Chapter 1

Introduction

Catalogue is a list or itemized display usually including descriptive information or illustrations. It is a complete, usually alphabetical list of items, often come with descriptions and details and also pictures about that certain product or services. Catalogue has proven its effectiveness in marketing industry by helping the customer's in making decisions in the product that they are going to purchase. The more information and benefits that customers can extract from the catalogue, the higher the chance that the customers will choose to purchase your product instead of others.

1.1 Background of study

Car catalogues has been widely used nowadays in order to attract customers to purchase the car whether by flyer form or even on website but it is not commonly used on a tabletop display. The current online catalogues and also promotion tools induce low interactivity and also usability. How is that so? Interactivity involve the reaction between the customers and the product that they wish to sell. In the current promotional tools used such as flyers, the customers can only read a paper which is filled full of words and some photos. Mainly people won't even bother to look at a flyers which is loaded with words because it couldn't attract their attention to read through a load fill of words. Meanwhile in online catalogues, it is being too static as the interaction depends mainly on mouse clicks and also pictures of the products. The main problem in the current catalogues system is that customers are not able to interact with the products that is shown on the catalogues. If the customers are able to interact with the catalogues, then it can greatly increase the effectiveness of the catalogues as compared to the current existing catalogue system.

Meanwhile my FYP project will be directly using the tabletop display technology provided by our University. By using this technology, we can fully use the function of the touch screen technology such as zooming, rotating and dragging by only the use of our fingers. A succession in this project can help a lot of industry in promoting their items or even used for other purposes such as customer service interface, presentation, purchasing transaction and many more. By using this technology in car catalogue system can encourage the interaction of the customers with the tabletop and through interaction they can obtain the information that they wanted to know or don't know of about the car. This project also developed supports user collaboration, which enabling more than one user to perform resizing, moving, zooming and rotating the car catalogue projected on the tabletop. This can greatly increase the potential of the customers to buy the car once he know the specifications and the features of the cars from the interaction with the tabletop.

1.2 Problem Statement

- The current online catalogues and also promotion tools induce low interactivity and also usability.

1.3 Objective

- To technologically build particular prototypes of tabletop by using Microsoft surface.
- To study and develop a generic interactive interface, which will take advantage in the car catalogue system.
    - Research for the potential of tabletop display on car catalogue systems.
    - Include 3D view of the products to increase interactivity and also attractiveness
    - Include search filter to let the customers search for their ideal car

1.4 Scope of Study

- This scope of study for this project will be the C# Language and also the interaction with Microsoft Surface.
- The limitation of this project is the features of the tabletop system since currently it is still not in the market hence proceeding this project with insufficient resources and also guideline may need time to do research of our own.

Chapter 2

Literature Review

2.1 Catalogue

Catalogue is a list or itemized display for exhibition or sale that usually includes the descriptive information or illustrations of the product. Catalog can helps in making life easier as user could study the references or the description of the product through the catalogue. Catalogue contains organized information about products and illustrated with pictures which can helps customers in making their decision whether to purchasing the item or not. There is two requirements that are required in order for catalogue system to be effective which are:

- Information: The description of the product in the catalogue is said to be the most important factor that can determine the selling point of the product. A good description such as the features and also the specifications will greatly boost the decision making of the customers.
- Picture: The picture of the product is also said to be important in order to create nice first impression of the product. If the first impression of the product is already bad then the customers won't even mind to spend more time looking at the information of the product.

According to the example below, I can surely said that the left catalogue is better than the right one. This is because it contains both information and also pictures which explain about its specification and award received together with an impressive first impression to the customers.

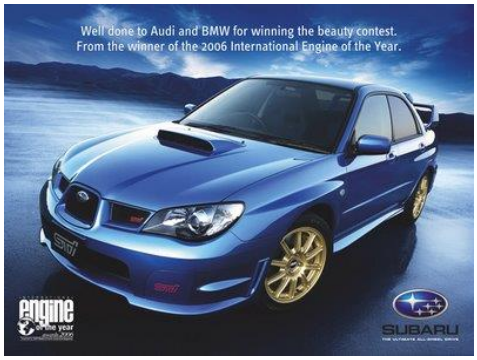


Figure 1 Sample of Good Catalogue

Figure 2 Sample of Bad Catalogue

2.2 Tabletop Display Hardware

With recent advances in display and input hardware large screen, high-resolution tabletop displays have become a technological reality. The large working surface and comfortable environment provided by these interactive tabletop displays offer great potential for supporting many formal and informal collaborative activities, such as planning, designing, organizing, and storytelling.

Tabletop system is the use of hand and object recognition on LCD of the tabletop system. By utilizing the polarization of LCD and also the camera, it is possible to segment hand or object region from the background image. Since it does not require computational effort, fast gesture recognition become possible. Powerful features of tabletop allow it to change the way the consumers interact with the digital content and brand.

Figure 3 Modern Tabletop Display System

I. Powerful CPU and graphics

Take computing power to the next level with Microsoft® PixelSense™ and its selection of high-performance hardware. With the AMD Athlon™ II X2 2.9GHz Dual Core processor, fast multi-tasking is no problem. The AMD Radeon™ HD 6570M desktop graphics card delivers clear and vibrant visuals as well. Four built-in speakers complete with powerful and comprehensive package which offers amazing immersive user experience.

Figure 4 Powerful CPU of Tabletop

II. Thin and flexible multi-configuration design

Experience attractive thin design and a range of practical setup possibilities which is only 4” thin but highly powerful. It can be deploy horizontally in table configuration for planning, learning, assisting sales and other uses or just hang it on walls for presentations, digital media interaction and more. Get the perfect fit for your needs.

Figure 5 Thin & Flexible Multi Configuration

III. Connect with an open software developer community

Make with the most expansive global community of developers rapidly adopting with Microsoft® PixelSense™ platform and technology. From creating customized apps to connecting with partners actively producing solutions for customers worldwide. Developers working with Microsoft® PixelSense™ utilize a wide selection of tools such as Microsoft Visual Studio 2010, .NET Framework, MSDN, Windows and many more. Now a strong and dedicated international community can truly interact, which means better implementation of ideas for everyone.

Figure 7 Connect with open software developer community

IV. The world's largest heavy duty Gorilla Glass display

Screen with the best possible protection from damage. Samsung SUR40 is equip with the world's largest sheet of Gorilla Glass bonded to any display. The robust material is amazingly strong, light and scratch-resistant. One-hour water ingress protection also featured. Thanks to its more durable display, you can enjoy the Samsung great effectiveness with your mind at rest.

Figure 8 Gorilla Glass Display

V. Suited to a wide range of industries and applications

Samsung SUR40 is created with various target industries in mind. It cab be change to the way people interact with information and each other. The Samsung SUR40 can help them communicate, collaborate, consult and connect; make education more entertaining and make content more

engaging. Shopping experience, immerse users in games and pastimes, and business practices with a new platform can also be enhanced in office communications creating a deeper connection with clients, customers and colleagues.

Figure 9 Suitable for wide range industries

VI. Reach out and touch your digital content

Go beyond the limits of touch control and grab the future with both hands. With this revolutionary new technology you can interact using gestures. There's no need for a mouse, keyboard or any advanced technical knowledge. The Samsung SUR40 even responds to inanimate objects placed or moved across it. Users will experience intuitive and natural interface.

Figure 10 Reach out and touch

VII. Gather multiple users around the Samsung SUR40

Introduce users to a face-to-face computing experience offering closer collaboration among more people. With more than 52 simultaneous inputs available, several users will be able to interact with the Samsung SUR40 at the same time. With this new advance technology, they can use the same surface area to work on individual projects or a single project with multiple components. This functionality makes a new range of social multi-user applications possible. People can do more together with multi-user computing.

Figure 11 Multiusers

VIII. Discover versatile and responsive object recognition

Make full use of pioneering cutting-edge technology that even recognizes multiple physical objects placed on the screen. Utilizing object recognition software, the Samsung SUR40 with Microsoft® PixelSense™ can distinguish, access and respond with wireless devices. With integrated PixelSense™ sensors built directly into the LCD layers, tagged objects containing certain patterns and designs are also recognized and responded to. Get a better response with the Samsung SUR40 with Microsoft® PixelSense™ and object recognition.

Figure 12 Object recognition

In my project, survey form will be distributed to both company and also public in order to gather out general customer car buying preferences sorted by gender whether male or female and also income level. Not only that, 3D view of the product will also be provided in order to fulfill both information and also picture requirement. The interactive car catalogue tabletop display system will surely be able to help the customers in making decision.

According to (Ryall, Forlines, Shen, & Morris, 2014), interactive tabletops have been previously proposed and studied in the domain of co-located group applications. However, the usage of tabletop display system is still not widely use in any sectors of industries. But the many research had been done by many researchers regarding the performance, potential and interoperability of the tabletop display. Some researchers even modify the tabletop system so that it can be used in entertainment and also gaming sector.

2.2.1 PlayAnywhere

Andrew D Wilson, the person who introduce PlayAnywhere, a front-projected computer vision-based interactive tabletop system which uses a new commercially available projection technology to obtain a compact, self-contained form factor. (Wilson, 2005) stated that the advent of novel sensing and display technology has encouraged him in the developing varieties of interactive systems which move the input and display capabilities of computing systems on to everyday surfaces such as walls and tables and PlayAnywhere is one of his creation that used the tabletop system.

Figure 13 Concept of Andrew D Wilson

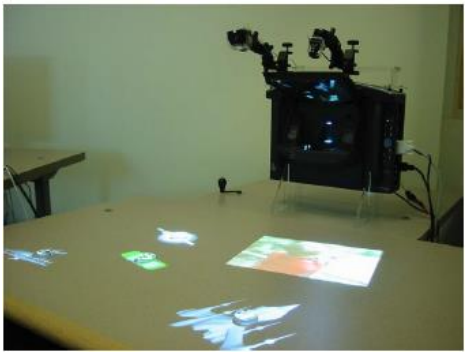


Figure 14 PlayAnywhere

(Wilson, 2005) also stated that his vision of future will be a continuation of trends in projection and computer vision technology which is not so far off anymore since a lot of creation had been created by a lots of developers such as the Canesta projection keyboard and other closely related virtual keyboard devices in many ways resemble their conceptual device.

Besides Andrew D Wilson, Sergi Jordà together with their music technology group also developed a tabletop based interface system named reacTable. (Jordà, Geiger, Alonso, & Kaltenbrunner, 2007) stated that there has been a proliferation of tabletop tangible musical interfaces whereby the trend started with the millennium with projects such as the Audiopad Jam-o-drum or SmallFish. They believed that fertile two-way cross-pollination between musical instruments and tabletop interfaces in particular, can equally benefit both fields and hence they musical instrument based on a tabletop interface that exemplifies several of these potential achievements.

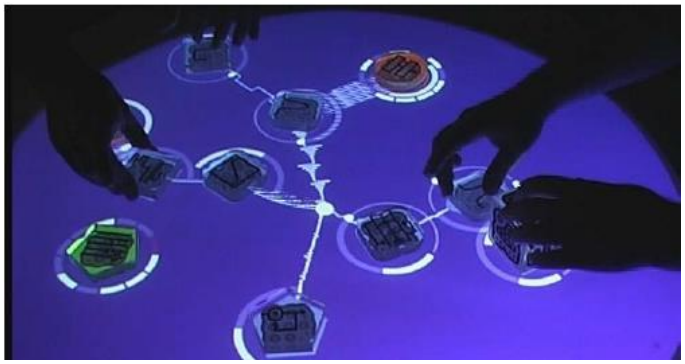


Figure 15 reacTable

2.2.2 Direct Touch vs Mouse Input

Not only that, some researchers also dedicated to research the efficiency and also the effectiveness of the tabletop system compared to the currently existed system. Clifton Forlines and his colleagues investigate the differences in terms of both quantitative performance and subjective preference between direct-touch and mouse input for unimanual and bimanual tasks on tabletop displays. (Forlines, Wigdor, Shen, & Balakrishnan, 2007) believes that direct-touch interactive tabletop displays have been the focus of numerous research projects and appear to provide several benefits over traditional desktop displays.

(Forlines, Wigdor, Shen, & Balakrishnan, 2007) also stated that the traditional desktop display settings somehow indirect mouse input may equal or outperform direct-touch input when the task requires just a single point of contact. Furthermore, it is difficult to accurately point at objects that are smaller than one's finger. Hence the result from their research discovered that results of two experiments show that for bimanual tasks performed on tabletops, users benefit from direct-touch input. However, their results also indicate that mouse input may be more appropriate for a single user working on tabletop tasks requiring only single-point interaction.

2.2.3 Multi Touch and Hand Gesture

Another research is also done by Mike Wu and Ravin Balakrishnan from University of Toronto regarding multi finger and whole hand gestural interaction techniques for multi user tabletop displays. (Wu & Balakrishnan, 2003) stated that recent advances in sensing technology have enabled a new generation of tabletop displays that can sense multiple points of input from several users simultaneously.

However, apart from a few demonstration techniques, current user interfaces do not take advantage of this increased input bandwidth. Hence, they would like to present variety of multi-finger and whole hand gestural interaction techniques for these displays that leverage and extend the types of actions that people perform when interacting on real physical tabletops.

Figure 16 Multi touch Experiment

(Wu & Balakrishnan, 2003) believe that despite the proliferation and increasing functionality of electronic communication tools, face-to-face meetings remain extremely important particularly when two or more people are working on a collaborative project. Tables of various types often form the focal point around which these meetings take place, due to numerous affordances that inherently support human-human collaborative activity. By recognizing the value of tables in collaborative activity, researchers have begun exploring the use of computationally enabled tabletops.

2.2.4 Larger Display

Besides gesture and also handling technique, some researcher also consider about the effects of group size and table size on interactions with tabletop shared display groupware. (Ryall, Forlines, Shen, & Morris, 2014) id (Kim, Park, Kim, & Lee, 2007)entify a number of size considerations for tabletop design, and present an experiment to explore some of these issues, in particular the effects of group size and table size on the speed at which the task was performed, the distribution of work among group members, issues of shared resources, and user preference for table size.

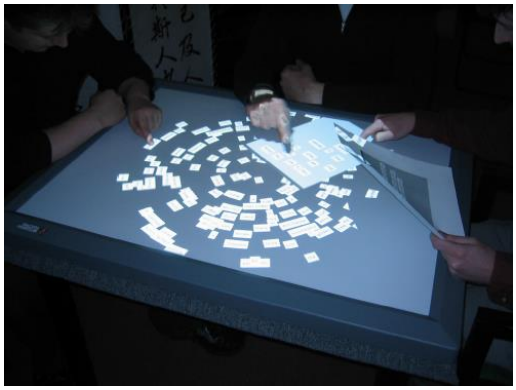


Figure 17 Experiment by using large display to solve the puzzle

(Ryall, Forlines, Shen, & Morris, 2014) stated that single or shared display groupware for tabletop application is an emerging but as yet largely unexplored research area. Until recently, most application development and experimentation were one of a-kind prototypes, making it difficult to reuse components or share results. But with recent technology developments in multi-user input devices such as DiamondTouch, SmartSkin, and DViT have made it easier to build tabletop shared-display groupware applications. Hence, they are able to produce their findings for their research which are

(1) How work strategies are affected by group size

(2) How social interaction varies with respect to table size

(3) How the speed of task performance is influenced by group size but not by table size.

In addition, their experiments also revealed that for larger groups, designers might need to add additional vertical displays for shared information. Finally, (Ryall, Forlines, Shen, & Morris, 2014) also believe that this finding will opens the door for extending single display groupware to shared-display groupware settings that involve multiple, shared displays.

2.2.5 HCI of Tabletop Display

In the field of human-computer interaction (HCI), computer- supported cooperative work (CSCW), and mixed reality (MR), there have been many research projects that combine the advantages of computers and tables through the development of tabletop displays. Below are some of the research conducted by various researchers on the HCI of the tabletop system.

2.2.6 HCI of Multi Touch Tabletop

As the computer technology advances and the complexity of information systems grows, the technology for supporting user friendly and intelligent interaction becomes very important. (Kim, Park, Kim, & Lee, 2007) stated that input technology using hands and gestures which are said to be the most intuitive tools for human has been focused by a lot of world-wide researches. This becomes a factor of core component when adopting information devices with dynamic touch interfaces. By then, (Kim, Park, Kim, & Lee, 2007) develop a hardware platform which can be used to manipulate the contents by recognizing the motion of user's hands and the contact between the hands and display. This technology can enhances the availability of next generation multimedia contents utilizing the interaction between the user and information system.

(Kim, Park, Kim, & Lee, 2007) also stated that the benefits of tabletop display is the natural direct manipulation experience they provide, as well as their potential for more complicated interactions using multiple fingers. It would be desirable to allow more than one user (multi touch) to access the display without affecting the work of others. The users also can randomly access any point on the display by simply touching the desired location. Finally, the expense spend for the development of the system is also cheap.

2.2.7 Lumisight Table

According to (Kakehi, Iida, & Naemura, 2005), when we are using a desktop computer, our eyes are focused on a display meanwhile our hands are restricted to both the keyboard and the mouse which is a bad. Nonverbal communication modalities, such as eye contact, facial expressions, and joint handling of physical objects, are important in face-to-face settings. To facilitate such face-to-face communication and collaboration, various table-based systems that let people share an electronic display on the tabletop have been developed (Kakehi, Iida, & Naemura, 2005). But there haven't been many tabletop systems that can show different images to each user surrounding the display.

Figure 18 Lumisight Table

(Kakehi, Iida, & Naemura, 2005) stated that tabletop display can be used as a personal display and as a shared display for multiple users. Orientation of displayed information plays a significant role in establishing and maintaining personal and group workspaces. However, because most tabletop displays for multiple users have a single view, they have a common problem when people try to share information that has specific orientation requirements. When the tabletop has a single view, this function might be helpful, but sometimes it might be insufficient as some of the tabletop display let users rotate the displayed information in either direction so that the information can be read and manipulated by everyone around the table. As a possible solution to this problem, Yasuaki Kakehi and his colleague thought of providing multiple views on a single tabletop.

In order to solve this solution, (Kakehi, Iida, & Naemura, 2005) stated that their main idea in solving this problem is by develop an interactive display system that allows users to stay close enough to maintain verbal and nonverbal communication while watching their own computer output. Their idea is based on the optical design of a special screen system composed `of a building material called Lumisty and a Fresnel lens. By combining these films and a lens with four projectors, they will be able to display four different images, one for each user's view.

(Kakehi, Iida, & Naemura, 2005) also stated that their other main idea is to develop an attractive and specialized applications on the Lumisight Table, including games and applications for computer-supported cooperative- work (CSCW) environments which is a method for a mixed and integrated display of shared and private information on a single screen could become a new paradigm in human computer interaction (HCI).

2.2.8 Effect of Fluid Interface Components

However, tabletop display also introduces a certain types of challenges to the users for example the large size and horizontal orientation of these displays introduces challenges for designing an effective collaborative user interfaces. (Hinrichs, Carpendale, & Scott, 2006) stated that sometimes it can be difficult for people to reach items located across from them on the tabletop workspace, especially when they are attempting to interact with small interface components. Additionally, tabletop collaborators often find it more comfortable and easier to converse when sitting on different sides of the table from each other and tend to walk around the table when working on certain tasks.

In his research, Uta Hinrichs and his team have included various forms of automated transportation and rotation of items across the tabletop workspace which means that they will be able to rotate the whole screen so that they will be able to interact with the area that they cannot reach. Though this approach, it appears to offer potential for supporting information access and sharing during tabletop collaboration.

Overall, Uta Hinrichs and his team's study revealed that Interface Currents effectively supported the following task and group interactions:

1. Exploration and discovery of visual information,
2. Equal access to information between group members
3. Casual and structured information organization
4. Both individual and collaborative work with information, and
5. Smooth and fluid transitions between individual and collaborative activities.

Finally in his research, Uta Hinrichs also give some future recommendations about the importance of the mobility and adjustability of Interface Currents in order to effectively support the variety of task activities and interactions that occurred during the tabletop collaboration sessions.

Uta Hinrichs other recommendations include the suitability of Interface Currents to other types of tabletop activities which involve text document. (Hinrichs, Carpendale, & Scott, 2006) stated that the use of documents might demand for different

functionalities on Interface Currents since overlapping and size of documents might become issues. Hence, Uta Hinrichs and his team are determined to investigate the use of tabletop system for other activities.

2.2.9 Collaboration Around Tabletop Display

(Inkpen, Mandryk, & Hancock, 2002) also stated that tabletop displays hold great potential for supporting collaborative interactions from the result of his study on how people interact around a tabletop display and that tabletop systems promote increased gesturing, interpersonal interactions, and communication. This new technology also allow the users to understand each other's intentions seamlessly. (Inkpen, Mandryk, & Hancock, 2002) also suggested that use of a stylus further enhances the experience of using a tabletop display by making it possible to utilize our existing capabilities for interaction in the physical world in the digital domain

As conclusion, tabletop displays provide exciting opportunities to support individual and collaborative activities such as planning, organizing, and storyboarding. It has been previously suggested that continuous flow of interface items can ease information access and exploration on a tabletop workspace, yet this concept has not been adequately studied. Hence, I believe that tabletop display will become more and more popular in the future. All of the benefits found from the researchers above from researching tabletop system will surely help a lot not only in promoting but also for other us.

Chapter 3

Research Methodology

3.1 Model Framework

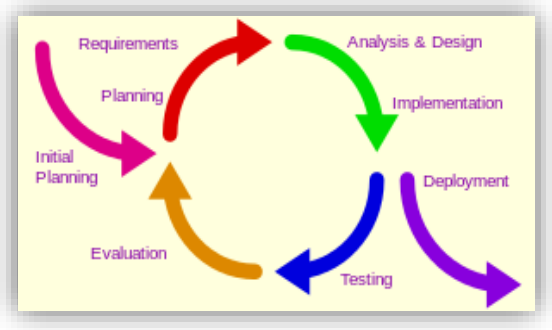


Figure 19Incremental and Iterative Development Model

This approach that I used in my project is known as incremental and iterative development model, which include iterative design and also incremental build model for software development. The concept of this approach is to develop a system through repeated cycles of planning, implementation, testing and also evaluation as shown in figure 1 in smaller portions at a time until it is ready for development. By using this approach, the developers will be able to take the advantages of identifying problems and solutions for it in the early stage of development. It is important for the developers to identify the problems in the early stages as it will be costly and also time consuming if only they discover the problem after the product is being release and market.

Not only that, by using this approach, the developers will also be able to understand what had they learnt during development of earlier parts or versions. Learning comes from both the process of development and also the use of the system which can help the developers iteratively enhance the software to be better as in each

iteration, new design modifications and functional capabilities are added to the older version of the software

This approach is ideal for my project because my project requires a lot of modifications and debug in order to ensure that all of the functional parts are integrated together. Not only that, through learning and using experience, I will be able to enhance more functionality and also features. Unlike waterfall model which is hard to backtrack once it proceed to the next stage of the process, incremental and iterative approach allows me to backtrack my process every time the cycle is being repeat and enhancement can be implemented more easily compare to waterfall model design.

3.2 Project Phase

1. Planning Phase
    - Objective and requirement of the project is define
    - Create a timeline for each and every task so that work can be done before the deadline
2. Analysis
    - Research on the tabletop system in order to understand the knowledge and also requirement required to do the project.
    - Past researchers articles in order to complete literature review.
    - Learning third party software such as Photoshop in order to edit the picture needed for the interface of the application.
    - Research on how to add in various functionality on the interaction when touch and also gesture.
    - Analyze the data obtain from the survey so that the information obtained can be used in further improving the project.

3. Design
    - Design the system interface
    - Design the use case and also Gantt chart
    - Design system flowchart
    - Design the system architecture

4. Execution
    - Coding for every interaction that the user input such as tapping and gesture.
    - Coding on the popup when the images is press for a few seconds.
    - Coding to ensure that the system runs smoothly.
5. Testing
    - Bug testing to detect defect and also error
    - Evaluate the program to determine if the requirement and the objective of the project is fulfilled.

3.3 Planning

Normally milestones is a tool used in project management in order to keep track of the event in the project schedule either it has been completed or not when a key task or deliverable has been achieved by marking specific points along a project timeline. Hence milestones will be use a tool of monitoring the progress and accomplishment of the project in my project in order to ensure that all of the tasks and progresses can be completed in time. Normally, Gantt chart will be used to illustrate the project schedule of the project, which is also applied the same as my project.

3.3.1 Key Milestones

No.	**Milestones**	**Week**
1.	Submission and Approval of FYP Topic Proposal	2
2.	Completion of Introduction and Literature Review	9
3.	Completion of Methodology	10
4.	Survey form for information gathering	12
5.	Completion of Result and Discussion	13
6.	Completion of Conclusion and Compilation of Interim Report	14

3.3.2 Gantt Chart

	Start Date	End Date	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Selection of Project Title	12-Jan-15	23-Jan-15														
Preliminary Research Work	20-Jan-15	26-Jan-15														
Introduction	26-Jan-15	31-Jan-15														
Literature Review	01-Feb-15	15-Feb-15														
Methodology	16-Feb-15	23-Feb-15														
Survey Form creation	23-Feb-15	02-Mar-15														
Survey Form Responses	3-Mar-15	10-Mar-15														
Result and Discussion	11-Mar-15	18-Mar-15														
Conclusion	19-Mar-15	26-Mar-15														
Submission of Draft Report	27-Mar-15	29-Mar-15														
Submission of Interim Report	30-Mar-15	31-Mar-15														
Proposal Defence	08-Apr-15	09-Apr-15														

Figure 20 Gantt Chart for FYP I

	Start Date	End Date														
			Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Collecting Survey Result	18-May-15	25-May-15														
Analysing Survey Result	26-May-15	1-Jun-15														
Study on Tabletop Coding Method	2-Jun-15	8-Jun-15														
Interface Design	9-Jun-15	23-Jun-15														
Coding Design	24-Jun-15	30-Jun-15														
Coding and Interface Integration	1-Jul-15	8-Jul-15														
Testing for Bug and Defects	9-Jul-15	20-Jul-15														
Improvement to the project	9-Jul-15	20-Jul-15														
Pre Sedex Presentation	14-Jul-15	14-Jul-15														
Technical Paper Completion	20-Jul-15	24-Jul-15														
Final Dissertation Completion	25-Jul-15	28-Jul-15														
Submission of Technical Paper	29-Jul-15	29-Jul-15														
Submission of Final Dissertation	29-Jul-15	29-Jul-15														
Sedex Presentation	5 August 2015	06-Aug-15														

Figure 21 Gantt Chart for FYP II

3.4 Project Tools

As mentioned from the literature review, my project involved the use of tabletop display. In order to develop an application or software which is compatible, specific tools and also software are required so that the code can run as programed by the programmer. Besides that, some third party software will also be used in order to assist and enhance upon the completion of my project. Hence, the main software that will be used in order to program the software functionalities and also process will be using Microsoft Surface.

- Microsoft Visual Basic C# 2010
  Interface and coding design is being processed by using this tool.

- Microsoft Surface

  Surface is a series of computing devices, including tablet computers and interactive whiteboards running on Windows operating systems, designed and created by Microsoft and powered by Microsoft Surface. Hence, Microsoft surface is the software used to create and also execute the program which is only used on surface devices.

Figure 22 Microsoft Surface

Chapter 4 Result and Discussion

4.1 System Use Case

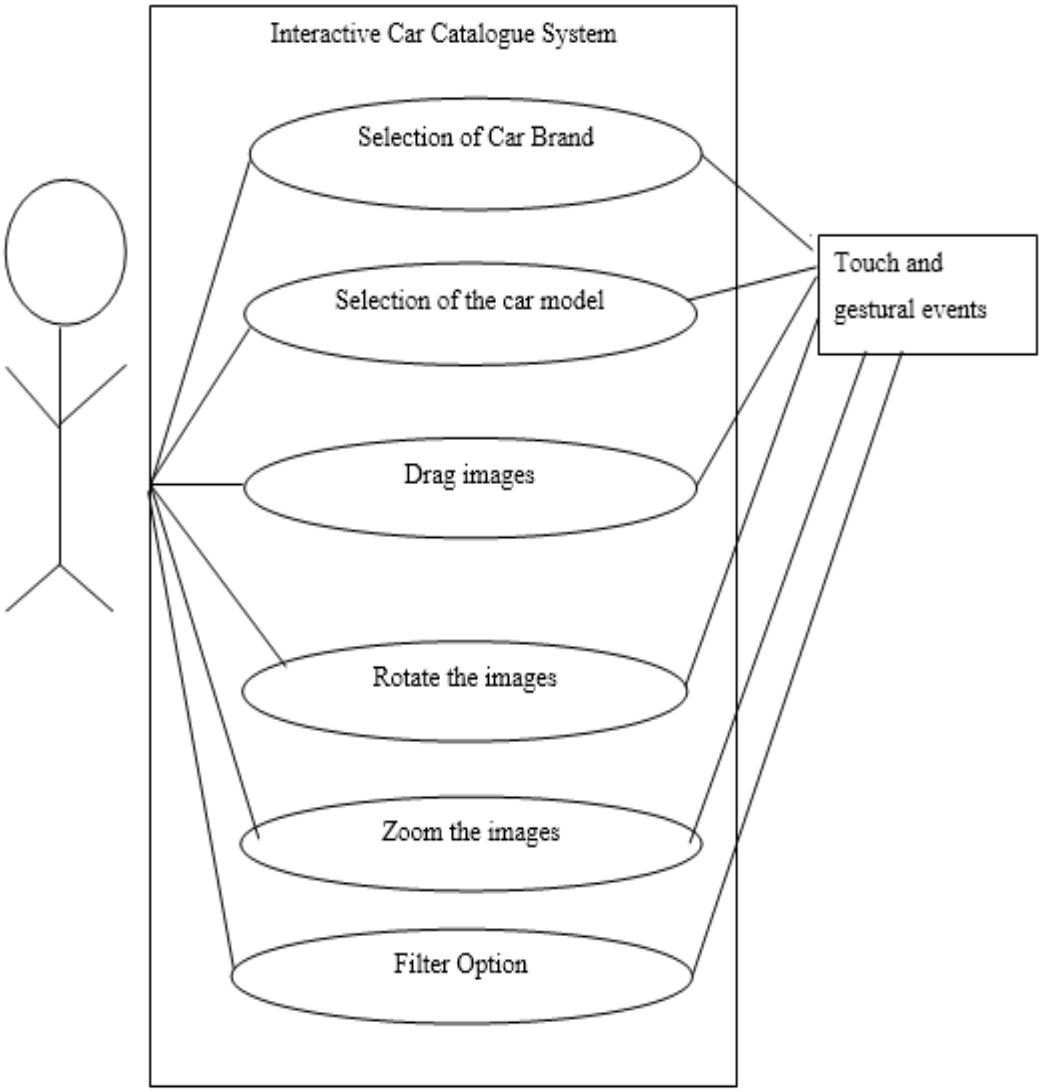


Figure 23 System Use Case Diagram

1.2 System Flowchart

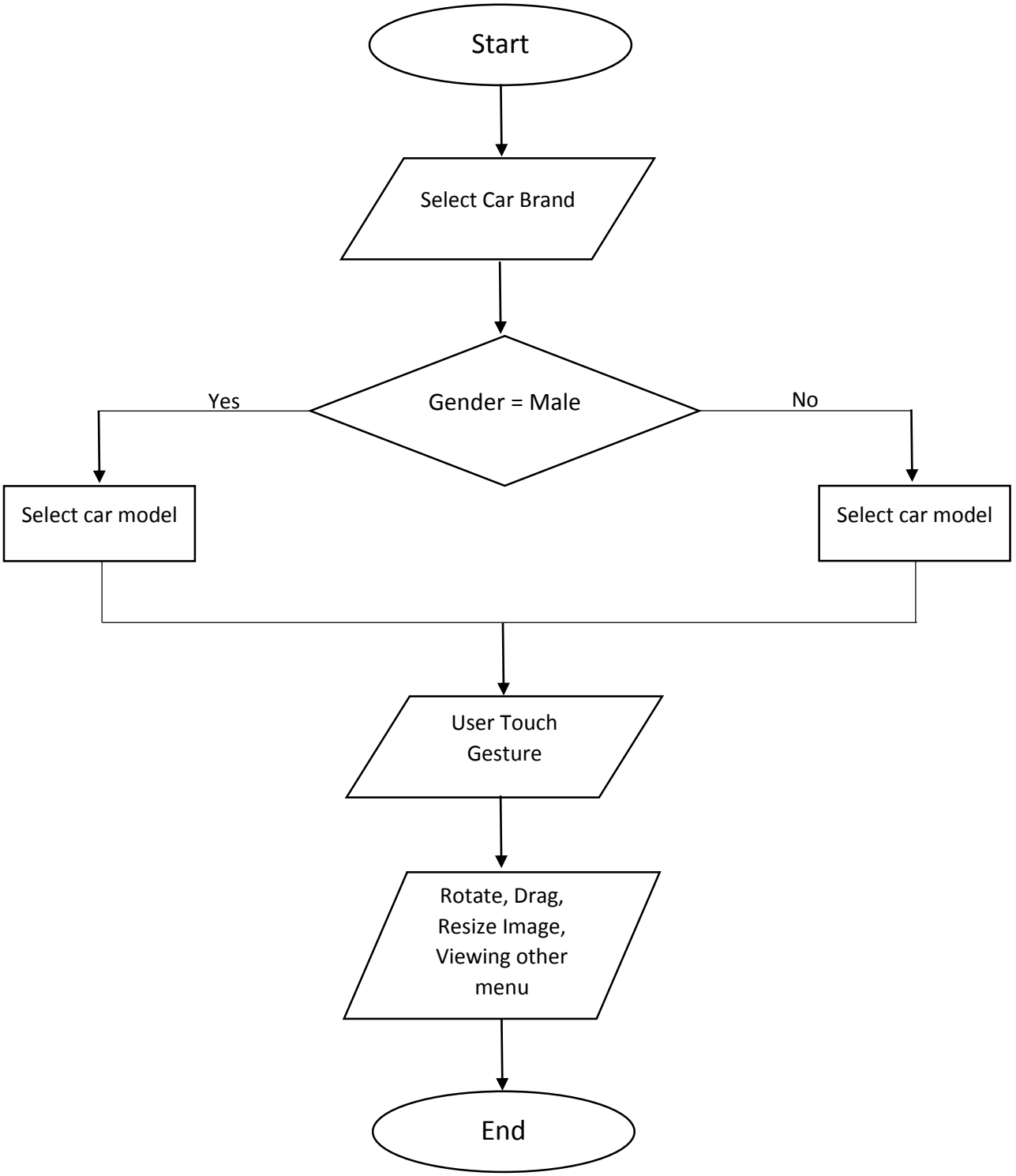


Figure 24 System Flowchart

4.2.1 Interface

Figure 25 Main Page Interface

Figure 26 Main Menu Interface (For Male)

Figure 27 Car Catalogue Interface

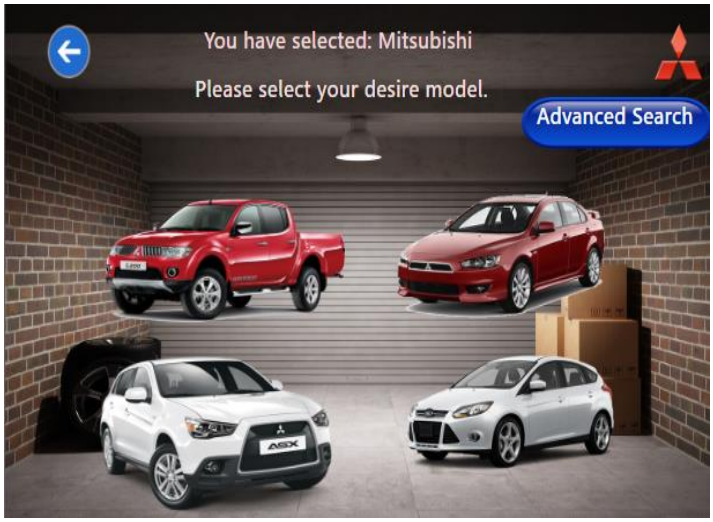


Figure 28 Advanced Search Interface

Figure 29 Car's Information Interface

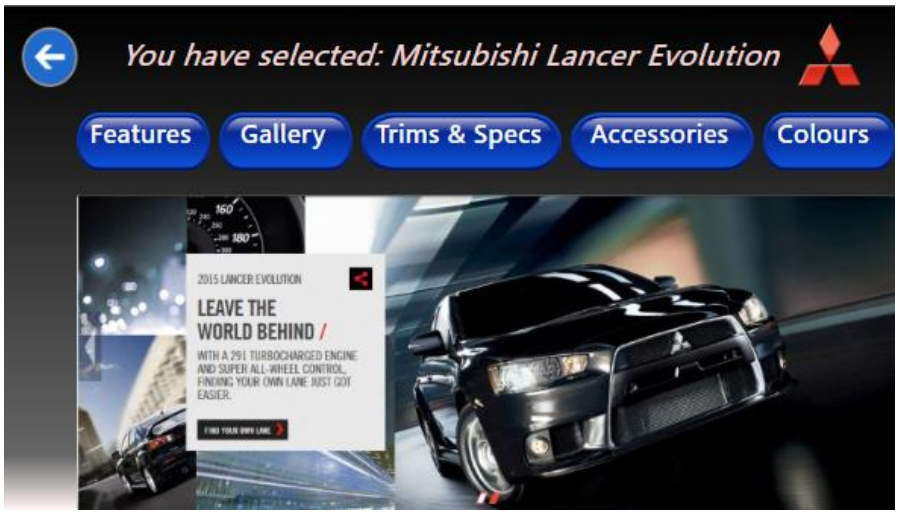


Figure 30 Car's Features Interface

Figure 31 Car's Gallery Interface

Figure 32 Car's Accessories Interface

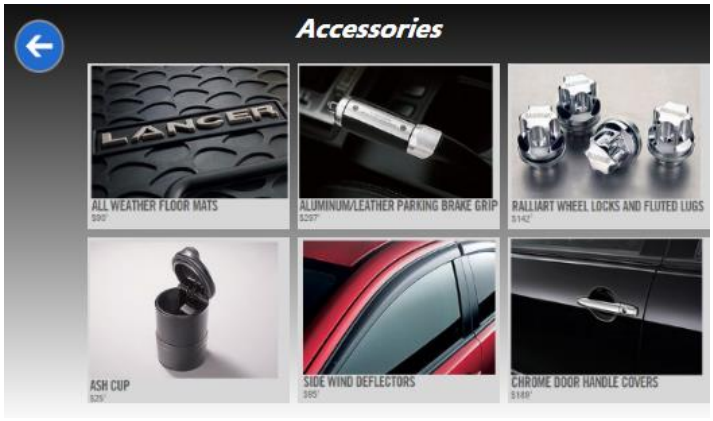


Figure 33 Car's Specification Interface

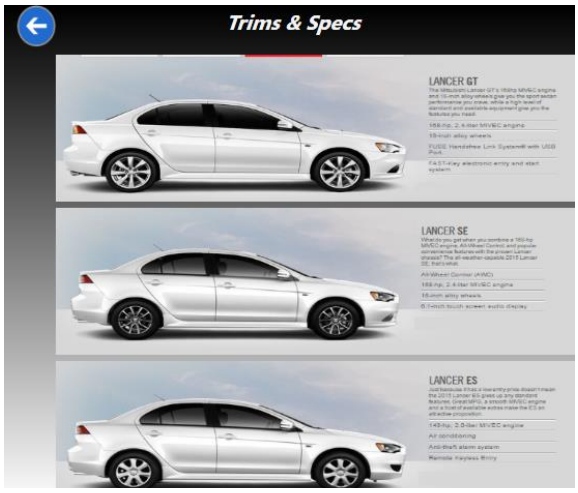


Figure 34 Car's 3D View Interface

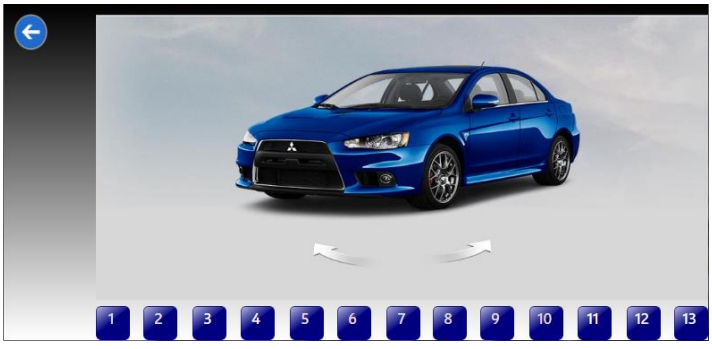


Figure 35 Car's Colour Interface

1.3 Survey Form

4.3.1 Discussion on Work Progress

In this project, survey form method is being used to obtain the responses and also information from both the company and also the customers. Both survey form are slightly different from each other but both contain the exposure of tabletop system. In the customer's survey form, the type of questions asked will be the type of cars and also the requirements preferred by the customers. Meanwhile, in the company's survey the type of question ask will their responses on the implementation of tabletop system.

The customer's survey form contains 9 required answer questions in order to complete the survey. Throughout the survey, only 30 responses are obtained in order to check on the responses of the public to this brand new technology. Since this technology can only been seen in the movie such as Startrek hence I predict that it will get good responses from the public.

Meanwhile in the company's survey form, there is 11 questions with 10 questions that are required to be answer and also 1 question which is not compulsory to answer in order to complete the survey. Throughout the survey, 60 responses had been collected whereby 30 of the responses are from Car Company such as proton, perodua and also private seller meanwhile another 30 responses are collected in order to find out whether such technology can attract the attention of the customers once it is being implemented. If the responses from the customers are good, then it might highly possible that the customers will be attracted to interact with the tabletop meanwhile helping the company to promote their products.

4.3.2 Customer's Responses

1. Gender

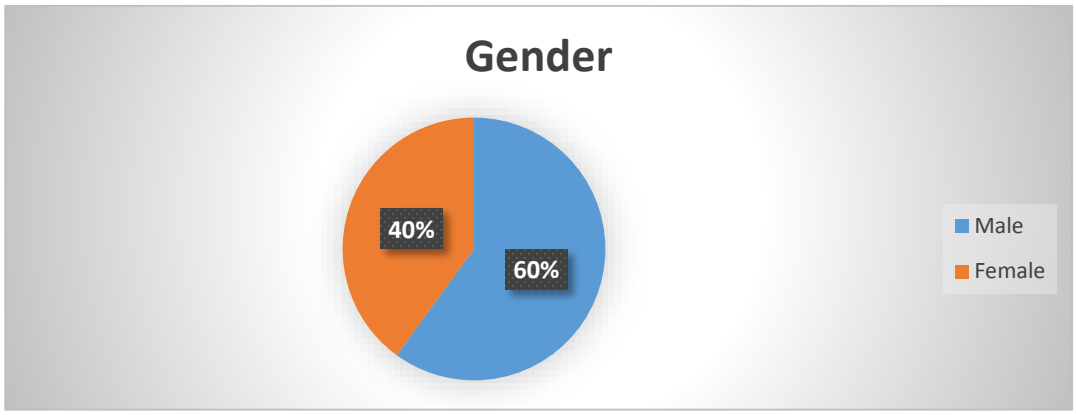


Figure 36 Pie Chart 1

2. Have you ever heard of Tabletop System?

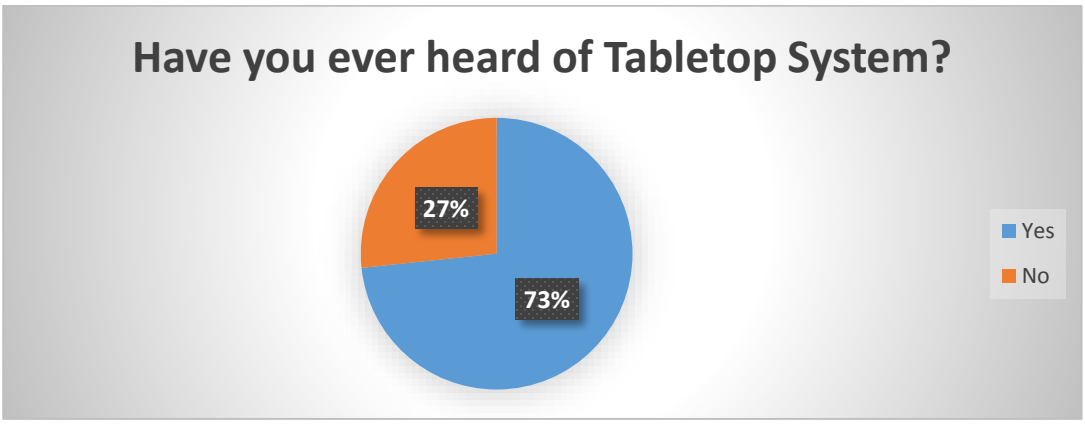


Figure 37 Pie Chart 2

3. What are the types of promotional tools that are currently used to promote products?

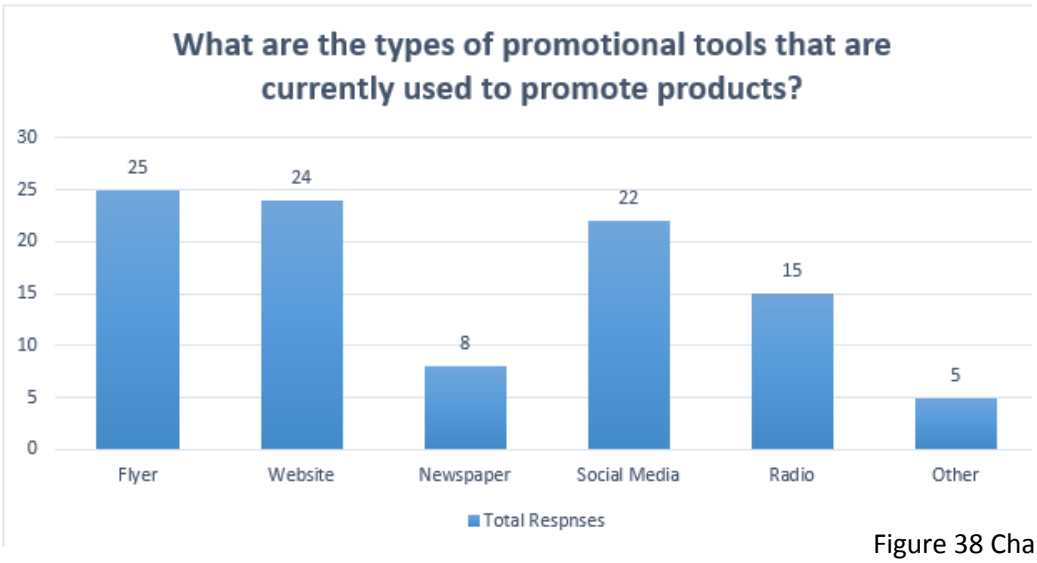


Figure 38 Chart 1

4. What is your favorite car brand?

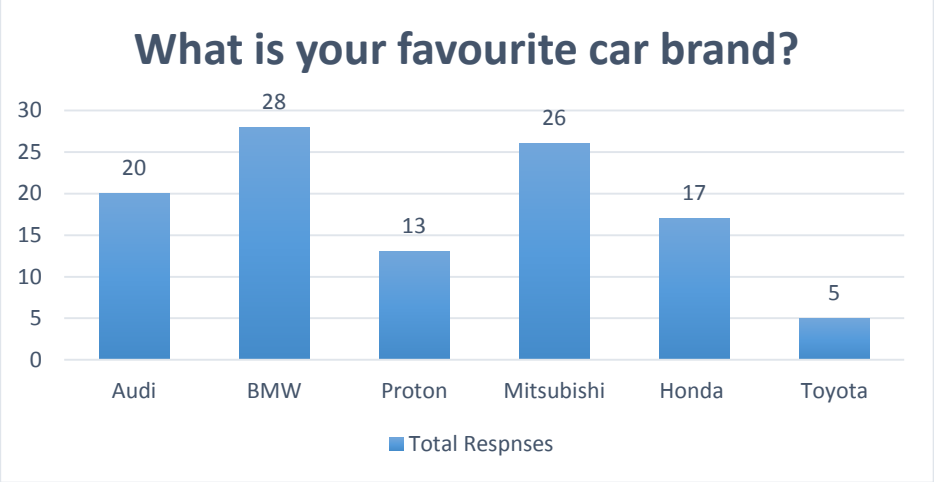


Figure 39 Chart 2

5. What is the specification or requirement required for your dream car?

Figure 40 Chart 3

6. What do you think is the price range of an expensive car?

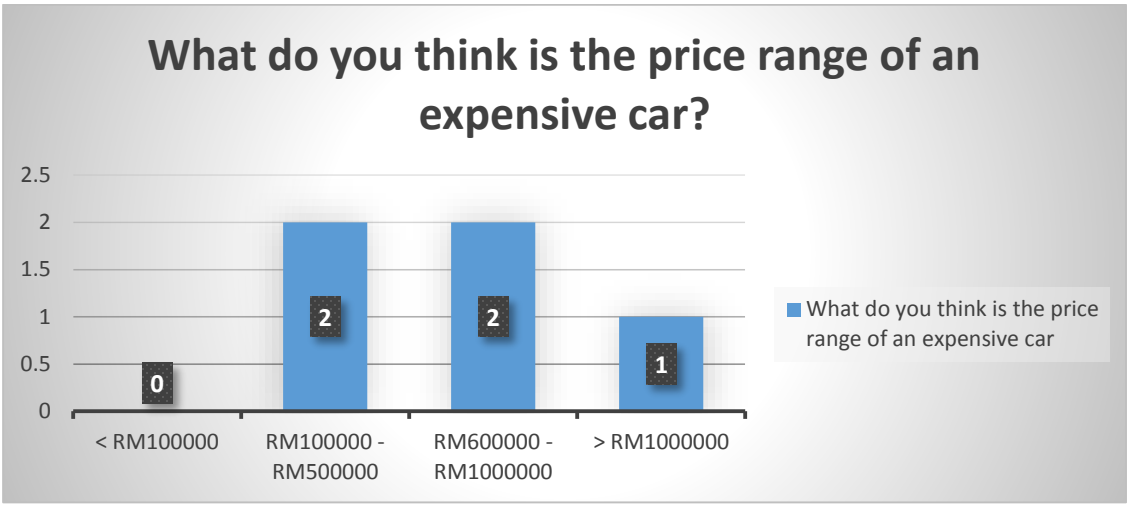


Figure 41 Chart 4

7. What is the most important information that need to be included into a catalogue?

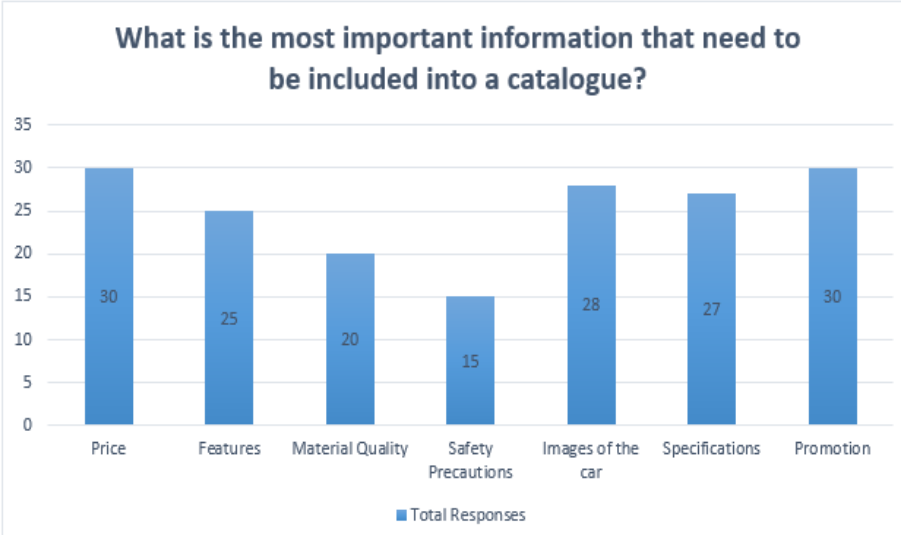


Figure 42 Chart 5

8. Do you think that interactive tabletop will be more effective than the current promotional tools?

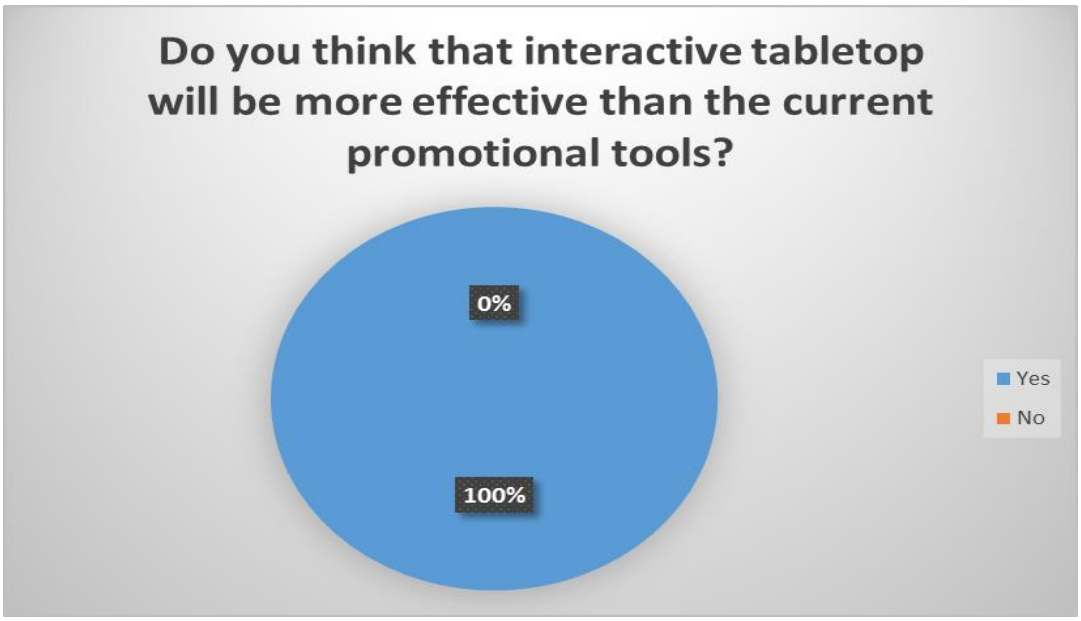


Figure 43 Pie Chart 3

9. Would you like to implement tabletop system to promote your products?

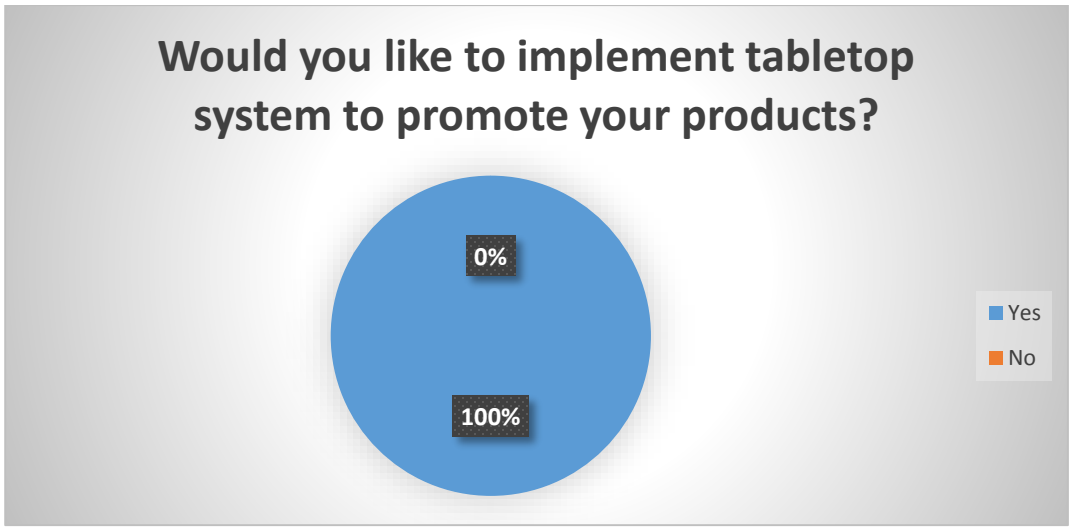


Figure 44 Pie Chart 4

4.3.3 Discussion

Two different survey form has been created in order to obtain the result from both the point of view of customers and also the car seller. The main purpose of this survey is to introduce the existence of tabletop system to the public. Secondly, after they understand the brief idea on what the tabletop is then some questions will be ask in order for the customers to compare the differences between the current promotional tools used by the public nowadays. Lastly, this survey is conducted in order to get the responses of the public about the tabletop system.

From the result that we obtain from the survey, firstly this survey is conducted by 5 respondents which consist of 12 female and 18 male respondents. In this survey, it is shown that out of 30 people there is 23 people who know about the existence of tabletop system which is a good as they will try to implement it in their business since they know about how the system works and the benefits that it brings to the company. Next as I proceed to the opinion of the public on the current promotional tools that is mostly seen today the result show that social media is the mostly seen promotional tool. This is because nowadays everyone is capable of surfing internet and we will always bump into advertisement no matter what website we surf such as google, facebook, twitter and etc.

Follow by the second highest responses will be flyer. Giving out flyer are said to be the mostly seen promoting method as people hire or volunteer for the company help handling out the flyer promoting their current promotion or any special deals. Not only the company can get attention, but the people who give the flyer will also get salary from giving out the flyer, benefiting both the company and also the person who give out the flyer. Hence, flyer is said to be the second highest promotional tool recommended by the company according to the responses of the public. Next follow up by newspaper and also radio which is said to be not very effective in promoting.

Next, a question regarding the specification of the car dream by the public is also important as people will not purchase the car if the requirement or specification is not fulfill no matter how luxuries or cheap the car. From the result obtained from the survey, it is shown that oil saving is prove to be the most popular for the public as oil saving car can help the driver to save a huge amount of money used in refilling the petrol in the

long run. Follow by the second highest, horsepower as car with higher horsepower will be more powerful but more oil consuming, hence this is also an important factor for the customer to make their decision. Later follow by luxurious car which is only affordable by person who has high level of income and also finally low price car. It is not a surprise as low pricing car tend to be less secure or used car. Hence, the public focus more on the safety and also the oil consumption of the car according to the survey.

Last but not least is the responses of the customers on the tabletop system. The result from the survey shows that all of the respondents agree that tabletop is more effective than the current promotional tools and also agree to implement it to the current business world.

4.3.4 Company Survey Form

1. Gender

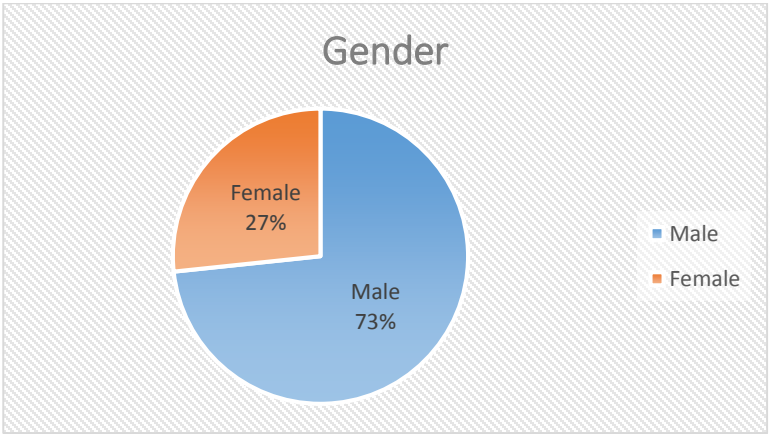


Figure 45 Pie Chart 5

2. Have you ever heard of Tabletop System?

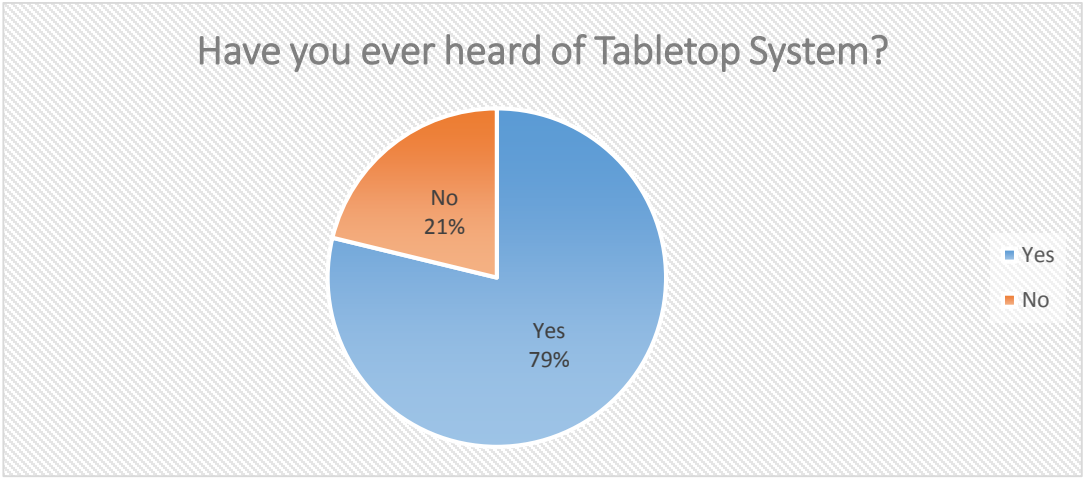


Figure 46 Pie Chart 6

3. What are the types of promotional tools that are currently used to promote products?

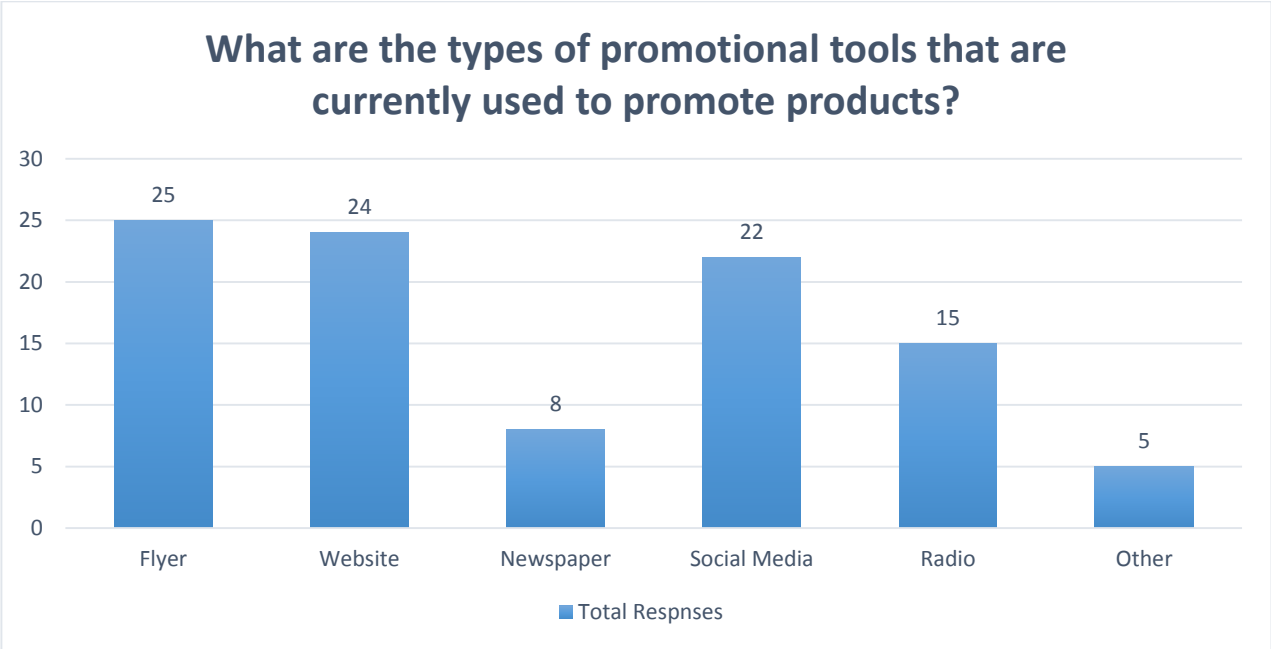


Figure 47 Chart 6

4. According to your experience, what is the specification of cars that is mainly purchased by the male category?

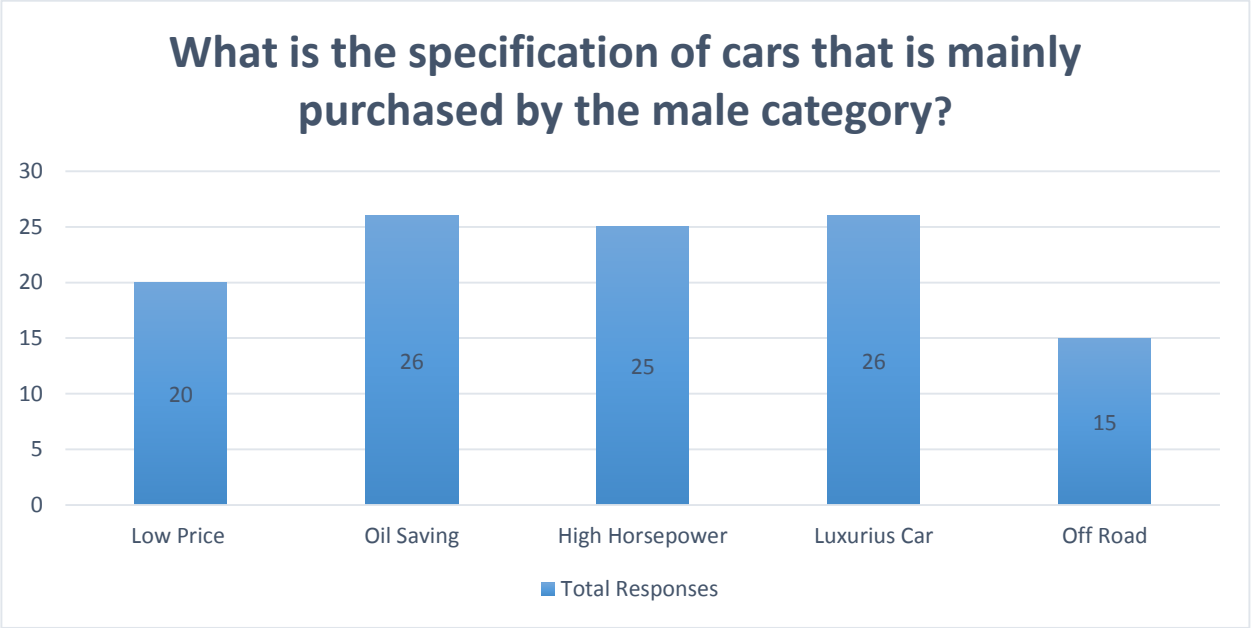


Figure 48 Chart 7

5. According to your experience, what is the specification of cars that is mainly purchased by the female category?

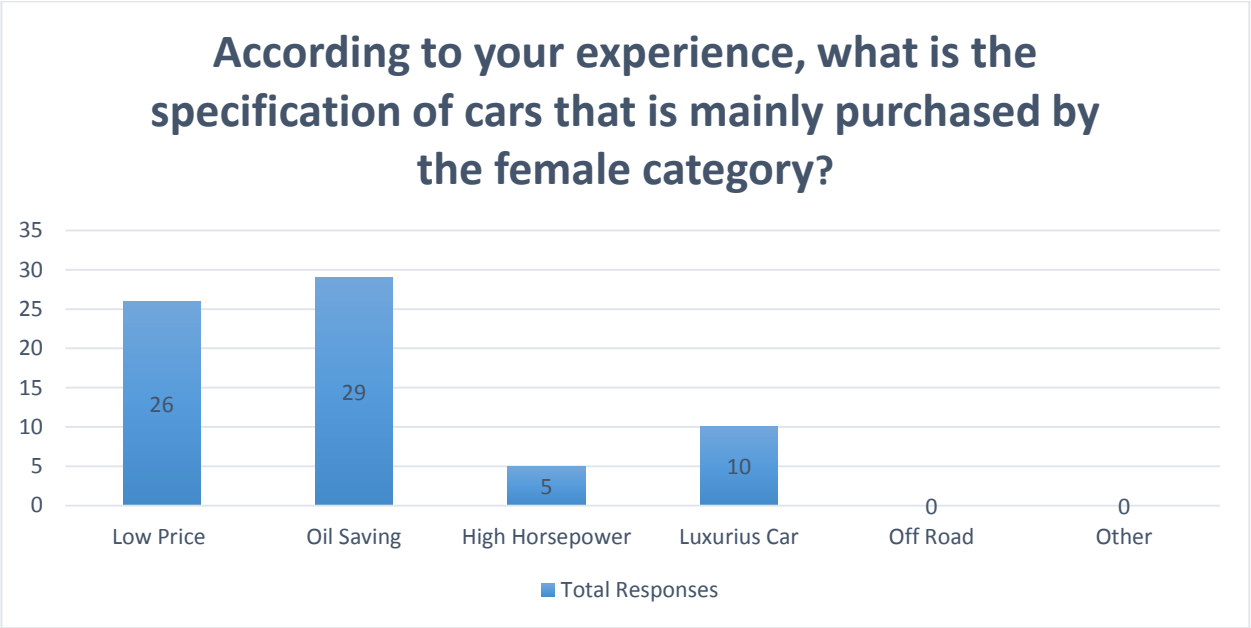


Figure 49 Chart 8

6. According to your experience, what is the price range of a car that is affordable by family with moderate income?

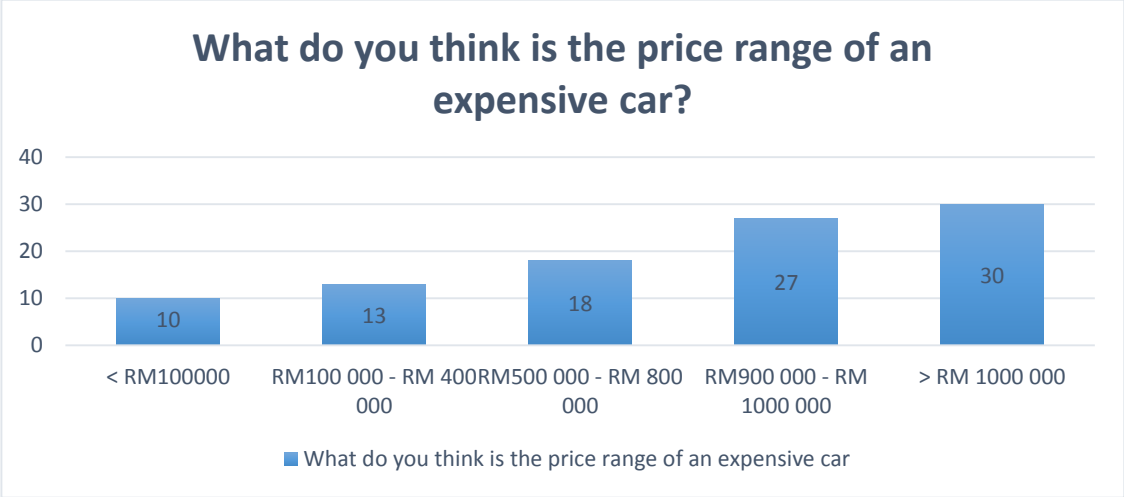


Figure 50 Chart 9

7. What is the most important information that need to be included into a catalogue?

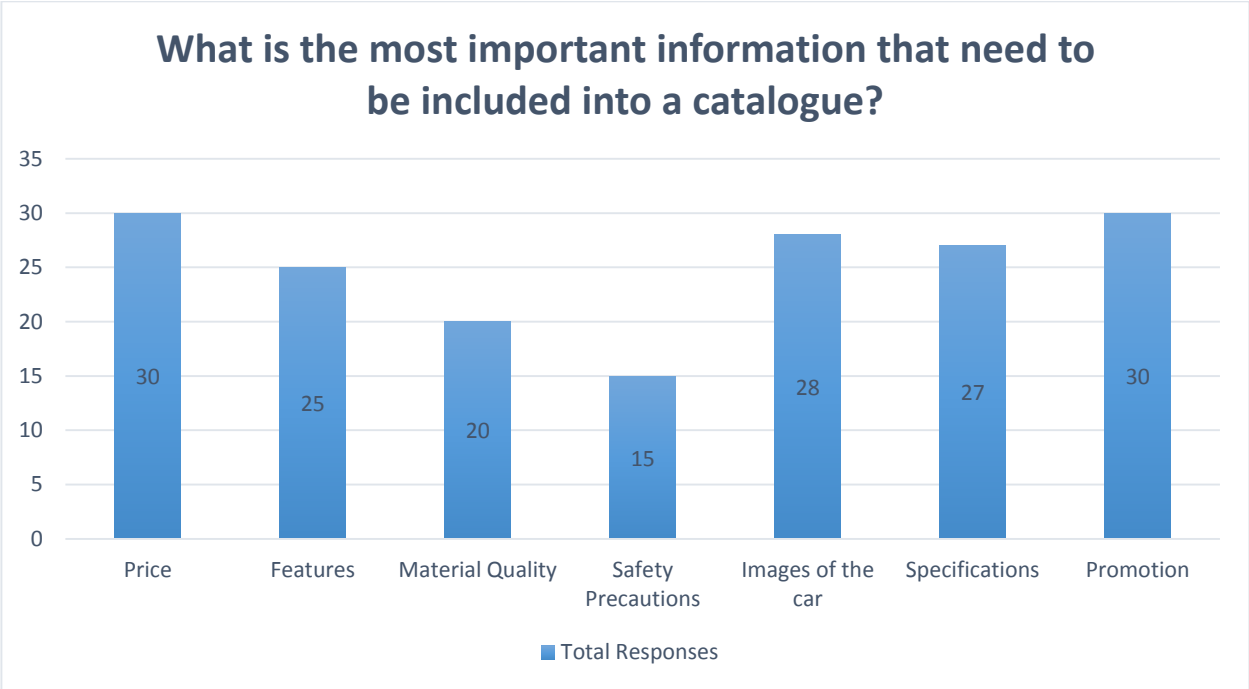


Figure 51 Chart 10

8. Do you think that interactive tabletop will be more effective than the current promotional tools?

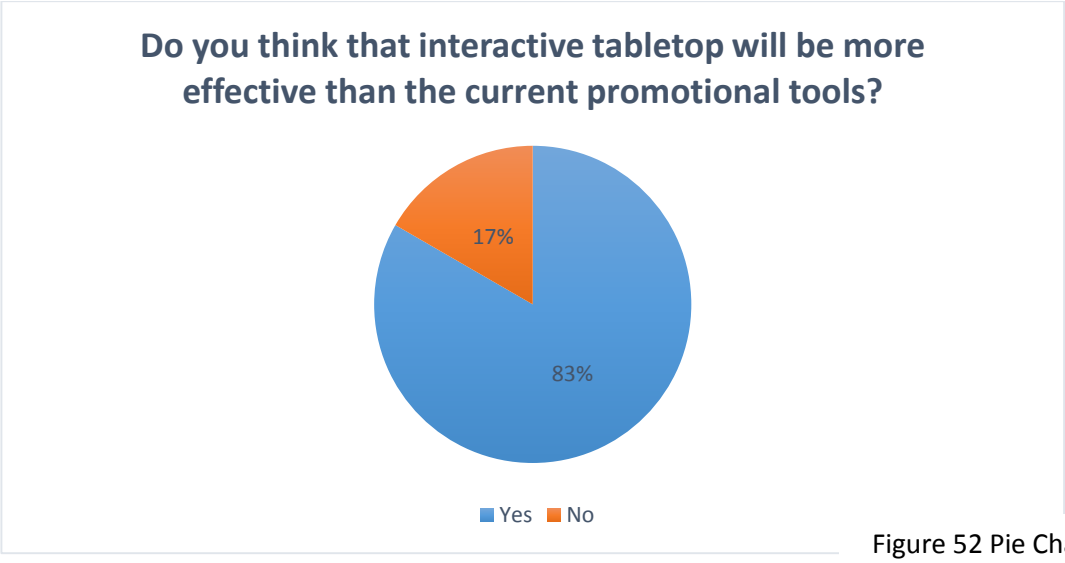


Figure 52 Pie Chart 7

9. Would you like to implement tabletop system to promote your products?

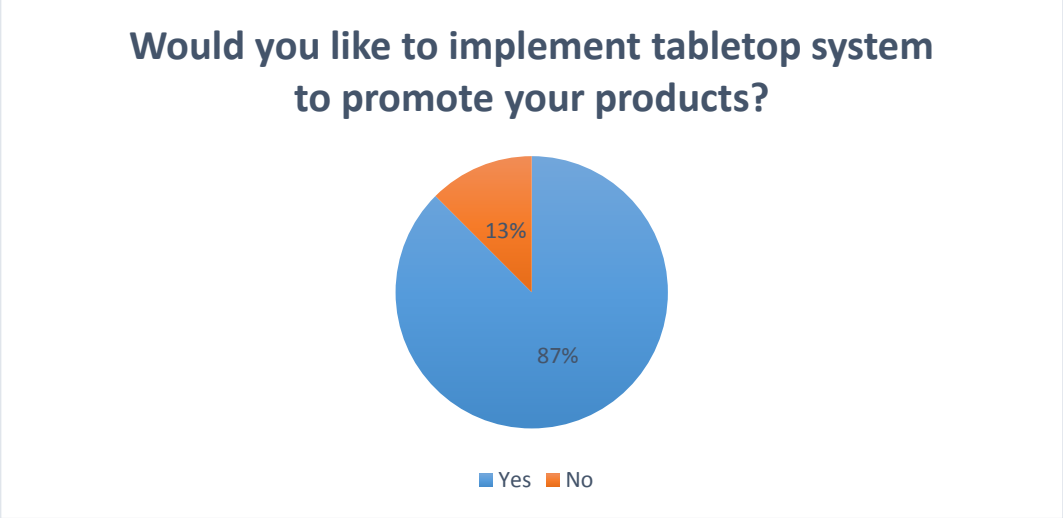


Figure 53 Pie Chart 8

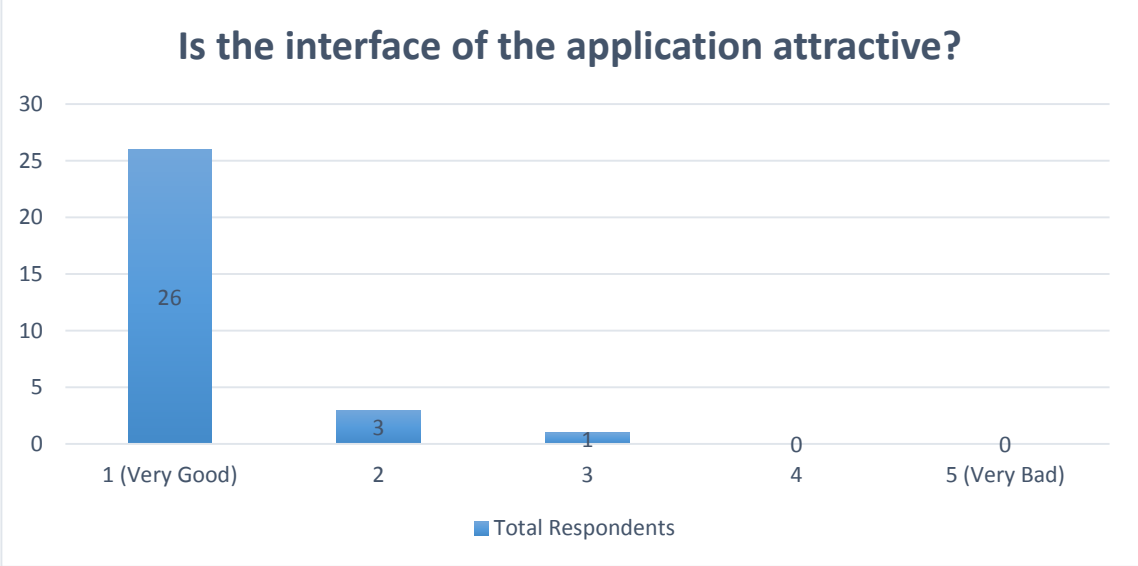
4.3.5 Discussion

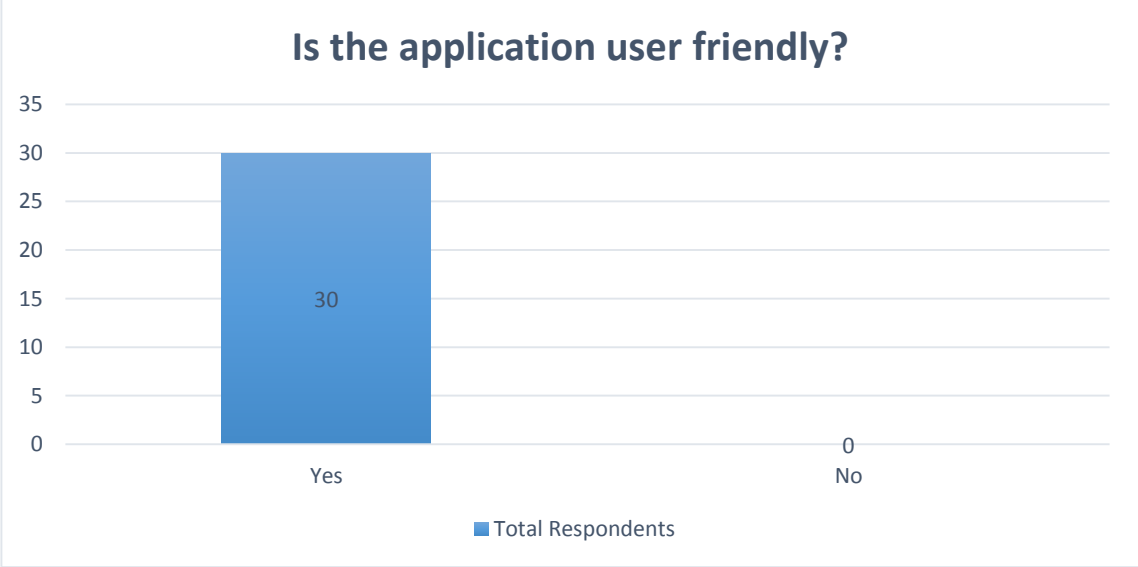
The main purpose of this survey is also the same which is to expose the existence of tabletop system to the company and secondly obtain the information regarding the information of the customers preferred car model and also specification. According to the result obtain, this survey is conduct by 30 respondents, consist of 23 male and also 7 female. Among the 30 respondent who work as car seller, 26 of respondents said that they know the existence of the tabletop system. This is good because this results show that the company might considering to implement this system as they already know of the potential of tabletop system as an effective promotional tools that the customers can interact with it.

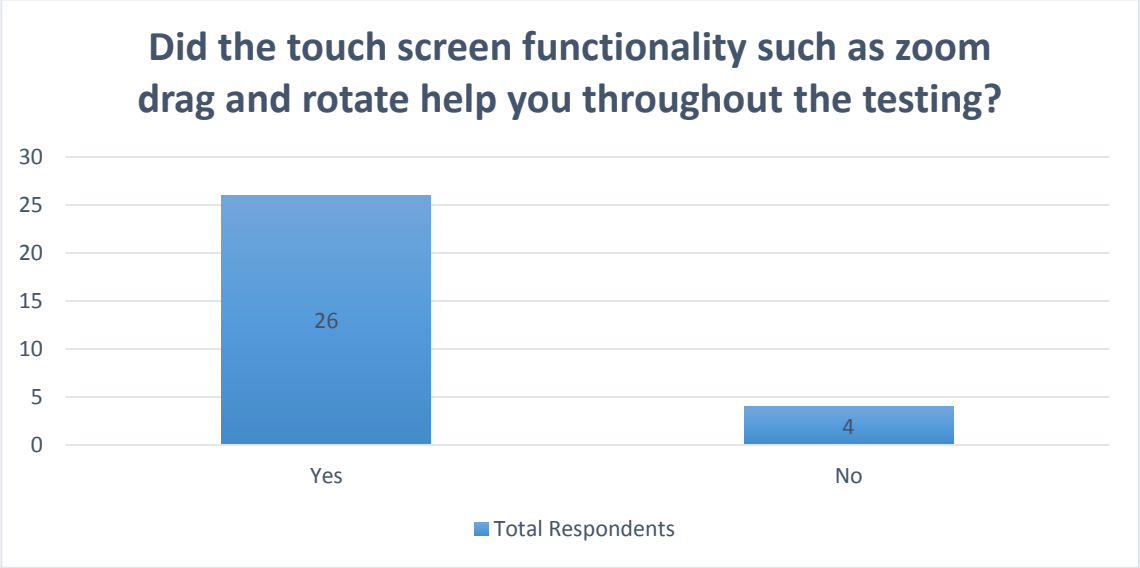
Next question is also about the current promotional tools used by the company and yes the result is almost the same as the customer's responses which is flyer and website. This result proves that the customers are aware of the current promotional tools used by the company. Hence, if tabletop system got good responses from the public then it will encourage the company to implement it in order for them to attract more customers.

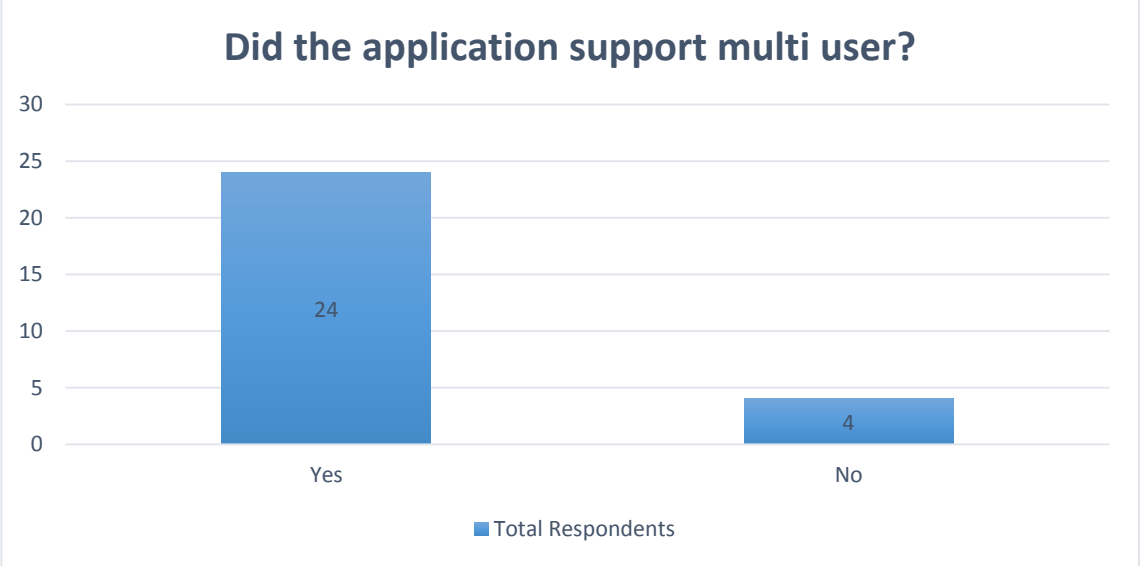
Follow by the question ask according to the experience of car seller, the category of car that are preferred by both male and female category, the result shows that car preferred by the male would be the car with high horsepower, follow by luxurious car, oil saving, low price and finally off road. This result shows that the male are more focus on the appearance and also the specification of a car. Meanwhile, the result for female category shows that the car preferred by female will be oil saving, lower price, follow by luxurious car and also horsepower. This result can also conclude that female focus more on the features of the car instead of the appearance. This is an important factor as type of cars being included into the catalogue system will affect the buying decision of the customers.

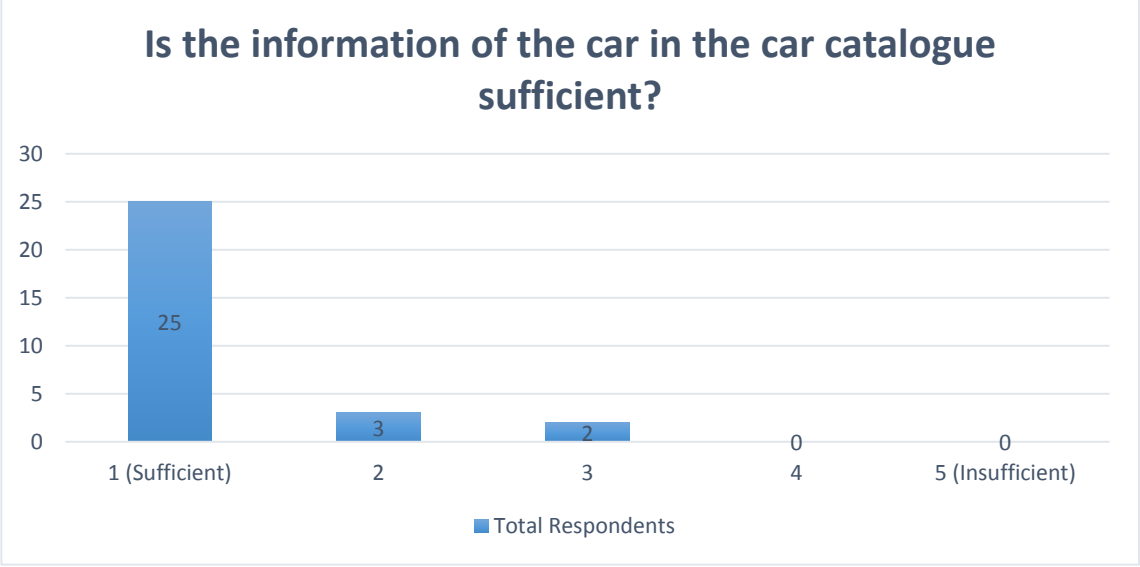
Last but not least, 9 respondents says that they are not willing to implement it because they claim that tabletop can only be used on a fixed place but cannot be carry around such as flyer. But overall, 21 respondents said that they are willing to try implement it even though they thought that it might not be as effective as the current tools.

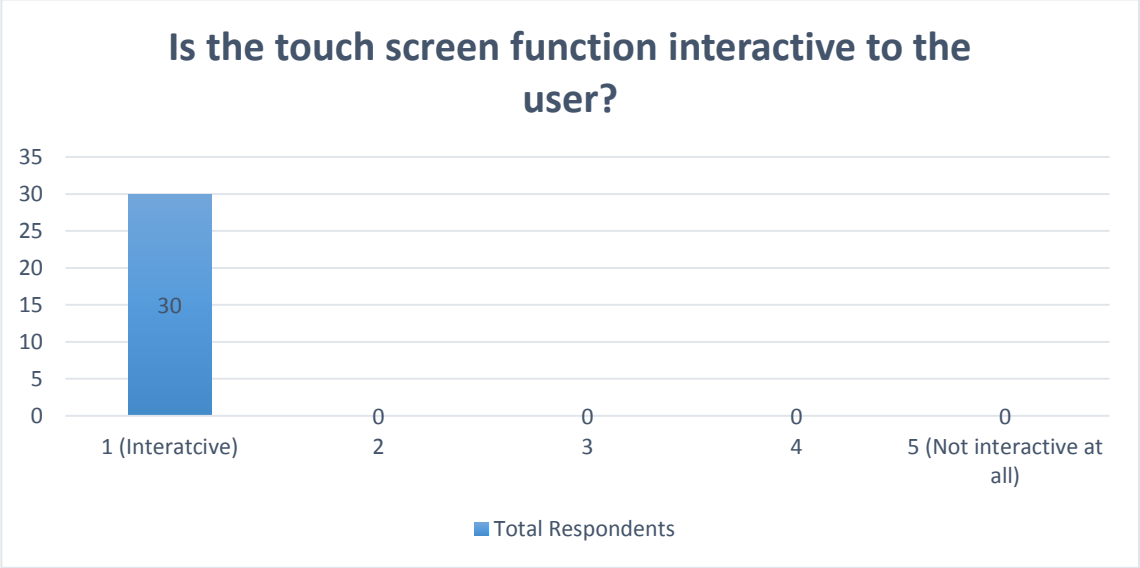

Is the interface of the application attractive?
30
25
20
15
10
5
0
26
3
1
0
0
1 (Very Good)
2
3
4
5 (Very Bad)
Total Respondents

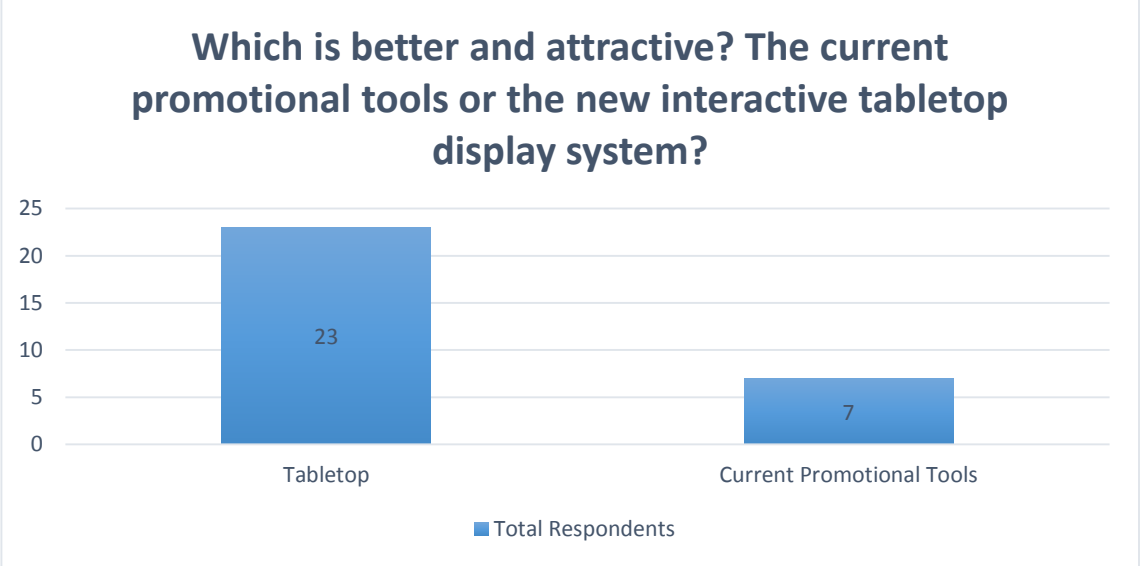

Is the application user friendly?
35
30
25
20
15
10
5
0
30
0
Yes
No
Total Respondents


Did the touch screen functionality such as zoom drag and rotate help you throughout the testing?
30
25
20
15
10
5
0
26
4
Yes
No
Total Respondents


Did the application support multi user?
30
25
20
15
10
5
0
24
4
Yes
No
Total Respondents


Is the information of the car in the car catalogue sufficient?
30
25
20
15
10
5
0
25
3
2
0
0
1 (Sufficient)
2
3
4
5 (Insufficient)
Total Respondents


Is the touch screen function interactive to the user?
35
30
25
20
15
10
5
0
30
0
0
0
0
1 (Interatcive)
2
3
4
5 (Not interactive at all)
Total Respondents


Which is better and attractive? The current promotional tools or the new interactive tabletop display system?
25
20
15
10
5
0
23
7
Tabletop
Current Promotional Tools
Total Respondents

Chapter 5

Conclusion and Future Recommendations

As conclusion, I firmly believe that the tabletop display, a table based tangible interfaces where digital information becomes graspable within the grasp of simple objects available on a table surface can fulfill different kinds on needs. Not only that, tabletop system also support multi-touch and shared control which can support the use of more than 1 person without interfering each other's work. Even though tabletop is still a largely unexplored research area but I can see the potential of it to expand and provide more features other than promoting products. But we have to do it step by step, first is by creating an interactive user interface such as my project the car catalogue system, once more people realize the potential of the tabletop then slowly they will be implemented in different area.

As summarizes from the result obtained from the survey, it is clearly shown that the respondents are highly agree towards the implementation tabletop system not only from the public but also company.

The future recommendations for this project would be the implementation of double screen for multi user's usage. It is true that tabletop support multi touch but the project is now only available for one user's usage at one time. The usage of more than one user will cause an interruption with the task that current user is doing. Hence, in future recommendation I hope that the designation of double screen or separated screen can implement the usage of multiple user at a time.

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Appendix A

Suevey Form Questionnaire (For Company Response)

Interactive Tabletop Car Catalogue System

This survey is conduct in order to collect the opinions of customers on the current promotional tools and also to introduce the interactive tabletop display system.

* Required

Tabletop Display

Gender *

- ○ Male
- ○ Female

Have you ever heard of tabletop system? *

Tabletop is a table with computer embedded inside the table. The user can interact with it either by using mouse or touch screen. The customers can interact with it by zooming into the product and also viewing the 3D view of the product.

- ○ Yes
- ○ No

What are the types of promotional tools that are currently use to promote your products? *

- ○ Flyers
- ○ Website
- ○ Newspaper
- ○ Social Media
- ○ Radio
- ○ Other: [ ]

According to your experience, what is the specification of cars that is mainly purchased by the female cateogory? *

- ○ Low Price
- ○ Oil Saving
- ○ High Horsepower
- ○ Luxurious Car
- ○ Off Road
- ○ Other: [ ]

What is the specification or requirement that is normally preferred by the male category? *

Selection can be more than one

- ☐ Low Price
- ☐ Oil Saving
- ☐ High Horsepower
- ☐ Luxurious Car
- ☐ Off Road
- ☐ Other: [ ]

What's the top selling car model of your company? *

Can be more than 1 model

[ ]

According to your experience, what is the price range of a car that is affordable by family with moderate income? *

[ ]

According to your experience, what is the most important information that need to be included into a catalogue? *

[ ]

Do you think that interactive tabletop will be more effective than the current promotional tools? *

- ○ Yes
- ○ No

If yes, briefly explain the reason why?

If no, briefly explain the reason why?

Would you like to implement interactive tabletop system? *

- ○ Yes
- ○ No

Survey Form Questionnaire (For Public Response)

Interactive Tabletop Car Catalogue System

This survey is conduct in order to collect the opinions of customers on the current promotional tools and also to introduce the interactive tabletop display system.

* Required

Gender *

- ○ Male
- ○ Female

Have you ever heard of tabletop system? *

Tabletop is a table with computer embedded inside the table. The user can interact with it by using mouse or touch screen.

- ○ Yes
- ○ No

What are the types of promotional tools that are currently use to promote your products? *

- ☐ Flyers
- ☐ Website
- ☐ Newspaper
- ☐ Social Media
- ☐ Radio
- ☐ Other: [ ]

What's your favorite car brand? *

More than 1 is acceptable

What is the specification or requirement required for your dream car? *

For example cost saving,luxuries,oil saving etc

- [ ] Low Price
- [ ] Oil Saving
- [ ] High Horsepower
- [ ] Luxurious Car
- [ ] Off Road
- [ ] Other:

What do you think is the price range of an expensive car? *

What is the most important information that need to be included into a catalogue? *

Do you think that interactive tabletop will be more effective than the current promotional tools? *

- ( ) Yes
- ( ) No

Would you like to implement tabletop system to promote your products? *

- ( ) Yes
- ( ) No