Online Payment System Using SMS

by

Muhammad Asree bin Asmoe

Dissertation submitted in partial fulfilment of

the requirements for the

Bachelor of Technology (Hons)

(Business Information System)

JANUARY 2008

Universiti Teknologi PETRONAS
Bandar Seri Iskandar
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Perak Darul Ridzuan

CERTIFICATION OF APPROVAL

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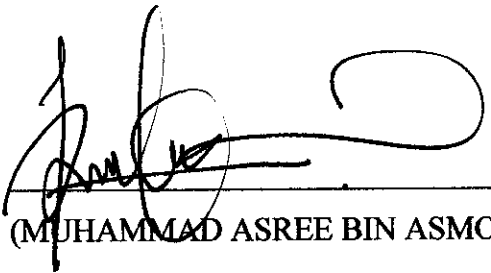Perak Darul Ridzuan, MALAYSIA.

UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

JANUARY 2008

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 concept 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.

(MUHAMMAD ASREE BIN ASMOE)

ACKNOWLEDGEMENT

ABSTRACT

The objective of this project is to develop a new payment system in e-commerce world. The new payment system must be convenient, low cost and easy to use in order to attract the cyber customer to utilize it.

This report consists of four (4) important chapters that cover the introduction, problems statement, objectives of the projects, review of related literature, project methodology, and finally the conclusion. The introductory part briefly discusses the background study of the project, more focus on the problem statement that covers problem identification and the significant of the projects, as well as the objectives of the project are stated and it describes more on the relevance and the feasibility of the project within the scope and time frame given. The review of related literature on the project is enclosed in part two while the project methodology is covered in part three of the report. The project conclusion is also stated in chapter four of the report together with the references used during the research works.

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INTRODUCTION

1.1 BACKGROUND OF STUDY

Nowadays, e-commerce is one platform to run businesses that provide wide opportunities to the participant. The business can be conducted online and there are no 'brick and mortar' anymore in the online business. Many technologies implemented in the online business to make the business and transaction more easier such as creating shopping cart, affiliate programs, payment method etc.

The main study of this topic is specialized on payment method. As for now, the e-commerce practitioners conducting the payment using some methods; either using credit cards or by using online money. Online money is a method where people buy the online money from the service providers. The examples of service provider for online money are PayPal.com and e-gold.

Using credit cards or PayPal maybe difficult for certain people in certain countries, as not everyone is affordable to have credit cards. PayPal meanwhile is not available in some countries, including Malaysia.

1.2 PROBLEM STATEMENT

There are too many difficulties that could stop people from buying online. In terms of availability, people would find hard to own a credit card or even to have online money. Other issues such as security and trustworthy also affect their decision to buy online.

Therefore, there should be a mechanism, completed with security features that enable people to buy online more easily and comfort.

However, developing such technology is not an easy task as it requires a lot of studies, research and findings, testing and even time to make sure that the system is very reliable and durable to its users.

1.3 OBJECTIVES

A research done by Malaysian Communications and Multimedia Commission (MCMC) reported, for the first three (3) months of 2007, there were 11.7 billion SMSes sent by 20.8 millions mobile users in Malaysia. Therefore, it is concluded that the technology is evolving to a new mobile age.

The whole research progress is based on motivation for fulfilling objectives below:
  i. To proof that online payment system can be developed and used in e-commerce trading.
  ii. To do a comparative study on the online money structure and how it works so that it can be implemented in online payment system using SMS.
  iii. To compare the efficiency, reliability and capability of both regular online money system and online payment system using SMS and come up with the best solution that has the most consistency and better performance.

1.4 SCOPE OF STUDY

The scope of work for this project is:

- To study and research all the finding and information regarding the implementation of a payment system using SMS.
- To research ways to connect between SMS and website application.
- To design and develop a website to promote this online payment and for administrative use.
- To conduct a test to test the whole system.

The flow process of this project is briefly shown in the diagram below:

```
┌─────────────────────────────┐
│      Problem Statement       │
└──────────────┬──────────────┘
               │
               ▼
┌─────────────────────────────┐
│    Defining the Objective    │
└──────────────┬──────────────┘
               │
               ▼
┌─────────────────────────────┐
│      Literature Review       │
└──────────────┬──────────────┘
               │
               ▼
┌─────────────────────────────┐
│           Theory             │
└──────────────┬──────────────┘
               │
               ▼
┌─────────────────────────────┐
│     Project Methodology      │
└──────────────┬──────────────┘
               │
               ▼
┌─────────────────────────────┐
│     Result & Analyze Data    │
└─────────────────────────────┘
```
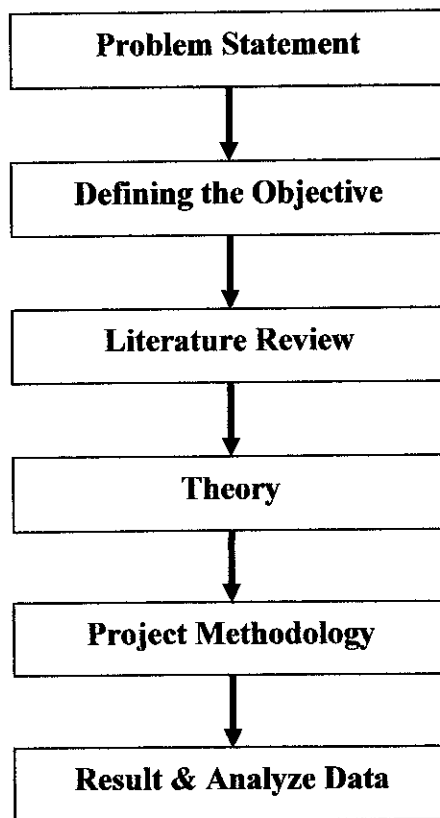
Figure 1: Brief project flow.

CHAPTER 2

LITERATURE REVIEW

2.1 SMS GATEWAY

To ensure the success of the project, the most important thing to concentrate and study is to establish a connection between SMS application and website application. It is called 'SMS gateway'. SMS gateways allow for the sending and receiving of SMS messages to or from devices and used to provide SMS network connectivity to third parties. SMS gateway providers facilitate the SMS traffic between businesses and mobile subscribers, being mainly responsible for carrying mission-critical messages, SMS for enterprises, content delivery and entertainment services involving SMS.

SMS Gateway platform is either provided by mobile carrier itself or SMS Gateway service providers. Considering SMS messaging performance and cost, as well as the level of messaging services, SMS gateway providers can be classified as aggregators or SS7 providers.

The aggregator model is based on multiple agreements with mobile carriers to exchange 2-way SMS traffic into and out of the operator's SMS platform (Short Message Service Centre – SMS-C). Aggregators lack direct access into the SS7 protocol, which is the network where the SMS messages are exchanged. These providers have no visibility and

control over the message delivery, being unable to offer delivery guarantees. SMS messages are delivered in the operator's SMS-C, not the subscriber's handset.

Another type of SMS gateway provider is based on SS7 connectivity to route SMS messages. The advantage of this model is the ability to route data directly through SS7, which gives the provider total control and visibility of the complete path during the SMS routing. This means SMS messages can be sent directly to and from recipients without having to go through the SMS-Centers of other mobile operators. Therefore, it's possible to avoid delays and message losses, offering full delivery guarantees of messages and optimized routing. This model is particularly efficient when used in mission-critical messaging and SMS used in corporate communications.

The most popular services using SMS Gateway is like   ring tones and wallpapers providers, TV e-voting, TV SMS, etc.
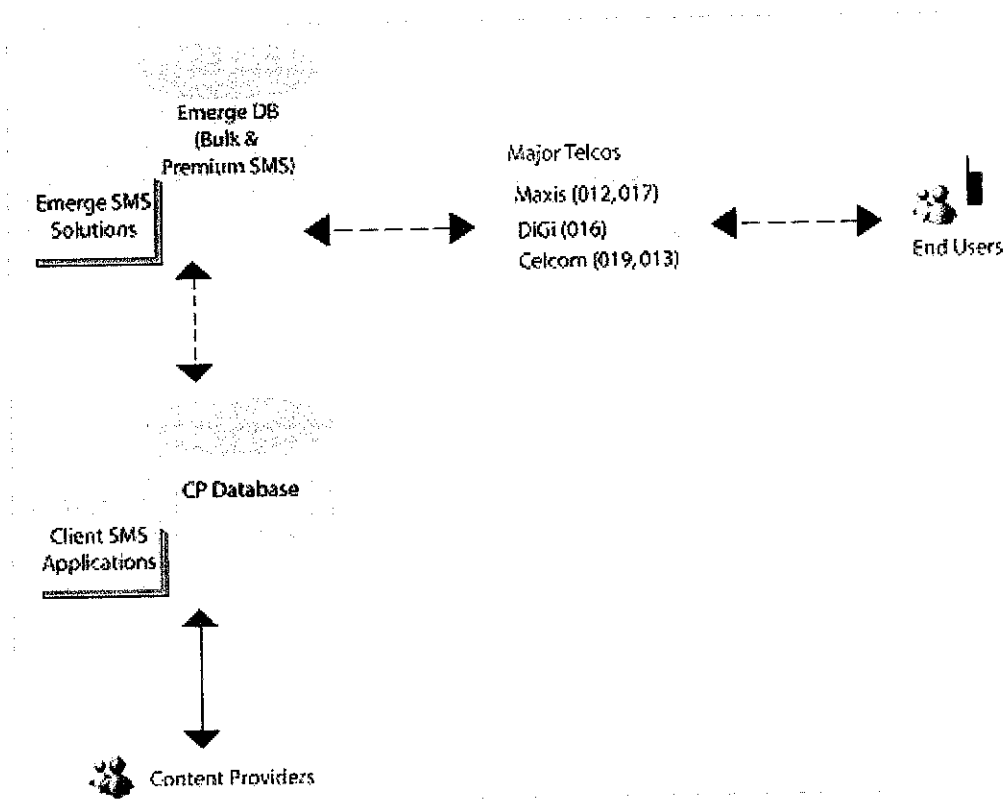
Figure 2: How SMS gateway works.

As shown in Figure 1, buyers (end users) send an SMS containing the payment information to the website server (Content Providers). When the server receives the information in the SMS, the server will send back an SMS to the buyers to inform about the transaction status, whether it is successful or fail.

Unified SMS & Mobile Messaging Gateway
Supports Unified Premium Billing SMS and Bulk SMS
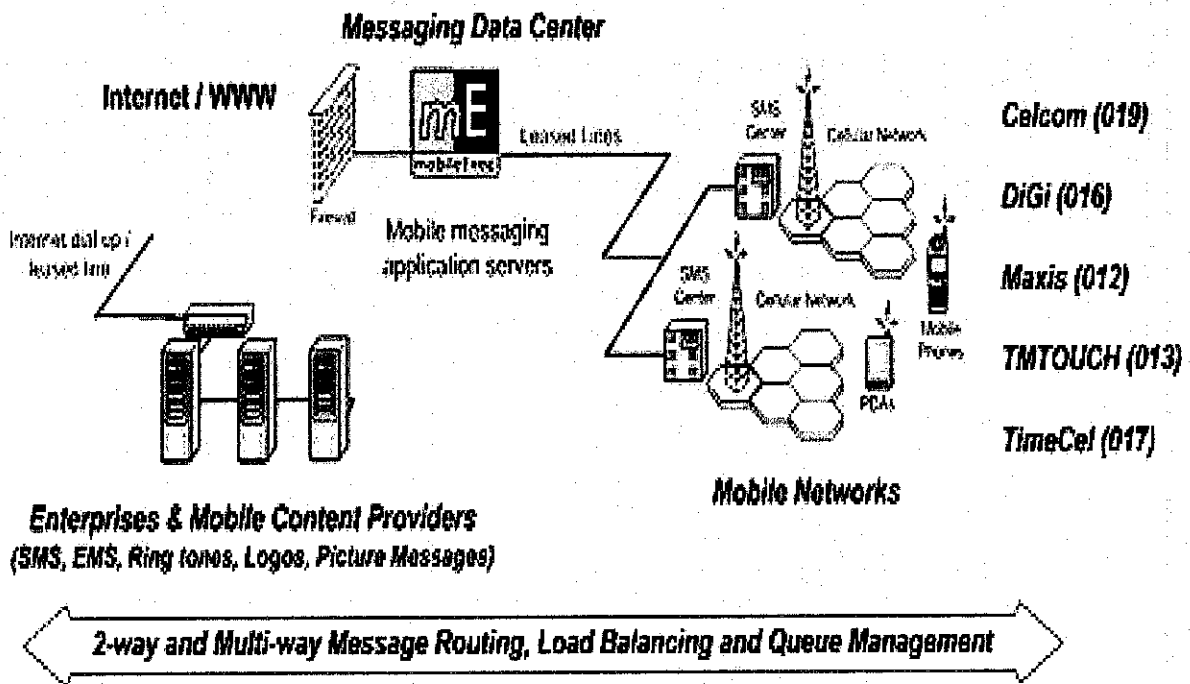
Figure 3: How SMS gateway works (2).

For Figure 2, there are connection between internet and mobile networks. The connection is using one of SMS gateway's service providers, which is mobileExec.

2.2 WEBSITE AND APPLICATION PROVIDER INTERFACE DEVELOPMENT

A website must be developed as an interface for the system. Essentially, the website will act as interface and provides information to the users. The website will be developed using PHP scripting language and will be connected to MySQL database. Using PHP and MySQL is the best solution as it is an open source solution and will reduce cost of the project.

The website then will be integrated will Application Provider Interface (API). Application Provider Interface is a system that manages the SMS Gateway. All SMS are sent to API before SMS Gateway converted it to become website codes such as PHP code and then can be kept in the MySQL database.

API uses XML schemas that describe the messages needed to communicate with the services such as sending and receiving SMS. To consume these schemas, it must be referenced to its XML Schema Definition (XSD). For example, to aggregate SMS service that will allow another service to receive SMS, ReceiveSMSRequest is The XSD schema is:

```xml
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://www.celcom.com.my/msp/adapter/sms"
xmlns:sms="http://www.celcom.com.my/msp/adapter/sms">
  <xs:element name="ReceiveSMSRequest">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="RequestID" type="xs:string"/>
        <xs:element name="CMPCorrelationID" type="xs:string"/>
        <xs:element name="RequestDateTime" type="xs:dateTime"/>
        <xs:element name="FromAddress" type="xs:string"/>
        <xs:element name="ToAddress" type="xs:string"/>
        <xs:element name="MessageID" type="xs:string"/>
        <xs:element name="DeviceType" type="xs:string"/>
        <xs:element name="ContentType" type="xs:string"/>
        <xs:element name="DataCoding" type="xs:int"/>
        <xs:element name="MessageText" type="xs:string"/>
        <xs:element name="MessageData" type="xs:string"/>
      <xs:element name="Keyword" type="xs:string"/>
      <xs:element name="MatchKeyword" type="xs:string"/>
        <xs:element name="IsPersistent" type="xs:boolean"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>

</xs:schema>
```

Figure 4: ReceiveSMSRequest XSD Schema

The schema the will be saved as the Eventing Web Service WSDL which will be used to initiate the application. This WSDL will be saved in the local drive, for example:

C:\Application\eventing.wsdl

After that, each schema required is copied, and save them in the local drive. For example to use all the schemas for SMS, they have to being copied and re-named as:

- C:\Application\ReceiveSMSRequest.xsd
- C:\Application\SendSMSRequest.xsd

Then, the schema will be converted into class files. In this example, we will use c# Class using the xsd.exe tools provided by Visual Studio. By default, the xsd.exe is located in:

C:\Program Files\Microsoft Visual Studio .NET 2003\SDK\v1.1\Bin

In the command prompt, the following below is typed:

C:\Program Files\Microsoft Visual Studio .NET 2003\SDK\v1.1\Bin\xsd.exe /c ReceiveSMSRequest.xsd
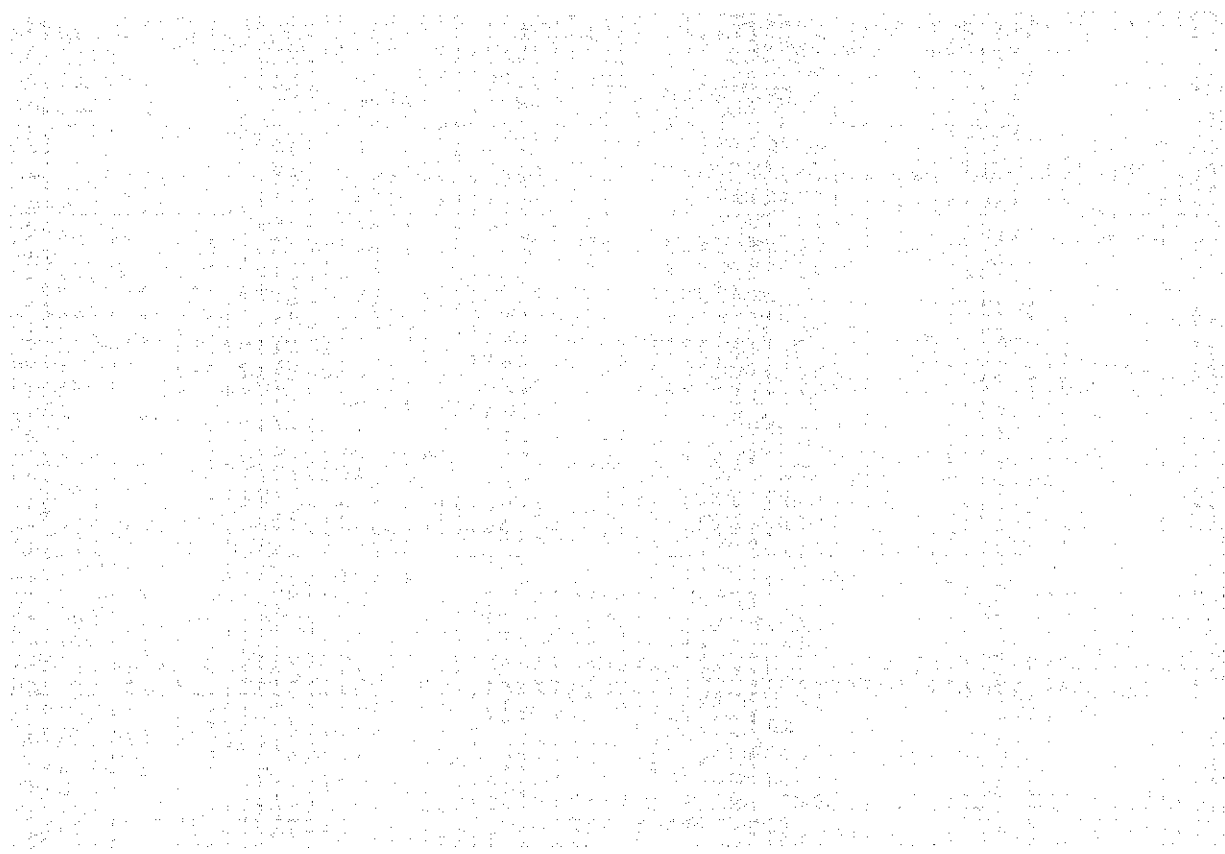
Figure 5: Screen-shot of the command prompt

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This will create c# class files:

- C:\Application\xsd\ReceiveSMSRequest.cs

Then the files created will be included in the c# project via the Add Existing Item dialog box.
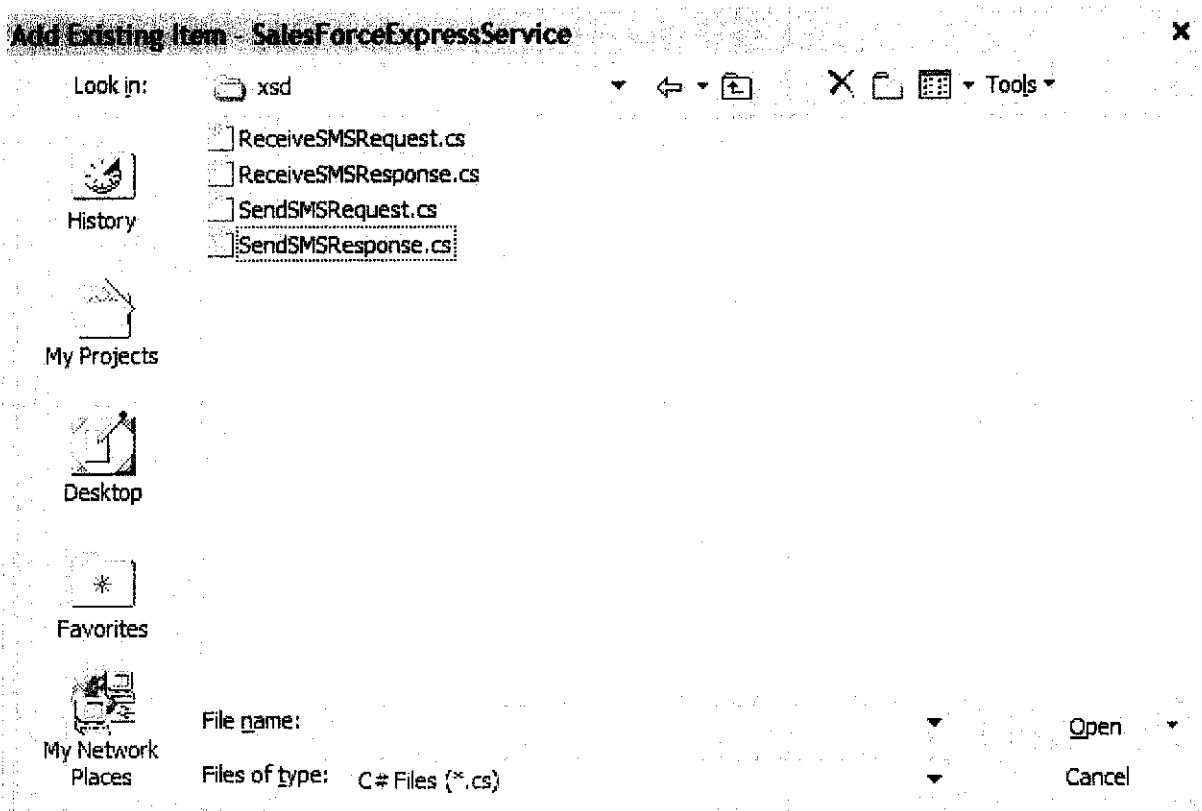
Figure 6: Add Existing Item Dialog in Microsoft Visual Studio

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From here, we may proceed to develop the application and use the Class files in the coding.

The schema above is only the beginning part of developing the Application Provider Interface. There are about six steps more to develop the basic API. The development module is provided by Celcom, one of the mobile carriers in Malaysia.

After the integration is being done, the API and the website should interact between each other, sending and receiving data from each other.

CHAPTER 2

METHODOLOGY

3.1 PROJECT PROCEDURE

Overviewed from the whole scope of studies, the project acquired a lot of stages of understanding and application on project scope as well as to the implementation part. As the research and implementation carried all way along until the final stage the project will proceed through phased development. The whole project implemented phase by phase started from planning as shown in the next figure. The phase can be breakdown as below:

o **Planning**

Designing the plan for completing the required research and prototype implementation

o **Requirement Gathering**

Identifying the requirement for the system based on the problem statement and implemented within the study scope and objectives.

o **Phase 1**

Developing web based system to capture and keep the customers' data.

o **Phase 2**

Enhancing the system to integrate with SMS gateway components

o **Phase 3**

Enhancing the system to integrate with SMS sent by the customers/users.
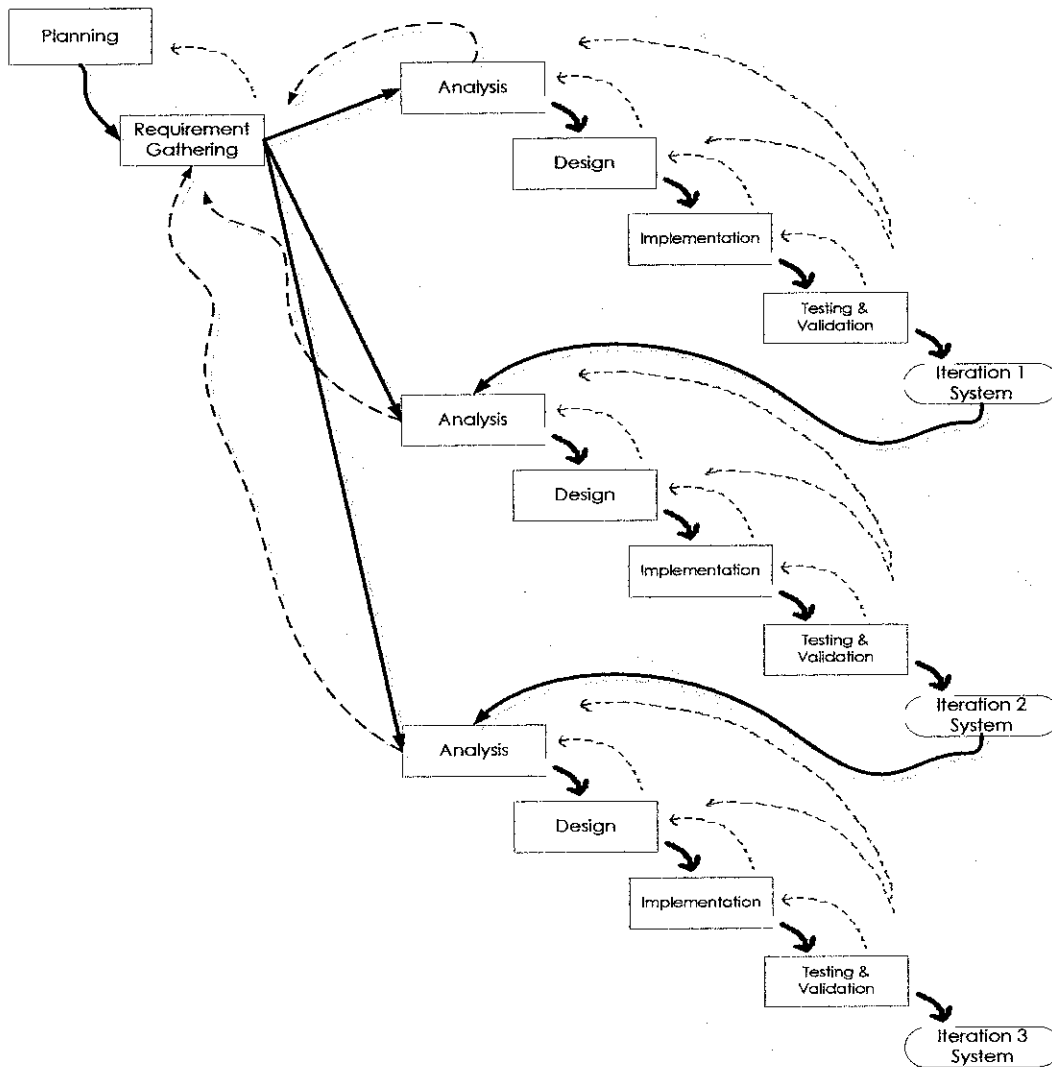
Figure 7: Phased Delivery RAD-based approach

Every phase eventually will develop the whole the framework of the components incrementally whereby every end of phase will undergo an integration test to validate do the target for that particular phase achieved or not. Any difficulties or conflicts should allow for reversing the step, especially back to analysis stage to resolve it, whereby to allow the research progress can be proceed during development in any phase.

3.2 SYSTEM ARCHITECTURE

The development of phase one which is developing web based system to capture users' data requires some diagrams to simplify the development phase.
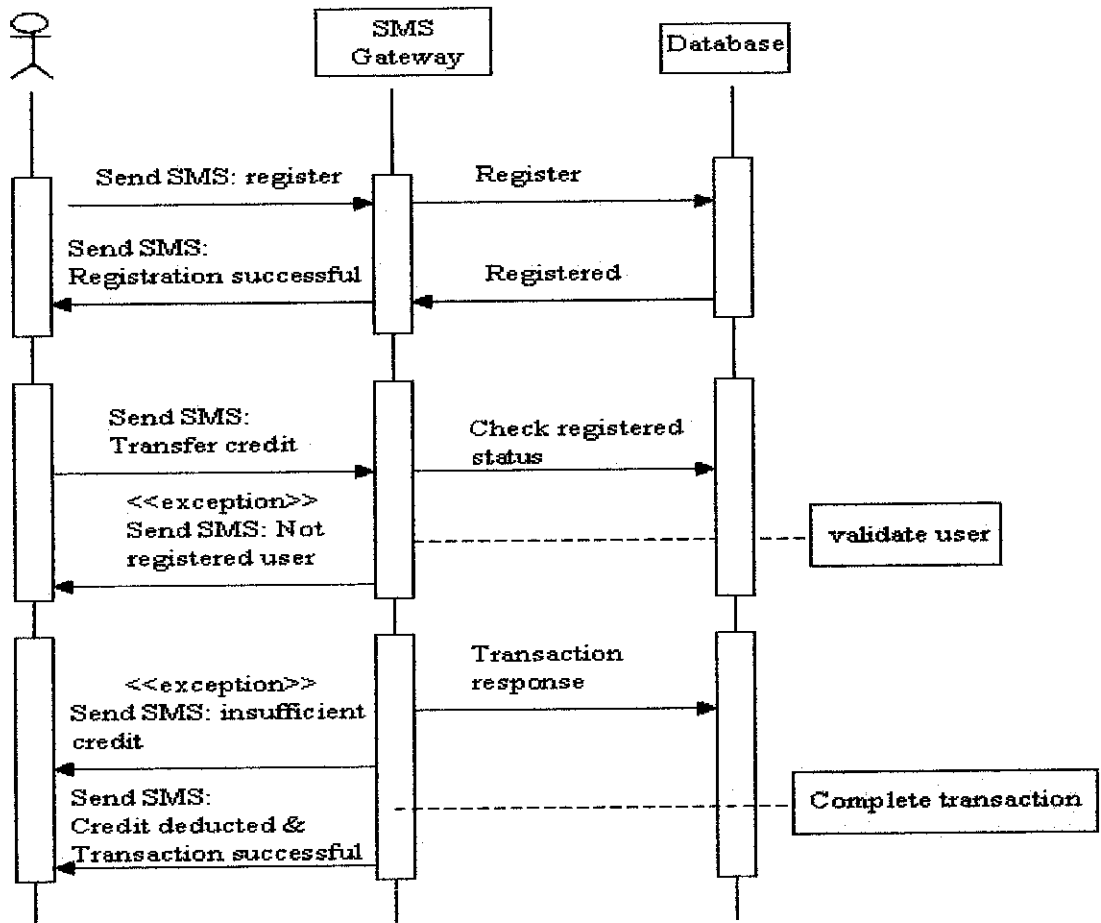
Figure 8: Sequence Diagram of the SMS and Database System

The web system classes will be built based on the above sequence diagram. Figure below explained how many classes are there in the system.
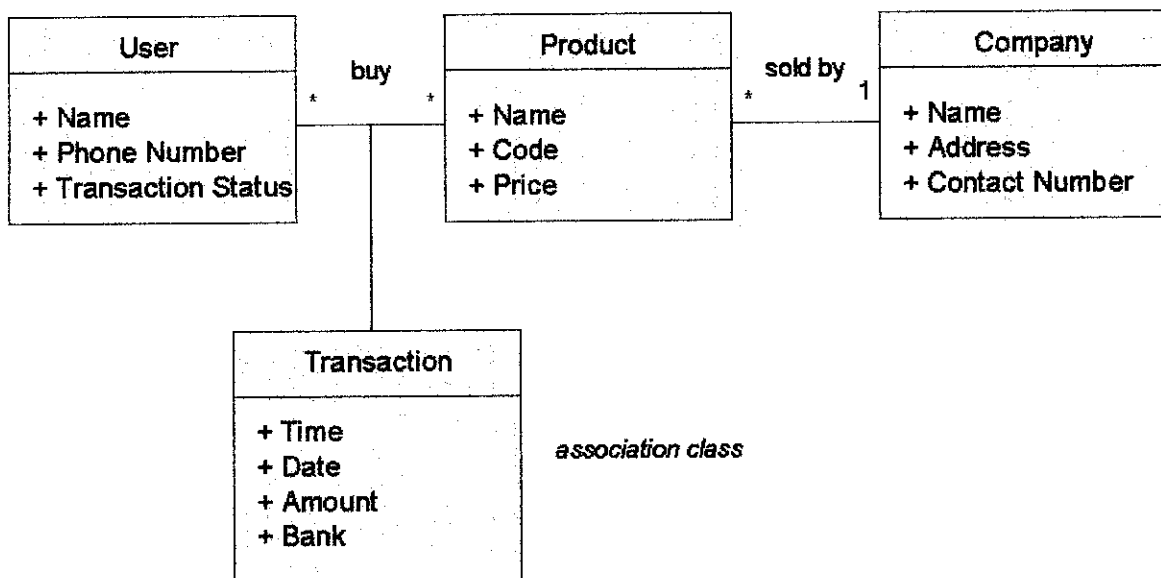
Figure 9: Class Diagram of the website's database.

There are four classes in the database system as it is not integrating with many parties. The system must be as simple as possible because complexity will cause the system too hard to manage.

As seen on the figure, when a user performs a transaction, he/she is actually buying the product. The data kept inside User class are his/her name, phone number and transaction status (successful/fail). While in Product class, the attributes are its name, code and price. The product is owned by the company who sell it. In Company class, it contains data such as the name, address and contact number.

In the diagram, there is an association class, exists between User and Product class, which is Transaction class. It holds data while the transaction takes place like time, date, amount and bank.

3.3 PROTOTYPE ARCHITECTURE

Presentation Layer (website)

A website (proposed name: sms2pay.com) will be developed and the users must register to use the service. Once registered, the user will receive an SMS on their mobile phone to inform that the phone number is successfully registered in the system.

When his/her account is being activated, user can browse through the website. Online shops that provide the online payment using SMS can simply put an instruction how to purchase products and pay it using SMS. When buyers want to make the payment, the buyers can simply write an SMS and send it to the number provided in the website.

In order for a user able to buy from the website, the user must have enough balance in his account registered at sms2pay.com. At first, he needs to top up his account and then verify the amount that he topped up. After that, he is able to buy anything online.

For example, an online shopping website named jersey.com sells various type of football's jersey. One of it is a Manchester United jersey priced of RM200. The buyer who wants to buy the jersey can simply type buy <space> <seller code> <space> <total price> and send it to the number given. E.g.: "buy 23223 200.00" and send to 32355

The server will receive the information in the SMS and passes it to the application provider interface (provided by Mobile carriers). If the application approves or rejects the payment (because of any circumstances such as lack of buyers' credit, etc), an SMS will be sent to the buyers to inform about the status (successful or fail).

Application Layer
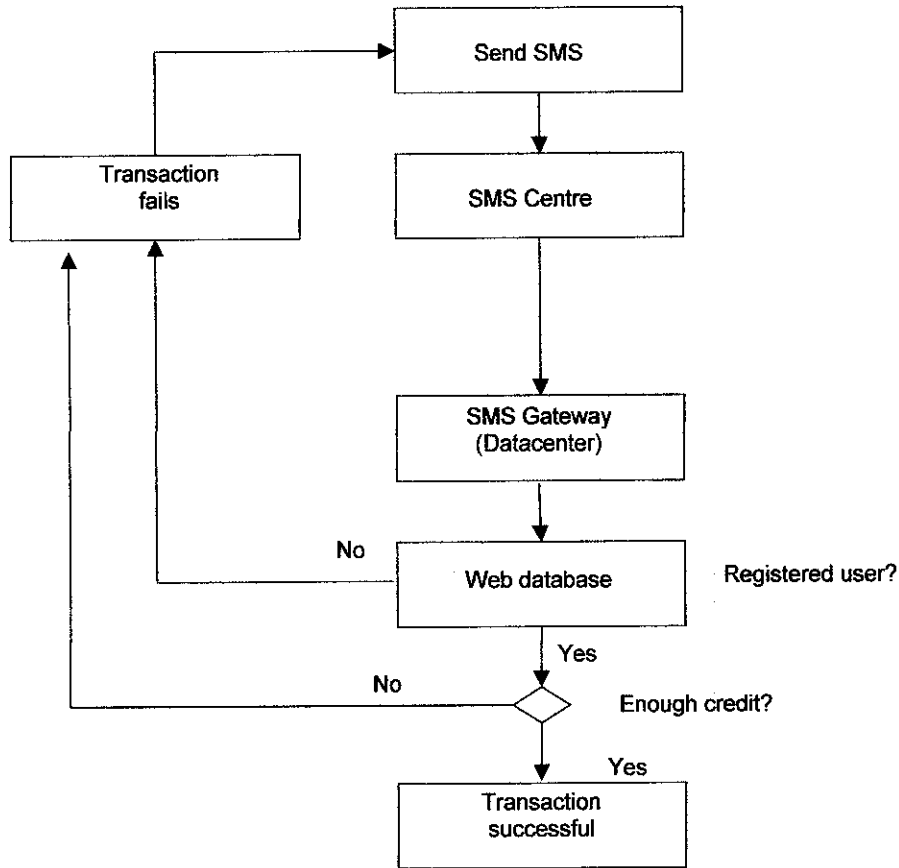
Figure 10: SMS application flow diagram

Displayed above is the SMS application flow diagram. It is similar to the sequence diagram that are showed earlier in the report. It explains briefly about the flow of the system and how SMS gateway integrates with the web database.

3.4 TOOLS REQUIRED

Requirements	Phase 1	Phase 2	Phase 3
Software Apache Web Server	✓	✓	✓
PHP Builder (Macromedia Dreamweaver MX)	✓	✓	✓
Internet Explorer	✓	✓	✓
MySQL Database	✓	✓	✓
Open Source Content Management System	✓	✓	✓
Application Programming Interface			✓
SMS Gateway			✓
Hardware Hand phone	✓	✓	✓
Sim Card 64kb	✓	✓	✓

Figure 11: Table of Requirements

3.5 STRUCTURAL ORGANIZATION OF THE STUDY/RESEARCH

Next figure is the relational among the study done for the research to complete the objectives of the whole project. Some of the relation or selected study scope/topic might be in changed later as reorganize the research in the middle of progress.

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CHAPTER 4

EXPECTED RESULT AND DISCUSSION

4.1 LIMITATION

Problems:

After several researchers have been done, there are some problems identified, especially related to the SMS Gateway service providers.

1. When SMS is sent mobile user, mobile carrier will return a delivery notification to the service provider to indicate the status, either successfully charged or fail charged. However, sometimes due to internet connection issue, they are unable to receive the notification and thus they have to wait till the end of the month to do reconsolidation.

2. There are a small percentage of missing transactions. For example, if 10 SMS is sent and the DN shows success. However, Mobile carrier only pays for 9 transactions. In this case, 1 transaction is considered as missing transactions. In this case, there will be a lost for that particular SMS user.

Solutions:

Due to the problems related to SMS gateway service providers, this project must directly cooperate with mobile carriers as SMS gateway provider. This is because only they can make sure the successfulness of each transaction. Therefore, a step has been taken where Celcom is chosen to be the service providers as it interested to join the research.

To be able to use Celcom's learning tools, one is required to register as Celcom Power Circle Developers. Once registered, a developer can optimize the learning tools, exchange ideas with other developers and develop a new and innovative mobile application that can benefit many people.

Figure 12: Celcom Power Circle website

The Celcom Power Circle website is https://cdc.celcom.com.my. To register as a developer, one must submit the form through mail to the Celcom Power Circle Secretariat. Only approved application can login and use the service provided by Celcom Power Circle and its community.

Some services that provided in the community are like education and guideline through live events, peer-to-peer support via Celcom Power Circle Portal and online forum, etc.

4.2 SELF PROGRAM & EXECUTION

The development of whole system consists of three (3) major parts, which is:

- Developing the Application Provider Interface (API) that controls the data that through the SMS Gateway.
- Developing web based website that contains information about the system and its services.
- Integration both application so that it can interact between each other.

There is a website that acts similar to the website system that is going to be developed. It is TextPayMe.com. The website allows users to transfer an amount of money/credits from one mobile phone to other mobile phone. The website is good as a benchmark and point of reference to the development phase of the website.

TEXT PAYME

Your Account   About TextPayMe

About | Services | Promotion | Policies | Help

What is TextPayMe?

Use TextPayMe to Send and Receive Money with your Phone via Text Messaging...

Use TextPayMe to

- Send and receive money with your phone
- Split your restaurant bills
- Purchase items from Amazon.com

How to Send Money with TextPayMe?

1 Send Text to "262966"   **2** Answer Phone Call   **3** Payment Sent

To: 262966

pay 5
2065551234   Incoming Call

$
—/

Sign in Now   **Register**

Sign in using your **Amazon.com** e-mail and password
If you don't have an Amazon.com account, Register Now.

If you signed up before 10/2/07, click here to login.

Did you receive money through TextPayMe?

If you received money, you must sign up to accept your
payment. Click on the button below to begin!

Claim Payment

Free $5 Signup Promotion

For a limited time, we are giving away $5 to all new
TextPayMe users. Click here for more information about the
promotion.

Sign up now!

Contact Us | Privacy Notice | User Agreement/Policies

©Copyright TextPayMe.com 2007. All rights reserved.

Please provide us feedback

Figure 13: TextPayMe.com website

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4.3 MODIFICATION

Due to the limitation problem, the project faced a difficult situation where all the solutions given cannot be used in the project. Therefore, the methodology of the project is being altered. Instead of each payment will deduct the credit of one's mobile (which cannot be implemented), it is proposed that a user needs to top up the amount of money in the particular website. Once a transaction has been made by the user, the amount of money in his account under sms2pay.com will be deducted. However, the alteration of this methodology is not changing the project's title and vision.

4.4 DEVELOPMENT PROGRESS

Website Development

The project is now undergoing development process. Currently, a website development is taking place. The website is developed using php and MySQL as the API provided by the service provider is able to understand php language. The website needs to be completed first in order to allow a connection testing to be done between the API and the website.

Developing the website contains two (2) major parts. The first one is to develop the layout and design of the website. The layout and design is being developed using Macromedia Dreamweaver and Adobe Photoshop as these software can provide the best graphic and design for the website. The other part is the php coding itself. In order to integrate the website with MySQL database, the php coding is used. As it is free open source coding and easy to use, php provides the best solution for the development of the website.

The development is divided into three (3) sections. The first one is to develop a welcome page, using Joomla Open Source, as a platform to introduce the service to users. This main website will contains all information regarding the service, how to use it, information to topup the credit into one's account, and many more.

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The second section is to develop a page for administration purposes. Every customer's details such as credit, time of registered, phone number, etc can be seen inside this administration page. Customers and sellers can also log in into their own admin page to see information on their account.

The third section is to develop a website of a seller (to become model on how the whole system works.) This website is developed to give clear view on how an sms payment can be done from a seller's website.

The next part after completing the website development is to integrate it with the API provided by the service provider. Once it is successful, the thing to consider next is to test the whole system, from a registration until a purchase can be made from the system.

API (Application Programming Interface)

An API (which integrates between the web-based system and SMS Gateway) is provided by XGEN Technology Sdn. Bhd. The API allows SMSes to be converted so that it will be understood by php language. When an SMS is sent, the API will capture the phone number of the sender, time and date of sending, message id, short code and the content of the SMS. It will be stored in its own database, but it can easily send this information to any php language where this php language saves the information in the MySQL database.

This information will then can be manipulated within the system. Below are the details on the data captured by the API:

These five captured data then are passed or forwarded to the website system. Example:
http://www.domain.com/receive.php?from=60121234567&text=Test%20Message&time=2007/01/05%2012:00&msgid=1&shortcode=32355

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No.	Parameter Name	Description
1	from	The sender's number (E.g. 60121234567)
2	text	- The message which the sender has sent to your account (E.g. SMS ACCOUNT *TEXT*). "SMS ACCOUNT" is cropped off and not forwarded together. Just the "TEXT" portion will be forwarded. - Normal Text and Unicode Text are accepted.
3	time	The local server time at which the message has been received and forwarded
4	msgid	This is a unique identification MessageID used for tracking and troubleshooting purposes.
5	shortcode	This is the shortcode number which the user has used to send incoming message to your account (E.g. 32365)

Figure 14: Data captured by API

In the system, we only capture from, text, time and msgid variables. These variables are captured with these following codes:

```
<tr>
    <td width="40%">Handphone number :</td>
    <td width="60%">
        <input type="text" name="from" size="30" />
    </td>
</tr>
<tr>
    <td width="40%">Text :</td>
    <td width="60%">
        <input type="text" name="text" size="30" />
    </td>
</tr>


    <td width="40%">Time:</td>
    <td width="60%">
        <input type="text" name="time" size="30" />
    </td>
</tr>

<tr>
    <td width="40%">MsgID:</td>
    <td width="60%">
        <input type="hidden" name="msgid" size="30" />
    </td>
</tr>
```

Figure 15: Codes to capture the variables

To send the SMS to the API, a user needs to type SMS <space> easypay <space> instructions and send it to 32355. For example, if a user wants to register, he needs to send 'SMS easypay reg' and send to 32355.

WebSMS2u
Your web-to-mobile partner - SMS Anytime, Anywhere

ADMINISTRATION
My Account
Account Manager
Credit Transfer
News Update

CONTACT MANAGEMENT
Contact List
Group List
Import Contact List
Export Contact List

INCOMING MESSAGES
Inbox
Settings

COMPOSE SMS
Text SMS
Scheduled SMS
Template Manager

REPORTS
SMS Log
SMS Log Update
Credit Transfer Log
Credit Balance

SMS In Box (Incoming SMS)

HOW TO RECEIVE SMS:
Send the following Message to 32355 (currently from Malaysia Only)
SMS easypay

Note:
Messages can only be 160 characters (1 SMS) in length. The sender is charged RM0.30 for each message sent unless you choose to bear a 2 credit charge.

SMS easypay

Status: 0 message(s) located in your Inbox
Sorry, No records found! Please try again!

Start from [03-23-2008] to [03-23-2008] (MM-DD-YYYY)
Search Messages | Export Messages (Excel) | Clear

Figure 16: Screen shot of the API application

The SMS sent will be categorized by its instruction. The instruction will be identified on the first word after 'SMS easypay'. For example, SMS easypay register will be categorized as new registration by the customer. Below is the table of the category for the system:

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Category	SMS Code	Details
Register	SMS easypay reg	For a new customer to register
Balance	SMS easypay bal	To enquire balance from the account
Payment	SMS easypay buy <seller ID> <price>	To buy products

Figure 17: SMS category

If a customer sends SMS 'SMS easypay reg', if the phone number is not registered yet, he will receive a sms to inform him that the registration is successful as picture:

Registration
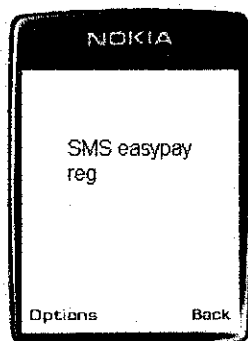
Customer sends
registration SMS

Reply from the
server

Figure 18: Snap shot of registration SMS

If a customer sends SMS to purchase, 'SMS easypay buy 12345 400.00', where 12345 is the seller's ID and 400.00 is the total amount of payment. if the phone number is not registered yet, he will receive a sms to inform him that the purchase status as picture:

Purchase

| Customer sends purchase SMS | Reply from the Server once successful (enough credit) | Reply from the Server once unsuccessful (no enough credit) |
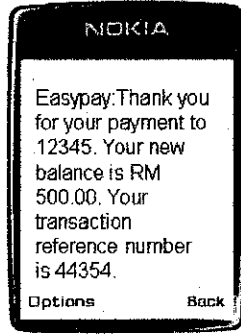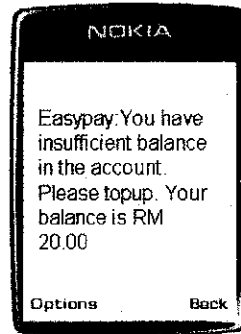
Figure 19: Snap shot of purchase SMS

If a customer sends SMS to check balance in the account, 'SMS easypay bal, he will receive a SMS to inform him the balance as picture:

Check Balance
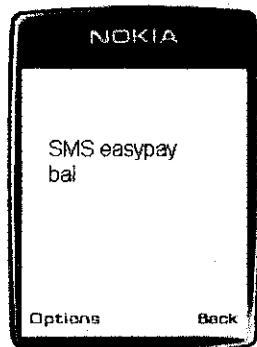
| Customer sends check balance SMS | Reply from the Server |
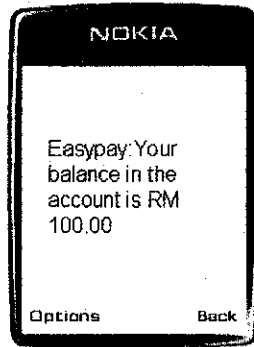
Figure 20: Snap shot of check balance SMS

Coding Parts

All SMS above are successfully working by inserting these php codes into /admin/insert.php file:

```php
<?php
    include "index.html";
    require_once "connection.php";
require_once ("sms_api.php");


$category = substr($_REQUEST['text'], 0, 3);
$data = substr($_REQUEST['text'], 4, 5);
$pay = substr($_REQUEST['text'], 10, 6);
$time = substr($_REQUEST['time'], 0);
        $phone_no = $_REQUEST['from'];


  if (isset($phone_no)) {
   if (!$phone_no)
       printf("<script language=\"javascript\">window.alert (\"Please insert phone number\");</script>");
   else {
       $sql = "select * from details where phone_no like '{$_REQUEST['phone_no']}' ";
       $result = mysql_query($sql);
       $num = mysql_numrows($result);
       if ($num > 0 ) {
                print(" <p> </p>
\n");
}
}
```

```php
?>
<div align="center"> <p>
<table width="50%"> <div align="center"> <p>
<table width="50%">
<p align="center">
 <?php
$sql = "SELECT * FROM details WHERE phone_no='$phone_no'";


            $result = mysql_query($sql);


            while ($myrow = mysql_fetch_array($result)) {
                    $phone_no = $myrow['phone_no'];
                    $register = $myrow['register'];
                    $credit = $myrow['credit'];
            }
    if ($category == reg && empty($register)){


        $sql = "INSERT INTO details(phone_no, time , register, msgid) VALUES
('$phone_no', '$time' , 'yes', '$msgid')";
        $result = mysql_query($sql) or die ("error");
        printf("<script language=\"javascript\">window.alert (\"Thank you
$phone_no! Your record has been saved in the system!\");</script>");
$mysms = new sms();
echo $mysms->session;
$mysms->send ("$phone_no", "easypay", "Easypay:Thank you for registering with
us! You can topup your credit account to use this service. For more info, kindly visit
www.elevenkit.com", "0");
echo "<meta http-equiv='Refresh' content='0; url=insert.php'>";
exit; }
```

```php
else if ($category == buy && (!empty($register)) && $pay < $credit) {
    $balance = $credit - $pay;
    $sql = "INSERT INTO buy(phone_no, transaction, pay, time , msgid)
VALUES ('$phone_no', '$data', '$pay' , '$time', '$msgid' )";
    $result1 = mysql_query($sql);
    $sql = "UPDATE details SET credit='$balance' WHERE
phone_no='$phone_no'";
    $result = mysql_query($sql) or die ("error");
    printf("<script language=\"javascript\">window.alert (\"Thank you for your
payment!\");</script>");


    $mysms = new sms();
echo $mysms->session;
$mysms->send ("$phone_no", "easypay", "Easypay:Thank you for your payment to
$data. Your new balance is RM $balance. Your transaction reference number is
$msgid.", "0");
echo "<meta http-equiv='Refresh' content='0; url=insert.php'>";
exit; }
 else if ($category == buy && (!empty($register)) && $pay > $credit) {


    printf("<script language=\"javascript\">window.alert (\"You have insufficient
balance in the account. Please topup\");</script>");
    $mysms = new sms();
echo $mysms->session;
$mysms->send ("$phone_no", "easypay", "Easypay:You have insufficient balance in
the account. Please topup. Your balance is RM $credit ", "0");
echo "<meta http-equiv='Refresh' content='0; url=insert.php'>";
exit; }


    else if ($category == bal ) {
```

```php
        printf("<script language=\"javascript\">window.alert (\"Your balance in the
account is RM $credit \");</script>");
$mysms = new sms();
echo $mysms->session;
$mysms->send ("$phone_no", "easypay", "Easypay:Your balance in the account is
RM $credit", "0");
        echo "<meta http-equiv='Refresh' content='0; url=insert.php'>";
exit;  }


  } else
 ?>
<?php
?>
<form action="<?php print $_SERVER['PHP_SELF']?>" method="post"
name="form1" id="form1"><font face="Trebuchet MS">


 <p> </p>
 <div align="center">
 <table width="60%" border="1" style="border-collapse: collapse"
bgcolor="#B5CBEF" cellpadding="5" bordercolor="white">
                <tr ><td colspan="2"><b>Details</b></td></tr>
                <tr>
                 <td width="40%">Handphone number :</td>
                 <td width="60%">
                        <input type="text" name="from" size="30" />
                 </td>
                </tr>
                <tr>
                 <td width="40%">Text :</td>
```

```html
                <td width="60%">
                        <input type="text" name="text" size="30" />
                </td>
                </tr>


<tr>

                <td width="40%">Time:</td>
                <td width="60%">
                        <input type="text" name="time" size="30" />
                </td>
                </tr>


                <tr>
                <td width="40%">MsgID:</td>
                <td width="60%">
                        <input type="hidden" name="msgid" size="30" />
                </td>
                </tr>
                </table><br>
        <p>
                <input type="submit" name="submit" value="Submit" />
                <input type="reset" name="reset" value="Clear" /> </div>
        </p>
</font></form>


        <?php
include "doFooter.html";
?>
```

4.5 OUTCOME AND END PRODUCT

After quite some time developing the system, the prototype is ready to be used and tested. The website is successfully integrated with the API. The website is filled with all information regarding on background of the system and on how to utilize the system.

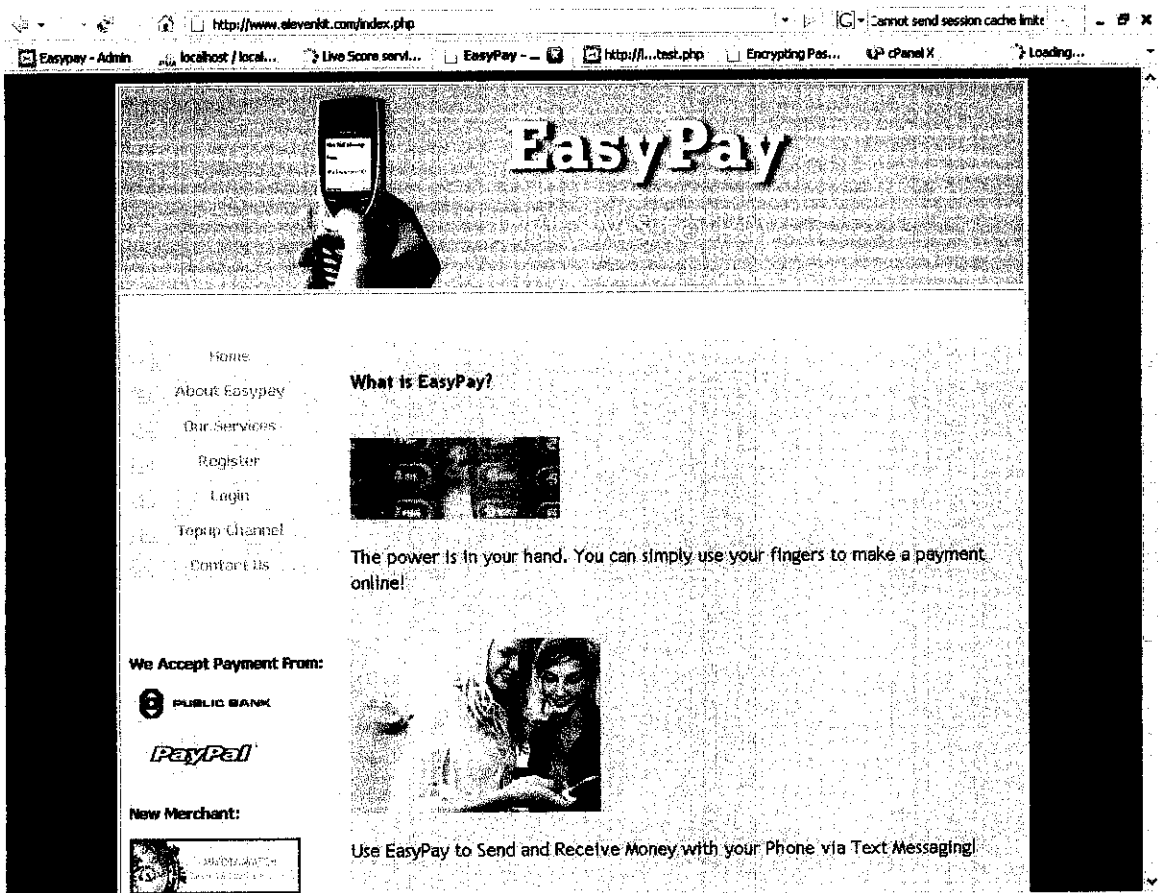Below is the screen shot of the main page of the website:

Figure 20: Screen Shot of Main Page of the Website

The website can be accessed through www.elevenkit.com. The website consists of 7 pages, where the main page acts to attract the guesses to browse and explore the website. At 'About EasyPay' page, users are briefed about how EasyPay works and its benefits.

'Our Services' is a page to explain on how to use and utilize the EasyPay service. Users can learn on how to register to the service when they go into 'Register' page. At 'Login' page, they are a form where Admin and Merchant can log in to check on the details and transaction in the system.

'Topup Channel' provides users the options where and how they can topup into the EasyPay account. Lastly, 'Contact Us' page contains information regarding the company and how to contact them.

4.6 Recommendation

Based on current progress and testing experience on the few recommendations can be suggested for further development or other developer who may interested to apply the Online Payment System Using SMS.

4.6.1 Research Recommendation

The main purpose of the study is to allow an online payment using SMS that will deduct the actual credit from the phone. But due to constraint and it is difficult for the time being to co-operate with any Telcos regarding this matter, the project was being modified little bit. Therefore, it would be a greater achievement if in the future; the payment is deducted straight away from the phone itself.

4.6.2 System Security

As it involves money transaction, it is being highly recommended that the security system should be implemented and upgraded. In this phase, the initial purpose is to proof that online payment system using SMS is not a myth as it can be implemented.

4.6.2 Website Layout and Design

The website layout and design should use Content Management System (CMS) so that it can be managed easier and efficiently. For the time being, the website was developed from raw php, so if some amendments need to be done, it must be done in php, which is a quite difficult for people without php knowledge.

4.7 Lesson Learned

Through out the research, design and implementation of the project, several of fields of study were learned in conceptually or technically whereby accommodate benefits and advantages as they are connected to each other.

- **Software Agent**
  Understanding the powerful of Agent technology and concepts to implement in real life application.

- **Hybrid Pattern-Design and Internet Programming** The framework developed using complex data structure, flexible and dynamic programming method in HTML and PHP using object oriented programming method by applying few patterns design.

- **Utilizing Graphics Developer – Adobe Photoshop**
  Studied and utilized Adobe Photoshop to create and edit image for the website.

- **Integrating Application Provider Interface and PHP**
  Communicating the API classes with the Web Service through SMS Gateway

CHAPTER 5

CONCLUSION

5.1 CONCLUSION

The Online Payment System Using SMS is a new attempt that has not being tried before as it has a lot of disadvantages especially in terms of security as it involve money transactions. Therefore, it is hoped that this project will be succeed to enable a further study to enhance the security and make the system become reliable. Once this system is being implemented, surely the e-commerce will boom and use widely as it is easy to make the payment.

5.2 WAY FORWARD

More devotion and focus need to be put on the research along applying the theories in the coding. Furthermore, to develop such system required a critical thinking that able to solve the problems of algorithms, dynamic data structure, mathematical approach and others, in a rational way that within the scope. Hopefully the research will be benefit for the implementation part of the prototype later on, besides approaching new scope and way in building an intelligent system.

REFERENCES

[1]   Dennis, Wixom and Tegarden, 2002, "System Analysis & Design:
       An Object-   Oriented Approach with UML", United State of America; John
       Wiley & Sons, Inc.

[2]   Wikipedia Website: What is SMS Gateway
       < http://en.wikipedia.org/wiki/SMS_gateways>

[3]   Web site refers to Service Provide of MobileGate by Emerge.com,
       < http://www.webautomate.net/pro_mobilegate.htm>

[4]   Web site refers to Intelli Software; *Send and receive SMS in your application.*
       <http://www.intellisoftware.co.uk/sms-gateway/com-component>

[5]   Celcom Power Circle Community.
       <https://cdc.celcom.com.my>

[6]   TextPayMe.com
       <http://www.textpayme.com>

[7]   Web Service and Other Distributed Technologies
       <http://msdn2.microsoft.com/en-us/webservices/default.aspx>

[8]   WebSMS2U.com
       <http://www.websms2u.com>

[9]   "Programming   Microsoft   Agent",   Microsoft,
       http://msdn.microsoft.com/library/default.asp?url=/libra
       ry/en-us/msagent/agentstartpage_7gdh.asp, accessed on
       May 15, 2007.

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APPENDIX 1: PROJECT GANTT CHART

No.	Detail/Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	SW	EW
1	Project Work Continue	█	█	█													
	- Research work																
2	Submission of Progress Report 1				█												
3	Project Work Continue					█	█	█									
4	Submission of Progress Report 2								█								
5	Project Work Continue									█	█	█					
6	Poster Exhibition										█						
7	Submission of Dissertation (soft bound)												█				
8	Oral Presentation													█			
9	Submission of Dissertation (hard bound)														█		

Legend:

SW: Study week
EW: Exam week

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APPENDICES

SMS HTTP API
DOCUMENTATION
JAN 2008

TABLE OF CONTENTS

XGEN Technologies

1.0) Introduction

This document is the official HTTP API connectivity guide for integrating with XGEN Technologies' SMS / Mobile Communication Network (WebSMS2u.com). This guide will bring you through the process of sending messages by simply submitting either a GET or a POST request to our API. Also included is the API building instructions for receiving forwarded incoming messages from WebSMS2u.com to your application on your server.

For sending of messages, we recommend users to use the POST method for submitting their requests due to the size limitation of GET as well as the HTTP request being exposed in the HTTP address bar.

This document will cover the following areas of connectivity:

- Sending normal text messages
- Sending UNICODE (UCS2) messages (Multi lingual)
- Sending UDH header messages (8 bit messages, EMS)
- Real Time transaction logs
- Error Codes
- Incoming SMS Forwarding API

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2.0) Sending Normal Text Messages

7 input fields required:

No.	Parameter Name	Description
1	user	Username of the user/client
2	pass	The password for authentication
3	to	The recipient's mobile number (start with the country code in front of the number without the + sign. E.g. 60121234567)
4	from	The source name or sender's number. Supports alpha, alphanumeric and numeric character up to 16 characters for numeric only and 11 characters for alphanumeric.
5	text	The content of the message
6	type = 0	Represents that "text" is in URLencoded ASCII/alphabets.
7	link	'0' to set sender id '1' via 32300 shortcode. Applicable to Malaysian telco only.

Example of URL:
http://www.websms2u.com/sms/sendapi.asp?user=user&pass=password&type=0&to=60121234567&from=xgentech&text=this+is+a+test+msg&link=1

*Note: Maximum number of characters is 160 and any extra character will be truncated.

3.0) Sending UNICODE (UCS2) Messages (Multilingual)

7 input fields required:

No.	Parameter Name	Description
1	user	Username of the user/client
2	pass	The password for authentication
3	to	The recipient's mobile number (start with the country code in front of the number without the + sign. E.g. 60121234567)
4	from	The source name or sender's number. Supports alpha, alphanumeric and numeric character up to 16 characters for numeric only and 11 characters for alphanumeric.
5	text	The content of the message
6	type = 5	Represents that text is UCS formatted.
7	link	'0' to set sender id '1' via 32300 shortcode. Applicable to Malaysian telco only.

Example of URL:
http://www.websms2u.com/sms/sendapi.asp?user=user&pass=password&type=5&to=60121234567&from=xgentechk&text=4e00&link=1

*Note: Maximum number of Unicode characters in one message is 70.
** To know more on Unicode, please refer to www.unicode.org.

www.xgentech.com

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4.0) Sending UDH Header Messages (8bit)

8 input fields required:

No.	Parameter Name	Description
1	user	Username of the user/client
2	pass	The password for authentication
3	to	The recipient's mobile number (start with the country code in front of the number without the + sign. E.g. 60121234567)
4	from	The source name or sender's number. Supports alpha, alphanumeric and numeric character up to 16 characters for numeric only and 11 characters for alphanumeric.
5	text	This field is for the input of UDH statement in hexbin format
6	type=6	Represents that "text" is UDH formatted.
7	link	'0' to set sender id '1' via 32300 shortcode. Applicable to Malaysian telco only.

Example of URL:

operator logo
http://www.websms2u.com/sms/sendapi.asp?user=user&pass=password&type=6&to=60
121234567&from=xgentech&link=0&text=0605041582158205F26100480E01014809B0
001DFF780000A816CC000300F00001E00040003A002000000000040001000F00000C0
0040001001F00000200940001921100000010094000192010000600B40001000F00000
8000A00013F0DC000081C0A0005409F8000071472000B7F83C0000094020043F00C
000004C14001F000380000027E800078E0F800

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---

5.0) Real Time Transactional Log & Credit Checks

There are two ways to check Log & Status of message sent through your account.

1) WEB ACCESS

User will be able to check their transaction real time by logging into this URL :
http://www.websms2u.com/sms/

User will need to use their provided user ID and password to log in.

From the SMS Log, users will be able to view transaction logs of each message sent over the past three months; which includes details such as: SMSID, Date, Time, SenderID, Destination Number, Text and Message Status.

2) HTTP API ACCESS

CREDIT CHECK
Example of URL:
http://www.websms2u.com/sms/reportapi.asp?user=user&pass=password&check=credit

RESPONSE	DESCRIPTION
400	Missing param or invalid check field
401	Invalid user/pass
Credit Amount	Shows the Credit Amount

MESSAGE STATUS CHECK
Example of URL:
http://www.websms2u.com/sms/reportapi.asp?user=user&pass=password&check=status&phoneno=60121234567&smsid=12345

RESPONSE	DESCRIPTION
400	Missing param or invalid check field
401	Invalid user/pass
messageid,phoneno,status,date/time sent	messageid,phoneno,status,date/time sent

6.0) Error Codes

For all submission of HTTP GET or POST for all types of messages stated above, a code will be return to acknowledge whether a particular request has been submitted correctly. Below is a list of codes with their corresponding description:

RESPONSE	DESCRIPTION
200	Message sent to queue successfully.
300	Unsuccessful Gateway Connection.
400	Missing parameters or invalid type field.
401	Invalid user/pass.
402	Insufficient credit.

www.xgentech.com

Technologies

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7.0) Incoming SMS Forwarding API

5 captured fields are passed/forwarded to your application at your preset URL:

No.	Parameter Name	Description
1	from	The sender's number (E.g. 60121234567)
2	text	- The message which the sender has sent to your account (E.g. SMS ACCOUNT *TEXT*). "SMS ACCOUNT" is cropped off and not forwarded together. Just the "TEXT" portion will be forwarded. - Normal Text and Unicode Text are accepted.
3	time	The local server time at which the message has been received and forwarded
4	msgid	This is a unique identification MessageID used for tracking and troubleshooting purposes.
5	shortcode	This is the shortcode number which the user has used to send incoming message to your account (E.g. 32355)

Example of URL:
http://www.yourdomain.com/receive.php?from=60121234567&text=Test%20Message&time=2007/01/05%2012:00&msgid=1&shortcode=32355

*Note: Each incoming message should have a total length of 160 characters (or Unicode equivalent) including the words "SMS ACCOUNT". Messages which are longer than 160 characters will be cropped off.

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bsite Design & Hosting, Online Advertising & Promotion, Information Technology Provider & Consultants

hammad Asree Bin Asmoe
, Jalan 5D/6
nan Setapak Indah
300 Kuala Lumpur
)

OFFICIAL RECEIPT

Receipt # : 764
Date   : 3/18/2008

ment Particulars

nvoice#/Acct.#:	Inv. Date/Acct. Name	Amount (RM)
5062866	3/17/2008	$310.00

iount Received: Three Hundred Ringgit Only	RM	$300.00
yment Method: Other		

)TES & COMMENTS:
yment; Muhammad Asree Bin Asmoe

for XGEN Technologies Sdn Bhd

....
AUTHORISED SIGNATURE

XGEN Technologies Sdn Bhd (13980-H)
5A, Jalan Travers, Off Jalan Tun Sambanthan, 50470 Kuala Lumpur, Malaysia
Tel: 603-22741764   Fax: 603-22745542   Web URL: http://www.xgentech.com

XGEN Technologies

1ammad Asree Bin Asmoe
Jalan 5D/6
1an Setapak Indah
00 Kuala Lumpur

OFFICIAL RECEIPT

Receipt # : 765
Date   : 3/18/2008

ment Particulars

voice#/Acct.#:	Inv. Date/Acct. Name	Amount (RM)
062866	3/17/2008	$310.00

)unt Received: Ten Ringgit Only	RM	$10.00
ment Method: Other		

TES & COMMENTS:
rment; Muhammad Asree Bin Asmoe

for XGEN Technologies Sdn Bhd

. . . .
AUTHORISED SIGNATURE

XGEN Technologies

bsite Design & Hosting, Online Advertising & Promotion, Information Technology Provider & Consultants

OFFICIAL INVOICE

hammad Asree Bin Asmoe
, Jalan 5D/6
nan Setapak Indah
)00 Kuala Lumpur

+60 (12) 968-8815   Fax:

Invoice #	:	25062866
Date	:	3/17/2008
Terms	:	C.O.D.
Due Date	:	
Sales Person	:	Adrian Tan Kar Yin
Your Order #	:	APPFORM
Page	:	1

ription	(RM) Amount
Broadcasting Account (Silver Package) idity period: 18 March 2008 to 17 Sept 2008 rlD: easypay	$240.00
Credits (500 @ RM0.14/credit)	$70.00

TES & COMMENTS:

Total RM: $310.00

ise ensure payment is received by us before expiry dates (if any) to ensure non-interrupted service.

)unt Payable: Three Hundred Ten Ringgit Only

:heques should be crossed "A/C Payee Only" and

le payable to: **XGEN Technologies Sdn Bhd**

Online Payment System Using SMS

yment is always troublesome in Malaysia. Some don't have online banking system,
't have any credit or debit cards, some unable to register for Online money such
, E-Gold and many more

cessity for online customer, especially from Malaysia to have a convenient way
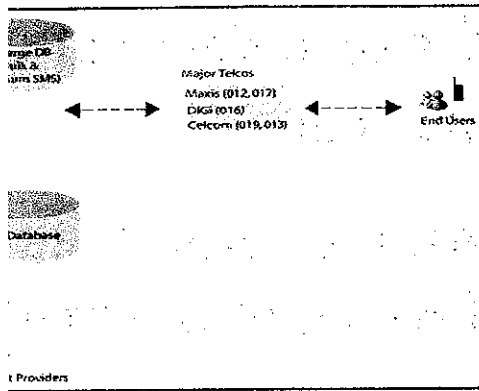ı pay online, and of course with an affordable price.

ı to pay online

ıney providers like PayPal is still unavailable in Malaysia

ıailable, it is quite difficult to register one as it needs customer to verify the account
dit cards

using online bank, inter-bank transaction will take around 2 working days to be verified

Major Telcos
Maxis (012,017)
DiGi (016)
Celcom (019,013)
End Users

Database

t Providers

- To ensure the success of the project, the most important thing to concentrate and study is to establish a connection between SMS application and website application.

- It is called 'SMS gateway'.

- SMS gateways allow for the sending and receiving of SMS messages to or from devices and used to provide SMS network connectivity to third parties.
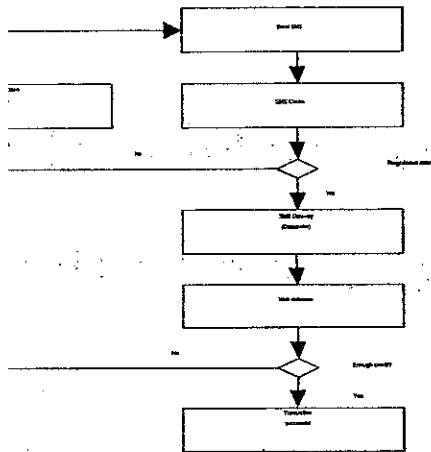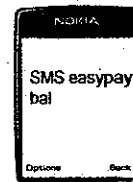
- A website, proposed www.easypay.com is developed and customer and seller register in it.

- e.g a website www.miyotawatch.com sells various type of watches. It's user ID is 12345

- Customer who wants to buy products from the website can simply send sms to buy

How to use the SMS Payment System
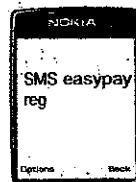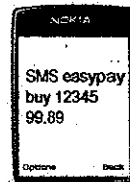
SMS easypay reg	SMS easypay buy 12345 99.89	SMS easypay bal
To register	To buy / purchase	To check balance

'ea of improvements:

Enhancing the security

Website (www.easypay.com) interface

Marketing and promotion of this new service

ı payment system using SMS is not imposible. It is successfully working and the
ransaction is accurate and very affordable.

ıopefully the research will be benefit for the implementation part of the prototype later
n, besides approaching new scope and way in building an intelligent payment system.

3Y: MUHAMMAD ASREE BIN ASMOE (4406)   SUPERVISED BY: DR. P D DOMINIC