

Price Comparison Website

By

Khamisah Binti Buaimin

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Universiti Teknologi PETRONAS
Bandar Seri Iskandar
31750 Tronoh
Perak Darul Ridzuan

CERTIFICATION OF APPROVAL

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A project dissertation submitted to the
Information Technology Programme
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in partial fulfillment of the requirement for the
BACHELOR OF TECHNOLOGY (Hons)
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Approved by,

(A.P Dr. Baharum B. Baharudin)

UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
Sept 2012
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 reference and acknowledgements, and that the original work contained herein has not been undertaken or done by unspecified sources or persons.

(KHAMISAH BINTI BUAIMIN)

ABSTRACT

Price comparison sites are designed to compare the price of goods and services from a range of providers, which will help consumers in making decision to choose products that will save their money through online. Considering the customers' busy lifestyle especially those who are living in the city area, most of the consumers prefer to buy their needs through the internet because it save their time. Besides, consumers always go for the cheaper price in purchasing products therefore by using price comparison website, customers don't have to travel from shop to shop only to survey the price offered by different shops for the same product. They can just check it from the price comparison website itself and decide where they should buy the products they need. This project, named as PriceWar.com is the place where shoppers could find the great deals on the home groceries products. The best deals will be clearly highlighted. Even though not all consumers are buying online, but it is one of the ways to help consumers increase their price awareness. Consumers have the right to know whether the price they are seeing in the shops are good deals as it is claimed or not. Thus it is an advantage for the consumers who are always aware about the current price of a certain product so that they are not cheated by the big words advertised by the shops. The website also beneficial to the sellers/retailers as they will be able to advertise their products and promote their shops at the same time. Unlike the giant supermarkets that have their own website, most of the owners of small groceries shop do not have the skills to get their own website or blog to promote their business online. Thus, with this website, the chances are open for the interested groceries shop owners to advertise their products in the website. They just need to provide the price information regularly and the admin of the website will do the rest.

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ABBREVIATIONS AND NOMENCLATURES

FRS	Financial Reporting Standards
RAD	Rapid Application Development
IPO	Input, Process, Output
Netizens	The community of internet users

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

A price comparison website acts as a platform or medium between the consumers and the sellers. It allows consumers to see different lists of prices for the product chosen by user and it helps consumers to make an informed decision about which to choose in order to save money. It also act as a tool to help consumers increase their price consciousness so that they will not feel cheated by the advertisement from the retailers that claimed they are offering the cheapest price but the reality happened to be otherwise.

Unlike other comparison sites, PriceWar.com (the name of this project) will focus on providing list of prices of home groceries products such as onion, chilies, garlic, potatoes, fish, chicken and others. Due to vast increase of people who are online, PriceWar.com will be a great help for those who are stuck with loads of work in the office and don't have much time to check on the current price of the home groceries products. According to research of Social, Digital and Mobile in Malaysia made by We Are Social, the internet penetration for Malaysia is 59% and the average hours Malaysian *netizens* spend using the internet every week is 19.8 hours. Meanwhile 21% of Malaysian internet users access the web via mobile devices which means they have internet accessibility anywhere with their smart phones. 77% of Malaysian web users have shared their thoughts on a brand via social media during this research was made in the year 2011. The research shows that how Malaysian people are attached to the internet.

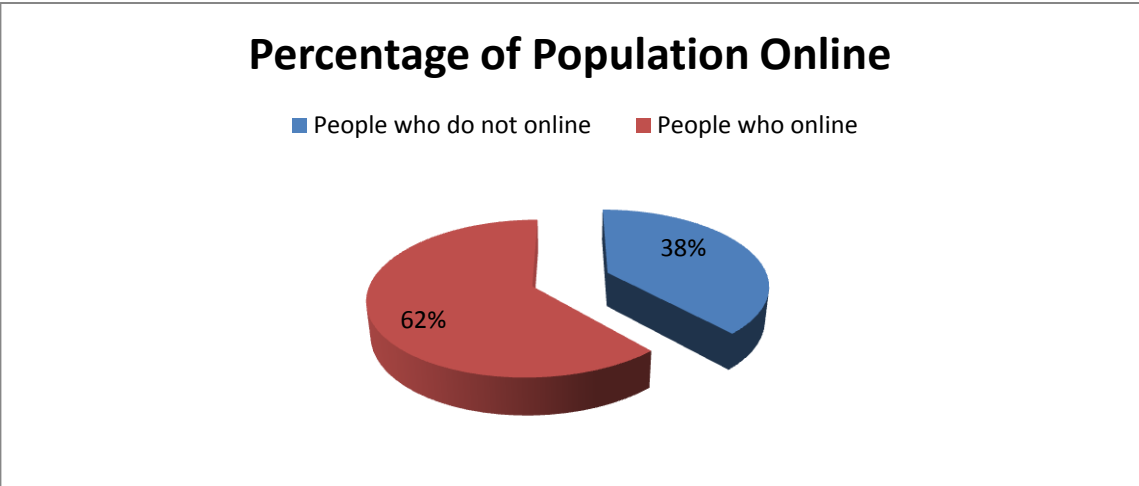


Figure 1: Percentage of Malaysian Population Online
 (Source: Malaysiacrunch.com, 2011)

Based on the figure above, the statistic is made according to the year 2011, it has clearly shown that more than half of the population in Malaysia is using internet everyday and it is believed that the number is increasing from time to time. A survey has been made by Nielsen towards internet users and the results shows that most of the Malaysian internet users spend 20 hours a week online in average. 53% of the respondents go online everyday meanwhile 35% go online on weekly basis. 63% use internet for information, and 94%, which is majority of the internet users, use internet as shopping guideline.

Based on the research made by FRS (Financial Reporting Standards) in the year 2009, it clearly shows that the usage of price comparison website divided into two types of users; those who really searching for the best deal possible and the other one are consumers that are simply looking for a convenient and time saving way to get a quote. The ‘Modern Sophisticate’ are serial switchers and more likely to use several comparison websites for research meanwhile the ‘Convenience Seekers’ are more likely to be loyal to single price comparison site. More people are using price comparison website as their reference to check on the price compared to the users that trusting the website. Please refer the figure below.

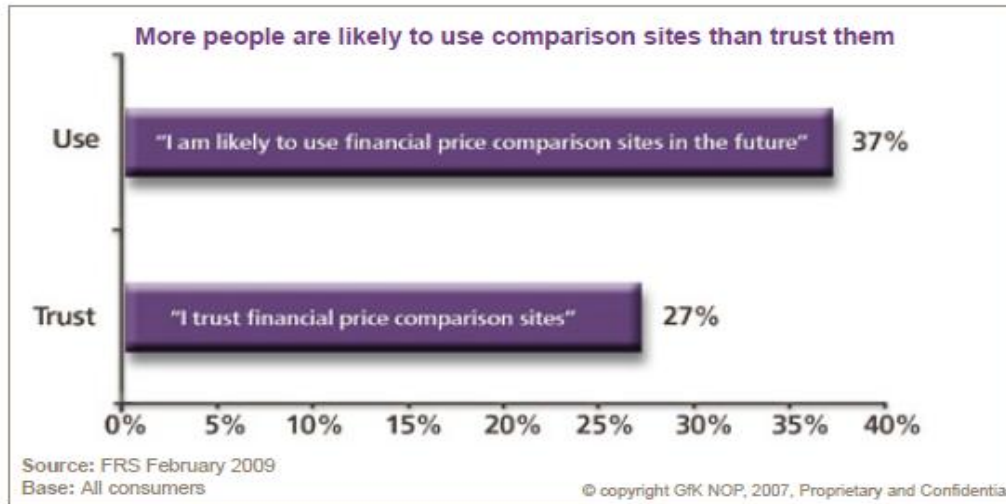


Figure 2: More People Are Likely to Use Comparison Sites than Trust Them
(Source: FRS – February, 2009)

As what has been mention earlier, a price comparison website act as the medium between customers and retailers so customers can make purchase online for certain retailers that provide such services. On the other words, the price comparison website also has the role to promote the retailer/shop/hypermarket/supermarket to the customers. The pressures on time and money especially in the current economic situation where the living cost increases and there's only little time to do some shopping for household, a price comparison website like PriceWar.com will absolutely become a great help towards consumers. Besides, users nowadays are very comfortable with the internet that it has grown a wider variety of applications from networking and now provide various references for the users.

1.2 PROBLEM STATEMENT

Compared to other countries, in Malaysia there is only few price comparison website that is accessible until now. Most of them is comparing price for hotel's rate, holiday's package, mobile phone and others.

It is important for a web comparison website to return results with the low prices as what the customers want but accurate results also important so that customers can get what they really want. It also depends on how regular the database is being updated otherwise customers will be confused when they compared it from other site.

Most of the working people do not have time to do shopping for their home groceries. As consumers, they have the right to choose which shop is offering the best price for a certain products that they are interested in. However, to check on price offered by each shop is time consuming and due to limited time that they have, they are not able to compare the prices and end up buying certain product with higher price. Typical mindset of customers nowadays, they see Tesco as the providers for the cheapest product but the reality is, not every products in Tesco offered at the cheapest price. Sometimes, the smaller shop in the neighbourhood offer cheaper price.

The other problem that occurs to the retailers/seller side, in order for them to promote their products or if there is any promotion going on, usually they will print out pamphlet to distribute it to the customers. It is costly as they have to produce it in lots of copies and if there is any error in the printed pamphlet, they have to make correction on every copy, which is time consuming, so that customers will not confuse with the pricing. Plus, the catalogue or pamphlets given to customers usually end up being thrown away carelessly and it lead to pollution. Therefore, by having catalogue that published online the sellers will be able to save cost and support the green campaign too.

Moreover, for the sellers/retailers who are operating with the small shops, they usually don't have the knowledge to blogging and website to promote their products online. As compared to the big supermarket like Giant or Tesco that have their own website, owners of the small shops found it is hard for them to reach out their customers. They do have the basic knowledge about internet but they do not have the skills to have blog/website for their shops. So, this project will be beneficial for them to get people know about them and their products.

1.3 OBJECTIVES

The objective of this project is to develop a price comparison website that will have the following functions:

1. To provide customers with a list of price comparison and highlight the cheapest price specifically in home groceries products.
2. To increase price consciousness among consumers.
3. To ensure that the price database is updated regularly so that customers will be able to get accurate results.
4. To provide service for users to find the product's price.
5. To provide platform for retailers to promote their products and promotion for free.

1.4 SCOPE OF STUDY

The scope of study for this PriceWar.com project will be all internet users and it is narrowed down to those who are using internet for business-related purpose, especially in Malaysia. Humanwebsite.com has provided a statistic for the Malaysian online shopping based on the number of internet users and the internet buyers. Refer to the figure below for the comparison of internet users and the internet buyers.

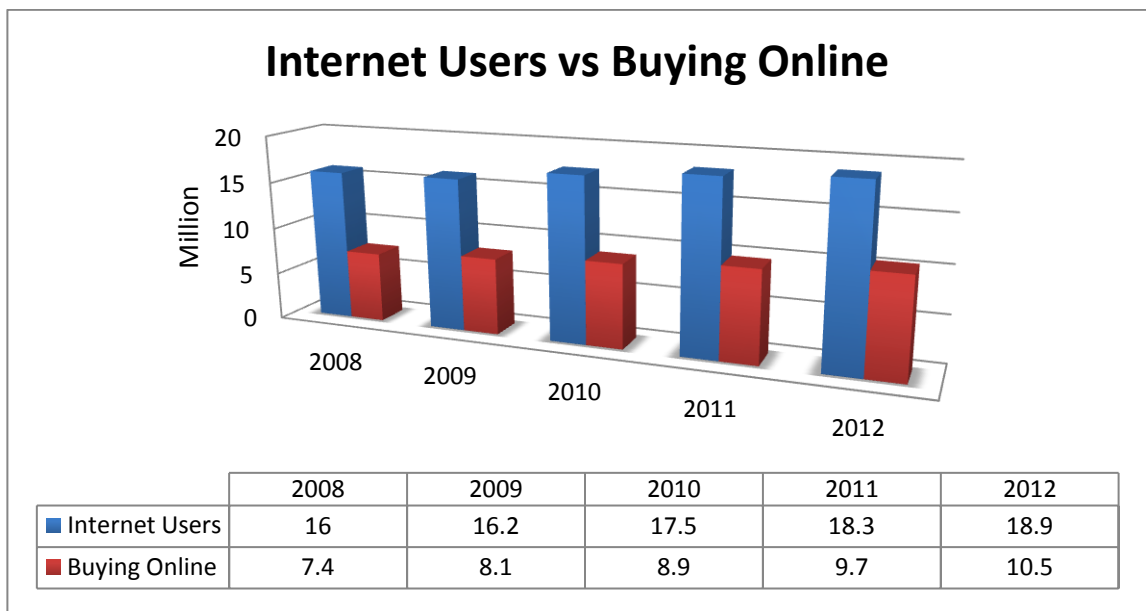


Figure 3: Statistics on Malaysian Online Shopping
(Source: Malaysiacrunch.com, 2012)

This statistic has been published in the local Chinese newspaper, Oriental Daily News. Based on the statistic, it shows that the number of internet users increasing every year as well as the internet buyer which means every single of them is the potential visitor of PriceWar.com. For a price comparison website like PriceWar.com, it only provides with the useful information to the users and it is up to the users to decide which supermarket or shop they should go.

With internet, a price comparison website is accessible anytime and anywhere. The observation made by the author has resulted that people usually go online when they are on the way back from work especially those who are using public transport. Therefore, visiting PriceWar.com can be one of their choices to fill up their free time. They also can share the link of the promotion through social website such as Facebook and Twitter which has the 90% of the Malaysian internet users according to the research made by We Are Social in December 2011.

Meanwhile for the sellers/retailers, the target will be focusing more on the business that operating at the shop lot. Based on the interview done by the author with some of the owners of the shops, they admit that it will be useful for them if there is service for them to advertise their products on the web for free because they don't have much time and insufficient skills to maintain website/blog on their own.

1.5 SIGNIFICANCE OF THE PROJECT

PriceWar.com act as tool to assist consumers make informed decision before purchasing product by providing the list of prices offered by different retailers/supermarket. Users will use this website as their reference to check on the price of groceries products sold and promote if there is any promotion going on. It also able to help sellers to promote new product by sending emails to the subscribers about it.

Instead of taking hours and energy to go to each shops just want to check on the price, PriceWar.com offered better solution by getting all the price and users just need to go online and choose which product they want to know and the list of retailers and the price offered will be shown. Users can check it from anywhere, no matter at home or at work, or even in the train while going back from work, PriceWar.com is accessible anytime as long as there is internet connection.

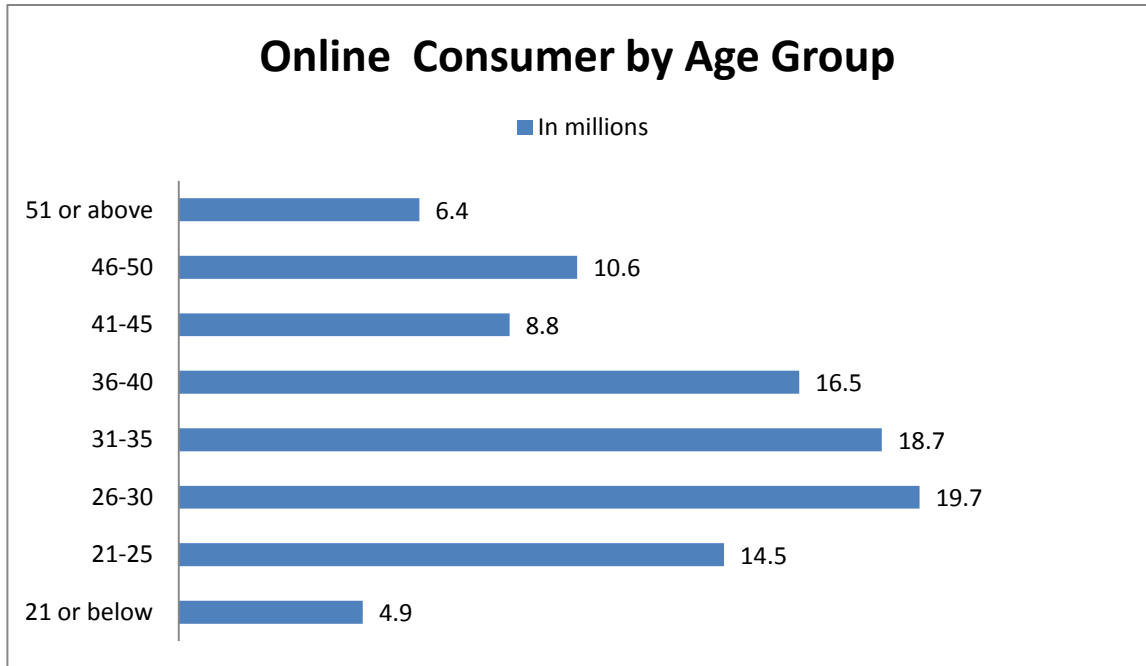


Figure 4: Online Consumer by Age Group
(Source: *Malysiacrunch.com, 2012*)

Based on statistics from Malaysia Crunch’s website, most of the consumers who online are contributed by the working adults in the age group of 21 to 40. Meanwhile 60% of online consumers are working as managers or executives and about 13% are students. It shows that most of the working people spend time on the net so a website that provides useful information to help them shopping.

A study was conducted by comScore, co-sponsored by Searchandise Commerce and iProspect, resulted as the following;

- Shoppers usually consulted about four websites for price and feature information (on average)

- Amongst all consumers who are purchasing products offline, roughly two-thirds begin their searches online, using a combination of search website and the retailer's own web site.
- 70% of shoppers make purchases within one month of their searching from the internet and one-third of the shoppers buy within one week of starting their searches.

It is clearly shown that online search has clearly become the norm nowadays and most of the customers out there has become more educated and knows how to use the internet. Therefore, it is significance to develop a system that provides information needed for consumers shopping. The development of PriceWar.com will help consumers to increase their price consciousness, help them making informed decision to save money as well as help the sellers to advertise for free.

1.6 FEASIBILITY STUDY

Feasibility study is an analysis of the viability idea. The studies provide thorough analysis of the system. The outcome of the feasibility studies will indicate whether can proceed or not to develop the system.

1.6.1 Technical Feasibility

The tools that will use for this system are:

- HTML as the main development platform. This HTML will connected with PHP language
- MySQL as database platform
- Another language such as CSS and javaScript

1.6.2 Operational Feasibility

This feasibility study mainly concerned whether this system will be used if it is developed and implemented. If this system meets the requirements and needs of customers and sellers, it can be proposed to them to be used in the future.

CHAPTER 2

LITERATURE REVIEW

2.1 OVERVIEW

In order to make this project more credible, previous research and article that related to price comparison website has been gathered and analyzed. Hence, this chapter covers the literature review which is the analytical, critical and objective review of written materials. There are three published research articles and journals that are being used as the main references for the literature review of this project. Each is be further describes in part **2.2**, **2.3** and **2.4**.

2.2 COMPARISON SITES

This research paper was written by Moraga-Gonzalez J.L and Wildenbeest M.R and it was published in July, 2011. The research was focus on the price comparison sites and its connotation towards market efficiency and price competition. The price comparison sites attract all the involved parties no matter suppliers or the consumers to its platform as it has become the aggregator of product information.

Nowadays people usually conduct first research on the internet regarding a particular product or service that they want which is very convenient as compared to what consumers have to do previously when there is no internet. Back then, consumers have to go through books, magazines, newspaper, encyclopedia and other medium to find needed information meanwhile yellow pages, directories, advertisements and others are useful to locate business and their products. Everything has to be done manually and

requires a lot of time, energy and resources to find information without the help of internet. Comparison sites are known as the second type of search technologies as it helps users find products and services according to users' have chosen. It helps consumers to easily compare between the alternatives available in the market and reduce consumer search costs at the same time.

Compared to the price comparison site from its first being established and act as online classifieds, nowadays comparison sites able to do a lot of things such as draw the products' cost, able to trawl sites and give the sites much greater control over the users with the help of current technology. It gathers and aggregate price, products and other relevant information from third-party sellers and presents it to the consumers with its own way.

There are several business models usually used by the price comparison website and the most widely implemented is the charge will be on the sellers if they want to be listed and users can access the sites for free. The fee usually based on a cost-per-click and is paid every time a consumer is referred to the seller's website from the comparison site. Sellers also have the alternative to pay fee if a consumer buys the product which is being implemented by Pricefight.com. Other than that is providing free services for both sellers and buyers and obtain revenue from the advertisers like what being practiced by Google Product Search. The less chosen business model is the sellers are listed for free meanwhile membership fee is charged towards the consumers such as AngeList.com. Whatever model is being used, the most important thing is the agreement from the both sides on the chosen model.

Based on the business models explanation, the most suitable business model for PriceWar.com is the one that providing free services for both users and retailers and the revenues will be obtained from the advertisers who wants to advertise with PriceWar.com. The free services will attract more people to use PriceWar.com because it is free and when more people is using PriceWar.com, the online traffic will be increased as well. The high traffic will attract advertisers to advertise with PriceWar.com. By choosing the intermediation fees carefully to out-compete the search market, a price comparison site will be able to stay in business for a long run. Based on studies made by Yavas (1994), the intermediary such as comparison site will be able to obtain profit by attracting high valuation sellers and low valuation buyers.

Comparison sites have the potential in providing abundant of data that might be useful for further analysis for example, analyze how exactly consumers search for products and provide indications about the best way to improve the current system.

2.3 THE USE OF PRICE COMPARISON SITES

The research entitled ‘The Use of Price Comparison Sites in the UK General Insurance Market’ which written by Emily Knight, a strategist for Consumer Intelligence has reported the current performance, media coverage, usage and marketing activity of price comparison sites in the UK General Insurance sector.

The results shows that there is increased on the advertising spend and competition and it gives adverse effect on the financial performance towards the price comparison sites. Meanwhile the number of consumers using price comparison sites for quotes has remains high and its average number of sites used are increasing over time. Based on the research, 8 out of 10 people are likely to get quotes from the price comparison sites in the future which show good sign of price comparison sites to stay in business in future.

To compete with other brands through the internet, big brands usually have to face big advertising spends. Based on Nielsen advertising data, back in 2006 it requires £35m has increased to £85m in 2009. The amount of spend needed to compete with the big player with the big name has make it tough for other competitors unless they have a good marketing budget. Some of the comparison sites have launched various campaigns to promote their sites and get more traffic for example ‘*Compare the Market*’ that creates a personality designed to appeal to consumers and improve their impression towards the brand at the same time increase its web traffic and boost conversion rates.

2.4 CONSUMERS PLAN MORE WEB RESEARCH BEFORE BUYING

This article was written by Reuther T. – Senior Editor of internetretailer.com, a portal related to e commerce. It is based on the findings of a survey made by Deloitte LLP, concludes that a fifth of online consumers plan to conduct more web research this year (2012) as compared to year 2011 before buying. Deloitte LLP, a consulting, auditing and financial services firm, has conducted the online survey on 5-12 July 2012 towards 1, 314 parents of children in kindergarten through the 12th grade. Around 20% of the survey respondents plan to shop online this year but the web is playing the important role in giving influence for the purchases either it is done online or offline (going to the shop to purchase). The result shows that a third of the parents who responded plan to visit e-commerce sites, retail blogs and other web locations to learn before buying the items.

Not only that, the survey also resulted that 57% of the respondents owned smart phones and use it as shopping tools for seeking price information with 63%, getting coupons and discounts with 45%, and finding store locations with 38% were among the most popular mobile shopping activities. From this result, it shows that there is big number of people who are using smart phone to check on the price information of a certain product. Therefore, based on this article, it can be conclude that most of the customers, as well as potential customers of a product will make some research online before making a purchase.

CHAPTER 3

METHODOLOGY

3.1 OVERVIEW

This chapter includes the research methodology, tools required for developing the system, key milestones, and the Gantt chart for the project.

3.2 RESEARCH METHODOLOGY

3.2.1 Stage 1: Project Planning

This is the stage where the problem related to the project is identified and the significance of the study is determined. The objective and also scope of study are outlined and the feasibility of the project work is ensured to be developed within the time frame given. The solution to the problem statement is studied and the types of system to be develop and tools used for developing the system are also identified through literature reviews.

3.2.2 Stage 2: Data Gathering and Analysis

Series of studies has been performed to gain further knowledge on the energy and electricity consumption. Also, readings was done to get better understanding on what comparison site is all about, how it helps people to solve problem before buying home groceries product, and example of existing comparison sites to check on the competitors. The data regarding previous researches are gained

from research papers written by scholars and have been explained in details in the literature review section earlier. Meanwhile the data regarding consumers were obtained through survey and interview that made online as well as meeting the respondents (shop owners in Perak's area) face to face.

3.2.3 Stage 3: Research on any Existing Similar Systems

Next is the study performed to check if any similar system exists. The main objective of doing research on similar existing system is to know how it works, what concept is being applied in the system, what is being computed by the system and how the system helps solving the problem.

3.2.4 Stage 4: Drafting the Main Components of the System

After the research on similar existing systems, the next step needed is to identify what will be the main component that made up the system to be developed. In order for the visitors of this website to use its services, they have to register with their basic information such as name, email, etc. The registered users will be subscribed automatically to this website's newsletter. The users shall be able to choose product and related information will be displayed. Other than that, users may add favorite products into their profile so the latest price for the favorite items will be sent personally to the user other than daily mail regarding the promotion for the day. Therefore user will be able to get directly the information that they are interested in. The main components of this system are:

- Database to store products and users' information
- User able to search the product that they are interested in

3.2.5 Stage 5: Develop System Architecture

The next phase to develop the architecture on how the system will work. This will give the clear picture and understanding on how the system will operate and to avoid developing a system that does not solve the problem it intended to solve.

Registered Users

The website requires visitors to sign up before they can use the functions in the website. The registered users will have personal accounts on this website and they may login using their username and password. The actions that registered users can do with this website are;

- Login to the website
- Able to edit profile
- Newsletter subscription
- Search groceries products
- View promotion and sales
- Compare prices

Admin

The admin of this website will be responsible to maintain both website and the database. The roles of admin for this website are;

- Receive price lists from sellers
- Update database regularly
- Maintenance of website content and functionality

- Maintain web servers and website
- Manage advertisements regarding sales and promotion from the sellers
- Write report and analyze website user statistics

Sellers/Retailers

Any parties that would like to join and become partner with PriceWar.com. Their roles are to submit the price lists to the admin of PriceWar.com. They are also responsible to inform the admin if they want to advertise the new products and also if there are sales and promotion being held at the shop.



Figure 5: System Architecture Design

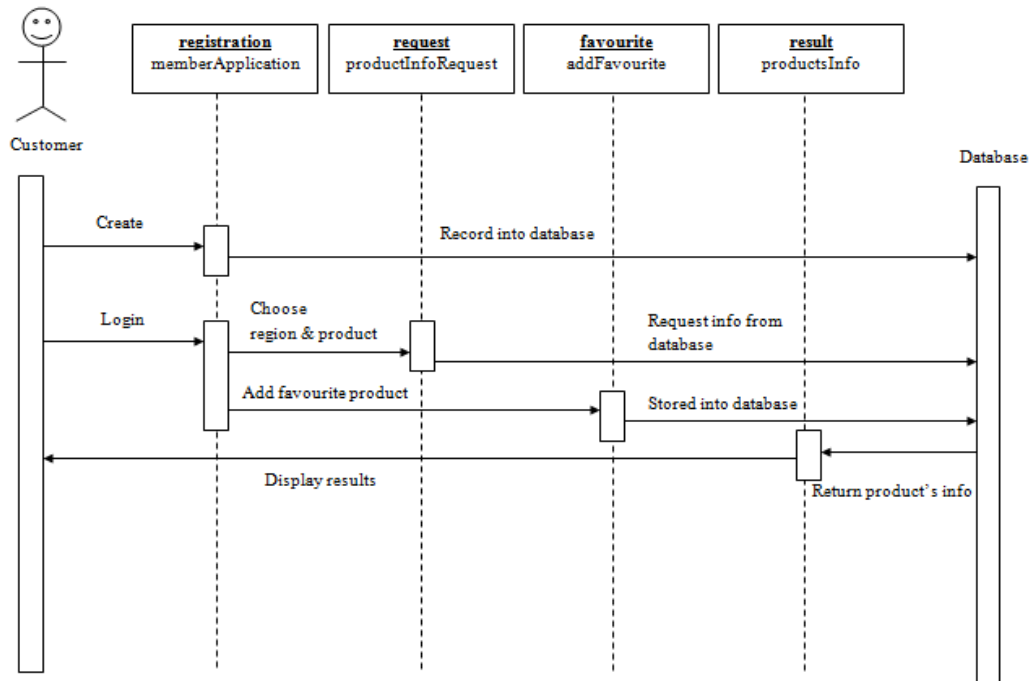


Figure 6: UML - Use Case Diagram

3.2.6 Stage 6: Sketching the Interface of the System

Once all the functions performed by the system are identified, the last step is to design the interface of the system. Developing the interface of the system will make it easier for the system to be developed during the development phase.

3.3 PROJECT DEVELOPMENT METHODOLOGY

Considering the time constraints to complete this project on time, the most suitable methodology is the Rapid Application Development (RAD) method. There is a set of management techniques that are optimized for speed in RAD which are;

- Prototyping - which is an approach based on creating a demonstrable result as early as possible and do refinements based on how the prototype works, whether it returns the desired result or not.
- Iteration – which is the incremental development based on refinement.

This project requires a rapid prototyping which will involve methods like iterative development and software prototyping. This methodology is also chosen due to the possibility if there might be functionality and performance compromising so the process of fixing the problems will be done promptly. The benefits of using this methodology is it allows any changes to be made during the development phase if there is needs to review and recheck at any other phase of project development. This is important as it provides flexibility throughout completing the project such as debugging process.

There are four main phases in RAD which are analysis and quick design, prototyping cycles, testing and implementation phase.

3.3.1 Design analysis

This phase has been covered up during the FYPI whereby the process of defining goals into defined functions and operation of the intended web system were being done. The designs of the website including its layout, process diagrams and other documentations also included in this phase.

Basic layout for PriceWar.com has four main menus which are “About Us”- this page will basically have the information regarding the website and its functionality. Next is “Let’s Make a Deal” page that will bring users to the website’s main function which is users will be able to search the home groceries product that after users have chosen which region that the users wanted to know. Then the website will check on the database and retrieve the information needed and it will give return results of the shops offering the products along with the location of the shops sorted according to the cheapest price. However, this

function requires member's login therefore users need to create an account first and login to this website before they can use the website's functions. "Testimonial" page will show the comments from the users that are satisfied with the service provided by this website meanwhile the "Contact Us" page will provide contact information of the website's admin in order for users who wants to give further enquiries regarding the system as well as for the sellers that want to join in advertising with PriceWar.com.

3.3.2 Prototyping development

This phase consists of 3 main categories namely; build, demonstrate and refine. These 3 steps is performed in cycle order, where its starts with building the system. The development of the system began and is performed part by part. The website was developed starting from the HTML according to the designated layout for its main interface. Then, the HTML will be connected with PHP language and the MySQL as the database to store all the information especially the products' information. Each completed part is then demonstrated to check for its functionality. The results should be matched with the expected results whereby the information will be filtered according to the location chosen by users and it needs to be sorted according to its price with the cheapest will be at the top. If there are any requirements or new functionality being identified, the system will be refined, where the building process will start again from where it has initially completed. These 3 steps cycles after one another until its functionality achieve satisfaction.

3.3.3 Testing Phase

This phase checks for errors, bugs and functionality of the website. There are five types of testing which are; regression test, internal testing, unit testing, application testing and stress testing.

Regression test will focus on the following;

Focus	Purpose
Internal	Make sure all internal's components work well
Unit	Make sure all customers' components work well
Application	Make sure the system can complete all scenarios

Table 1: Regression Test

Internal testing get the every function or component being tested which also called as white-box testing because all details are visible to the test. Meanwhile unit testing tests the interaction of many functions but impound the test within one unit which also known as black-box testing because it focused on the details of the interface that visible to the test. Next is the application testing that deals with the entire system. The project is ready for implementation after pass all of these tests.

Test No	Type of System Testing	Purpose	Status
1	Black Box testing	To test for system requirement and functionality without considering the internal architecture of the system.	Passed
2	White Box Testing	To test for internal functionality of the system. This testing included the coding of the system.	Passed
3	Unit Testing	To test for the functionality of each separated system page.	Passed
4	Acceptance Testing	To ensure the system is completed and performed as requested by user.	Passed
5	Functional Testing	To ensure the system able to performed all its intended functionality.	Passed
6	Usability Testing	To ensure the system is understandable and can be easily used by the user	Passed
7	Integration Testing	To verify that all different part of the system pages can integrate with each other and function with no error	Passed

Table 2: Type of System Testing

3.3.4 Implementation Phase

After all the testing performed is completed and passed, the system is ready for the implementation. The PriceWar.com has received a positive response and will be considered to be used soon. This is the final phase of the system development and hence, the system is expected to be fully functioning as it intended for.

Figure 7 below shows the RAD cycle used in developing this website.

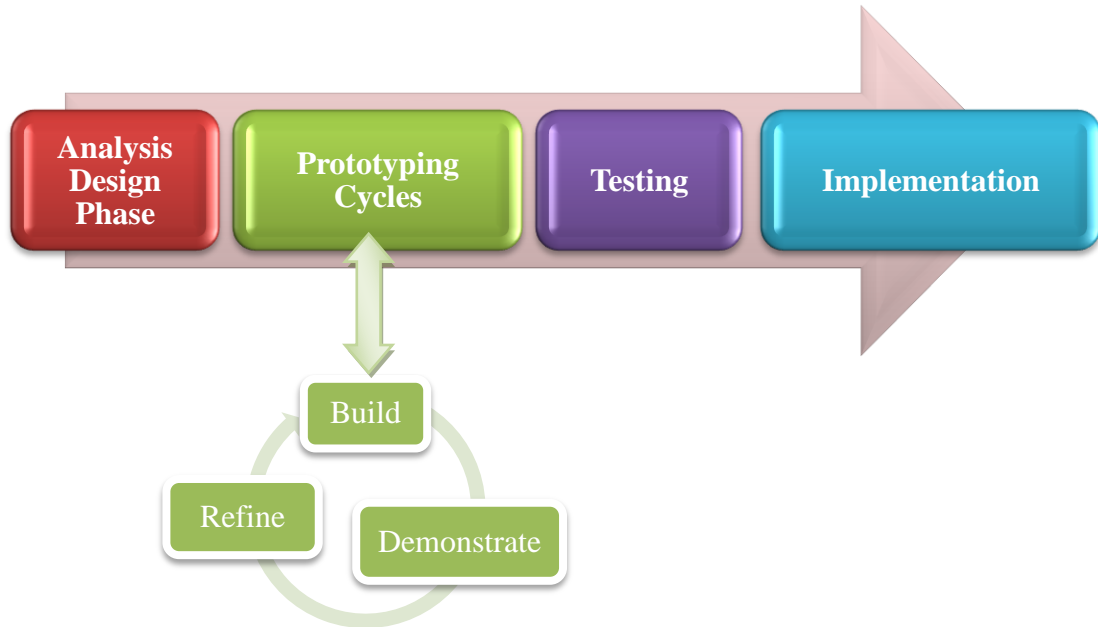


Figure 7: Rapid Application Development Cycle

3.4 TOOLS REQUIRED

3.4.1 Hardware

- Personal computers (laptop)

3.4.2 Software

- Wamp Server

According to Wikipedia, Wamp is a free and open source cross-platform web server solution stack package, consisting mainly of the Apache HTTP Server, MySQL database, and interpreters for scripts written in the

PHP and Perl programming languages. With Wamp, it will be easier to set up and manage the local web server created. The process of testing scripts, programming and others can be done easily with Wamp, thus it helps the process of developing 'PriceWar.com'.

By having a local web server, developers will be able to test out stuff on the local computer without need to wait all the files to be uploaded to the webhost. Thus, if there's any changes that need to be done, there's no need to re-upload the files again. Besides that, developers also have full access and flexibility to set and change the variables being used. The status of Apache and MySQL can be checked from Wamp control panel.

- Macromedia Dreamweaver 8
- MySQL – store database
- Webhost – to host domain and web pages

3.5 KEY MILESTONES

Week	FYPH Activities	Date
2-14	Regular Meeting with Supervisor	-
3-10	Project Development	-
4	Progress Report Submission	10 th October, Wed
4	Talk by Intel	10 th October, Wed
7	Prototype Demo with Supervisor	29 th October – 2 nd November
11	Submission of Dissertation	26 th November, Mon
11	Pre-EDX	28 th November, Wed
12	Viva	5 th December, Wed
14	Submission of Final Dissertation	19 th December, Wed

Table 3: Key Milestones FYPH

3.6 GANTT CHART FOR FYP II – PRICE COMPARISON WEBSITE

Table 4: Gantt Chart FYPII

No.	Detail/Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Regular Meeting with Supervisor		■	■	■	■	■	■	■	■	■	■	■	■	■
2	Project Development		■	■	■	■	■	■	■	■	■				
3	Submission of Progress Report				■										
4	Prototype Demo with Supervisor							■			■	■			
5	Pre-SEDEX and Poster Presentation											■			
6	Submission of Dissertation											■			
7	Viva Presentation												■		
8	Submission of Final Dissertation														■
9	Submission of Technical Paper														■

CHAPTER 4

RESULTS AND DISCUSSION

4.1 OVERVIEW

The results and discussion regarding this project will be explained and discussed in details in this section. This section will cover the IPO (Input, Process, Output) Diagram, the Process Flow Diagram, the Interface Design of PriceWar.com, the Sample of Search's Results, and Survey's Results analysis.

4.2 IPO (Input, Process, Output) Diagram

IPO diagram represent a process by demonstrating the relationships between input and output elements which also known as 'factors' and 'responses' respectively. It is very useful to define a process as an activity that transforms inputs in order to generate corresponding outputs. Refer the figure below for PriceWar.com's IPO diagram.

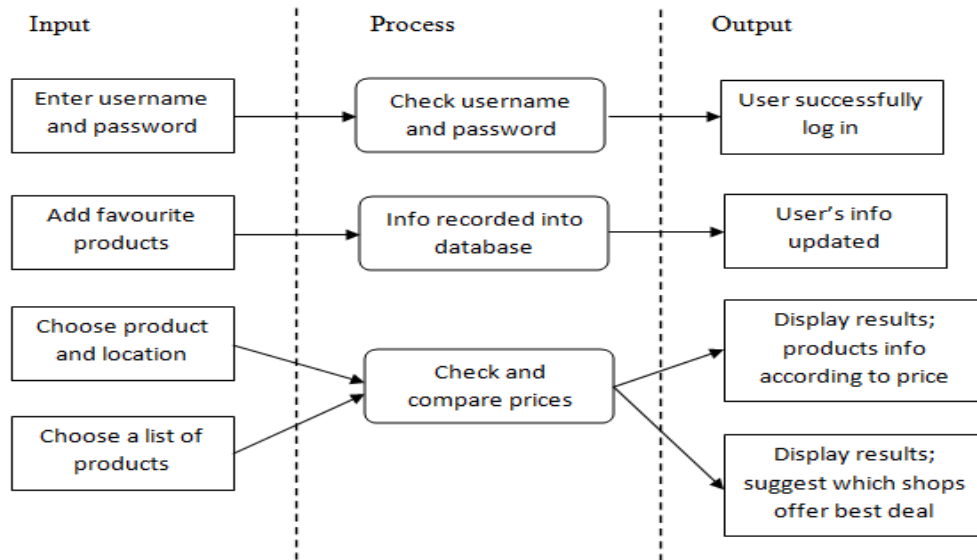


Figure 8: IPO Diagram

4.3 PROCESS FLOW DIAGRAM

According to book *Implementing Six Sigma and Lean – a Practical Guide to Tools and Techniques* written by Ron Basu, the definition of flow chart is a visual representation of all major steps in a process which helps people to understand a process better by providing the actual flow or sequence of events in a process. Please refer figure below for PriceWar.com's flow diagram.

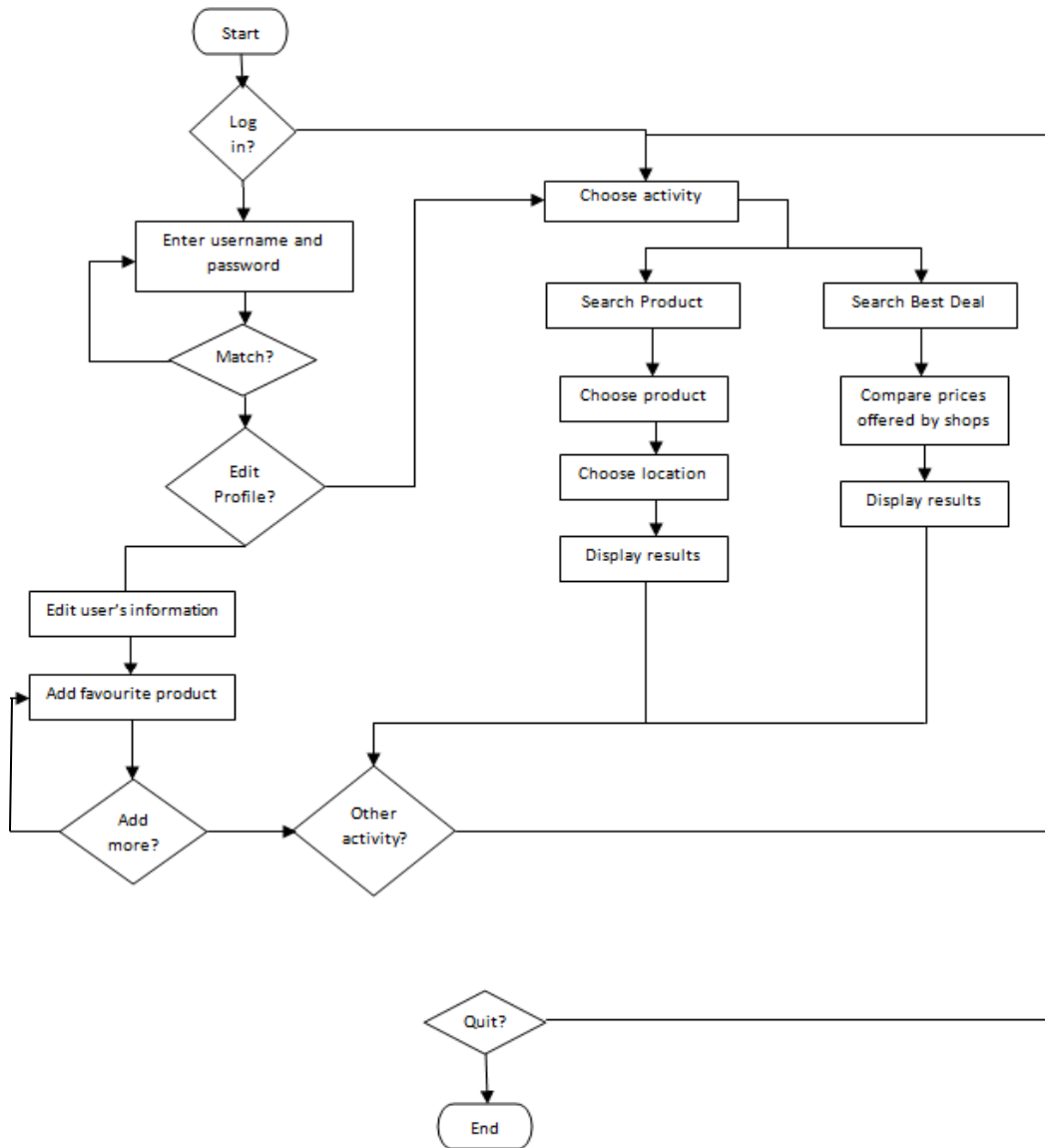


Figure 9: Process Flow Diagram

4.4 INTERFACE DESIGN

PriceWar.com is focus on groceries products; such as chicken, prawn, fruits, cooking oil etc. The interface design of PriceWar.com is simple and easy to use. It is because, the target market for this website is focus on working people who are busy to find information about groceries current price and offers, if available. Therefore, by developing a website that is easy to use to find information will help them to find the info they needed faster. Every piece of information will be shown clearly to avoid confusion. Visitors of PriceWar.com will have to register membership so that they will be able to sign in every time they visit PriceWar.com to use its services.

Visitors of PriceWar.com will be able to search desire product from the list. Once the product has been chosen, user is required to choose location to narrow down the search. In return, a list of shops who are selling that particular product will be displayed with their price. The list will be sorted from the cheapest offer, so that it will be easier for user to see which shop offer the best deal.

Users also will be able to check on the current promotion. For example they are 5 products that are going on promotion; user may click on one of the products to view more details regarding the product's information. It will display on the name of the shop, the location of the shop as well as the promotional price offered by that particular shop. This information will be provided by the sellers/retailers to admin of the website.

Registered users will be able to add a list of their favorite products to their account. Whenever there is promotion regarding these products, that particular user will receive email notification regarding the sales of the products. In the future, registered users also will be offered with special discount upon signing up with PriceWar.com. Users' information is useful for the promotional purpose. If there's sales going on or a new product is being launched, all users will receive newsletter so that they will not miss it.

4.5 SAMPLE OF SEARCH'S RESULTS

The desired outcome of the system will be shown in this section. Whenever a product is chosen, the website should return a list of shops that offers that particular product. The result returned the name of the shops, the location of the shops and the price. This information will be sorted with the cheapest price at the top of the list.



The screenshot shows the 'express Groceries' website interface. At the top, there is a navigation bar with links for HOME, ABOUT US, PRICE CHECK, ON SALE!, TESTIMONIALS, CONTACT US, and LOGOUT. A 'let's deal' tag is visible in the top right corner. The main content area displays the search results for 'CHICKEN' in Kuala Lumpur. An image of a whole chicken is shown above a table of results. The table is highlighted with a red border and contains the following data:

Shop	Location	Price
Pasaraya Hero	Seksyen 6 Wangsa Maju, Bt14 Kg, Baharu Puchong, Bandar Sri Permaisuri Cheras, TTDL, Alam Megah Shah Alam	RM4.00 per kg
Pasaraya NSK	Wangsa Maju, Selayang	RM4.60 per kg
Tesco	Setia Alam, Shah Alam, Puchong, Mutiara Damansara, Selayang, Cheras	RM6.60 per kg
Giant	Setiawangsa, Desa Petaling, Pandan Kapital, Damansara Town, Sungai Wang	RM8.00 per kg

Figure 10: Sample of search's result

4.6 SURVEY'S and INTERVIEW RESULTS

A survey and interview has been conducted to identify how frequent people do home groceries shopping and what factors affected their decision in making purchase. Target respondents of this survey are consumer especially working people who are usually busy with their work. The result of this survey will support the significance of this project.

Question 1; “Who is responsible to do home groceries shopping for you?”

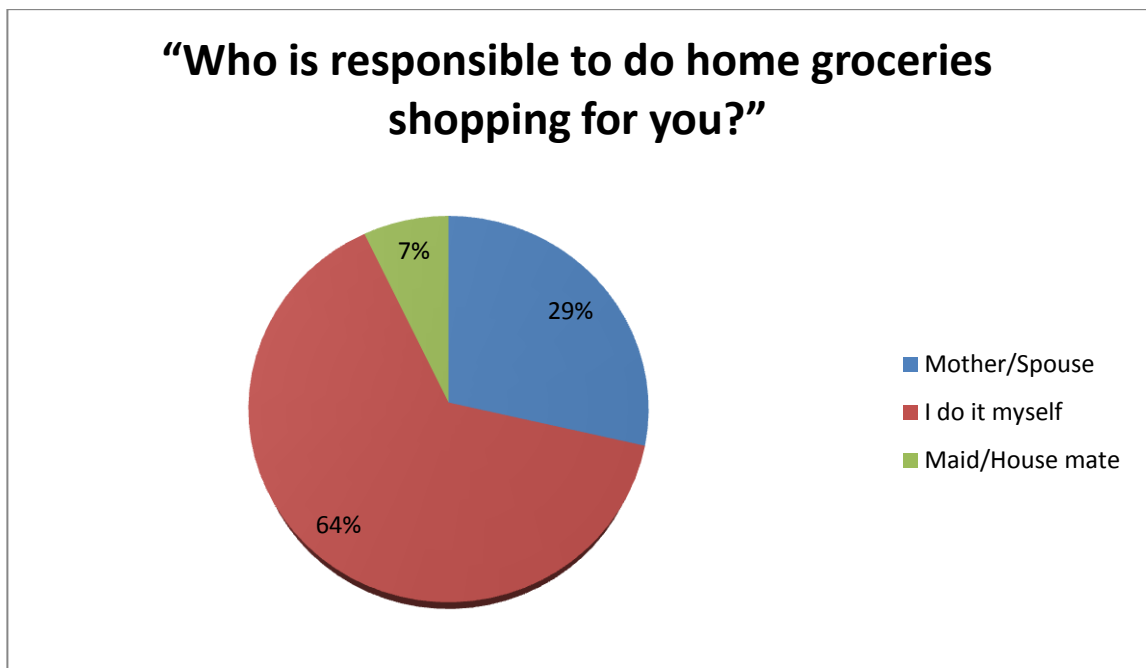


Figure 11: Question 1

Based on the response of this question, it shows that majority of the respondents do home groceries shopping by themselves even though they are busy with works, they have to do it every month.

Question 2; “**How frequent you/the person-in-charge do home groceries shopping in a month?**”

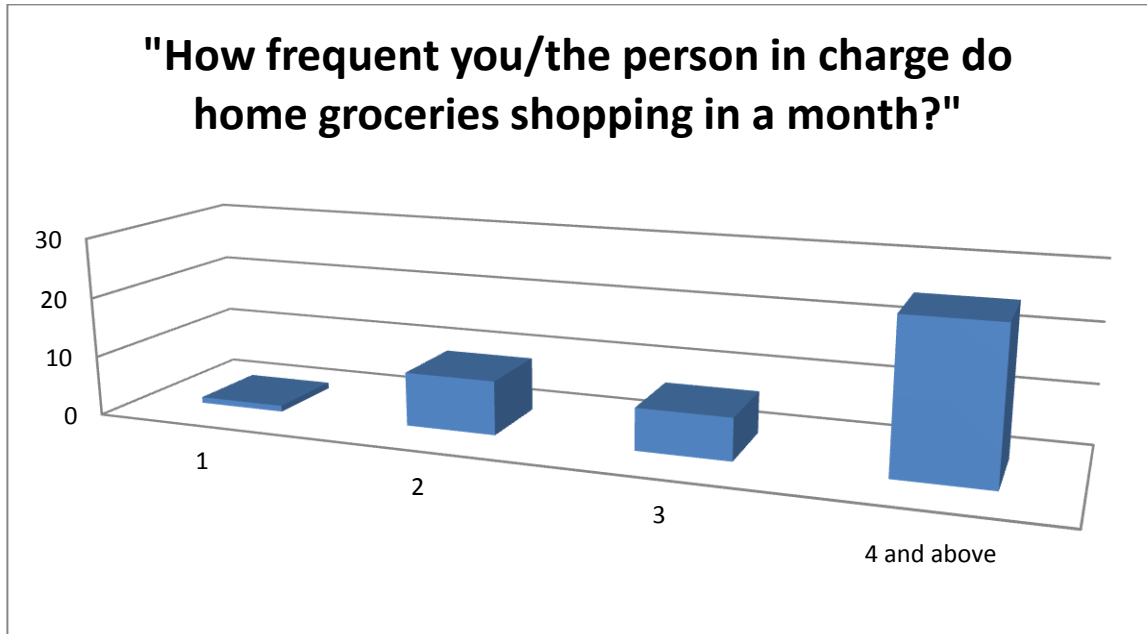


Figure 12: Question 2

Certain groceries products need to be stocked up frequently such as prawn, fish, chicken, and vegetables – raw materials to be cooked. Therefore, most of the respondents would go for home groceries shopping more than 4 times every month.

Question 3;“**When usually you/the person responsible go for home groceries shopping?**” (Respondents may choose more than one answer)

This question is asked to identify when is the time people usually go for groceries shopping. 35% of the respondents will go when there are sales or promotion going on. The author has interviewed respondents personally to identify what is the reason behind it and the respondents replied that they will get cheaper price during sales. Meanwhile 30% answers they would go whenever they are free. But if they are free during the

promotion, they will definitely go to the shops. Other than that, 20% of the respondents choose to go after work, and the other 15% would go during weekend. The results is represented in the chart below.

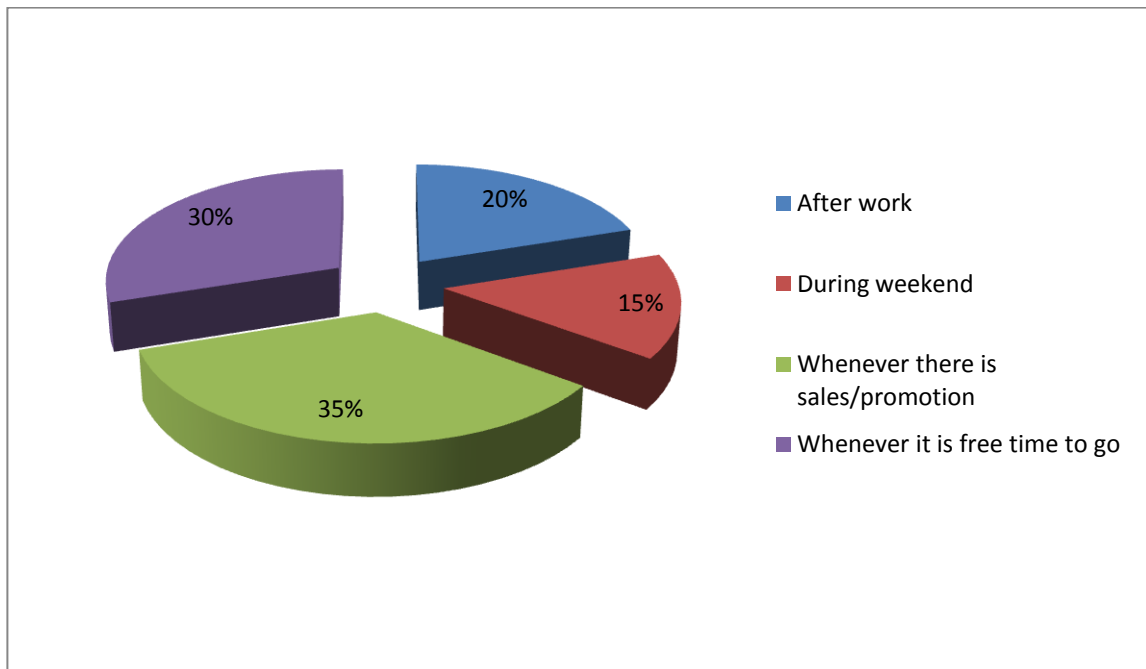


Figure 13: Question 3

Question 4; “Before making a purchase of home groceries products, did you compare the price with other shops?”

75% of the respondents reply ‘Yes’ to this question shows that consumers really concern about the price offered by the shops. It is among one of the most important factors that influence people to come and buy the products. Some of the supermarkets even make advertisement that they are offering cheaper price than its competitors.

Question 5; “Are you aware the current market price for the products that you want to buy?”

The result of this question will reflect the level of price consciousness among consumers. It turns up 69% of the respondents answered ‘No’ which means majority of the consumers out there have very low level of price consciousness. This may cause consumers were charge overpriced on the products they buy because they are not aware the latest market price of the products.

Question 6; “Has it occur to you, that you found products with cheaper price offered by different shops after you have bought it from other shop?”

Surprisingly, 100% of the respondents have experienced this situation and they answered ‘Yes’ to this question. This situation happened because not every product sold in a particular shop being sold at the cheapest price. For example, Tesco might offer cheapest price for tomatoes and potatoes but the price for watermelon is more expensive than Giant supermarket. Therefore, a price comparison website will help consumers to reduce the probability of this situation to happen again.

Question 7; “Do you regret your decision when you realize it?”

Based on the results, 56% of the respondents have regretted their decision to buy products that are more expensive than the other shops have offered. Meanwhile the rest of the respondent does not really care about it and they did not regret their decision.

Question 8; “Have you ever missed any sales/promotion before this?”

There are 92% of the respondents who admit that they have missed sales or promotion before this meanwhile 8% were not sure and answered ‘Maybe’. Some of the

respondents admit that they feel regret if they are late to know about the sales. Due to busy working life, most of the consumers will not be able to go to supermarket frequently thus; they might miss it if there is sales/promotion made by the shop. During sales and promotion, most of the products will have discount so consumers will be able to buy the products at much cheaper price.

Question 9; “Have you ever received any catalogue from shops informing you about sales and promotion going on?”

All of the respondents agree that they have received catalogue from shops informing there is sales and promotion going on. Based on the author’s interview with the respondents, the catalogue were distributed on the street, on the shops itself, and also delivered to each house in the housing area.

Question 10; “What did you do with it after you have checked the contents of the catalogue?”

There are three options to be chosen and 89% of the respondents have answered they throw it away. Only 11% keep the catalogue for other purpose such as they might want to refer it again in the future. Not a single person from the respondents has recycled the catalogue after received it. Based on the interview, the respondents add that they noticed irresponsible people who left the catalogue on the trolley and also left on the floor which is polluting the environment. Nowadays, there are some of the shopping malls provided virtual catalogues using QR code such as Tesco to support the go green campaign launched by the government. However, the QR code only available at the shop only which means, people can get it if they come to the shop so people will not be able to check on the prices beforehand.

Question 11; “In a scale of 1 to 5, identify the factors below that influence your decision in making purchase. With 1 being the most important factor. [Brand, Quality, Price, Promotion, Suggested Products]

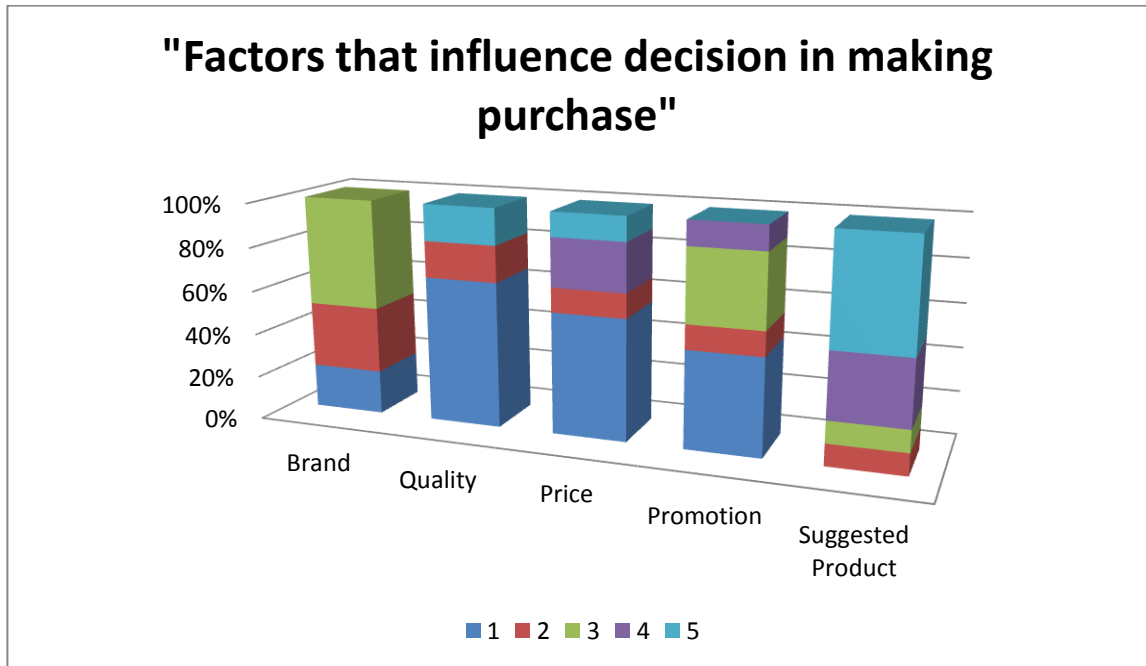


Figure 14: Question 11

Based on the results, the respondents have chosen ‘Quality’ as the most important factor that affect them to buy the product. It follows by ‘Price’, ‘Promotion’, ‘Brand’ and ‘Suggested products’. It shows that the quality of a product is very important than the brand itself.

Question 12; **“If there is a price comparison website specifically for home groceries products that allows you to check on the price offered by different shops and let you know if there are sales going on, would you like to use this kind of service?”**

Majority of the respondents answered ‘Yes’ with 92% of the total response meanwhile the other 8% answered ‘Maybe’. This result have shown that willingness of people to accept and use this kind of service to help them make decision wisely while shopping for home groceries products.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

This document comprises all details related to the project. The abstract, background and objectives can be considered as the overview of the project meanwhile the methodology part explains in details what is the suitable method chosen for this project to be completed. It is also important to get reference from the previous research paper that is related to the project. The literature review shows the research that has been done previously by other researchers. It is very important to get more knowledge in this topic in order to develop a successful and well functional price comparison website. More research needs to be done in order to get the desired results because different site uses its own formula to determine how, when and from where it gathers prices. Therefore, it is very important to get the correct way to retrieve the desired data according to what the user wants. In order to differentiate PriceWar.com with other comparison sites in Malaysia, this website will focus on the home groceries products to help people make informed decision before making purchase.

The website provides users with useful information that will help them making informed decision. With this price comparison website, it solves the problems of the working people to check on the price before buying groceries products. It provides platform for sellers to promote new products and advertise any promotion or sales going on.

5.2 RECOMMENDATION

It is recommended to have more research on this project and determine what can be improved from the existing comparison site. One of the functions that could be included into PriceWar.com is by allowing users to set price trigger alert where by customer will have the ability to set a certain price for a particular item, and once there is seller offers the price match with the parameter set by the user, PriceWar.com will send a notification alert through email saying that the product's current price has triggered the alert. This type of alert is widely being used by the sites that provide tools and guidance for stock exchange business. When the price of a certain stock has reached a certain value set by the user, it will trigger the alert and notify the user. Therefore user does not need to stay and watch the price movement all the time.

Other recommendation for the price comparison website is to be developed as mobile application for android or IOS phone. Extended function to be added is for the users can make order and purchase through this application by using Google wallet – a new product by Google that allows users to shop online, and there will be delivery services to the customer's house like what have been done by Tesco Homeplus in South Korea where they are using the concept of 'Let the Store Come to People'. Customers only have to scan the QR code of the products with their smart phone then the products will be automatically lands in the customer's online cart. When the purchase is done, the item will be delivered to the customer's house. This system helps the customers to shop easier just by using their smart phone.

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APPENDICES

USER INTERFACE



Figure 15: Login Interface



Figure 16: Home Interface

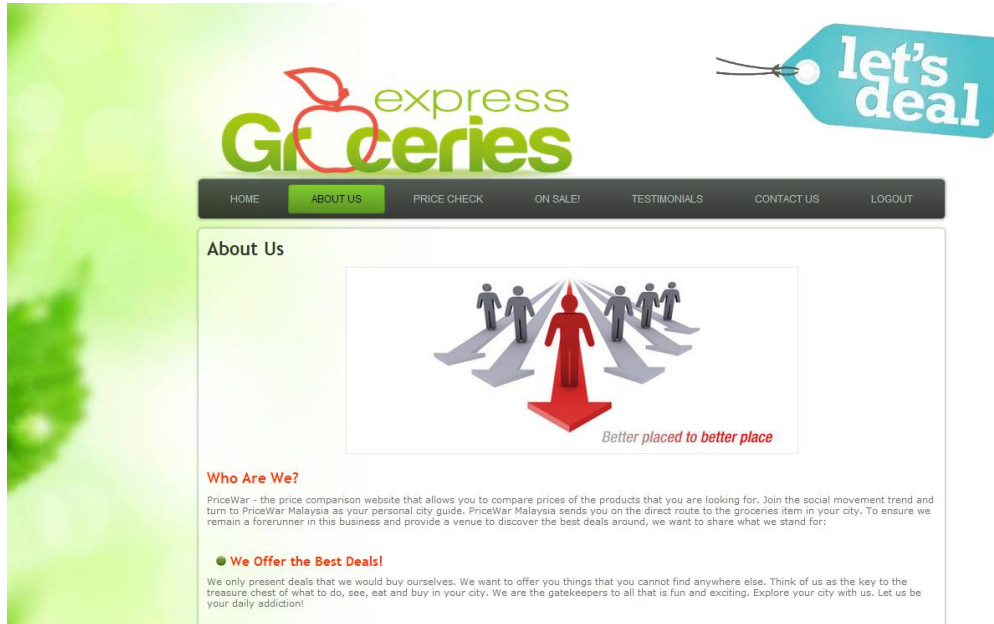


Figure 17: About Us Interface



Figure 18: Price Check Interface

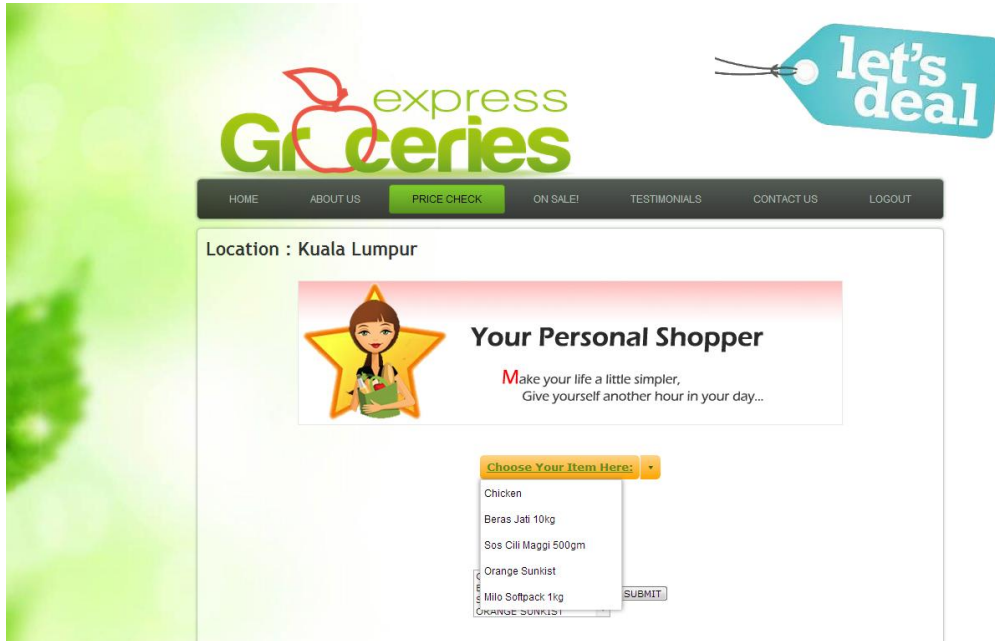


Figure 19: Choose Product Interface



Figure 20: Result Interface



Figure 21: On Sale Page Interface



Figure 22: Sale Info Interface

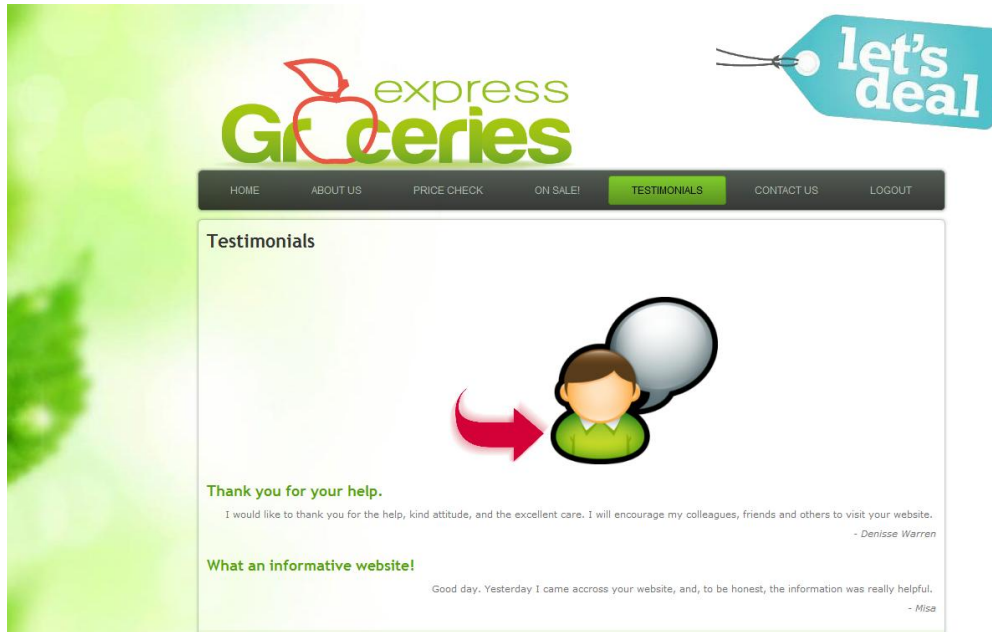


Figure 23: Testimonial Page Interface

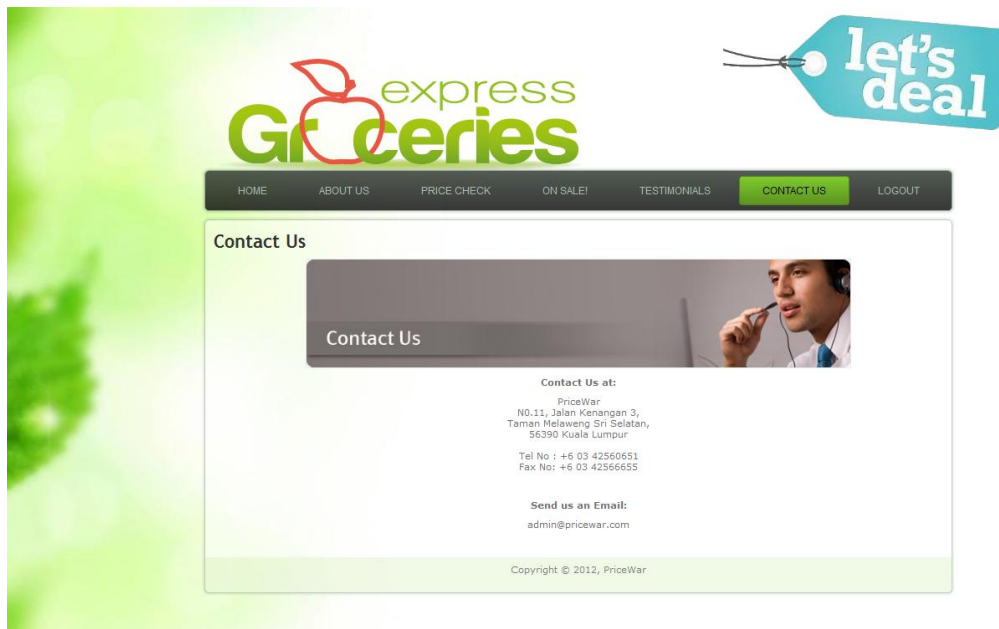


Figure 24: Contact Us Page Interface

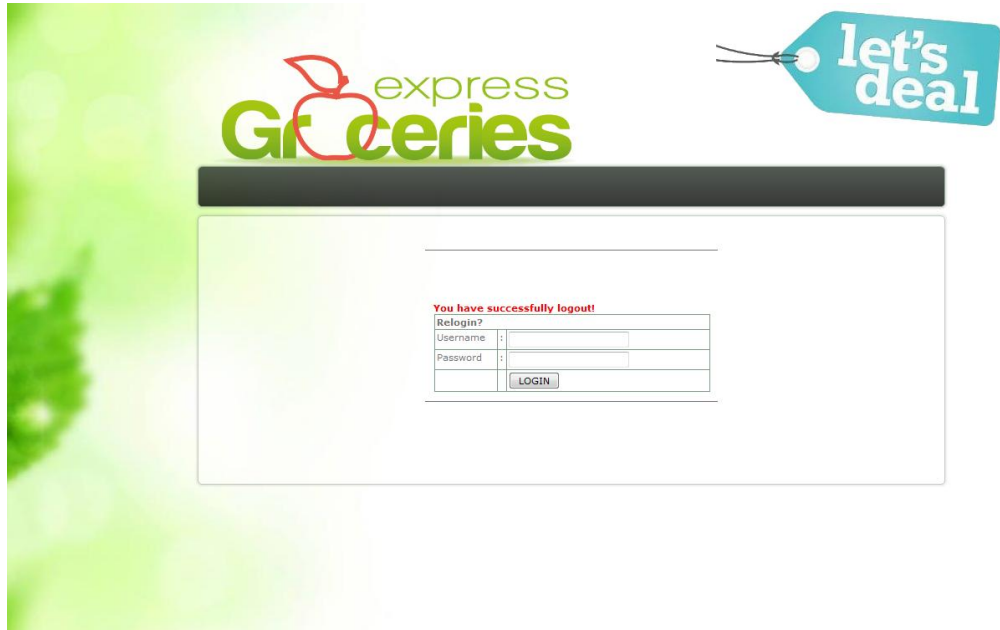



Figure 25: Logout Page

QUESTIONNAIRE



Home Groceries Shopping Behavior

Price awareness helps consumers to save more money in making purchases of home groceries products. However, the process of comparing prices offered by different shops takes time hence consumers might end up buying something that is overpriced. This survey is targeted for consumers especially working people to identify how frequent they do home groceries shopping and what factors affected their decision in making purchase.
* Required

Who is responsible to do home groceries shopping for you? *

Mother/Spouse
 Maid/House mate
 I do it myself

How frequent you/the person responsible do home groceries shopping in a month? *

1
 2
 3
 4 and above

When usually you/the person responsible go for home groceries shopping? *
(You may choose more than 1 answer)

After work
 During weekend
 Whenever there is sales/promotion
 Whenever it is free time to go

Before making a purchase of home groceries products, did you compare the price with other shops? *

Yes
 No

Do you aware the current market price for the products that you want to buy? *

Yes
 No

Has it occur to you, that you found products with cheaper price offered by different shop after you have bought it from other shop? *

Yes
 No

Do you regret your decision when you realized it? *

Yes
 No

Have you ever missed any sales/promotion before this? *

Yes
 No
 Maybe

Have you ever received any catalogue from shops informing you about sales and promotion going on? *

Yes
 No

What did you do with it after you have checked the contents of the catalogue? *

Recycle it
 Throw it away
 Keep it for other purpose
 Other:

In a scale of 1 to 5, identify the factors below that influence your decision in making purchase with 1 being the most important factor. *

	1	2	3	4	5
Brand	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Price	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Promotion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Suggested products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If there is a price comparison website specifically for home groceries products that allows you to check on the price offered by different shops and let you know if there are sales going on, would you like to use this kind of service? *

Yes
 No
 Maybe

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Figure 26: Online Survey

This survey is available online here;

<https://docs.google.com/spreadsheets/viewform?formkey=dFZLS1dpbDNaRzI4TkpuNGJwZHphV1E6MQ>

Here's the hard copy version of the survey questions.

Price awareness helps consumers to save more money in making purchases of home groceries products. However, the process of comparing prices offered by different shops takes time therefore; consumers might end up buying something that is overpriced. This survey is targeted for working people to identify how frequent they do home groceries shopping and what factors affected their decision in making purchase.

1. Who is responsible to do home groceries shopping for you?
 - Mother/Spouse
 - I do it myself
 - Maid/Housemate
2. How frequent you/the person responsible do home groceries shopping in a month?
 - 1
 - 2
 - 3
 - 4 times and above
3. When usually you/the person responsible go for home groceries shopping?
 - After work
 - During weekend
 - Whenever there is sales/promotion
 - Whenever there is free time to go
4. Before making a purchase of home groceries products, did you compare the price with other shops?
 - Yes
 - No
5. Do you aware the current market price for the products that you want to buy?
 - Yes

No

6. Has it occur to you, that you found products with cheaper price offered by different shop after you have bought it from other shop?

Yes

No

7. Do you regret your decision when you realized it?

Yes

NoHave you ever missed any sales/promotion before this?

Yes

No

8. Have you ever received any catalogue from the shops regarding sales and promotion?

Yes

No

9. What did you do with it after you have checked the contents of the catalogue?

Recycle it

Throw it away

Keep it for other purpose

10. From 1 to 5, rank the factors below that influence your decision in making purchase with 1 being the most important factor.

	1	2	3	4	5
Quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Price	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Promotion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Suggested products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. "PriceWar.com is a price comparison website specifically for home groceries products that allows you to check on the price offered by different shops and let you know if there are sales going on." Would you like to use this kind of service?

Yes

No

Price Comparison Website

A.P Dr. Baharum Baharudin
Computer and Information Sciences Department
Universiti Teknologi PETRONAS
Bandar Seri Iskandar, 31750 Tronoh, Perak, Malaysia
baharbh@petronas.com.my

Khamisah Buaimin
Computer and Information Sciences Department
Universiti Teknologi PETRONAS
Bandar Seri Iskandar, 31750 Tronoh, Perak, Malaysia
khamisahbuaimin@gmail.com

Abstract-A price comparison website provides platform for customers to check on the price of the products and sellers will be able to promote their products online. This project, named as PriceWar.com is the place where shoppers could find the great deals on the home groceries products where the results are sorted from the cheapest price onwards. Customers also will be able to receive email notification during promotion and they also able to view the products that are being offered by the shops. Even though not all consumers are buying online, but it is one of the ways to help consumers increase their price awareness. The website will be beneficial towards the sellers/retailers as well because they will be able to advertise their products and promote their shops at the same time. Unlike the giant supermarkets that have their own website, most of the owners of small groceries shop do not have the skills to have their own website or blog to promote their business online. Thus, with this website, the chances are open for the interested groceries shop owners to advertise their products in the website for free. They just need to provide the price information regularly and the admin of the website will do the rest.

I. INTRODUCTION

Price comparison website allows consumers to see different lists of prices for the product chosen by user and it helps consumers to make an informed decision about which to choose in order to save money. It also act as a tool to help consumers increase their price consciousness so that they will not feel cheated by the advertisement from the retailers that claimed they are offering the cheapest price but the reality happened to be otherwise.

Unlike other comparison sites, PriceWar.com (the name of this project) will focus on providing list of prices of home groceries products such as onion, chilies, garlic, potatoes, fish, chicken and others. Due to vast increase of people who are online, PriceWar.com will be a great help for those who are stuck with loads of work in the office and don't have much time to check on the current price of the home groceries products. According to research of Social, Digital and Mobile in Malaysia made by We Are Social, the internet penetration for Malaysia is 59% and the average hours Malaysian *netizens* spend using the internet every week is 19.8 hours. Meanwhile 21% of Malaysian internet users access the web via mobile devices which means they have internet accessibility anywhere with their smart phones. 77% of Malaysian web users have shared their thoughts on a brand via social media during this research was made in the

year 2011. The research shows that how Malaysian people are attached to the internet. Based on the research made by MalaysiaCrunch.com in the year 2011, more than half of the population in Malaysia is using internet everyday and it is believed that the number is increasing from time to time. A survey has been made by Nielsen towards internet users and the results shows that most of the Malaysian internet users spend 20 hours a week online in average. 53% of the respondents go online everyday meanwhile 35% go online on weekly basis. 63% use internet for information, and 94%, which is majority of the internet users, use internet as shopping guideline.

Based on the research made by FRS (Financial Reporting Standards) in the year 2009, it clearly shows that the usage of price comparison website divided into two types of users; those who really searching for the best deal possible and the other one are consumers that are simply looking for a convenient and time saving way to get a quote. The 'Modern Sophisticate' are serial switchers and more likely to use several comparison websites for research meanwhile the 'Convenience Seekers' are more likely to be loyal to single price comparison site. More people are using price comparison website as their reference to check on the price compared to the users that trusting the website.

As what has been mention earlier, a price comparison website act as the medium between customers and retailers so customers can make purchase online for certain retailers that provide such services. On the other words, the price comparison website also has the role to promote the retailer/shop to the customers. The pressures on time and money especially in the current economic situation where the living cost increases and there's only little time to do some shopping for household, a price comparison website like PriceWar.com will absolutely become a great help towards consumers. Besides, users nowadays are very comfortable with the internet that it has grown a wider variety of applications from networking and now provide various references for the users.

A. Problem Statement

Compared to other countries, in Malaysia there is only few price comparison website that is accessible until now. Most

of them is comparing price for hotel's rate, holiday's package, mobile phone and others.

It is important for a web comparison website to return results with the low prices as what the customers want but accurate results also important so that customers can get what they really want. It also depends on how regular the database is being updated otherwise customers will be confused when they compared it from other site.

Most of the working people do not have time to do shopping for their home groceries. As consumers, they have the right to choose which shop is offering the best price for a certain products that they are interested in. However, to check on price offered by each shop is time consuming and due to limited time that they have, they are not able to compare the prices and end up buying certain product with higher price. Typical mindset of customers nowadays, they see Tesco as the providers for the cheapest product but the reality is, not every products in Tesco offered at the cheapest price. Sometimes, the smaller shop in the neighborhoods offer cheaper price.

The other problem that occurs to the retailers/seller side, in order for them to promote their products or if there is any promotion going on, usually they will print out pamphlet to distribute it to the customers. It is costly as they have to produce it in lots of copies and if there is any error in the printed pamphlet, they have to make correction on every copy, which is time consuming, so that customers will not confuse with the pricing. Plus, the catalogue or pamphlets given to customers usually end up being thrown away carelessly and it lead to pollution. Therefore, by having catalogue that published online the sellers will be able to save cost and support the green campaign too.

Moreover, for the sellers/retailers who are operating with the small shops, they usually don't have the knowledge to blogging and website to promote their products online. As compared to the big supermarket like Giant or Tesco that have their own website, owners of the small shops found it is hard for them to reach out their customers. They do have the basic knowledge about internet but they do not have the skills to have blog/website for their shops. So, this project will be beneficial for them to get people know about them and their products.

B. Objective

The objective of this project is to develop a price comparison website that will have the following functions:

1. To provide customers with a list of price comparison and highlight the cheapest price specifically in home groceries products.
2. To increase price consciousness among consumers.
3. To ensure that the price database is updated regularly so that customers will be able to get accurate results.
4. To provide service for users to find the product's price.
5. To provide platform for retailers to promote their products and promotion for free.

C. Scope of Study

The scope of study for this PriceWar.com project will be all internet users and it is narrowed down to those who are using internet for business-related purpose, especially in Malaysia. Humanwebsite.com has provided a statistic for the Malaysian online shopping based on the number of internet users and the internet buyers.

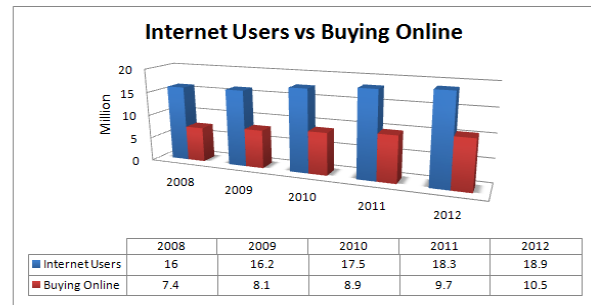


Figure 1: Internet Users vs Buying Online

This statistic has been published in the local Chinese newspaper, Oriental Daily News. Based on the statistic, it shows that the number of internet users increasing every year as well as the internet buyer which means every single of them is the potential visitor of PriceWar.com. For a price comparison website like PriceWar.com, it only provides with the useful information to the users and it is up to the users to decide which supermarket or shop they should go.

With internet, a price comparison website is accessible anytime and anywhere. The observation made by the author has resulted that people usually go online when they are on the way back from work especially those who are using public transport. Therefore, visiting PriceWar.com can be one of their choices to fill up their free time. They also can share the link of the promotion through social website such as Facebook and Twitter which has the 90% of the Malaysian internet users according to the research made by We Are Social in December 2011.

Meanwhile for the sellers/retailers, the target will be focusing more on the business that operating at the shop lot. Based on the interview done by the author with some of the owners of the shops, they admit that it will be useful for them if there is service for them to advertise their products on the web for free because they don't have much time and insufficient skills to maintain website/blog on their own.

II. LITERATURE REVIEW

A. Comparison Sites

This research paper was written by Moraga-Gonzalez J.L and Wildenbeest M.R and it was published in July, 2011. The research was focus on the price comparison sites and its connotation towards market efficiency and price competition. The price comparison sites attract all the involved parties no matter suppliers or the consumers to its platform as it has become the aggregator of product information.

Nowadays people usually conduct first research on the internet regarding a particular product or service that they want which is very convenient as compared to what consumers have to do previously when there is no internet.

Back then, consumers have to go through books, magazines, newspaper, encyclopedia and other medium to find needed information meanwhile yellow pages, directories, advertisements and others are useful to locate business and their products. Everything has to be done manually and requires a lot of time, energy and resources to find information without the help of internet. Comparison sites are known as the second type of search technologies as it helps users find products and services according to users' have chosen. It helps consumers to easily compare between the alternatives available in the market and reduce consumer search costs at the same time.

Compared to the price comparison site from its first being established and act as online classifieds, nowadays comparison sites able to do a lot of things such as draw the products' cost, able to trawl sites and give the sites much greater control over the users with the help of current technology. It gathers and aggregate price, products and other relevant information from third-party sellers and presents it to the consumers with its own way.

There are several business models usually used by the price comparison website and the most widely implemented is the charge will be on the sellers if they want to be listed and users can access the sites for free. The fee usually based on a cost-per-click and is paid every time a consumer is referred to the seller's website from the comparison site. Sellers also have the alternative to pay fee if a consumer buys the product which is being implemented by Pricefight.com. Other than that is providing free services for both sellers and buyers and obtain revenue from the advertisers like what being practiced by Google Product Search. The less chosen business model is the sellers are listed for free meanwhile membership fee is charged towards the consumers such as AngeList.com. Whatever model is being used, the most important thing is the agreement from the both sides on the chosen model.

Based on the business models explanation, the most suitable business model for PriceWar.com is the one that providing free services for both users and retailers and the revenues will be obtained from the advertisers who wants to advertise with PriceWar.com. The free services will attract more people to use PriceWar.com because it is free and when more people is using PriceWar.com, the online traffic will be increased as well. The high traffic will attract advertisers to advertise with PriceWar.com. By choosing the intermediation fees carefully to out-compete the search market, a price comparison site will be able to stay in business for a long run. Based on studies made by Yavas (1994), the intermediary such as comparison site will be able to obtain profit by attracting high valuation sellers and low valuation buyers.

Comparison sites have the potential in providing abundant of data that might be useful for further analysis for example, analyze how exactly consumers search for products and provide indications about the best way to improve the current system.

B. The Use of Price Comparison Sites

The research entitled 'The Use of Price Comparison Sites in the UK General Insurance Market' which written by

Emily Knight, a strategist for Consumer Intelligence has reported the current performance, media coverage, usage and marketing activity of price comparison sites in the UK General Insurance sector.

The results shows that there is increased on the advertising spend and competition and it gives adverse effect on the financial performance towards the price comparison sites. Meanwhile the number of consumers using price comparison sites for quotes has remains high and its average number of sites used are increasing over time. Based on the research, 8 out of 10 people are likely to get quotes from the price comparison sites in the future which show good sign of price comparison sites to stay in business in future.

To compete with other brands through the internet, big brands usually have to face big advertising spends. Based on Nielsen advertising data, back in 2006 it requires £35m has increased to £85m in 2009. The amount of spend needed to compete with the big player with the big name has make it tough for other competitors unless they have a good marketing budget. Some of the comparison sites have launched various campaigns to promote their sites and get more traffic for example '*Compare the Market*' that creates a personality designed to appeal to consumers and improve their impression towards the brand at the same time increase its web traffic and boost conversion rates.

C. Consumers Plan More Web Research Before Buying

This article was written by Reuther T. – Senior Editor of internetretailer.com, a portal related to e commerce. It is based on the findings of a survey made by Deloitte LLP, concludes that a fifth of online consumers plan to conduct more web research this year (2012) as compared to year 2011 before buying. Deloitte LLP, a consulting, auditing and financial services firm, has conducted the online survey on 5-12 July 2012 towards 1, 314 parents of children in kindergarten through the 12th grade. Around 20% of the survey respondents plan to shop online this year but the web is playing the important role in giving influence for the purchases either it is done online or offline (going to the shop to purchase). The result shows that a third of the parents who responded plan to visit e-commerce sites, retail blogs and other web locations to learn before buying the items.

Not only that, the survey also resulted that 57% of the respondents owned smart phones and use it as shopping tools for seeking price information with 63%, getting coupons and discounts with 45%, and finding store locations with 38% were among the most popular mobile shopping activities. From this result, it shows that there is big number of people who are using smart phone to check on the price information of a certain product. Therefore, based on this article, it can be conclude that most of the customers, as well as potential customers of a product will make some research online before making a purchase.

III. METHODOLOGY

A. Research Methodology

Stage 1: Project Planning

This is the stage where the problem related to the project is identified and the significance of the study is determined. The objective and also scope of study are outlined and the feasibility of the project work is ensured to be developed within the time frame given. The solution to the problem statement is studied and the types of system to be developed and tools used for developing the system are also identified through literature reviews.

Stage 2: Data Gathering and Analysis

Series of studies has been performed to gain further knowledge on the energy and electricity consumption. Also, readings was done to get better understanding on what comparison site is all about, how it helps people to solve problem before buying home groceries product, and example of existing comparison sites to check on the competitors. The data regarding previous researches are gained from research papers written by scholars and have been explained in details in the literature review section earlier. Meanwhile the data regarding consumers were obtained through survey and interview that made online as well as meeting the respondents (shop owners in Perak's area) face to face.

Stage 3: Research on any Existing Similar Systems

Next is the study performed to check if any similar system exists. The main objective of doing research on similar existing system is to know how it works, what concept is being applied in the system, what is being computed by the system and how the system helps solving the problem.

Stage 4: Drafting the Main Components of the System

After the research on similar existing systems, the next step needed is to identify what will be the main component that made up the system to be developed. In order for the visitors of this website to use it services, they have to register with their basic information such as name, email, etc. The registered users will be subscribed automatically to this website's newsletter. The users shall be able to choose product and related information will be displayed. Other than that, users may add favorite products into their profile so the latest price for the favorite items will be sent personally to the user other than daily mail regarding the promotion for the day. Therefore user will be able to get directly the information that they are interested in. The main components of this system are:

- Database to store products and users' information
- User able to search the product that they are interested in

Stage 5: Develop System Architecture

The next phase to develop the architecture on how the system will works. This will give the clear picture and understanding on how the system will operate and to avoid developing a system that does not solving the problem it intended to solve.

1. Registered Users

The website requires visitors to sign up before they can use the functions in the website. The registered users will have personal account to this website and they may login using their username and password. The actions that registered users can do with this websites are;

- Login to the website
- Able to edit profile
- Newsletter subscription
- Search groceries products

- View promotion and sales
- Compare prices

2. Admin

The admin of this website will be responsible to maintain both website and the database. The roles of admin for this website are;

- Receive price lists from sellers
- Update database regularly
- Maintenance of website content and functionality
- Maintain web servers and website
- Manage advertisements regarding sales and promotion from the sellers
- Write report and analyze website user statistics

3. Sellers/Retailers

Any parties that would like to join and become partner with PriceWar.com. Their roles are to submit the price lists to the admin of PriceWar.com. They are also responsible to inform the admin if they want to advertise the new products and also if there are sales and promotion being held at the shop.

Stage 6: Sketching the Interface of the System

Once all the functions performed by the system are identified, the last step is to design the interface of the system. Developing the interface of the system will make it easier for the system to be developed during the development phase.

B. Project Development Methodology

Considering the time constrains to complete this project on time, the most suitable methodology is the Rapid Application Development (RAD) method. There is a set of management techniques that are optimized for speed in RAD which are;

- Prototyping - which is an approach based on creating a demonstrable result as early as possible and do refinements based on how the prototype works, whether it returns the desired result or not.
- Iteration - which is the incremental development based on refinement.

This project requires a rapid prototyping which will involves methods like iterative development and software prototyping. This methodology is also chosen due to the possibility if there might be functionality and performance compromising so the process of fixing the problems will be done promptly. The benefits of using this methodology is it allows any changes to be made during the development phase if there is needs to review and recheck at any other phase of project development. This is important as it provides flexibility throughout completing the project such as debugging process. There are four main phases in RAD which are analysis and quick design, prototyping cycles, testing and implementation phase.

1. Design Analysis

This phase has been covered up during the FYPI whereby the process of defining goals into defined functions and operation of the intended web system were being done. The designs of the website including its layout, process diagrams and other documentations also included in this phase.

Basic layout for PriceWar.com has four main menus which are "About Us"- this page will basically have the information regarding the website and its functionality. Next is "Let's Make a Deal" page that will bring users to the website's

main function which is users will be able to search the home groceries product that after users have chosen which region that the users wanted to know. Then the website will check on the database and retrieve the information needed and it will give return results of the shops offering the products along with the location of the shops sorted according to the cheapest price. Users also able to see the promotion offered by the shops by choosing the tab 'On Sale'. It will shows the product, shop's name, shop's location and the promotion price. However, this function requires member's login therefore users need to create an account first and login to this website before they can use the website's functions. "Testimonial" page will show the comments from the users that are satisfied with the service provided by this website meanwhile the "Contact Us" page will provide contact information of the website's admin in order for users who wants to give further enquiries regarding the system as well as for the sellers that want to join in advertising with PriceWar.com.

2. Prototyping Development

This phase consists of 3 main categories namely; build, demonstrate and refine. These 3 steps is performed in cycle order, where its starts with building the system. The development of the system began and is performed part by part. The website was developed starting from the HTML according to the designated layout for its main interface. Then, the HTML will be connected with PHP language and the MySQL as the database to store all the information especially the products' information. Each completed part is then demonstrated to check for its functionality. The results should be matched with the expected results whereby the information will be filtered according to the location chosen by users and it needs to be sorted according to its price with the cheapest will be at the top. If there are any requirements or new functionality being identified, the system will be refined, where the building process will start again from where it has initially completed. These 3 steps cycles after one another until its functionality achieve satisfaction.

3. Testing Phase

This phase checks for errors, bugs and functionality of the website. There are five types of testing which are; regression test, internal testing, unit testing, application testing and stress testing. Internal testing get the every function or component being tested which also called as white-box testing because all details are visible to the test. Meanwhile unit testing tests the interaction of many functions but impound the test within one unit which also known as black-box testing because it focused on the details of the interface that visible to the test. Next is the application testing that deals with the entire system. The project is ready for implementation after pass all of these tests.

4. Implementation Phase

After all the testing performed is completed and passed, the system is ready for the implementation. The PriceWar.com has received a positive response and will be considered to be used soon. This is the final phase of the system development and hence, the system is expected to be fully functioning as it intended for.

IV. RESULTS AND DISCUSSION

A. Process Flow Diagram

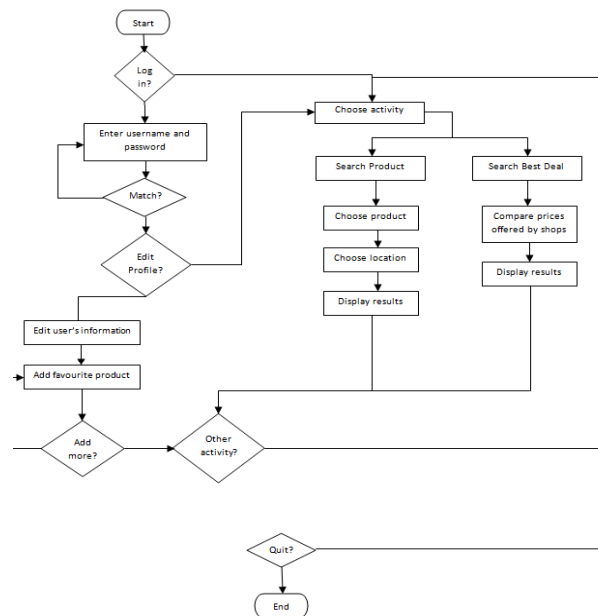


Figure 2: Process Flow Diagram

B. Interface Design

The interface design of PriceWar.com is simple and easy to use. It is because, the target market for this website is focus on working people who are busy to find information about groceries current price and offers, if available. Therefore, by developing a website that is easy to use to find information will help them to find the info they needed faster. Every piece of information will be shown clearly to avoid confusion. Visitors of PriceWar.com will have to register membership so that they will be able to sign in every time they visit PriceWar.com to use its services.

Users will be able to search desire product from the list. Once the product has been chosen, user is required to choose location to narrow down the search. In return, a list of shops who are selling that particular product will be displayed with their price. The list will be sorted from the cheapest offer, so that it will be easier for user to see which shop offer the best deal.

Users also will be able to check on the current promotion. For example they are 5 products that are going on promotion; user may click on one of the products to view more details regarding the product's information. It will display on the name of the shop, the location of the shop as well as the promotional price offered by that particular shop. This information will be provided by the sellers/retailers to admin of the website.

C. Survey & Interview's Results

The results show that 100% of the respondents have experienced buying overpriced products. When the question asked if they are interested in using website that offer services to check on prices and promotion offered, majority of the respondents answered 'Yes' showing that the customers' willingness to accept and use this kind of service to help them make decision wisely while shopping for home groceries products.

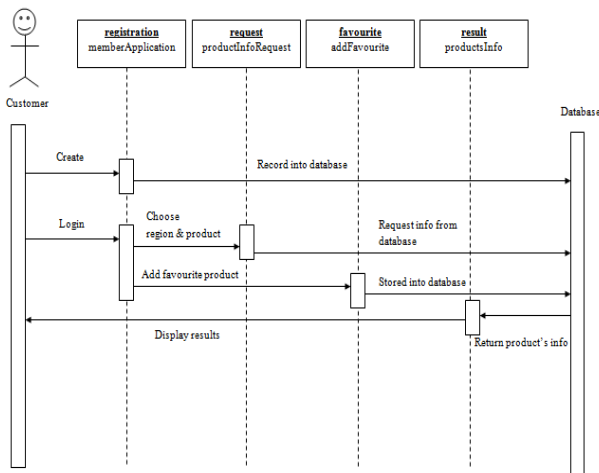


Figure 3: Use Case Diagram

D. User Interface



Figure 4: Home Interface



Figure 5: Products On Sale



Figure 6: Product On Sale's Details

For price checking's function, whenever a product is chosen, the website should return a list of shops that offers that particular product. The result returned the name of the shops, the location of the shops and the price. This information will be sorted with the cheapest price at the top of the list. Users also can share the link of the website through social networks like Twitter.



Figure 7: Sample of Price Checking's Result

V. CONCLUSION

This document comprises all details related to the project. The abstract, background and objectives can be considered as the overview of the project meanwhile the methodology part explains in details what is the suitable method chosen for this project to be completed. It is also important to get reference from the previous research paper that is related to the project. The literature review shows the research that has been done previously by other researchers. It is very important to get more knowledge in this topic in order to develop a successful and well functional price comparison website. More research needs to be done in order to get the desired results because different site uses its own formula to determine how, when and from where it gathers prices. Therefore, it is very important to get the correct way to retrieve the desired data according to what the user wants. In order to differentiate PriceWar.com with other comparison sites in Malaysia, this website will focus on the home groceries products to help people make informed decision before making purchase.

The website provides users with useful information that will help them making informed decision. With this price comparison website, it solves the problems of the working people to check on the price before buying groceries products. It provides platform for sellers to promote new products and advertise any promotion or sales going on.

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