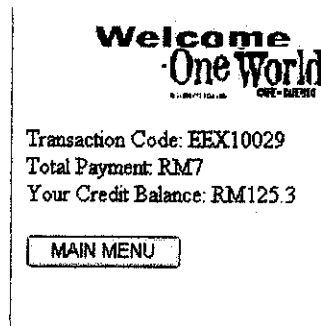
Figure 4.8: The transaction receipt for a particular transaction.

After finished with all the orders, the system will prompt the confirmation page of the whole transaction. In the confirmation sales page, the system will display all the transaction or order that have been made by the client. The system will also project the total amount of price that will be deducted from the client prepaid account as shown in *Figure 4.7*. After satisfy with the transaction the client will click on the confirm order button to complete the transaction. After the transaction completed and success the system will prompt a receipt as a transaction reference as shown in *Figure 4.8*.

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4.1.2 Web-based order sub-system

As been mentioned earlier in this chapter, the ordering system has been divided into two main parts, which are the mobile and the web-based. This following description will be for the web-based ordering sub-system. The ordering sub-system will be used mainly by the clients. Only several pages will be used or accessible for the clients, there are login page, navigation page, personal information/profile page, and menu listing & order page.


Figure 4.9: Login page for user verification.

As shown in *Figure 4.9*, the users are required to key-in their username and password in order to allow them to have access to the system. The username and password are given to the client when they did their registration with the system administrator. The client can access to the system only when they have successfully verify themselves as the registered user to the system. If their attempt to login to the system is failed, they need to refer to the system administration either to reregister or to retrieve back their password and username.
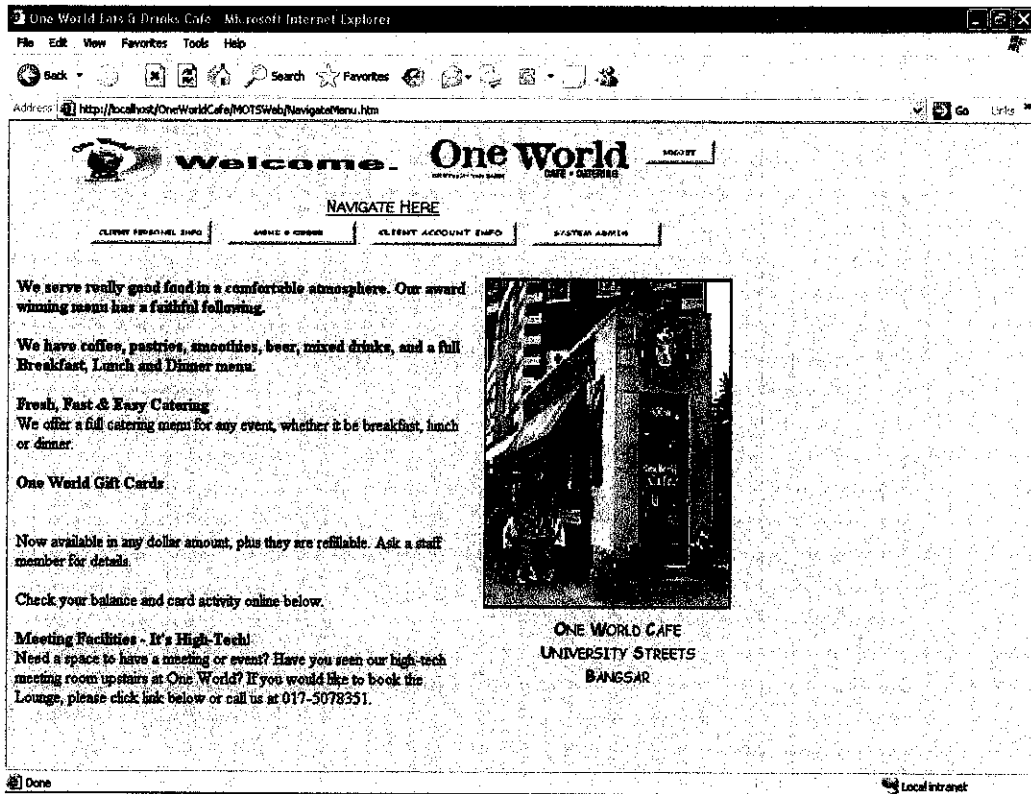
Figure 4.10: Welcoming page for the One World Café which also the navigation page.

In the *Figure 4.10*, the welcoming page will appear as soon as the client has successfully login to the system. Besides giving brief information to the client on the operator business, the welcoming page will also becoming the navigation page for the client. Only personal information and menu listing & order will be visible for the client as they are login as the client instead of administration.
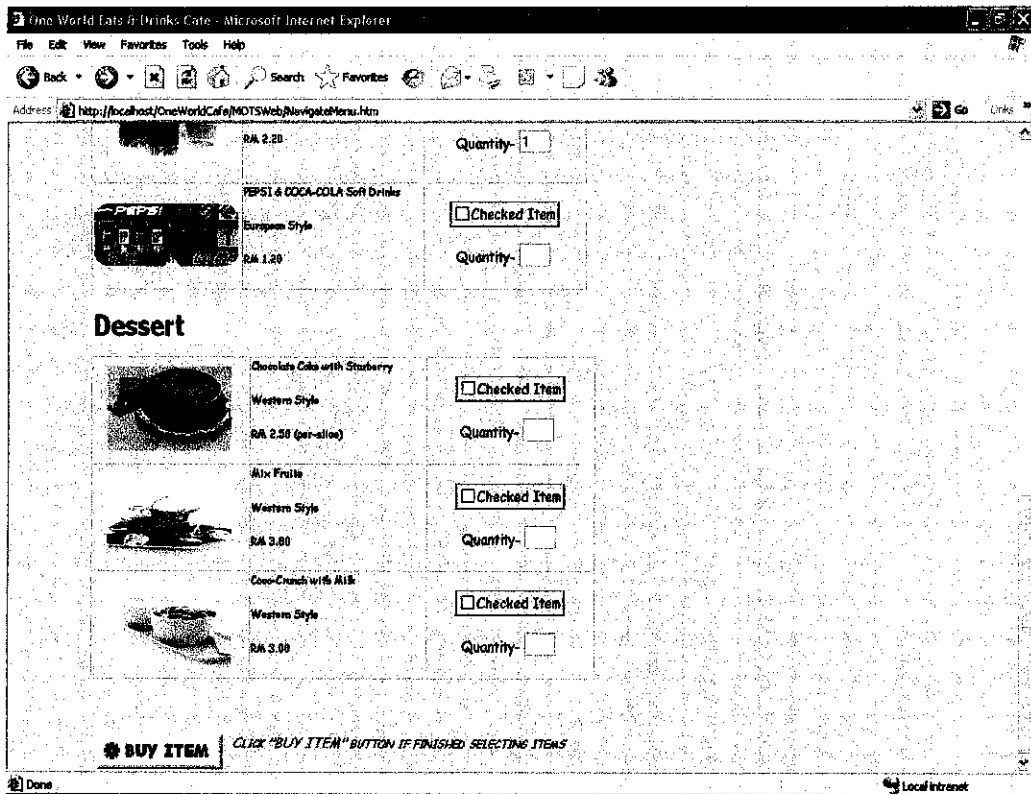
Figure 4.11: Menu list and order taking page.

The menu listing & order page is the crucial part in the web-based order sub-system. This is where the client of the business makes their order. As shown in *Figure 4.11*, the client will be given option on the category of order that can be made by the client. Up till this moment, the clients are given three main options that are food, beverages, and dessert. After selecting the order category, they clients will be shown with the menu being offered through the menu listing given. To take the order, the client simply clicks the Select link and it will be put into the shopping cart in the same page. If the clients want to proceed and complete the transaction, the clients simply click on the submit button. An electronic receipt will be given to the clients and for record for the transaction. The client will only have to bring the receipt to claim the items that they have ordered.
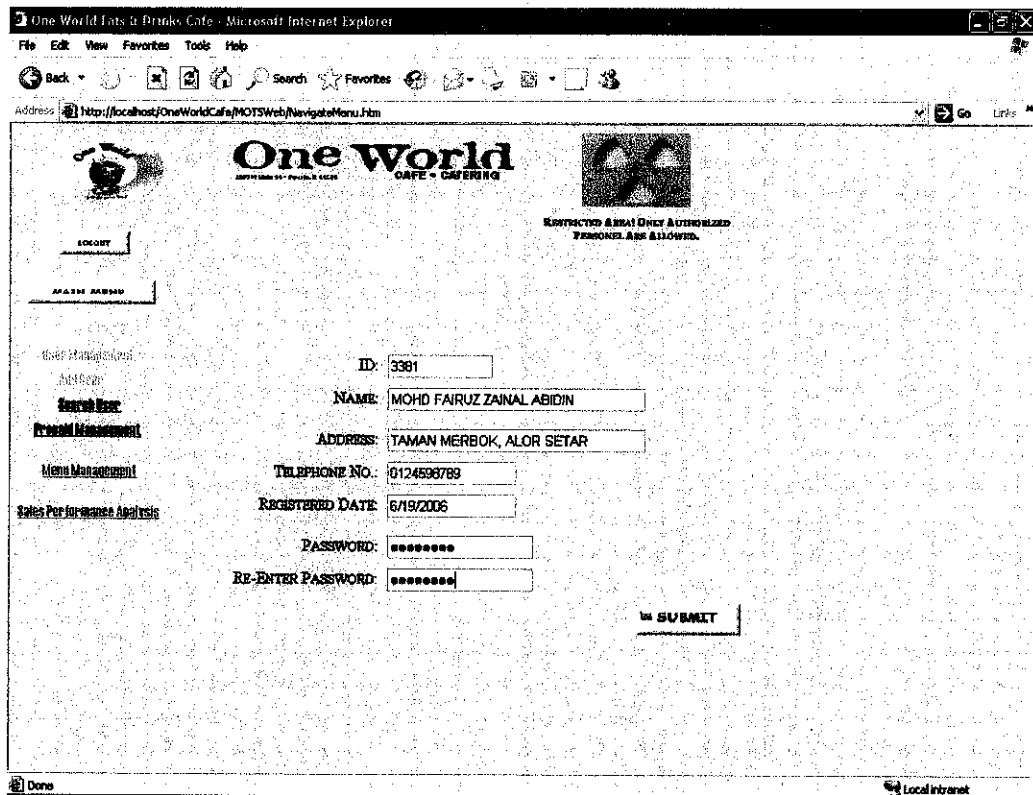
Figure 4.12: User profile management for the client side.

In the early registration for each client, only the system administration can only access to the client profile registration. The details will be discussed latter in the administration function. As for client side, the personal information or the client profile is given for the purpose of updating information and profile of the client as shown in *Figure 4.12*. Beside that this page is where the client can change their password for security purposes. All information can be edited accept for the user type which is only being authorized to the system administrator.

4.1.3 System administration sub-system

For the purpose of administrating the system, the author has provided the system with the system administration sub-system. In the system administration sub-system, several elements will be administered which are the user profile and information specifically for the registration part, and the menu management which allowing the system administrator to frequently update the menu being offered by the business operator.

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4.1.3.1 Menu management
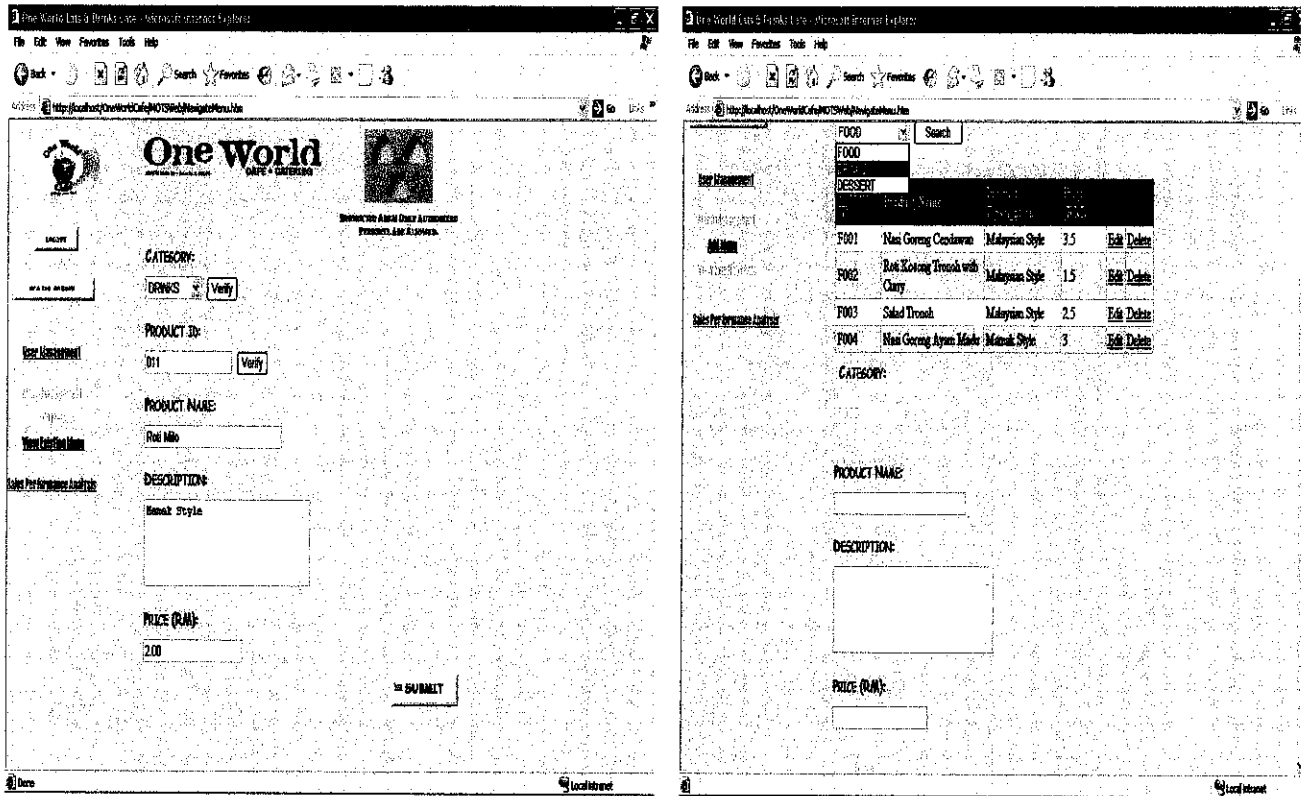
Figure 4.13: Page for adding and updating the menu selection for the café

As shown in *Figure 4.13*, in order to update the menu listing which being offered by the business operator to their clients the system provide the user with the menu management sub-system. In the menu management sub-system the user of this particular system can frequently update the menu that they offer to their clients. For the mean time, the menus that have been registered to the system are being displayed in the table form, whereby the registered menu can be either deleted or can be edited. For the purpose of entering new menu to the listing, the user can simply clicking on the "Add New Menu to The Database" button. The entering components will be displayed and the user is required to fill in the required filed.

4.1.3.2 Client profile and prepaid management
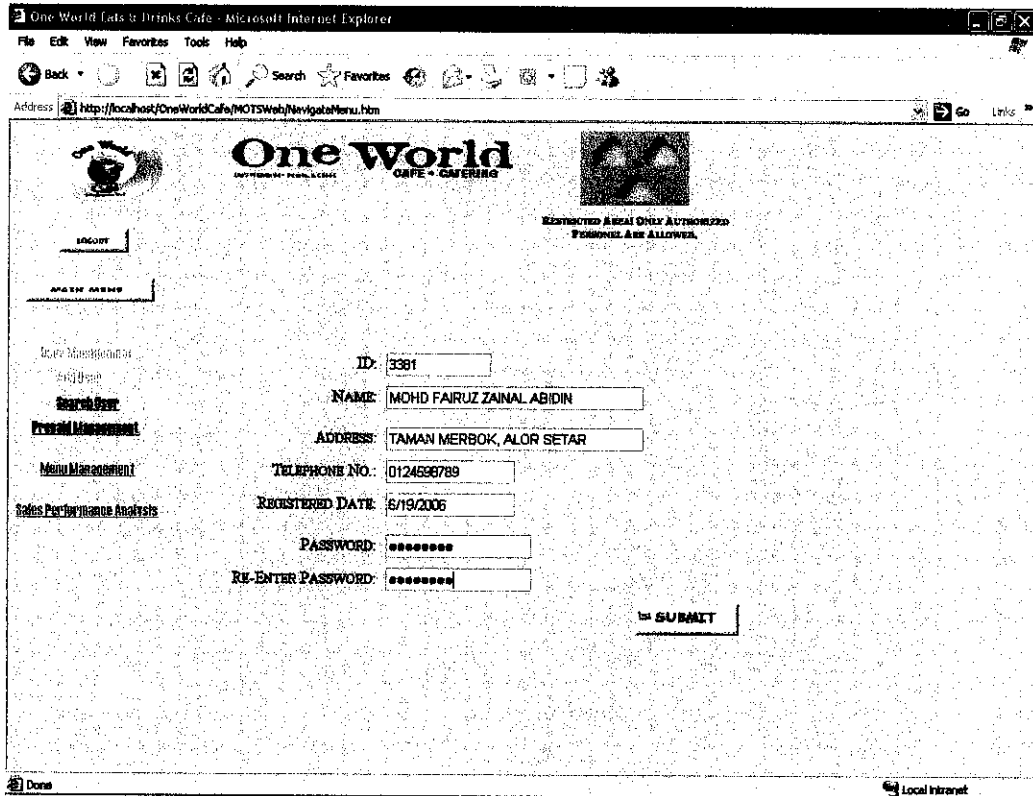
Figure 4.14: Page for adding user/client profile.

As been mentioned earlier this system is being provided with user/client profile administration. Previously the author has stated that the client as well as the administrator has access to the user/client profile page. The difference between both accesses is the client access only to their own profile and only has the access to update their own profile. Different from the client access, the administrator access can register new client to the system and also can update the existing client profile. As the pre-caution action, the administrator can only update the client profile only if they have the key number which only given to the client in order to control the client profile update.

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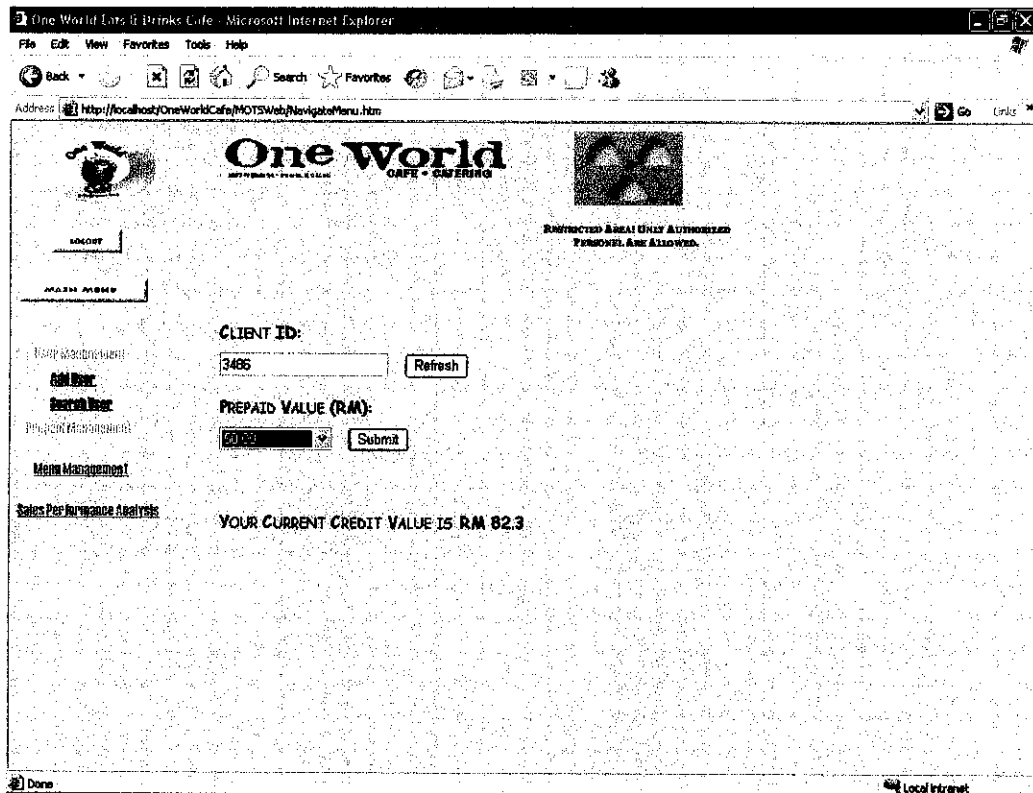
Figure 4.15: Page for updating and maintaining the user prepaid account.

As shown in *Figure 4.15*, the client's prepaid accounts are as above. In this page the system will display all the clients' information regarding their prepaid accounts. The system will display the database of the prepaid accounts for the clients. The system will display the credit balance, the client id as the indicator of the owner for the account, and the date for the most recently updated for each accounts. In order to increase the credit value for each account, the system administrator simply checks on the "Increase Credit Value" check box in order to allow them to increase the credit value. After the check box have been checked, all the information required need to be filled. After the process complete the account will automatically updated and the new credit value will be displayed.

4.1.3.3 Sales analysis

The extension sub-system on this system from the existing system for the mobile order taking system is the tracking system. The element that is being tracked by this system are sales or the transactions that being successfully done by the clients. The sales analysis and tracking are being done using the Crystal Report 9.0 which is among the best report generator. The analyses are projected through a graph which clearly indicated the performance of the business operator sales. The manager can view the analysis either in daily basis, weekly basis, monthly basis, or yearly basis. The analysis also can be made based on the product offered by the business by being compared based on their category. This will help the business operator to decide which product should be given more focus and which product should be eliminated from the menu listing. As the author is using the Crystal Report 9.0, it has been built in with the printing function. With that feature the manager can easily print the desired report.
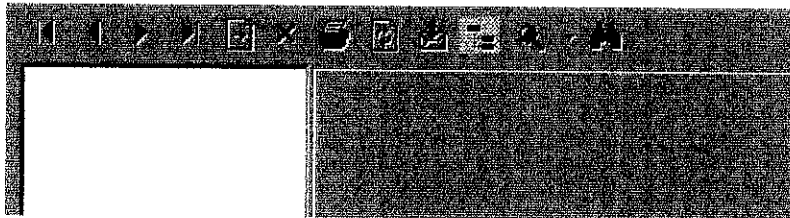
Figure 4.16: Sales Report navigation toolbar

As shown in Figure 4.16, the toolbar is the function that is embedded in Crystal Report 9.0 whereby the user can print the report, search for particular report, find a particular page in the report, export the report into several more extension file, refresh the report data, and navigate the report pages. The function provided in the report will assist the sales manager to view the report and analysis.

4.1.3.3(a) Total sales analysis

2/12/2006

DateofTransaction	Total Sales	TransactionCode
02/12/2006	$ 20.00	2
02/12/2006	$ 14.00	3
02/12/2006	$ 16.60	4
02/12/2006	$ 17.70	5
02/12/2006	$ 11.20	6
02/12/2006	$ 10.00	7
02/12/2006	$ 9.90	8
02/12/2006	$ 11.10	9
02/13/2006	$ 12.20	10
02/13/2006	$ 11.90	11
02/13/2006	$ 6.20	12
02/13/2006	$ 6.00	13
02/13/2006	$ 18 TotalSalesTracking.TotalSales (Currency)	14
02/13/2006	$ 50.20	15
02/13/2006	$ 8.90	16
02/13/2006	$ 7.50	17

Total for 2/12/2006: $ 232.30

Records: 16

Figure 4.17: Total sales report that the business operator manage to achieve

In the sales analysis, the finance manager or any financial staff of the company can view and make their analysis on the company performance either based on the total sales or items sold basis. As shown in Figure 4.17, it shows the report for the total sales that the company manages to gain on the date of 12/2/2006. The fields that will be given to the analyzer are date of the transaction, the total sales of the day, and sales for each transaction and the transaction code. This will help the analyzer to make their analysis efficiently.

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Sum of Total Sales / Date of Transaction
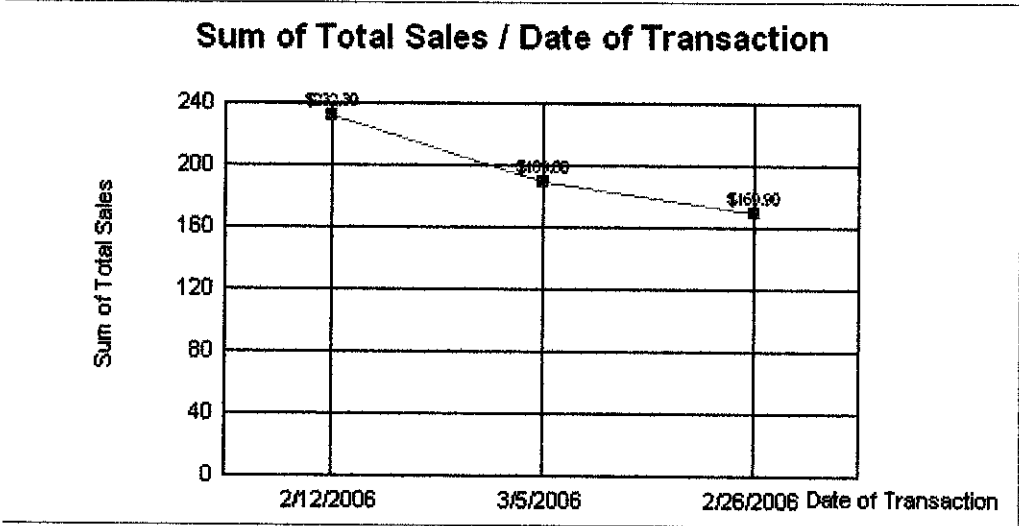
Figure 4.18: The total sales analysis and tracking based on the transaction date using a line chart

In order to assist the sales analyzer, the system also builds in with the cline chart. This will clearly shows the performance of the company's total sales for each day.

4.1.3.3(b) Items sold analysis

Printed Date: 6/16/2006   Last modified: 6/16/2006

Dessert

Product Category	Sales	Transaction Code	Product ID
Dessert	$ 2.20	4	22
Dessert	$ 2.00	3	21

Total for Dessert $ 4.20

7.00

Figure 4.19: Items sold report for dessert category

Beverage

Product Category	Sales	Transaction Code	Product ID
Beverage	$ 1.20	7	03
Beverage	$ 1.50	6	02
Beverage	$ 1.00	1	01

Total for Beverage: $ 3.70

14.00

Figure 4.20: Items sold report for beverage category

Food

Product Category	Sales	Transaction Code	Product ID
Food	$ 4.50	12	16
Food	$ 4.50	11	16
Food	$ 4.50	10	16
Food	$ 4.50	9	16
Food	$ 5.00	8	15
Food	$ 4.00	5	13
Food	$ 3.50	2	11

Total for Food: $ 30.50

57.00

Figure 4.21: Items sold report for the food category

As shown in Figure 4.19, Figure 4.20, and Figure 4.21 it represent the report of the items that being sold to the customer. These reports are categorized based on the item's category. In the report also it shows the ProductId which will indicate the sales performance for each product offered by the company. The reports also give the total amount of sales that the company manages to gain for each category. This will assist the company to decide which product or category that will need more attention and more investment.
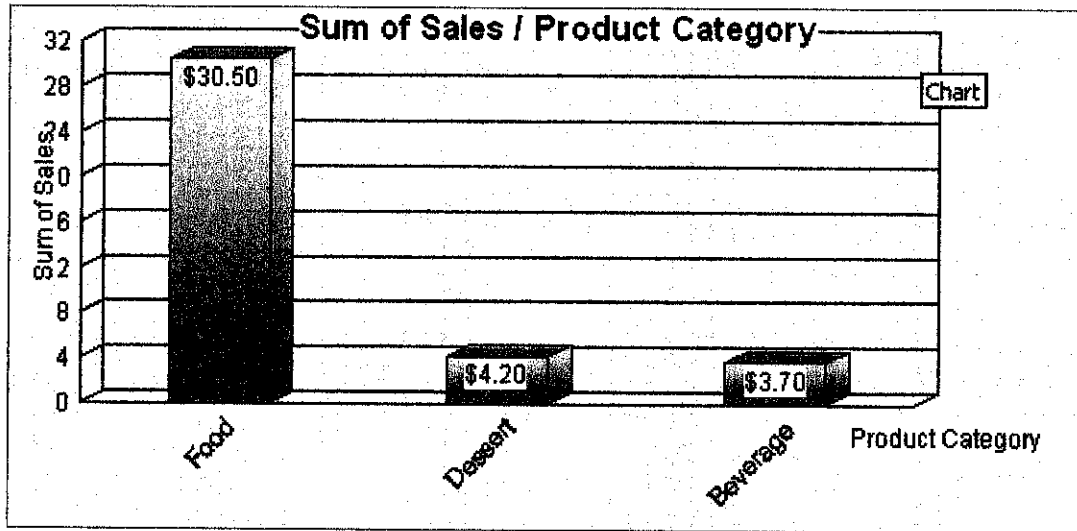
Figure 4.22: The items sold projection through chart categorized by the product category

As part from giving the report for the items sold for each product, the system will also proved the chart or graph for each product category. The changes of the graph will be based on the total sales that each category manages to gain as a sum. As in the total sales report, the chart is to ease the sales manager to make their decision on the projection in the future.

4.2 Discussion

During the system development, there are certain challenges and constraints that have to be considered. Beside that there are several elements that have been added to the system compare from the existing system. There are also several things that needed detailed discussion for clarification. Below is the discussion of the challenges and constraints with solution that can solve them.

4.2.1 Relevancy of having two platforms

In the early part of this chapter, the author has presented this system to be built in with two separate platforms, which are the mobile platform and web-based platform. This action has been taken because of several reasons, there are;

- To have a wider coverage of user of this system, not only for the mobile device owner but also for people that are mobile but without the mobile devices.

- To give the clients opportunity to experience different way of buying the business product.

- To open the option for the business to reach to their customer by having more than one methods.

Basically all the reasons that have been stated to diversify the business and allowing the business to become the market creator not only to share the existing market in the industry.

4.2.2 Registration method

As been mentioned in the early part of this chapter, the author has stated that the system will only allow the system administrator to do the registration for new user regardless the new user is the client or the staff for the business. The reason of only having the user registration to be done only on the service provider side is to control the users that are using the system. If the registration is to be opened to everybody, the system administrator can not have a good analysis on the effectiveness of the system itself. By having the registration one sided, the system can have one profile for one user.

4.2.3 No images in Mobile Order Sub-system

Due to the consideration of limited bandwidth that is available in WLAN 802.11b network which only offer max throughput of 11 MBPS at best effort, it is decided that picture for the product is not included in the Mobile Order sub system. Furthermore, the wireless network is not necessary able to perform well at all the time and most likely will achieve only between 7 MBPS to 8 MBPS that has to be shared between all the PDA

available in the restaurant. Apart from that, the small screen size of PDA will limit the viewable size of images and displayed information at one time in one page.

4.2.4 Prepaid system

The idea of having the system to be built in as a prepaid system not a postpaid system is a big move that have been taken by the author. In the initial plan and at the prototype development phase, the system is being built as a postpaid system. Based on the feedback received and based on the observation on existing system, it will assist the client more by having the system prepaid. This is because this will reduce the waiting time for the client by just coming to the outlet to claim their order and the client will not have to queue for several moments to complete the payment. Beside that the business operator also can reduce the risk for losing their cash at the pot by having cashless counter at their outlet.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

This paper has presented the essentiality of CRM in food industry. In food industry, the significant element is the relationship between the business and its customers. That is why the CRM in food industry should be upgraded and enhanced from time to time. As for the purpose of this research, the implementation of the mobile system will help to increase the business productivity by improving the level of CRM. The mobile system which integrated several sections in the food industry and centralized the database will increase the business productivity.

The Mobile Order Tracking System will basically cover both management and operation levels. In the operation level it will contribute on the order tacking processes, started from the order tacking to the food preparation process and lastly to the payment process. All three processes will be integrated and centralized in one system. Enhanced to that, the system will also occupied for the management level where all the sales will be recorded and the system will performed proper analysis on the selling. From the sales analysis the management could make the best business decision.

Currently, the research will only cover for improving the business transaction flow and the sales tracking. The element that needs to be focus more is about the transaction flow in the business operation. This is because it is related to the business customer. Customer is the driven force to the business to earn profit and to survive in the business world. Other additional element that will be focus on too is about the mobile technology itself. To integrate four domains in one system will need extra effort especially this system related to the mobile system.

Although mobile commerce using wireless technology is a promising profit generating business processes, there are some challenges that have to be taken note to avoid possible

shortcomings. With more companies jumping into m-commerce bandwagon, careful planning and design that suit customer's needs are important to ensure successful launch of new services. The constraint issues on limited screen size and usability of mobile devices, dependability and reliability of the wireless network and wireless infrastructure will definitely affect the deployment of m-commerce application.

In this project, several critical issues are investigated for m-commerce realization. Throughout the process, it has been proven that design factor plays a big role in achieving the objectives and scope of the system. With the reference of the existing system which also applying the mobile commerce system, it has given a broad view of implementing the new featured mobile system. The limitations of having only a mobile device as the mobile commerce need to be given with a new solution. The author has come out with the solution by having two platform for the mobile commerce which are the mobile device based and web-based system. Mobile commerce and wireless mobile applications are waiting to be widely used when wireless technology can leverage the current cost of business processes.

5.2 Recommendations

Up to the current stage project development, the suggested next task is to further develop the system prototype for operational testing using real hardware devices rather than using emulator. The purpose of operational testing is to verify the usability and functionality of the system in a real world environment. Due to the constraints of getting the necessary hardware devices such as Wireless Access Point router and Pocket PC PDA with Wi-Fi capability, it is recommended to perform an operational testing to specifically verify the conformance of the system performance against the network requirements.

A part from that, the system development should be proceed in order to measure the effectiveness of this system and to see how it can really improve the customer relationship management in a business like the café or restaurant business operation. In order to have the accurate result the complete system that can be implemented in the real business environment should be observed by the system provider on any weakness of the

system. The feedback from the business operation manager is also very important. This is because the business operation manager is the person who will be more attach to the system. On the other hand, this system will become familiar to the business clients since this system enables the clients to have a serve service business. The assessments from the clients are very important for the system provider in order to increase the usability of the system and enhance the user friendliness of the system as well.

A part from that, the author has several recommendations that need to taken into consideration by the system provider, as well as the business operator that will use this particular system.

5.2.1 Mobile order sub-system using Short Messaging Service (SMS)

Although it is still early to expend the usage of this mobile order system, but the market demand and pattern require the business to offer the very best and easy service to their customer. At the moment in the market the mobile order system are using the mobile device platform and the web-based platform as the method to enabling their services mobile. In this era, the world populations have been considering the mobile phone as their necessity and one function that is compulsory in the mobile phone usage is the SMS. Due to this situation the business need to act fast and grape this opportunity to offer their customer with the mobile ordering through the SMS platform.

5.2.2 Sales analysis

As been presented in this report, the mobile system that has been developed is not only for the purpose of ordering basis but also being included is the sales analysis basis. That is why the system is named Mobile Order Tracking System. Up to the current stage, the sales analysis sub-system can only perform the sales analysis and performance analysis. In order to increase the functionality and the effectiveness of this system to the business especially to assist the finance management, the author recommends the system need to upgrade the sales analysis sub-system from not only able to display the sales analysis but also can give the projection of sales for the business for the future sales.

5.2.3 User registration

As been discussed in chapter four, there are several reasons the system registration particularly the user registration can only be done on the system administration side. In order to increase the effectiveness of the system administration and to increase the usability of the system for the client, the author strongly recommend that the system registration to be opened not only for the system administration but also by the client. In order to does that, the author recommend that client registration be controlled by the identity card number. This can hopefully can increase the usage of this system and increase the performance of the business in the future.

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APPENDIX:

Appendix 1: Source Code for Mobile Sub-System

```
Private Sub Page_Load(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles MyBase.Load
        'Put user code to initialize the page here

        If Not IsPostBack Then

                OleDbDataAdapter1.Fill(DataSet11)
                ObjectList1.DataSource = DataSet11
                ObjectList1.DataMember = "MenuDetails"
                ObjectList1.DataBind()

                OleDbDataAdapter2.Fill(DataSet21)
                ObjectList3.DataSource = DataSet21
                ObjectList3.DataMember = "MenuDetails"
                ObjectList3.DataBind()

                OleDbDataAdapter3.Fill(DataSet31)
                ObjectList2.DataSource = DataSet31
                ObjectList2.DataMember = "MenuDetails"
                ObjectList2.DataBind()

        End If

        If Cancel = "True" Then

                ActiveForm = frmNavigate
                lblCreditBalance.Text = CreditBalance

        End If
    End Sub

    Private Sub btnLogin_Click(ByVal sender As System.Object, ByVal e
As System.EventArgs) Handles btnLogin.Click

        Dim strClientID() As DataRow
        Dim strPassword() As DataRow
        Dim strCreditBalance() As DataRow

        OleDbDataAdapter5.SelectCommand.Parameters("ClientID").Value =
txtID.Text
        DataSet51.Clear()
        OleDbDataAdapter5.Fill(DataSet51.ClientProfile)

        strClientID = _
        DataSet51.Tables("ClientProfile").Select("ClientID='" & _
        txtID.Text & "'")

        strPassword = _
        DataSet51.Tables("ClientProfile").Select("Password='" & _
        txtPassword.Text & "'")

        If strClientID.Length = 0 Or strPassword.Length = 0 Then

                txtID.Text = ""
```

```
            txtPassword.Text = ""
            lblWarning.Text = "Login Failed"

        Else

            ActiveForm = frmNavigate


            OleDbDataAdapter4.SelectCommand.Parameters("ClientID").Valu
            e = txtID.Text
            DataSet41.Clear()
            OleDbDataAdapter4.Fill(DataSet41.ClientCreditAccount)

            strCreditBalance = _

            DataSet41.Tables("ClientCreditAccount").Select("ClientID='"
            & _ txtID.Text & "'")

            CreditBalance = strCreditBalance(0)("CreditBalance")
            lblCreditBalance.Text = "RM" & CreditBalance

            CID = txtID.Text

        End If

    End Sub

Private Sub ObjectList3_ItemCommand(ByVal sender As Object, ByVal e As
System.Web.UI.MobileControls.ObjectListCommandEventArgs) Handles
ObjectList3.ItemCommand

        ItemName = ObjectList3.Selection("ProductName")
        ProductID = ObjectList3.Selection("ProductID")
        Price = ObjectList3.Selection("Price")
        ProductDescription =
ObjectList3.Selection("ProductDescription")
        PCategory = ObjectList3.Selection("ProductCategory")

        Server.Transfer("ViewOrder.aspx")

    End Sub


    Private Sub ObjectList1_ItemCommand(ByVal sender As Object, ByVal e
As System.Web.UI.MobileControls.ObjectListCommandEventArgs) Handles
ObjectList1.ItemCommand

        ItemName = ObjectList1.Selection("ProductName")
        ProductID = ObjectList1.Selection("ProductID")
        Price = ObjectList1.Selection("Price")
        ProductDescription =
ObjectList1.Selection("ProductDescription")
        PCategory = ObjectList1.Selection("ProductCategory")

        Server.Transfer("ViewOrder.aspx")

    End Sub
```

```vbnet
    Private Sub ObjectList2_ItemCommand(ByVal sender As Object, ByVal e
As System.Web.UI.MobileControls.ObjectListCommandEventArgs) Handles
ObjectList2.ItemCommand

        ItemName = ObjectList2.Selection("ProductName")
        ProductID = ObjectList2.Selection("ProductID")
        Price = ObjectList2.Selection("Price")
        ProductDescription =
ObjectList2.Selection("ProductDescription")
        PCategory = ObjectList2.Selection("ProductCategory")

        Server.Transfer("ViewOrder.aspx")

    End Sub

    Private Sub frmNavigate_Activate(ByVal sender As System.Object,
ByVal e As System.EventArgs) Handles frmNavigate.Activate

    End Sub
End Class


Private Sub Page_Load(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles MyBase.Load

        Dim txtID As String
        txtID = 1

        'Put user code to initialize the page here
        OleDbDataAdapter3.SelectCommand.Parameters("ID").Value = "1"
        DsTrans1.Clear()
        OleDbDataAdapter3.Fill(DsTrans1.TransNo)

        Transcode = _
        DsTrans1.Tables("TransNo").Select("ID='" & _
        txtID & "'")

        lblTCODE.Text = Transcode(0)("TCODE")

        TC = lblTCODE.Text

        TransactionCode = "EEX" & lblTCODE.Text

        lblProductName.Text = "Item Name: " & ItemName
        lblProductID.Text = "Product ID: " & ProductID
        lblProductDescription.Text = "Description: " &
ProductDescription
        lblProdcutPrice.Text = "Price per item: RM" & Price
        lblTransactionNo.Text = TransactionCode

        lblDate.Text = Today

    End Sub

    Private Sub frmBuyingOption_Activate(ByVal sender As System.Object,
ByVal e As System.EventArgs) Handles frmBuyingOption.Activate
```

```
    End Sub

    Private Sub btnSubmit_Click(ByVal sender As System.Object, ByVal e
As System.EventArgs) Handles btnSubmit.Click

        Quantity = txtQuantity.Text
        Price = Price * Quantity
        'TotalPrice = (TotalPrice + Price)
        GrandPrice = (GrandPrice + Price)

        If GrandPrice > CreditBalance Then

            lblInvalid.Text = "Your credit balance is not sufficient.
Please reload your account or buy lower price item."
            ActiveForm = frmInvalid

        Else

            If IsValid Then

                Me.OleDbInsertCommand1 = New
System.Data.OleDb.OleDbCommand
                Me.OleDbInsertCommand1.CommandText = "INSERT INTO
OrderList(TransactionCode, ItemName, TotalPrice, Quantity, Category)
VALUES ('" & TransactionCode & "', '" & ItemName & "', '" & Price & "',
'" & Quantity & "', '" & PCategory & "')"
                Me.OleDbInsertCommand1.Connection = Me.OleDbConnection1

                OleDbConnection1.Open()
                OleDbInsertCommand1.ExecuteNonQuery()
                OleDbConnection1.Close()

            End If

        End If

        Price = 0
        ActiveForm = frmBuyingOption

    End Sub

    Private Sub btnCancel_Click(ByVal sender As System.Object, ByVal e
As System.EventArgs) Handles btnCancel.Click
        Cancel = "True"
        Server.Transfer("MOTSMobile.aspx")
    End Sub

    Private Sub btnComplete_Click(ByVal sender As System.Object, ByVal
e As System.EventArgs) Handles btnComplete.Click

        If IsValid Then

            Me.OleDbSelectCommand1.CommandText = "SELECT
TransactionCode, ItemName, TotalPrice, Quantity FROM OrderList WHERE
TransactionCode Like '" & lblTransactionNo.Text & "' "
            Me.OleDbSelectCommand1.Connection = Me.OleDbConnection1
```

```
                OleDbConnection1.Open()
                OleDbSelectCommand1.ExecuteNonQuery()
                OleDbConnection1.Close()

                OleDbDataAdapter1.Fill(DataSet11)
                ObjectList1.DataSource = DataSet11
                ObjectList1.DataMember = "OrderList"
                ObjectList1.DataBind()

                lblID.Text = CID

                lblgrandPrice.Text = "RM " & GrandPrice

            End If

            ActiveForm = frmItemList

        End Sub

        Private Sub btnCompleteTrans_Click(ByVal sender As System.Object,
    ByVal e As System.EventArgs) Handles btnCompleteTrans.Click

            Dim strCreditBalance() As DataRow
            'Dim TransDate As String

            Me.OleDbInsertCommand4 = New System.Data.OleDb.OleDbCommand
            Me.OleDbInsertCommand4.CommandText = "INSERT INTO
    SalesRecord(TransactionCode, TotalSale, SalesD) VALUES ('" &
    TransactionCode & "', '" & GrandPrice & "', '" & lblDate.Text & "')"
            Me.OleDbInsertCommand4.Connection = Me.OleDbConnection1

            OleDbConnection1.Open()
            OleDbInsertCommand4.ExecuteNonQuery()
            OleDbConnection1.Close()

            ActiveForm = frmReceipt

            CreditBalance = (CreditBalance - GrandPrice)

            lblTransactionCode.Text = "Transaction Code: " &
    TransactionCode
            lblTotalPayment.Text = "Total Payment: RM" & GrandPrice
            lblCreditBalance.Text = "Your Credit Balance: RM" &
    CreditBalance

            OleDbDataAdapter2.SelectCommand.Parameters("ClientID").Value =
    lblID.Text
            DataSet21.Clear()
            OleDbDataAdapter2.Fill(DataSet21.ClientCreditAccount)


    DataSet21.Tables("ClientCreditAccount").Rows(0)("CreditBalance") =
    CreditBalance

            OleDbDataAdapter2.Update(DataSet21)
            DataSet21.AcceptChanges()
```

```vb
        TC = TC + 1

        DsTrans1.Tables("TransNo").Rows(0)("TCODE") = TC

        OleDbDataAdapter3.Update(DsTrans1)
        DsTrans1.AcceptChanges()

    End Sub

    Private Sub btnCancel2_Click(ByVal sender As System.Object, ByVal e
As System.EventArgs)
        Cancel = "True"
        Server.Transfer("MOTSMobile.aspx")
    End Sub

    Private Sub btnMain_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles btnMain.Click

        GrandPrice = 0

        Cancel = "True"
        Server.Transfer("MOTSMobile.aspx")
    End Sub

    Private Sub btnCancelTrans_Click(ByVal sender As System.Object,
ByVal e As System.EventArgs) Handles btnCancelTrans.Click
        Cancel = "True"
        Server.Transfer("MOTSMobile.aspx")
    End Sub

    Private Sub btnReturn_Click(ByVal sender As System.Object, ByVal e
As System.EventArgs) Handles btnReturn.Click
        Cancel = "True"
        Server.Transfer("MOTSMobile.aspx")
    End Sub

    Private Sub frmBuyItem_Activate(ByVal sender As System.Object,
ByVal e As System.EventArgs) Handles frmBuyItem.Activate

    End Sub

    Private Sub Timer1_Elapsed(ByVal sender As System.Object, ByVal e
As System.Timers.ElapsedEventArgs) Handles Timer1.Elapsed
        lblDate.Text = Today
    End Sub

    Private Sub Command1_Click(ByVal sender As System.Object, ByVal e
As System.EventArgs) Handles Command1.Click
        GrandPrice = 0

        Cancel = "True"
        Server.Transfer("MOTSMobile.aspx")
    End Sub
End Class
```

Appendix 2: Source Code for Web-Based Sub-System

A) Menu Listing & Order Taking

```
Private Sub Page_Load(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles MyBase.Load

        Dim txtID As String
        Dim Transcode() As DataRow

        lblCrtBal.Text = "AS A REMINDER: Your credit balance is RM" &
CreditBalance
        lblD.Text = Today
        lblCID.Text = CID

        D = lblD.Text
        txtID = 1

        'Put user code to initialize the page here
        OleDbDataAdapter2.SelectCommand.Parameters("ID").Value = "1"
        DsTransNo1.Clear()
        OleDbDataAdapter2.Fill(DsTransNo1.TransNo)

        Transcode = _
        DsTransNo1.Tables("TransNo").Select("ID='" & _
        txtID & "'")

        lblTC.Text = Transcode(0)("TCODE")

        TCNo = lblTC.Text

        TC = "EEX" & lblTC.Text

    End Sub

    Private Sub ImageButton5_Click(ByVal sender As System.Object, ByVal
e As System.Web.UI.ImageClickEventArgs) Handles ImageButton5.Click
        Response.Redirect("webLogin.aspx")
    End Sub

    Private Sub btnItem3_Click(ByVal sender As System.Object, ByVal e
As System.Web.UI.ImageClickEventArgs) Handles btnItem3.Click

        Dim AddData1, AddData2, AddData3 As DataRow
        Dim AddData4, AddData5, AddData6 As DataRow
        Dim AddData7, AddData8, AddData9 As DataRow
        Dim AddData10 As DataRow

        Dim ItemPrice As Double

        If chkFood1.Checked = True Then

            OleDbDataAdapter1.Fill(DataSet11.OrderList)

            AddData1 = DataSet11.Tables("OrderList").NewRow
```

```
        OleDbDataAdapter1.Update(DataSet11)
        OleDbDataAdapter1.Fill(DataSet11)

End If

If chkDrinks1.Checked = True Then

    OleDbDataAdapter1.Fill(DataSet11.OrderList)

    AddData4 = DataSet11.Tables("OrderList").NewRow

    ItemPrice = txtQtyDrinks1.Text * 2.2

    AddData4("TransactionCode") = TC
    AddData4("ItemName") = "Hot Coffee with Chocolate"
    AddData4("TotalPrice") = ItemPrice
    AddData4("Quantity") = txtQtyDrinks1.Text
    AddData4("Category") = "DRINKS"

    TotalPrice = TotalPrice + ItemPrice

    DataSet11.Tables("OrderList").Rows.Add(AddData4)

    OleDbDataAdapter1.Update(DataSet11)
    OleDbDataAdapter1.Fill(DataSet11)

End If

If chkDrinks2.Checked = True Then

    OleDbDataAdapter1.Fill(DataSet11.OrderList)

    AddData5 = DataSet11.Tables("OrderList").NewRow


    ItemPrice = txtQtyDrinks2.Text * 2.2

    AddData5("TransactionCode") = TC
    AddData5("ItemName") = "Original Fruite Juices"
    AddData5("TotalPrice") = ItemPrice
    AddData5("Quantity") = txtQtyDrinks2.Text
    AddData5("Category") = "DRINKS"

    TotalPrice = TotalPrice + ItemPrice

    DataSet11.Tables("OrderList").Rows.Add(AddData5)

    OleDbDataAdapter1.Update(DataSet11)
    OleDbDataAdapter1.Fill(DataSet11)

End If

If chkDrinks3.Checked = True Then

    OleDbDataAdapter1.Fill(DataSet11.OrderList)
```

```
AddData6 = DataSet11.Tables("OrderList").NewRow

ItemPrice = txtQtyDrinks3.Text * 1.2

AddData6("TransactionCode") = TC
AddData6("ItemName") = "PEPSI & COCA-COLA Soft Drinks"
AddData6("TotalPrice") = ItemPrice
AddData6("Quantity") = txtQtyDrinks3.Text
AddData6("Category") = "DRINKS"

TotalPrice = TotalPrice + ItemPrice

DataSet11.Tables("OrderList").Rows.Add(AddData6)

OleDbDataAdapter1.Update(DataSet11)
OleDbDataAdapter1.Fill(DataSet11)

End If

If chkDessert1.Checked = True Then

     OleDbDataAdapter1.Fill(DataSet11.OrderList)

     AddData7 = DataSet11.Tables("OrderList").NewRow

     ItemPrice = txtQtyDessert1.Text * 2.5

     AddData7("TransactionCode") = TC
     AddData7("ItemName") = "Chocolate Cake with Starberry"
     AddData7("TotalPrice") = ItemPrice
     AddData7("Quantity") = txtQtyDessert1.Text
     AddData7("Category") = "DESSERT"

     TotalPrice = TotalPrice + ItemPrice

     DataSet11.Tables("OrderList").Rows.Add(AddData7)

     OleDbDataAdapter1.Update(DataSet11)
     OleDbDataAdapter1.Fill(DataSet11)

End If

If chkDessert2.Checked = True Then

     OleDbDataAdapter1.Fill(DataSet11.OrderList)

     AddData8 = DataSet11.Tables("OrderList").NewRow

     ItemPrice = txtQtyDessert2.Text * 3.0

     AddData8("TransactionCode") = TC
     AddData8("ItemName") = "Mix Fruite"
     AddData8("TotalPrice") = ItemPrice
     AddData8("Quantity") = txtQtyDessert2.Text
     AddData8("Category") = "DESSERT"

     TotalPrice = TotalPrice + ItemPrice
```

```
        DataSet11.Tables("OrderList").Rows.Add(AddData8)

        OleDbDataAdapter1.Update(DataSet11)
        OleDbDataAdapter1.Fill(DataSet11)

    End If

    If chkDessert3.Checked = True Then

        OleDbDataAdapter1.Fill(DataSet11.OrderList)

        AddData9 = DataSet11.Tables("OrderList").NewRow

        ItemPrice = txtQtyDessert3.Text * 3.0

        AddData9("TransactionCode") = TC
        AddData9("ItemName") = "Coco-Crunch with Milk"
        AddData9("TotalPrice") = ItemPrice
        AddData9("Quantity") = txtQtyDessert3.Text
        AddData9("Category") = "DESSERT"

        TotalPrice = TotalPrice + ItemPrice

        DataSet11.Tables("OrderList").Rows.Add(AddData9)

        OleDbDataAdapter1.Update(DataSet11)
        OleDbDataAdapter1.Fill(DataSet11)

    End If

    OleDbDataAdapter3.Fill(DataSet31.SalesRecord)

    AddData10 = DataSet31.Tables("SalesRecord").NewRow

    AddData10("TransactionCode") = TC
    AddData10("TotalSale") = TotalPrice
    AddData10("SalesD") = lblD.Text

    DataSet31.Tables("SalesRecord").Rows.Add(AddData10)

    OleDbDataAdapter3.Update(DataSet31)
    OleDbDataAdapter3.Fill(DataSet31)

    CreditBalance = (CreditBalance - TotalPrice)

    OleDbDataAdapter4.SelectCommand.Parameters("ClientID").Value =
lblCID.Text
    DataSet41.Clear()
    OleDbDataAdapter4.Fill(DataSet41.ClientCreditAccount)


DataSet41.Tables("ClientCreditAccount").Rows(0)("CreditBalance") =
CreditBalance

    OleDbDataAdapter4.Update(DataSet41)
    DataSet41.AcceptChanges()
```

```
        TCNo = TCNo + 1

        OleDbDataAdapter2.SelectCommand.Parameters("ID").Value = "1"
        DsTransNo1.Clear()
        OleDbDataAdapter2.Fill(DsTransNo1.TransNo)

        DsTransNo1.Tables("TransNo").Rows(0)("TCODE") = TCNo

        OleDbDataAdapter2.Update(DsTransNo1)
        DsTransNo1.AcceptChanges()

        chkFood1.Checked = False
        chkFood2.Checked = False
        chkFood3.Checked = False
        chkDrinks1.Checked = False
        chkDrinks2.Checked = False
        chkDrinks3.Checked = False
        chkDessert1.Checked = False
        chkDessert2.Checked = False
        chkDessert3.Checked = False

        txtQtyFood1.Text = ""
        txtQtyFood2.Text = ""
        txtQtyFood3.Text = ""
        txtQtyDrinks1.Text = ""
        txtQtyDrinks2.Text = ""
        txtQtyDrinks3.Text = ""
        txtQtyDessert1.Text = ""
        txtQtyDessert2.Text = ""
        txtQtyDessert3.Text = ""

        Response.Redirect("TransReceipt.aspx")

    End Sub
```

B) Menu Management

```
Private Sub btnVerify_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles btnVerify.Click

        Dim foundID() As DataRow

        PID = lbltest.Text & txtProductID.Text
        lblTest2.Text = lbltest.Text & txtProductID.Text

        OleDbDataAdapter2.SelectCommand.Parameters("ProductID").Value =
lblTest2.Text
        DataSet21.Clear()
        OleDbDataAdapter2.Fill(DataSet21.MenuDetails)

        foundID = _
            DataSet21.Tables("MenuDetails").Select("ProductID='" &

            lblTest2.Text & "'")
```

```
        If foundID.Length = 0 Then

            txtName.Enabled = True
            txtDescription.Enabled = True
            txtPrice.Enabled = True
            btnSubmit.Enabled = True
            lblWarning.Text = ""

        Else

            lblWarning.Text = "The Product ID have been assigned to
other product. Please re-assigned the ID"

        End If

    End Sub

    Private Sub btnVerify2_Click(ByVal sender As System.Object, ByVal e
As System.EventArgs) Handles btnVerify2.Click

        txtProductID.Enabled = True
        btnVerify.Enabled = True

        If dropCategory.SelectedValue = "FOOD" Then

            initial = "F"

        ElseIf dropCategory.SelectedValue = "DRINKS" Then

            initial = "D"

        ElseIf dropCategory.SelectedValue = "DESSERT" Then

            initial = "DS"

        End If

        lbltest.Text = initial

    End Sub

    Private Sub btnSubmit_Click(ByVal sender As System.Object, ByVal e
As System.Web.UI.ImageClickEventArgs) Handles btnSubmit.Click

        Me.OleDbInsertCommand1 = New System.Data.OleDb.OleDbCommand
        Me.OleDbInsertCommand1.CommandText = "INSERT INTO
MenuDetails(ProductID, ProductName, ProductCategory,
ProductDescription, Price) VALUES ('" & lblTest2.Text & "', '" &
txtName.Text & "', '" & dropCategory.SelectedValue & "', '" &
txtDescription.Text & "', '" & txtPrice.Text & "')"
        Me.OleDbInsertCommand1.Connection = Me.OleDbConnection1

        OleDbConnection1.Open()
        OleDbInsertCommand1.ExecuteNonQuery()
        OleDbConnection1.Close()
```

```
lblTest2.Text = ""
txtName.Text = ""
txtDescription.Text = ""
txtPrice.Text = ""
txtProductID.Text = ""
dropCategory.SelectedValue = "FOOD"

End Sub
```