USER ACCEPTANCE OF CROWDSOURCING TECHNOLOGY IN RURAL AND URBAN AREA IN MALAYSIA

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USER ACCEPTANCE OF CROWDSOURCING TECHNOLOGY IN RURAL AND URBAN AREA IN MALAYSIA

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This report is submitted in partial fulfillment of the requirements for the Bachelor of Computer Science (Computer Networking)

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2016

DECLARATIONS

I hereby declare that this report

USER ACCEPTANCE OF CROWDSOURCING TECHNOLOGY IN RURAL AND URBAN AREA IN MALAYSIA

is the result of my own work except for quotes as cited in the references.

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DEDICATION

Special thanks to my family, project supervisor and friends.

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ABSTRACT

Crowdsourcing is a process of collecting ideas from the public or the crowd to solve a particular problem at hand. Crowdsourcing plays a significant role at the present time when it comes to navigation. Most people these days are always travelling and are always on the move to a place or another and it is becoming increasingly important for them to be up to date with the routes, traffic information and incident report so that they can plan their travelling time accordingly and have a smooth travel as a result. Waze is an example of a navigation tool utilizing crowdsourcing to benefit its users. However, the number of users contributing information in Waze differs in rural area compared to urban are, where users are more likely to share information in Waze. This research is carried out to explore the technology acceptance of crowdsourcing technology in rural and urban areas by applying the Technology Acceptance Model. This research is conducted using quantitative method and a structured questionnaire is used to collect data. A total of 250 respondents are chosen to collect and analyze the data from.

ABSTRAK

"Crowdsourcing" adalah proses mengumpul idea-idea daripada orang ramai untuk menyelesaikan masalah tertentu . "Crowdsourcing" memainkan peranan yang penting pada masa kini dalam sektor navigasi. Kebanyakan orang hari ini sentiasa sentiasa bergerak ke suatu tempat atau yang lain dan ia menjadi semakin penting bagi mereka untuk mendapatkan maklumat terkini tentang jalan raya, maklumat lalu lintas dan laporan kejadian atas ajalan raya supaya mereka boleh merancang masa perjalanan mereka dengan sewajarnya dan mempunyai perjalanan yang lancar. Waze adalah contoh alat navigasi yang menggunakan "crowdsourcing" yang menjadi amat berguna kepada penggunanya. Walau bagaimanapun, bilangan pengguna yang menyumbang maklumat dalam Waze berbeza di kawasan luar bandar berbanding di bandar, di mana pengguna lebih cenderung untuk berkongsi maklumat dalam Waze. Kajian ini dijalankan untuk mengkaji penerimaan teknologi "crowdsourcing" di kawasan luar bandar dan bandar dengan menggunakan Technology Acceptance Model. Kajian ini dijalankan dengan menggunakan kaedah kuantitatif dan soal selidik berstruktur digunakan untuk mengumpul data. Seramai 250 responden dipilih untuk mengumpul dan menganalisis data dari.

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CHAPTER I

INTRODUCTION

1.1 Introduction

Crowdsourcing is the process of gathering information, commonly from an online platform, from a group of people. Crowdsourcing itself is a combination of two words; crowd and sourcing, which means outsourcing a task to a crowd of people (Suroweicki, 2004). Crowdsourcing can be used for various purposes such as funding, designing, and collecting wisdom. The genuine advantage of crowdsourcing is that it garners mass intelligence to solve any type of problem at a relatively lower price. In contrast to hiring a devoted professional to work on it, crowdsourcing helps in getting more people who are willing to contribute their intelligence at any time.

However, the credibility of the information gathered through crowdsourcing is compromised. Since the information is contributed by the general public, the level of expertise becomes questionable. This becomes a setback of crowdsourcing tool. Crowdsourcing has made its existence among us for many years. It has served as an important tool when it comes to problem solving along with the rapid growth of technology and crowdsourcing platforms. Since crowdsourcing is closely associated to use of technology, the level of acceptance varies in urban and rural areas (Pakistan e-learning).

Crowdsourcing is defined as problem-solving model that is effective, efficient and relatively cheap. Through crowdsourcing, an organization can gather mass intelligence from an indeterminate number of people. The up side of opting to use crowdsourcing technology is that people are willing to contribute information at any time and that makes it flexible, rather than hiring a dedicated professional who comes at a cost, though the level of expertise is more reliable. The down side of crowdsourcing is the credibility of the information gathered. An example of crowdsourcing technology is Wikipedia. Wikipedia is an information sharing website online that allows any user to edit and contribute information.

1.2 Problem Statement

Table 1. 1: Problem Statement

PS	Problem Statement
PS1	A less user acceptance of crowdsourcing technology in Waze application

The technology acceptance of crowdsourcing technology in Waze application differs in rural areas, where it is lower as compared to urban area.

1.3 Project Questions

Project Questions (PQ) were constructed in table 1.2 below, to recognize the problem statement as discussed in previous section.

Table 1. 2: Project Questions

PS	PQ	Project Questions
PS1	PQ1	How to determine the user acceptance of crowdsourcing technology in Waze application?
	PQ2	How does the geographical location of the user affect the variables affecting technology acceptance of crowdsourcing technology in Waze application?

1.4 Project Objective

There are a few project objectives that need to be achieved through this study. The main objective of this analysis is:

Table 1. 3: Project Objective

PS	PQ		Project Objective
PS1	**PQ1**	**PO1**	To study the applicability of Technology Acceptance Model's variables in the acceptance of crowdsourcing technology in Waze.
		PO2	To evaluate the Technology Acceptance Model's variables in the acceptance of crowdsourcing technology in Waze.
	PQ2	**PO3**	To analyze the influence of geographical factor influences the variables of the technology acceptance of crowdsourcing technology.

1.5 Project Scope

1.5.1 Crowdsourcing Technology in Waze Application

Waze is a community-driven navigation application that gathers complementary map data and traffic information from its users. It allows the users to report accidents, traffic jams, speed and police traps, and from the online map editor, can update roads, landmarks, house numbers and more. "Crowdsourcing" is the act of gathering needed service or idea from a large group of people. Most common crowdsourcing platforms are Twitter and Waze.

In this study, the technology acceptance of "crowdsourcing" technology in Waze Application is analyzed.

1.5.2 Random Sample Size

This study is targeted to Malaysians only. The respondents in this study are not specified to any gender or age group. The respondents are divided into two main groups that are respondents from rural area and respondents from urban area.

1.6 Project Contribution

1. **Practical contribution:** A validated questionnaire for technology acceptance of crowdsourcing technology in Waze application.
2. **Community contribution:** Analysis of technology acceptance of crowdsourcing technology in Waze application based on different geographical locations and how it can make travelling on Malaysian roads a pleasant environment.

1.7 Thesis Organization

This report consists of six chapter that is Chapter 1: Background, Chapter 2: Literature Review, Chapter 3: Methodology, Chapter 4: Design and Data Collection, Chapter 5: Testing and Result Analysis and Chapter 6: Conclusion.

Chapter 1: Introduction

This chapter will elaborate in detail about the project introduction, project objective, problem statement, project question, project scope, project contribution, and thesis organization.

Chapter 2: Literature Review

This chapter will discuss related work on this topic, such as type of mobile social network application and trust issues in mobile social network.

Chapter 3: Methodology

This chapter will describe the method that will be used to analyse the level of trust in web-based mobile social network application and its effect on users' social behaviour by the results gathered from conducting a survey.

Chapter 4: Design and Data Collection

This chapter will introduce the software used to facilitate the analysing process in the project and environment setup,

Chapter 5: Testing and Result Analysis

This chapter will analyse the collected data and carry out the parameter proposed to support the evidence.

Chapter 6: Conclusion

This chapter will conclude and discuss the outcomes, restrictions, contribution and the future work of the project.

1.8 Conclusion

As a conclusion, this chapter draws a guideline for the study that is about to be carried out. Each sub-topic is a brief explanation on what this study is about. The next chapter will be about literature review.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

In this chapter, prior studies that have been carried out on crowdsourcing will be discussed. Besides, papers and researches related to Technology Acceptance Model (TAM) are also studied to comprehend how TAM is implemented in this study and the variables in TAM affect the outcome of this study. Studies and researches that are related to the domain are discussed briefly in this chapter. Moreover, a comparison between the previous researches, thesis, and papers is done in order to list down the context and domain of study to identify the research gap.

2.2 Taxonomy of Technology Acceptance of Crowdsourcing Technology in Waze Application in Rural and Urban Area.

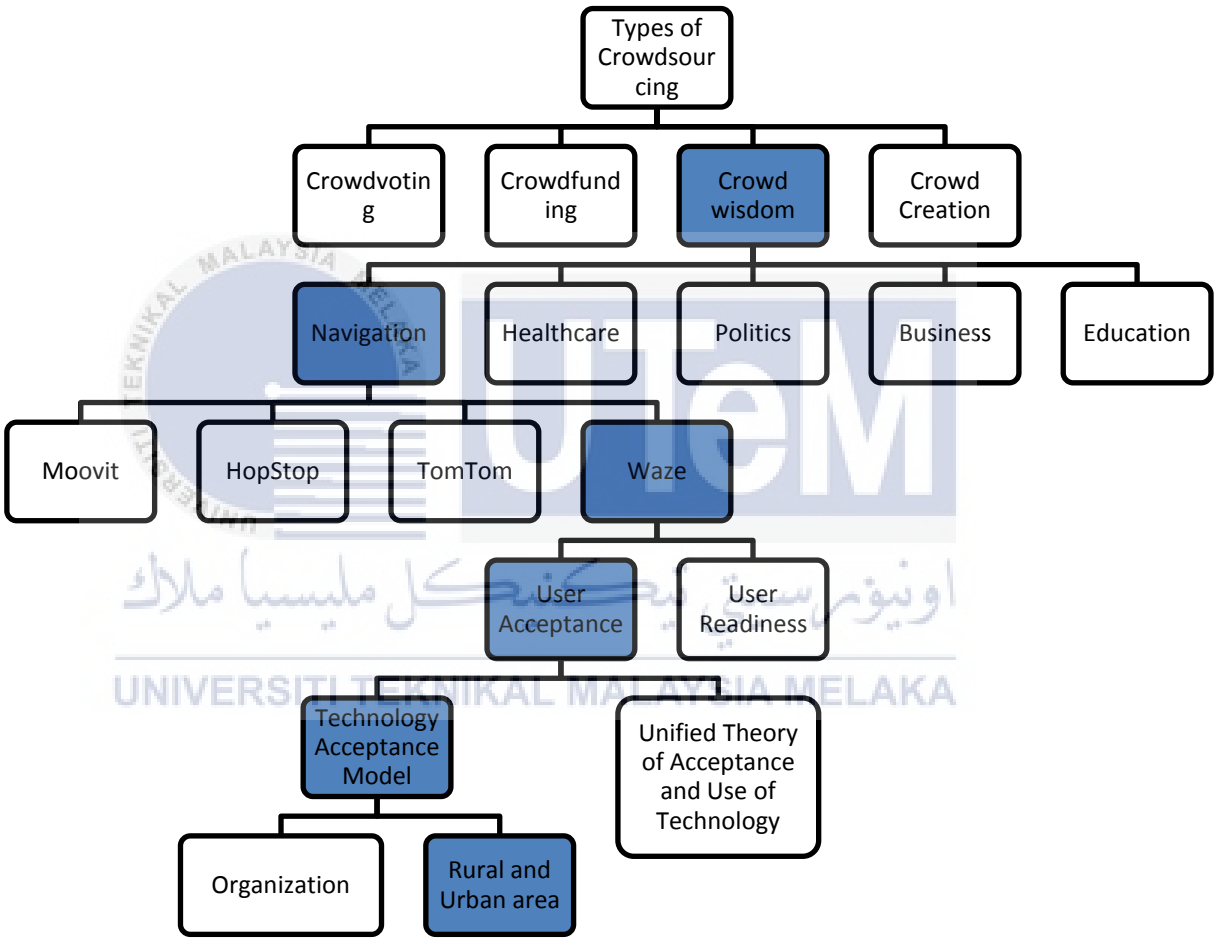


Figure 2.1: Taxonomy of Technology Acceptance of Crowdsourcing Technology in Waze Application in Rural and Urban Area.

2.3 Types of Crowdsourcing

Crowdsourcing is defined as a problem-solving model which is distributed and is participate by a mass of unspecified size to resolve a difficult problem through an open invite. The term crowdsourcing is a combination of two words; crowd and outsourcing (Suroweicki, 2004), which brings the meaning using the crowd to outsource to gain information or get a task accomplished. Jeff Howe has specified in his article (Howe, 2006), that the word crowdsourcing is used for a wide group of activities that take on different forms. Jeff Howe has stated that crowdsourcing was a form of outsourcing, which is much reasonable in cost and flexible than hiring a dedicated professional to get the same task done. Wikipedia describes crowdsourcing as "an internet based problem solving model." Authors such as (Lakhani, Jeppeson , 2010) also interpret crowdsourcing as problem-solving competitions. Crowdsourcing has become one of the most important developments in transforming the current internet and the mobile market. It can be extremely useful when it comes to gathering collective intelligence from a big or undefined number of people. Crowdsourcing is divided into several types such as crowdfunding, crowdvoting, crowdwisdom and crowdcreation.

2.3.1 Crowdwisdom

Crowdwisdom gives an opportunity to big organizations who want to collect mass intelligence a cheaper, efficient and flexible method to gather information. The crowd that is willing to contribute information at any time to gather information, rather than hiring a professional who comes at a more expensive cost. However, the authenticity and credibility of the information becomes questionable since it is gathered from a wide range of people with

general expertise on the particular topic. The supposed advantages of crowdwisdom include an easy access to an extensive range of people who are willing to work, various solutions to problems, lower labor rates and reduced time-to-market.

2.3.2 Domain

Crowdwisdom is useful in many sectors to gather collective intelligence. Several sectors that rely on crowdwisdom are healthcare, navigation, politics, business and education. For example, countries like India depend heavily on crowdwisdom where it serves as a platform of voice-forum in developing regions of India (Vashista, Cutrell, Borriello, Thies, 2015). Moreover, India also relies on crowdwisdom to improve healthcare in rural areas. Bathnagar (2016) proposed a framework for designing an MIS for health delivery system in rural India. Furthermore, crowdwisdom helps business organization to reach out customers to get feedback on their service or product, as well as hiring new employers (O'Neill, Martin, 2013).

2.3.3 Navigation

Navigation gears or applications are becoming extremely useful to users nowadays, especially with the growing need to travel on a daily basis. Navigation applications started off as just pinpointing the users' location and giving them directions received from satellite. However, with the growth of technology, most navigation application these days have incorporated crowdsourcing into their application to get real time information as well as

enabling users to edit maps and locations by themselves. This brings the navigation application to a whole new level, making it a wholesome application.

2.3.4 Application

Crowdsourcing tools can be defined as applications that support cooperation, communication and sharing among dispersed groups of people. Usually, crowdsourcing tools are used as a standardized medium when outsourcing to a wide range of people to gather information. It makes it easier to obtain information using a common platform instead of multiple tools. The most common crowdsourcing tool known is Wikipedia. Wikipedia is a website that consents users to edit and contribute data on anything and everything. It has become the most preferred research source among users of the Internet. However, despite being the most favored research resource among internet users, Wikipedia has been condemned on its inaccuracy, lack of transparency and vulnerability to vandalism. In par with the speedy growth of the technology, social media network (Twitter, Facebook) has also emerged as crowdsourcing tools. Crowdsourcing tools are also being implemented in various navigation applications such as Waze, Moovit, HopStop and TomTom. Crowdsourcing in navigation helps decrease to the struggle of quarterly and longer-frequency updates as well as frequent software updates and traffic reports. (Newcomb, 2014)

2.3.5 Waze

Many mobile-based applications have been developed that serves as great crowdsourcing tools such as Waze. Waze is community-driven navigation

application that gathers complementary map data and traffic information from its users. It allows the users to report accidents, traffic jams, speed and police traps, and from the online map editor, can update roads, landmarks, house numbers and more. Waze users can contribute information about routes, nearest petrol station, and update road names that have been changed, making Waze an up to date navigation application.

2.3.6 User Behavior

User behavior is how the end user perceives a particular system or technology. According to Verkasalo, 2010 user behavior and experience are necessary in today's product expansion and marketing activities. User behavior helps predict how ready or how much does the user accept a certain innovation or product (Jen-Hung Huang, Yu-Ru Lin,Shu-Ting Chuang, 2006)

2.3.7 User Acceptance

User acceptance can be defined as to which extent do the users approve or agree using a technology or an innovation. Most software, applications and products these days go through a user acceptance test before being marketed into the real world. The user acceptance test allows the developer understand better what are the aspects that influence the acceptance level of users on the particular software, application product. The findings then can be used as a guideline to be followed and taken into consideration when developing or improving the product. In 2004, Akinci, Aksoy and Atilgan performed a study to comprehend the consumers' behaviors and acceptance of internet-banking among urbane consumers. They observed several factors such as the demographic, attitudinal,

and behavioral characteristics of internet-banking users and non-users in this study (Akinci, S, Aksoy, S, & Atilgan, E, 2004). User acceptance is the pivotal element that determines the success or failure of a technology innovation. Many studies have been conducted to investigate the technology acceptance of the emerging technology. Mattila (2003) concentrated on the driving and inhibiting factors of mobile banking services. The outcome of the study was that complexity, compatibility, relative advantage, observability, and trial-ability are the factors influencing the decision making process of users in adopting mobile banking.

Apart from that, confidence and secrecy of information are vital conditions for any mobile banking services to be effective. The process of comprehending on why users accept or reject a certain technology has recognized to be the most difficult issues (F. J. Swanson; T. K. Kratz; N. Caine; R. G. Woodmansee, 1988) . Internal beliefs and attitudes are believed to have an impact on the usage behavior and how this internal beliefs and attitude combined with external factors affect the user acceptance (DeSanctis, 1983). In investigating the hesitancy reasons of Koreans in using mobile banking for mobile payment, Cheong and Park made an addition to the traditional Technology Acceptance Model factors (Cheong, J.H., & Park, M.C, 2008). Two additional factors were included which are; facilitating conditions and switching barriers. The facilitating conditions denote to the lack of interoperability and market de-facto. Meanwhile, the switching barriers denote to great exchanging expenses, and appeal of replacements. The results show that facilitating conditions are positively associated to the intention to use mobile payment and switching barriers are associated negatively.

Moreover, social and cultural characteristics can impact the decision making of usage. A research in Ghana scrutinized the effect of social and cultural

characteristics in accepting mobile-banking. They indicated that social and cultural factors in the form of perceived credibility, facilitating conditions, perceived elitism and demographic factors have fundamental roles in having an effect on acceptance and continued practice.

Besides that, gender was also considered a fundamental factor that influences user acceptance. David Gefen and Detmar W. Straub tested the differences in gender could probably correlate to the views and usage of computer-based media (David Gefen, Detmar W. Straub, 2003). The results showed that women and men differ in their perceptions but not use of e-mail. Furthermore, perceived credibility and facilitating conditions also have an influence on attitudes towards the technology (Crabbe, M., Standing, M., Standing, C. S., & Karjaluoto, H, 2009).The current study uses a Technology Acceptance Model (Davis, Bagozzi, Warshaw, 1989)to study technology acceptance of crowdsourcing technology in rural and urban areas.

2.3.5 Model

There are several models that are used to investigate user acceptance of technology. Models that are most commonly used are Technology Acceptance Model (Davis, Bagozzi, Warshaw, 1989) and Unified Theory of Acceptance and Use of Technology by Venkatesh. Technology Acceptance Model focuses on its two main factors which are Perceived Usefulness and Perceived Ease of Use. UTAUT model on the other hand focuses on factors like performance expectancy, effort expectancy, social influence, and facilitating conditions.

2.3.5.1 Technology Acceptance Model

The technology acceptance model (TAM) conveys an explanation of the factors that influence user acceptance and is in overall adept of explaining users' behavior through an extensive range of end-user totaling technologies and user populations, while at the same time being both sparing and justified ideally (Davis, Bagozzi, Warshaw, 1989).

TAM model proposes two main determinants of user acceptance of technological innovations, which are, perceived usefulness (PU) and perceived ease of use (PEU), as significant factors of the users' intent to use a certain specified information technology. The extent to which user believes that a particular system or technological innovation helps boost their job or task is defined as Perceived Usefulness (Davis, Bagozzi, Warshaw, 1989). Adam, Nelson, Todd, (1992) also believe that perceived usefulness serves as the key determinant of users' behavior in accepting technology innovations. Perceived usefulness (PU) is positively linked to the system usage; hence it becomes common for users to assess the usefulness before using a system or technology innovation.

On the contrary, the extent to which a person trusts that using a particular system would be free of effort or seeming as difficult to understand and use is defined as Perceived Ease of Use. The word "ease" in this context is defined as being free from difficulty or excessive effort. Users usually look for minimal effort when it comes to usage of a system due to the other responsibilities and task at hand. A number of studied have indicated that users try to reduce their intellectual effort (Petty, Cacioppo, 1986) and (Venkatesh, Davis, 2000)Users have the tendency to look for the most convenient, least effort-requiring and efficient method to get a job done so that they can save time. Therefore,

perceived ease of use (PEU) can be linked positively with the usage of a system or technology innovation.

TAM is a model applicable to a variety of technologies as it is, (Adams et al., 1992; Chin and Todd, 1995; Doll et al., 1998).However; it has been critiqued for not supplying adequate information on individuals' opinions that may affect the user behavior in accepting a technology. Mathieson (1991) made an observation that external variables increase the capability of TAM to predict acceptance of future innovation. The selection of external variables is influenced by the type of technology being studied; type of user and the environment where the study is being conducted (Ji-Won Moon and Young-Gul Kim, 2001).

Information Quality is the timeliness, currency and completeness of information presented. Perceived Information Quality is defined as to which extent the user believes that the piece information is authentic. Chung, (2012) added Perceived Information Quality in investigating the user acceptance of e-learning. The addition of this external variable to this study is apt because information quality is highly influential when it comes to credentials shared while using e-learning.

Meyer, (1988) described Perceived Credibility as "reasonable grounds for being believed". Credibility becomes a question when it comes to information being shared around. When the credibility of the information is high, users tend to give it more importance. The credibility of information is defined by its accuracy, reliability and trustworthiness.

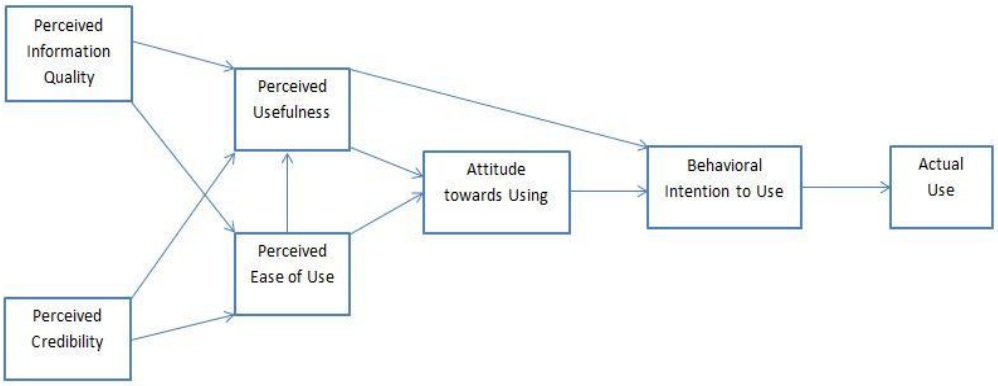


Figure 2. 2: TAM Diagram (Davis, Bagozzi, Warshaw (1989), Chung (2012) and Meyer (1988)

2.3.6 Area of Study

The area of study is the context or the environment on where the study will be conducted. Area of study is important in determining users' opinion in using or adopting a new technology. For example, Farahat (2012) conducted his research among university students when investigating the acceptance of online learning in Egypt.

2.3.6.1 Rural and Urban Area

Generally, rural area is defined as the geographical area that is situated in the outskirts of towns and cities (Wikipedia). According to the Statistic Department of Malaysia, rural areas in Malaysia are defined as “areas with population less than 10,000 people having agriculture and natural resources in which its population either clustered, linear or scattered.” The economic activities in rural areas typically consist of agriculture, fishing or small business depending on the geographical location of the area. The growth of technology in rural areas is not as rapid as it is in urban areas, therefore making the number of technology users significantly lesser than in urban areas.

According to (S.S, 2006), ICT programs in rural areas such as the establishment of Medan Infodesa and Rural Internet Center (PID) were many of the various ICT products that have been implemented in Malaysia for (Siti Masayu Rosliah Abdul Rashid, 2012) The founding of tele-centers also enables to close the technology gap between the urban and rural areas.

The technology gap existing between urban and rural area causes a lack of exposure in the latest technologies, especially the internet (Shakeel, H., Best, M., Miller, B., & Weber, S., 2001). Implementing ICT products in rural areas have known to improve development as well as saving time and energy (Harris, 2001).

Most populations of urban areas have nonagricultural jobs. The Department of Statistics, Malaysia defined urban area as "announced areas with their neighboring built-up areas, which had a joint population of 10,000 or more at the time of the Census 2010 or the distinct development area that can be identified, which at least had a population of 10,000 with at least 60 % of population (aged 15 years and above) were involved in non-agricultural activities. Unlike in rural areas in Malaysia, the technology development in urban areas is far more rapid and progressive, resulting in a digital divide in urban and

rural areas. Residents in urban areas have faster access to Internet and other technology enhancement compared to urban areas.

2.4 Related Work

From the previous works done on crowdsourcing technology, various aspects have been covered in different domains and context. Siyoung Chung used Technology Acceptance Model to study the perceptive and social factors influencing the use of Wikipedia (Chung, 2012). Chung's study's main objective was ruled down to two; to comprehend the causes behind the use of Wikipedia and to understand the factors important information-seeking behavior. In this study, Chung defined "information-seeking" as, to which extend would a user go to acquire information. Chung also linked Perceived Usefulness (PU) and Perceived Ease of Use (PEU) to the use of Wikipedia positively.

Besides, a study has been conducted on smartphone crowdsourcing by Chatzimilioudis, Konstantinidis, Laoudias, and Zeinalipour-Yazti in 2011. According to the study, it has been identified that crowdsourcing has still not completely infiltrated the mobile workforce, which will eventually reveal the maximum potential of crowdsourcing as a problem-solving model due to the smartphones' usage characteristics and distinctive features (Georgios Chatzimilioudis, Andreas Konstantinidis, Christos Laoudias, Demetrios Zeinalipour-Yazti, 2011). Smartphones are in extensive, daily use and are constantly connected making them a distinct platform for "extending existing web based crowdsourcing applications" to a bigger contributing crowd, making contribution easier and global.

Other studies include the user acceptance of technology innovation. A study by Bong-Keun Jeong and Tom E Yoon in 2013 uses Technology Acceptance Model adopted from (Davis, Bagozzi, Warshaw, 1989) to explore aspects influences the adoption of mobile banking. In this context, mobile banking is perceived as a technology innovation. Based on their research, Bong-Keun Jeong and Tom E Yoon were able to identify the factors affecting users' acceptance of mobile banking. Apart from Perceived Usefulness (PU) and Perceived Ease of Use (PEU), three other factors were extended to the existing Technology Acceptance Model, namely; Perceived Credibility, Self-Efficacy, and Perceived Financial Cost. It was believed that Perceived Credibility and Self-Efficacy both has a positive relation to the adoption of mobile banking whereas Perceived Financial Cost was negatively related to the adoption of mobile banking (Bong-Keun Jeong, Tom E Yoon, 2013).

Saad Yaseen performed a research on the technology acceptance of mobile crowdsourcing and its use in the crises management of Arab spring societies in 2014 (Yaseen, 2014). Unlike Bong-Keun Jeong and Tom E Yoon , Yaseen extended the Unified Theory Of Acceptance And Use Of Technology (UTAUT2) to achieve his objective when conducting his research. The UTAUT2 model was used to study the major determining factor of the behavioral intention to accept or adopt crowdsourcing technology in the specified domain. The proposed extended model includes five theories, including performance expectancy, effort expectancy, subjective norms, hedonic motivation, and cultural values.

2.4.1 A Comparison of the Different Context Covered In Technology Acceptance

Table 2.1: A Comparison of the Different Context Covered In Technology Acceptance

Authors	Year	Domain	Factors Considered in The Study								
			SI	M	PIQ	PC	TA	PSE	PFC	BST	D
Taher Farahot	2012	e-learning	✓								
Siyoung Chung	2012	e-learning	✓	✓	✓						
Tamara Dinev, Qing Hu	2007	User acceptance technology					✓	✓			
Bong-Keun Jeong, Tom E Yoon	2013	M-banking				✓		✓	✓		
Constance Elise Porter, Naveen Donthu	2006	Internet usage									✓
Shah, Bhatti, Iftikhar	2013	e-learning			✓						
Almahamid, McAdams, Al Kalaldeh,Al-Sa'eed	2010	e-government			✓						
Tsai	2012	e-books								✓	
LEGENDS											
SI = Social Influence					PSE = Perceived self-efficacy						

M = Motivation	PFC = Perceived Financial Cost
PIQ = Perceived Information Quality	BST = Brand and Service Trust
PC = Perceived Credibility	D = Demographic
TA = Technology Awareness	

2.5 Research Gap

Based on the comparison table, it can be concluded that numerous studies and researches have been done on technology acceptance. Most studies have used either Technology Acceptance Model (TAM) or Unified Theory of Acceptance and Use of Technology (UTAUT) to study the determining elements that affect users' intentions in accepting or adopting a particular technology, be it crowdsourcing or other technology innovation.

Siyoung Chung has conducted a study on factors affecting users' intention in using Wikipedia by using Technology Acceptance Model to determine the contributing factors in 2012.

Apart from that, Saad Yaseen has used extended the Unified Theory of Acceptance and Use of Technology to study the crises management of Arab spring societies using mobile crowdsourcing stating that besides the factors stated in the table above, cultural impact and gender roles are also an important factor in technology acceptance.

In 2012, Maja Bott and Gregor Young studied the role that crowdsourcing plays in improving governance in international development. The article covered the role of crowdsourcing in international development, success criteria affecting the use of crowdsourcing and risks involved with the use of crowdsourcing in international development. However, it has come to light that there was not a research or study conducted on the user acceptance of crowdsourcing technology in rural and urban areas by using the Technology

Acceptance Model to determine the contributing factors that affect the users' intentions.

This would be the research gap of that has been identified for the current study. Henceforth, this study is believed to be able to deliver new information and knowledge on the factors that have an influence on user acceptance of crowdsourcing technology in rural and urban area in Malaysia.

2.6 Conclusion

It can be concluded that through this chapter, the model that are needed to study about user acceptance of crowdsourcing technology in rural and urban area in Malaysia have been able to be identified. The external variable for the Technology Acceptance Model that is being used in the current study has been identified to conduct the research. The related work gives a basic idea on what the current study is going to be about. The comparison table of studies conducted and the research gap are discussed to give a clearer picture of what has been studied and researched previously and what has not, as well as how the current study is different than the previous ones. In the next chapter, the method that will be used to conduct the current research will be conferred in detail.

CHAPTER III

METHODOLOGY

3.1 Introduction

In this chapter, the methodology that will be used to carry out this project will be discussed. Project methodology is the procedures taken in order to complete a project. The Gantt chart is also included in this chapter to show the tasks done periodically and the duration needed to complete this project. Furthermore, the variables that are used in this project are analyzed as well.

3.2 Project Methodology

The methodology that will be used in this project is the Waterfall model. It was originally developed by Winston W Royce in the 1970s. The waterfall model by Winston W Royce is divided into five phases which are the Requirements, Design, Implementation, Verification and Maintenance. Each phase has a distinctive aim that has to be achieved. In the waterfall model, each phase has to be completed before proceeding to the next phase. The methodology process for this project is as shown in the figure below.

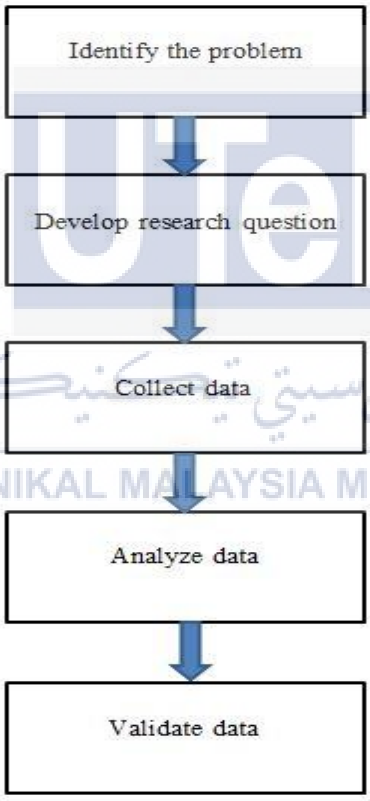


Figure 3. 1: Methodology Process (Royce)

3.2.1 Phase 1: Identify the Problem

This is the first phase in this research. In the beginning of a research, it is crucial to first identify and establish the research problem that needs to be studied in the user acceptance of crowdsourcing in rural and urban area. Various resources are used to study and grasp a good understanding on the related topic and identify the problem. Resources that are typically used are newspaper articles, journals, online source, library search, and other resources. The user acceptance of crowdsourcing in different geographical area is identified as an important issue in this research. This issue will be used as a guideline to aid this research throughout each phase. The objective of this research is also recognized based on the issue that has been identified. The objective is important to identify the answers and the end of the research. This is where literature review plays a major role. Related articles, journals, research papers and various other sources are gathered and studied to find what the topics that have been covered previously are, and they are compared to find research gap as well as the variables affecting user acceptance of crowdsourcing technology in rural and urban area.

3.2.2 Phase 2: Develop research question

The second phase is to develop the research question. In this phase the research design is discussed. There are two types of research that can be conducted, which are quantitative research and qualitative research. Qualitative Research principally can be defined as an investigative research. It is used to acquire a comprehension of essential reasons, opinions, and motivations. Qualitative research also offers discernments into the problem or assistances to develop ideas or hypothesis. On the other hand, quantitative research is used to

measure the problem by generating numerical data or data that can be transformed into statistics that can be user and comprehended. Attitudes, opinions, behaviors, and other distinct variables can be quantified through quantitative analysis. Quantitative Research can be used to discover patterns in a research. In this study, quantitative research is chosen to the user acceptance of crowdsourcing technology in rural and urban area. In addition to that, a basic study with descriptive method is carried out for this research. All the variables selected for this study from previous research papers, are then defined by adapting definition from other research papers.

3.2.3 Phase 3: Collect Data

In phase three, data will be collected to be measured. Since quantitative research is chosen for this study, the most optimum way to gather data is by conducting a survey using questionnaires. Surveys are a very communal form of data collection, specifically when it comes to collecting information from big groups of respondents, where standardization plays an imperative role. Surveys can be created in many ways, but they constantly consist of two components: questions and responses. The evaluators can select to keep the responses either open-ended or close-ended. Open ended responses are long and narrative whereas close-ended responses require respondents to choose from an array of pre-determined answers. A questionnaire is constructed thoroughly based on the variables that have been selected. The questionnaire is divided into three sections, A, B and C respectively. The language used to construct the questionnaire is simple English language so that respondents can easily understand what is being asked. The questionnaire is planned to be distributed via two medium; hardcopy and online. Once the questionnaire is constructed, two methods are selected to validate the questionnaire. First, the content of the questionnaire is validated by referring three experts that are chosen based on area

of expertise. The expert lecturers give some comments. Their comments will be taken into consideration and the questionnaire will be modified accordingly if necessary. The second type of validation is the construct validation, which is further divided into two types of analysis namely; Factor Analysis and Items Analysis. Both of these analyses need data from pilot. A Pilot is not an actual data collection respondent. The revised questionnaire is then distributed to 255 respondents again. The data collected in this phase will then later be used in next phase for analysis.

3.2.4 Phase 4: Analyze data

The data that has been collected in the previous phase will be analyzed in this phase. Statistical software program such as SPSS is used to enter quantitative data and qualitative data is regularly written out with precision to make data analysis process simpler. Procedures must be in order to make certain the process is carried out correctly. For all types of data, data entry and management procedures must also be in place to protect the private health information of respondents. In the analytic phase of all research, the patterns and relationships in the data are acknowledged and the research question is answered through the combination of numerical and or narrative data. In order to describe the sample characteristics, descriptive statistics are used. Descriptive statistics enhance the description of other analyses. It is crucial to assess the result of the sampling plan and define whether study respondents embody the larger population in quantitative research.

3.2.5 Phase 5: Validate Data

The result obtained from analysis phase previously undergoes the validation process in this phase. The validation process is carried out to make sure that the result is trustworthy and valid. Besides, statistical validation is an essential phase as well because this phase is conducted for the acceptance of the model. The new framework will be constructed by using the software SEM. In order to get the best model fit, the new framework must fulfil certain criteria. All the result obtained from analysis and validation is then discussed.

3.3 Operational Definition

Table 3. 1: Operational Definition

Variable	Definition
Perceived Information Quality	Perceived Information Quality is defined as to which extent the user believes that the piece information is authentic.
Perceived Credibility	The concept of perceived credibility is defined as rational grounds for being believed. (Meyer, 1988)
Perceived Usefulness	Perceived usefulness is defined the degree to which user believes that a particular system or technological innovation helps enhances their job or task. (Fred D. Davis, Richard P. Bagozzi, Paul R. Warshaw, 1989)
Perceived Ease of Use	Perceived ease of use refers to the degree to which a person believes that using a particular system would be free of effort or perceived as difficult to understand and use. (Fred D. Davis, Richard P. Bagozzi, Paul R. Warshaw, 1989)

Attitude Toward Using	Attitude toward an innovation is a critical intervening variable in the innovation adoption decision. (Rogers, 1995)
Behavioral Intention to Use	A person's beliefs about its ability to use a piece of technology and their subjective evaluation of the usefulness of that technology are the key determinants of behavioral intentions. (Bruner II G.C., Kumar A., 2005)

3.4 Dimensional Definition

Table 3. 2: Dimensional Definition

Variable	Definition	Dimensions
Perceived Information Quality	Perceived Information Quality is defined as to which extent the user believes that the piece information is authentic.	**Timeliness:** Timeliness is defined as the extent to which the information is adequately up-to-date for the current task or problem at hand. **Currency**: Currency is defined as the degree to which the information remains applicable to the problem at hand **Completeness**: Completeness is defined as the extent to which information is not lost and thorough to be used for the task at hand.
Perceived Credibility	The concept of perceived credibility is defined as rational	**Reliability**: Reliability is defined as the quality of information is true.

	grounds for being believed. (Meyer, 1988) .	**Accuracy**: Accuracy is when the information that is crowdsourced is error free, and that it is not altered or modified. **Trustworthiness**: Trustworthiness is defined as the dependability of the information crowdsourced.
Perceived Usefulness	Perceived usefulness is defined the degree to which user believes that a particular system or technological innovation helps enhances their job or task. (Fred D. Davis, Richard P. Bagozzi, Paul R. Warshaw, 1989)	**Time saving**: In this context, time-saving means that crowdsourcing technology saves time for the users when getting a job done. **Efficient**: Efficient is defined as how using crowdsourcing technology can increase the user' productivity.
Perceived Ease of Use	Perceived ease of use refers to the degree to which a person believes that using a particular system would be free of effort or perceived as difficult to understand and use. (Fred D. Davis, Richard P. Bagozzi, Paul R. Warshaw, 1989)	**Easy to understand:** The crowdsourcing technology is perceived to be understood with minimum or no difficulties. **Minimum effort**: The crowdsourcing technology is perceived to be used without using much effort.
Attitude Toward Using	Attitude toward an innovation is a critical intervening variable in the innovation adoption decision. (Rogers, 1995)	**Individual context:** The intention to use is influenced by the individual's personal belief itself.
Behavioral Intention to Use	A person's beliefs about its ability to use a piece of technology and their subjective evaluation of the usefulness of that technology are the key determinants of behavioral intentions. (Bruner II G.C., Kumar	**Individual context:** The intention to use is influenced by the individual's personal belief itself. **Social context:** The intention to use is influenced by the individual's surrounding and social influence.

	A., 2005)	

3.4 Hypothesis Formation

1. H1 $_{(a)}$: Perceived Usefulness (PU) in using crowdsourcing technology in rural and urban area in Malaysia is affected by the Perceived Information Quality

2. H1 $_{(b):}$ Perceived Usefulness (PU) in using crowdsourcing technology in rural and urban area is affected by the Perceived Credibility.

3. H1$_{(c)}$: Perceived Usefulness (PU) in using crowdsourcing technology in rural and urban area is affected by Perceived Ease of Use (PEU).

4. H2 $_{(a)}$: Perceived Ease of Use (PEU) in using crowdsourcing technology in rural and urban area is affected by the Perceived Information Quality.

5. H2 $_{(b)}$: Perceived Ease of Use (PEU) in using crowdsourcing technology in rural and urban area is affected by the Perceived Credibility.

6. H3 $_{(a)}$: Attitude towards Using in crowdsourcing technology in rural and urban area is affected by Perceived Usefulness (PU).

7. H3 $_{(b)}$: Attitude towards Using in crowdsourcing technology in rural and urban area is affected by Perceived Ease of Use (PEU).

8. H4: Behavioral Intention to Use Using in crowdsourcing technology in rural and urban area is affected by Perceived Usefulness (PU).

9. H5: Behavioral Intention to Use in crowdsourcing technology in rural and urban area is affected by Attitude towards Using (ATU).

3.5 Model used

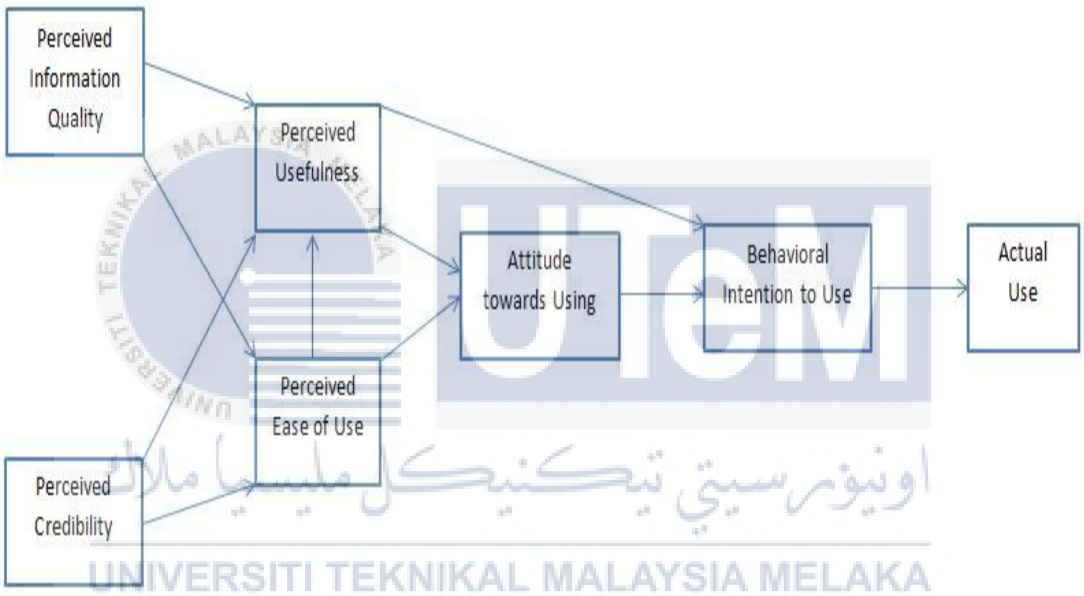


Figure 3. 2: Model Used adapted by Davis, Bagozzi, Warshaw (1989), Chung (2012) and Meyer (1988)

3.6 Project Milestone for PSM1 and PSM2

Table 3. 3: Gantt Chart for PSM1

No	Task	Week																Completion
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
1.	Submission & Presentation of PSM proposal Proposal assessment and verification																	Proposal
2.	Proposal correction and improvement																	Proposal
3.	Develop research question																	Chapter 1
4.	Develop research design																	Chapter 2
5.	Methodology																	Chapter 3
6.	Data collection																	Chapter 4
7.	Complete PSM1																	Complete PSM1
8.	Final Presentation																	Presentation for PSM1

Table 3.4: Gantt Chart for PSM2

No.	Task	Week							Completion
		1	2	3	4	5	6	7	
1.	Analysis and Results								Chapter 5
2.	Validation and Discussion								Chapter 6
3.	Conclusion								Chapter 7
4.	Complete PSM report								Complete Report
5.	Prepare slide presentation								Final Slides
6.	Final presentation								Presentation

3.7 Conclusion

It can be concluded at the end of this chapter that, project methodology is extremely important to make sure all the processes are executed before progressing to the next phase. The duration of each phase also described in the milestone, which helps give an idea on how much time is advisable to be spent on a particular phase, to avoid time wastage. This also ensures that each phase is completed. All the action on each phase should be taken in order to get approximate result. In the next chapter the process of data collection will be described.

CHAPTER IV

DATA COLLECTION

4.1 Introduction

Data collection is the most significant phase in this survey. The research instrument design will be explained thoroughly in this chapter. In order to collect data, the questionnaire is chosen as the research instrument. Using questionnaires allows the gathering data from a large group of people in a short amount of time and the results are also often times of effect. The result from questionnaire can be quantified quickly using software. The data received from the pilot study is gathered and the result is discussed. This chapter also goes in detail about the content and constructs validation. These values are measured to define how much the variables effect and reflect the variables that are being studied. In the end, the actual data gathered from this study analyzed and discussed.

4.2 Research Instrument Design

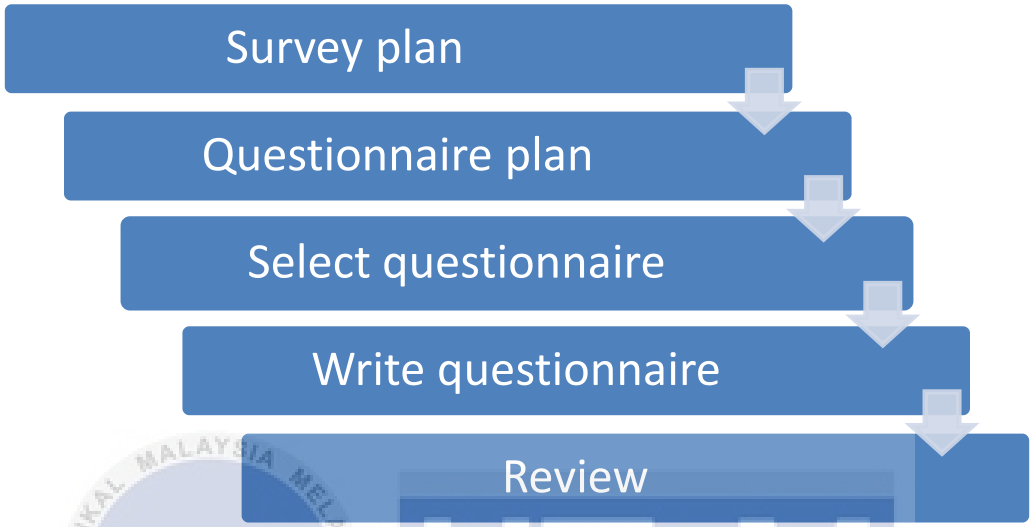


Figure 4. 1: Five steps to questionnaire design process (Adapted from Neil Cary, 2013)

Step 1: Survey plan

This is the first step when it comes to designing a questionnaire. Having a clear plan on what the objectives that are wished to be achieved in the survey helps put in perspective on what research instrument is the most appropriate to gather data in a survey. The key objective of this survey is to identify the attitude of the respondent. There are many types of data collecting tools that can be used to determine respondents' attitude such as questionnaire, conducting an interview, or mere observation. The data collecting tool which is most suitable for this survey is by using questionnaires. Questionnaire garners data or response

that is self-administered, which means respondents answer the questionnaire without being influenced by anyone. A questionnaire can be divided into two types which is closed form and open ended form. A closed form questionnaire is conclusive in nature and can create data that is easily quantifiable. It has clear or categorical options for a respondent to select from such as scales, multiple choices or checkboxes. The open ended form, on the other hand is unrestrictive and explanatory in nature, allowing the respondents to answer with their own words. Open ended forms work well for qualitative researches to gain insight on the particular study. Interview is a research instrument in which the researcher meets the respondent in person to interact and get ideas usually done by asking questions related to the study. Observation is the study of photographs, videotapes, tape recording and others. Observations do not require interaction between respondent and the researcher and it is used in qualitative research. For this study, questionnaire is selected as the data gathering tool because this study is a quantitative research. This type of research also involves a large group of people, thus making questionnaire the suitable method because the results from questionnaires can be gathered quickly and the effectiveness of the result can be counted on as well. The result from questionnaire can be easily quantified using software. The questionnaires are distributed to the respondent using two methods, which is manually, and via the internet using Google forms. The photocopy of questionnaire is distributed to everyone and the online questionnaire is forwarded through Facebook, email, WhatsApp, and other social media platform. The internet survey is chosen as a method of distribution because not only it is easy to manage, it also saves time and is more efficient when getting the statistics of the data received.

Step 2: Questionnaire plan

Once the questionnaire is chosen to be used as the research tool, constructing a questionnaire plan is the next step. It is important to plan what should be in the questionnaire and how the questionnaire should be. The

questionnaire is planned to be developed using simple English with Bahasa Malaysia translated below each English statement. The reason the questionnaire is planned to be bilingual is so that respondents who have poor command in English can understand what is being asked in the questionnaire easily. The questionnaire is divided into two sections; section A asks about the respondents' demographic information and section B asks about the variables affecting the technology acceptance of crowdsourcing technology in Waze application. Besides, an online questionnaire form is constructed using Google docs to be distributed online.

Step 3: Select questionnaire

In section A, demographic information questions are asked by using, categorical for gender and education level, interval for age, and polar for geographic location and understanding of crowdsourcing. For section B, all the questions used ordinal type of measurement. The format used for all section is close ended questions. For section B, a continuous scale of 1 to 6 is used to identify either the respondent strongly agree or strongly disagree towards the question asked. The participant can indicate level of agreement or disagreement by selecting the 6 point given. The scale range from 1 to 6 in which answers 4 and above favors more towards agreeing and for 3 and below means more towards disagreeing.

Step 4: Write questionnaire

The items were constructed using simple English to make sure that respondents understand the question. During constructing question in section B, any questions with the tone of biasness or suggestiveness are avoided. The items were also made sure to be constructed with proper grammar to avoid ambiguity and misunderstanding. Five items were constructed for each variable, which

sums up to a total of 35 questions including questions about demographic information. The questionnaire is also bilingual. To each statement in English, a translated Bahasa Malaysia version is stated below to help those who have a poor command in English to understand the questions better. Furthermore, having the questionnaire in two languages will help it reach a larger range of respondents. The questions used in this questionnaire were adapted from various researches done previously by Abu-Dalbouh (2013), A. Rabaa'i,Zogheib,AlShatti (2016), and Mead, 2011.

Step 5: Review

The final step in designing a questionnaire is by reviewing it. The validation of the content in the questionnaire is an important process in making sure that the developed questionnaire is valid and effective to use. Three experts were chosen to validate the questionnaire. The experts gave constructive criticism on how to improve the questionnaire and all the remarks were taken into consideration. The copies of the questionnaire are then distributed to respondents and the link of the online form for the questionnaire is shared in social media such as Facebook and WhatsApp. The data received from the respondents are then stored in Microsoft Excel. This step is crucial because it makes it easier to transfer the data into the SPSS software.

4.3 Sampling

4.3.1 Sampling method

In this survey, the sampling method that is used is the probability sampling method. Probability sampling method is defined as a method of sampling that utilizes some type of random sampling. This method is chosen because it provides the most reliable result by reflecting the characteristic of the population. There are two type of probability sampling, which is random and stratified. The simple random sampling is a sampling that gives each person in the population an equal opportunity to be included in this sample. Simple random sampling is also easy to conduct. The random sampling has high probability of achieving a representative sample. Stratified sampling is when the population is categorized into groups, based on certain characteristic. Then, within each group, a probability sample is selected. The groups in stratified sampling are called strata. In this study, stratified sampling of probability sampling is selected. For this present study the sample population that is targeted is Waze application users in rural and urban area.

4.3.2 Sampling size

The sample size of this study is 250 respondents from rural and urban area. There is no limitation of age or gender for the respondents, anyone that has used or is still using Waze application can answer this questionnaire. To conduct factor analysis, the number of respondents should be the number of items multiplied by five which gives total of 175. Therefore a sample size of 250 is more than sufficient as the maximum sample size needed is only 245 respondents.

4.4 Content Validation

Content validation is the process of verifying to which extent is the measurement tool is accurate. The content validity can be measured by referring to people with knowledge or experts who are familiar with the constructed tool. The experts are then asked to offer comment on how well each item represents the construct in question. The comments are taken into consideration and are further analyzed to help make decision about the aptness of each question. Content validation for this study is conducted by referring three experts that are chosen based on specialist. The experts are asked to provide some comment on how far they disagree with items that represent the variables. Since the items that represent the variables are based in validated scales, all three experts were satisfied with the content over all. The first expert that was consulted gave comment on the usage of the continuous scale where else the second and third expert commented to simplify the English language to suit the respondents. The comments given by the experts were measured carefully and corrections were done to improve the questionnaire before conducting the pilot study.

The three experts that were consulted for content validation are:

Table 4. 1: First Expert

First expert	
Name	Dr. Othman Bin Mohd
Designation	Vice Director
Faculty	Faculty of Information and Communication Technology
Expertise	Information Management

Table 4. 2: Second Expert

Second Expert	
Name	En. Erman Bin Hamid
Designation	Senior Lecturer
Faculty	Faculty of Information and Communication Technology
Expertise	Computer and Information Network

Table 4. 3: Third Expert

Third Expert	
Name	Dr. Robiah Yusof
Designation	Senior Lecturer
Faculty	Faculty of Information and Communication Technology
Expertise	Network Security, Network Administration, Network Management

4.5 Pilot Study

A pilot study is a preliminary study conducted carried out before the actual survey using the set of questionnaire that has been validated by expert in content validation. In order to carry out the pilot study, the number of respondents needed is number of items in a variable multiplied by 5 (no. items in variable × 5). Hence 25 respondents are chosen because the maximum number of item is 5 in each variable. The pilot study does not represent actual data collection respondent. 25 respondents for pilot is selected carefully, they are those who can be reached easily to ask for feedback. The purpose of pilot study is to conclude whether the questions asked symbolize the anticipated outcome. It is also to identify whether the questions can be understood by all type of age, gender, and education level. Based on the response from pilot, the questions are restated, and eliminated.

4.5.1 Construct Validation

Construct validation is divided into two analysis which are Factor Analysis and Items Analysis. It is conducted to identify whether items actually represent the true meaning of variable.

4.5.1.1 Factor Analysis

Factor analysis is done to identify the relationship between the variables and the item. Since the variables used in this study is from the Technology Acceptance Model, it is therefore validated prior to this study.

4.5.1.2 Item Analysis

For item analysis, Cronbach's Alpha is used. Cronbach's Alpha is the most common tool to measure the items' consistency. This analysis is carried out to test the reliability of the scale. It is represented between 0 and 1. Cronbach's Alpha is to describes the whether the items that test are measuring the same concept. So it shows the inter-relatedness of items. The Cronbach's Alpha value is only acceptable if it is 0.70 to 0.95. The Cronbach's Alpha value will be low when the correlation between items is low. The item that has low correlation will be discarded or revised.

Table 4. 4: Cronbach's Alpha Value

Variable Name	Cronbach's Alpha Value
Perceived Usefulness	0.783
Perceived Ease of Use	0.709
Perceived Credibility	0.739
Perceived Information Quality	0.849
Behavioral Intention to Use	0.710
Attitude Towards Using	0.711

As it can be seen in the table above, the Cronbach's Alpha value for all the variables are above the acceptable value 0.70 and does not exceed 0.95. This is because the items used in this questionnaire were taken from previously validated questionnaires.

4.6 Data Collection

The data collection is done by distributing questionnaire to Waze users in rural and urban area. The respondent should be using or have prior experience with Waze. There is no limitation on age, education level and gender. The questionnaire will be distributed in two ways; manually and through social media. The manual method is by giving the respondents a copy of the questionnaire, which have checklist type of questions for them to answer by selecting the appropriate answer on given choices. The second method is by distributing the questionnaire online. The same questionnaire is created in Google doc to make it available online. The link to the questionnaire is then shared to everyone on Facebook, Facebook Messenger, WhatsApp, and email. Once the respondents have answered the questions, the data is then collected in Microsoft excel. This is done because it makes it easier to transfer the data collected into the SPSS software. SPSS software is used to analysis the data collected. The data collection process is done for approximately 4 weeks.

4.7 Conclusion

In this chapter, the research instrument is designed. The designed research instrument is validated by using two methods which is content validation and constructs validation. The sample size and sampling method is also determined in this chapter. Once the validation process is completed, the validated questionnaire is distributed to respondents to collect data. The data collected that will be used to perform analysis will be discussed thoroughly in the next chapter.

CHAPTER V

ANALYSIS

5.1 Introduction

In this chapter, analysis is conducted on 250 data from the respondents. The main purpose on why this analysis is carried out is to identify the inference from the sample. From the 250 data gathered from the respondents, analysis such as descriptive statistics analysis, factor analysis, parametric analysis, correlation analysis and regression analysis were carried out. The details of each analysis will be further explained in this chapter.

5.2 Data Screening

Data screening is done to check whether the data entered by respondents is correct and there are no missing values from the data collected. In this study, there are no missing values left or incorrect data entered by the respondents during the data collection. Hence, there is no requirement to handle the missing value. The number of respondent in this study is 250 and all the 250 respondents have answered all the questions correctly.

5.3 Construct analysis

5.3.1 Factor analysis

Numerous scientific studies are presented by the fact that a number of variables describe an object. (Rietveld & Van Hout 1993). Factor analysis is useful when it comes to investigate relationships between variables. It is a multivariate analysis that measures any causal factor that covariate among group independent items. This analysis is done to make sure that the questions asked relate to the variable that is intended to be measured in the study. The items in each variable must denote pointer of some mutual underlying concept in order to be grouped together theoretically as well as mathematically. Factor analysis is also known as data reduction procedure. Factor analysis assists the researchers to get a clear picture of the data and also the prospect of using the result in the following Expletory Factor Analysis (Field, 2000)

Factor analysis is also used to determine which item can be removed to make it more parsimonious. Data reduction is done through factor analysis and it is carried out to classify factors that explain most of the difference observed in a

much bigger number of apparent variables (Rietveld & Van Hout 1993). In this study the variables used are inferred from existing studies, the variables are therefore believed to have undergone factor analysis before the model was published. Apart from that, the questionnaire has been examined and validated by the experts, hence giving credibility that factor analysis has been carried out on the variables that are used in this study. Therefore, factor analysis has not been carried out in this study.

5.3.2 Reliability Analysis

Reliability is when the scale is steadily reflecting the construct its measuring. In terms of statistics, reliability is based on the concept that individual items should produce results consistent with the whole questionnaire. (Dr. Andy Field, 2006) In order to ensure that the constructs are free from errors, the reliability test is performed on each constructs. The level to which a number of items in scale measure the similar attribute or variable is examined through internal consistency reliability. For item analysis, Cronbach's Alpha is used. Cronbach's Alpha is the most common tool to measure the items' consistency. This analysis is carried out to test the reliability of the scale. It is represented between 0 and 1. Cronbach's Alpha is to describes the whether the items that test are measuring the same concept. So it shows the inter-relatedness of items. The Cronbach's Alpha value is only acceptable if it is 0.70 to 0.95. The Cronbach's Alpha value will be low when the correlation between items is low. The item that has low correlation will be discarded or revised.

Table 5.1: Cronbach's Alpha Value for variables for Technology Acceptance of Crowdsourcing before item deletion

Factor	Factor Name	Items	Cronbach's Alpha Value

1	Perceived Usefulness	PU1 PU2 PU3 PU4 PU5	0.866
2	Perceived Ease of Use	PEU1 PEU2 PEU3 PEU4 PEU5	0.705
3	Perceived Credibility	PC1 PC2 PC3 PC4 PC5	0.772
4	Perceived Information Quality	PIQ1 PIQ2 PIQ3 PIQ4 PIQ5	0.921
5	Behavioral Intention to Use	BIU1 BIU2 BIU3 BIU4 BIU5	0.564
6	Attitude Toward Using	ATU1 ATU2 ATU3 ATU4 ATU5	0.764

In Table 5.1 above, the Cronbach's Alpha value from the reliability analysis that has been carried out in this study is shown. There are a total of six

items that are incorporated in this study, which consists of Perceived Usefulness, Perceived Ease of Use, Perceived Credibility; Perceived Information Quality, Behavioral Intention to Use, and lastly, Attitude Toward Using. These items are tested to find their Cronbach's Alpha value. The Cronbach's Alpha value for each item is 0.866, 0.705, 0.772, 0.921, 0.564, and 0.764. The threshold value is 0.7 and the Cronbach's Alpha value for each variable is higher than 0.7, which means that items from five out of six variables that are used in the questionnaire represent the same general factor. The Behavioral Intention to Use variable has a Cronbach's Alpha value of 0.564, which is lower than the threshold value of 0.7.

Deletion of a particular item(s) from the variable in the questionnaire can increase the Cronbach's Alpha value, thus making the questionnaire even more solid and precise. The table below shows the Cronbach's Alpha value of the variables after certain items were deleted.

Table 5.2: Cronbach's Alpha Value for variables for Technology Acceptance of Crowdsourcing after item deletion

Factor	Factor Name	Items	Cronbach's Alpha Value
1	Perceived Usefulness	PU2 PU3 PU4 PU5	0.883
2	Perceived Ease of Use	PEU1 PEU3 PEU4 PEU5	0.860
3	Perceived Credibility	PC1 PC2 PC3 PC4	0.815

4	Perceived Information Quality	PIQ1 PIQ2 PIQ3 PIQ4 PIQ5	0.921
5	Behavioral Intention to Use	BIU1 BIU2 BIU3 BIU4	0.772
6	Attitude Toward Using	ATU1 ATU2 ATU3 ATU4	0.846

As it can be seen in the table 5.2, the Cronbach's Alpha value increases once certain items have been deleted from the variable. For the first variable, Perceived Usefulness, the first item, PU1 is removed and it gives a Cronbach's Alpha value of 0.883. The next item that was deleted is PEU2. The Cronbach's Alpha value of Perceived Ease of Use then increased to 0.860, followed by the deletion of item PC5 from the variable Perceived Credibility which increased the Cronbach's Alpha value to 0.815. Items BIU5 and ATU5 were removed from variables Behavioral Intention to Use and Attitude toward Using respectively, hence increasing the Cronbach's Alpha of each variable to 0.772 and 0.846. The significant increase in value can be seen in the Behavioral Intention to use variable after the removal of item BIU5, which goes from 0.564 initially to 0.772. The only variable that did not have any items removed is Perceived Information Quality as it has a high Cronbach's Alpha value of 0.921 even without removing any item

5.4 Scale Score

In this study, the summated rating scale is used. The summated rating skill is also known as the likert scale. The summated rating scale consists of two or more likert item that represents similar questions and same variable (Paul E. Spector, 2006). Summing scales is a very common practice that is used in researches (D. Hopper, 2012). There are four characteristics that determine whether or not a scale is considered as a summated rating scale. The first characteristic that determines a summated rating scale is that the scale should consist of multiple items. The second characteristic is that each individual item should measure something that could be at variance quantitatively than qualitatively. Third characteristic is that each item has no "right" or "wrong" answers which sets apart multiple choice test and summated rating scale from one another. The last characteristic is that a majority of the summated rating scales contains between four and seven response choices and each item in a scale is reflected as a statement.

Any item that is negatively worded must be rectified prior to calculating the total score. If the item(s) is negative worded, it need to be reversed coded. The items that are positively worded do not require reverse scale. Then the entire item in variable is summed to become likert scaled data. Rescaling of the summation value is done in order to make the value ranges equal to avoid assigning more weight to some variable than to other. The likert scale uses a few degree of agreement or disagreement. In this study, this degree constitutes into six points. These points carry a score, such as 6 point given for strongly agrees which is the highest score and 1 point represents strongly disagree, which shows the lowest score.

5.5 Descriptive Statistics

Descriptive statistics can be defined as a method to describe what the data signifies in a way that is easily understood. Descriptive statistics is used to represent the essential characteristics of the data attained from the study, thus providing a streamlined summary of the sample and measures together with it. However, descriptive statistics do not make judgement analyses or make conclusion. Descriptive statistics are used to define the data and does not comprise generalizing. In this study, descriptive statistics are used to describe the sample data based on gender, education level, and understanding on crowdsourcing technology to get a clearer picture of the sample data.

5.5.1 Descriptive Statistics on Understanding of Crowdsourcing based on Area

Table 5. 3: Descriptive Statistics on Understanding of Crowdsourcing based on Area

Count

		Crowd sourcing understanding		Total
		yes	no	
Area	Urban	104	21	125
	Rural	18	107	125
Total		122	128	250

From the table above, it can be seen that the number of respondents who understand what crowdsourcing is, is higher in urban area with a number of 104 respondents answering “yes” compared to that of in rural area which has only 21

respondents who understand what crowdsourcing is. A total of 107 respondents do not understand what crowdsourcing is in rural area.

5.5.2 Descriptive Statistics on Understanding of Crowdsourcing Technology Based on Area and Gender

Table 5. 4: Descriptive Statistics on Understanding of Crowdsourcing based on Area and Gender

Count

Crowd sourcing understanding			Gender		Total
			Male	Female	
yes	Area	Urban	51	53	104
		Rural	9	9	18
	Total		60	62	122
no	Area	Urban	12	9	21
		Rural	61	46	107
	Total		73	55	128
Total	Area	Urban	63	62	125
		Rural	70	55	125
	Total		133	117	250

Based on the table shown above, more female respondents from both urban and rural understand what crowdsourcing is compared to males from both urban and rural area. The number of male respondents who do not understand what crowdsourcing is higher in rural area than urban area.

5.6 T- test between area and variable

T-test is carried out to identify if is there any significant difference in variable between respondents from urban and rural area. Therefore, a group t-test or also known as independent-sample test is used in this current study. The independent-sample test compares the mean between two unrelated groups on same continuous variable. In this test, all the variables is test to see whether they have any difference between male and female.

Levene's test of equality of variance shows the equality of variances. If the significant value is less than or equal to 0.05, then the "equal variances not assumed" value should be used. If the f value is greater than to 0.05, then the "equal variances assumed" value should be used. Then 2-tailed test is to identify whether there is any significant difference between respondents from urban and rural area. From the column "sig (2-tailed)" if the value is less than 0.05 then we can assume that there is a significant difference between urban and rural area toward the variable. Then effect size is calculated to see how much the area affect the variables.

Cohen's d is used to understand the value of size effect. Cohen (1998) provides valuable guidelines to interpret social science research. Cohen's d is a advised guideline for understanding defined effect size measures.

Size effect (Cohen's d)	Size interpretation
$0.2 \leq d < 0.5$	Small
$0.5 \leq d < 0.8$	Medium
$d > 0.8$	Large

Table 5.5: Group statistics

Report

Area		Perceived Usefulness	Perceived Ease Of Use	Perceived Credibility	Perceived Information Quality	Attitude Toward Using	Behavioral Intention To Use
	Mean	3.7360	3.7360	3.8400	3.5600	3.6880	3.8080
Urban	N	125	125	125	125	125	125
	Std. Deviation	.94309	1.09356	.77668	.89262	.87451	.83951
	Mean	3.4080	3.5200	3.5200	3.1760	3.5360	3.4160
Rural	N	125	125	125	125	125	125
	Std. Deviation	1.22538	1.04419	.94698	1.05543	1.08170	.88157
	Mean	3.5720	3.6280	3.6800	3.3680	3.6120	3.6120
Total	N	250	250	250	250	250	250
	Std. Deviation	1.10349	1.07248	.87903	.99425	.98455	.88123

The table above shows that the mean value for each variable in urban area is higher than that of the mean value obtained for each variable in rural area. This shows that, the respondents from urban area have high Perceived Usefulness, Perceived Ease of Use, Perceived Credibility, Perceived Information Quality, Attitude toward Using and Behavioral Intention to Use towards the crowdsourcing technology in Waze compared to respondents in rural area.

In conclusion, the acceptance of crowdsourcing technology in rural area is indeed lesser than in urban area.

Table 5.6: Result from t-test of variable according to area.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PerceivedUsefulness	Equal variances assumed	.347	.557	3.300	248	.001	.44000	.13334	.17738	.70262
	Equal variances not assumed			3.300	247.729	.001	.44000	.13334	.17737	.70263
PerceivedEaseOfUse	Equal variances assumed	2.215	.138	3.657	248	.000	.42400	.11594	.19564	.65236
	Equal variances not assumed			3.657	234.887	.000	.42400	.11594	.19558	.65242
PerceivedCredibility	Equal variances assumed	9.065	.003	3.426	248	.001	.40800	.11908	.17346	.64254
	Equal variances not assumed			3.426	244.097	.001	.40800	.11908	.17344	.64256
PerceivedInformationQuality	Equal variances assumed	5.314	.022	3.106	248	.002	.38400	.12364	.14049	.62751
	Equal variances not assumed			3.106	241.350	.002	.38400	.12364	.14046	.62754
BehaviorIntentionToUse	Equal variances assumed	9.904	.002	5.053	248	.000	.51200	.10133	.31242	.71158
	Equal variances not assumed			5.053	241.335	.000	.51200	.10133	.31239	.71161
AttitudeTowardUsing	Equal variances assumed	.544	.461	2.454	248	.015	.29600	.12060	.05848	.53352
	Equal variances not assumed			2.454	247.948	.015	.29600	.12060	.05848	.53352

From the results obtained from t-test, it can be concluded that all the variables are significant

5.8 Correlation

Correlation is defined as a term that denotes to the strength of a relationship between two variables. Variables that have a strong, or high, correlation means that the particular variables have a strong relationship with each other, whereas variables that have a weak, or low, correlation means that the particular variables are scarcely related. The strength of the relationship with presented statistical data is learned by correlation analysis. The correlation analysis is conducted to measure linear association between 2 variables. The value of correlation can range between -1 to +1. The value +1 represents a perfect positive relationship, which indicates that as one variable increases in value, so does the other. The -1 value represents two variables that have a perfect negative relationship. If the correlation value is 0, this indicated that two variable does not have any relationship. The correlation does not interpret cause- and-effect of relationship, but it shows how and to what extent variables are related with each other.

There are 3 types of correlation namely the Pearson's correlation, Spearmen's correlation and Kendall's correlation. Pearson's correlation coefficient is a statistical measure of the strength of a linear relationship between paired data. Person's correlation is defined as the ratio covariance of two variables to their respective Standard deviation (N.S.Chok 2008). Pearson's correlation ranges from -1 to +1. The two variables have a tendency to increase

or decrease concurrently when that value is positive. On the other hand, when the value is negative one variable tend to increase as the other variable decreases. The value is 0 denotes the absence of relationship between the variables. The value of correlation shows the strength of the relationship between two variables. When the value is 1 it indicate a perfect linear relationship.

Spearman's correlation coefficient is a statistical measure of the strength of a monotonic relationship between paired data. The Spearmen's correlation is a rank based version of the Pearson's correlation. Spearmen's correlation coefficient varies from -1 to +1 and these values represent the strength of the relationship between variable. The closer to the value 0, the weaker is the relationship. Just like Pearson's, Spearman's correlation coefficient can be 0 for variable that no relationship.

Kendall's correlation is similar to spearman's correlation which is design to capture relationship between two ordinal variables. This correlation is also similar to the previous correlations, the values range from +1 to -1, and similar to the previous correlations, the values indicate the strength of relationship between two variables. However, Kendall's value can be 1 for even wider range of scenarios.

The type of correlation coefficients that should be used is determined by the type of data analyzed. For Pearson's, the most appropriate type of data to be used is interval data. (N.S.Chok, 2008) Meanwhile, for spearman's and Kendall correlation, ordinal or interval data could be used.

In this current study, the data type that is used is likert scale, is also known as interval data. Therefore, the Pearson's correlation is used because Pearson's correlation is the most appropriate correlation for interval data according to N.S.Chok, (2008).

The strength of the relationship between variables according to a guide suggested is determined by the Pearson product moment correlation coefficient (r) value interpretation. According to Evans (1996) the range is as follow; 0.00-0.19: Very weak linear positive relationship; 0.20-0.39: Weak linear positive relationship; 0.40-0.59: Linear positive relationship; 0.60-0.79: Strong linear positive relationship; 0.8-1.0: Very strong linear positive relationship.

Table 5. 7: Pearson Correlation – Pearson Product moment correlation coefficient

Correlations

		PerceivedInformationQuality	PerceivedCredibility	PerceivedUsefulness	PerceivedEaseOfUse
PerceivedInformationQuality	Pearson Correlation	1	.696**	.712**	.716**
	Sig. (2-tailed)		.000	.000	.000
	N	250	250	250	250
PerceivedCredibility	Pearson Correlation	.696**	1	.744**	.683**
	Sig. (2-tailed)	.000		.000	.000
	N	250	250	250	250
PerceivedUsefulness	Pearson Correlation	.712**	.744**	1	.747**
	Sig. (2-tailed)	.000	.000		.000
	N	250	250	250	250
PerceivedEaseOfUse	Pearson Correlation	.716**	.683**	.747**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	250	250	250	250

**. Correlation is significant at the 0.01 level (2-tailed).

The relationship between the variables is broken down into several groups when conducting the Pearson correlation. The table above shows the relationship between the variables Perceived Information Quality, Perceived Credibility, Perceived Usefulness and Perceived Ease of Use. The correlation value between Perceived Information Quality and Perceived Usefulness is 0.712 which indicates that these two variables have strong relationship and the significant value is 0, which shows perfect significant correlation between both variable. Perceived Information Quality positively and significantly correlate to Perceived Usefulness. The correlation value between Perceived Information Quality and Perceived Ease of Use is 0.716 and the significant value is 0, indicating a strong relationship and perfect significant correlation between the two variables. Perceived Information Quality correlates to Perceived Ease of Use positively and significantly. Perceived Credibility has a correlation value of 0.744 and 0.683 with Perceived Usefulness and Perceived Ease of Use respectively and the significant value between Perceived Credibility and Perceived Usefulness and Perceived Ease of Use is 0, showing a perfect

significant correlation between the variables respectively.

Table 5.8: Correlation between Variables

Correlations

		PerceivedUsefulness	PerceivedEaseOfUse	AttitudeTowardUsing
PerceivedUsefulness	Pearson Correlation	1	.747**	.686**
	Sig. (2-tailed)		.000	.000
	N	250	250	250
PerceivedEaseOfUse	Pearson Correlation	.747**	1	.715**
	Sig. (2-tailed)	.000		.000
	N	250	250	250
AttitudeTowardUsing	Pearson Correlation	.686**	.715**	1
	Sig. (2-tailed)	.000	.000	
	N	250	250	250

**. Correlation is significant at the 0.01 level (2-tailed).

The table above shows the correlations between three variables Perceived Usefulness, Perceived Ease of Use and Attitude toward Using. The correlation value between Perceived Usefulness and Attitude toward using is 0.686 and the significant value is 0. Perceived Usefulness positively and significantly correlates to Attitude toward using. The correlation value between Perceived Ease of Use and Attitude toward Using is 0.715 which shows a strong relationship between these two variables. The significant value is 0, indicating that Perceived Ease of Use and Attitude toward Using has a positively significant relationship. The variables Perceived Usefulness and Perceived Ease of Use have correlation value of 0.747 and a significant value of 0, showing that these two variables correlate positively and significantly to one another.

Table 5.9: Correlation between Variables

Correlations

		PerceivedUsefulness	BehavioralIntentionToUse
PerceivedUsefulness	Pearson Correlation	1	.700**
	Sig. (2-tailed)		.000
	N	250	250
BehavioralIntentionToUse	Pearson Correlation	.700**	1
	Sig. (2-tailed)	.000	
	N	250	250

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation value between Perceived Usefulness and Behavioral Intention to Use is 0.700 and the significant value is 0. This shows that Perceived Usefulness and Behavioral Intention to Use have a positive and significant correlation.

Table 5. 10: Correlation between Variables

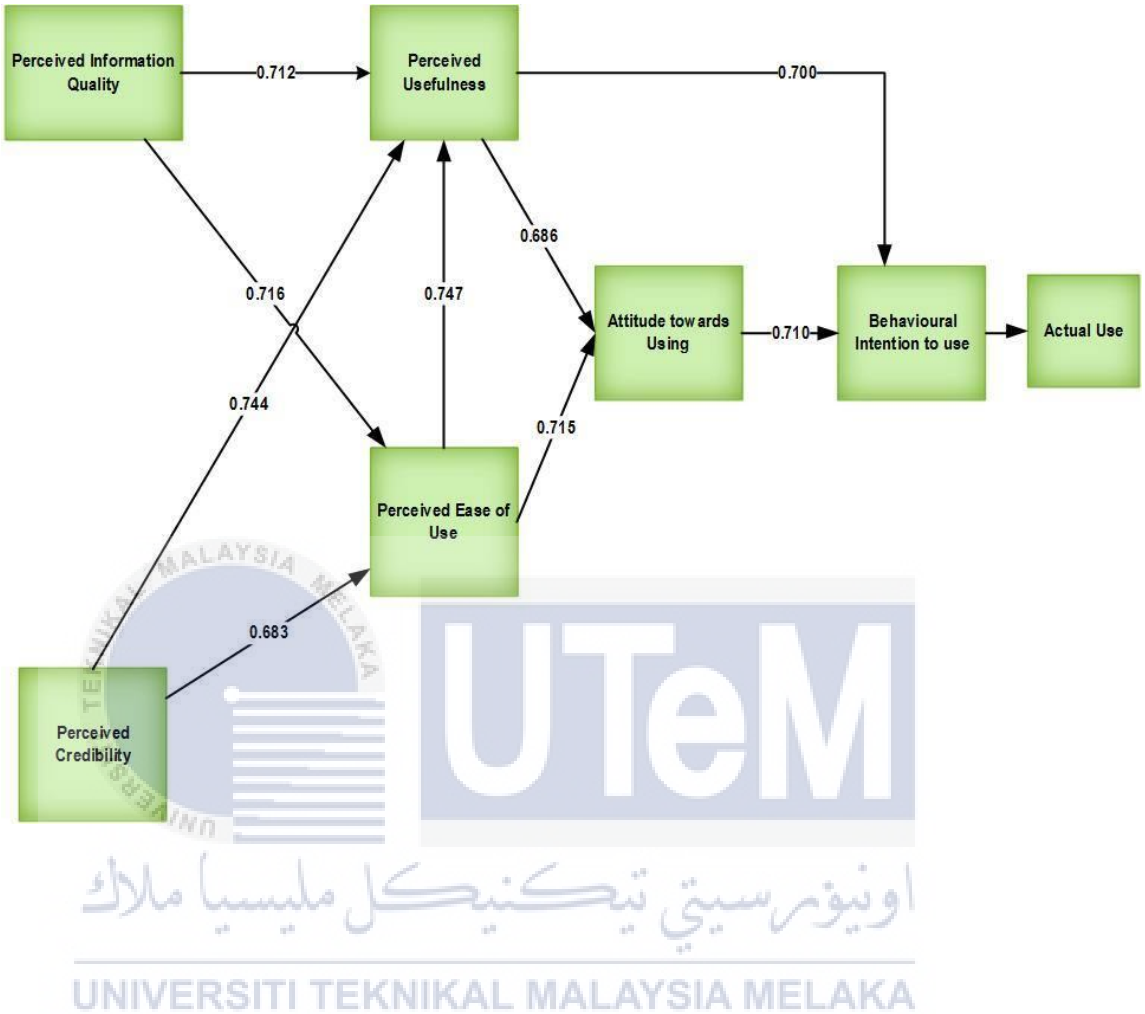
Correlations

		BehavioralIntentionToUse	AttitudeTowardUsing
BehavioralIntentionToUse	Pearson Correlation	1	.710**
	Sig. (2-tailed)		.000
	N	250	250
AttitudeTowardUsing	Pearson Correlation	.710**	1
	Sig. (2-tailed)	.000	
	N	250	250

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation value between Behavioral Intention to Use and Attitude toward Using is 0.710 which denotes a strong relationship between these two variables. The significant value is 0, which shows perfect significance between both variables. Therefore, Behavioral Intention to Use and Attitude toward Using are positively and significantly correlated to one another.

5.8.1 Framework after Correlation Analysis



5.9 Multiple Regression Analysis

Regression analysis is a statistical tool that is used to analyze the relations between variables. Regression is carried out to identify how strong the relationship is between one dependent variable with independent variable in the statistical terms. There are two type of regression which is linear regression and multiple regressions. Linear regression is used when one independent variable predicts the outcome of dependent variable whereas multiple regressions is used when there are two or more independent variable predicting the outcome of one dependent variable. The value from regression can be used to create equation. The estimated equation is as below;

Linear regression: Y=a+bX

Multiple regression: Y=a+b1X1 + b2X2+b3X3+b4X4 +⋯ btXt+u

Where: Y = dependent variable

X= independent variable

a= intercept

b= the slope

u= the regression residual

The equation shown above can be used to predict the value of dependent variable with the given value for independent variable. In this current study, multiple regressions are used because there are more than one independent variable.

5.9.1 Multiple Regressions for the dependent variable Behavioral Intention to Use.

Table 5. 11: Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.710[a]	.504	.502	.62190
2	.768[b]	.590	.586	.56671
3	.805[c]	.648	.644	.52589

a. Predictors: (Constant), AttitudeTowardUsing

b. Predictors: (Constant), AttitudeTowardUsing, PerceivedUsefulness

c. Predictors: (Constant), AttitudeTowardUsing, PerceivedUsefulness, PerceivedInformationQuality

The column “R” in the table above represents multiple correlation coefficients. R is to measure quality of the prediction of Dependent variable. The best model is model in this case is 3, which has the value of 0.805, which denotes a very good level of prediction. The “R Square” column represents the proportion of variance in dependent variable that can be explained by the independent variable. The value 0.648 means that the independent variable explains 64.8 % of the variability of dependent variable.

Table 5.12: Annova Table

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	97.448	1	97.448	251.963	.000[b]
	Residual	95.916	248	.387		
	Total	193.364	249			
2	Regression	114.038	2	57.019	177.541	.000[c]
	Residual	79.326	247	.321		
	Total	193.364	249			
3	Regression	125.330	3	41.777	151.058	.000[d]
	Residual	68.034	246	.277		
	Total	193.364	249			

a. Dependent Variable: BehavioralIntentionToUse

b. Predictors: (Constant), AttitudeTowardUsing

c. Predictors: (Constant), AttitudeTowardUsing, PerceivedUsefulness

d. Predictors: (Constant), AttitudeTowardUsing, PerceivedUsefulness, PerceivedInformationQuality

From the table above, it can be seen that the significance value for all the variables is below the threshold value of 0.05. Henceforth, all the models are show that they are statistically significant and Model 3 can be used to predict the users' behavioral intention to use crowdsourcing technology in urban and rural area.

Table 5.13: Coefficients Table

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.317	.150		8.789	.000
	AttitudeTowardUsing	.635	.040	.710	15.873	.000
2	(Constant)	1.061	.141		7.519	.000
	AttitudeTowardUsing	.388	.050	.434	7.752	.000
	PerceivedUsefulness	.321	.045	.402	7.187	.000
3	(Constant)	.884	.134		6.607	.000
	AttitudeTowardUsing	.262	.051	.293	5.187	.000
	PerceivedUsefulness	.186	.047	.233	4.001	.000
	PerceivedInformationQuality	.331	.052	.374	6.390	.000

a. Dependent Variable: BehavioralIntentionToUse

Table above shows the coefficients. The unstandardized column coefficients are to recognize how much the dependent variable changes with independent variable when other variables are held constant. It can be seen from the table that all the independent variable positively affects the dependent variable. The regression Coefficients for Perceived Information Quality is 0.331, which is the highest regression value. For the variable Perceived Usefulness, the regression value is 0.186. The regression Coefficients for Attitude toward Using is 0.262. This show that regression Coefficients for Perceived Information Quality, Perceived Usefulness, and Attitude toward Using variables are positive, in which each variable has a t value of 6.390, 4.001 and 5.187 respectively.

From this result shown in table above, model 3 is used to predict an equation, where all the variables are positively significant on the dependent variable. The regression equation can be predicted from model 3.

The predicted equation:

Behavioral Intention to Use: 0.331Q + 0.186U +0.262A+ 0.884

Where:

Q: Perceived Information Quality

U: Perceived Usefulness

A: Attitude toward Using

Table 5. 14: Excluded Variables

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	PerceivedUsefulness	.402[b]	7.187	.000	.416	.530
	PerceivedInformationQuality	.480[b]	8.942	.000	.495	.527
2	PerceivedInformationQuality	.374[c]	6.390	.000	.377	.418

a. Dependent Variable: BehavioralIntentionToUse

b. Predictors in the Model: (Constant), AttitudeTowardUsing

c. Predictors in the Model: (Constant), AttitudeTowardUsing, PerceivedUsefulness

Table above shows the excluded variables. This table shows the variables that have been excluded from each model. It can be seen that Model 3 is not included in this table because Model 3 comprises of all the variables and therefore deemed to be a fit model that gives significance to Behavioral Intention to Use.

5.9.2 Regression among variables

Regression among variable carried out to identify correlation and obtain a value for the model.

5.9.2.1 Linear Regression between Perceived Information Quality, Perceived Credibility and Perceived Usefulness.

Table 5. 15: Linear Regression between Perceived Information Quality, Perceived Credibility and Perceived Usefulness.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.063	.187		-.335	.738
	PerceivedInformationQuality	.417	.060	.375	6.933	.000
	PerceivedCredibility	.606	.068	.483	8.922	.000

a. Dependent Variable: PerceivedUsefulness

The table above shows the relationship between Perceived Information Quality, and Perceived Credibility with a significant value of 0.00 and coefficient value of 0.417 and 0.606.

5.9.2.2 Linear Regression between Perceived Information Quality, Perceived Credibility and Perceived Ease of Use.

Table 5.16: Linear Regression between Perceived Information Quality, Perceived Credibility and Perceived Ease of Use.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.325	.193		1.686	.093
	PerceivedInformationQuality	.505	.062	.468	8.142	.000
	PerceivedCredibility	.435	.070	.357	6.208	.000

a. Dependent Variable: PerceivedEaseOfUse

The table above shows the relationship between Perceived Information Quality, and Perceived Credibility with a significant value of 0.00 and coefficient value of 0.505 and 0.435.

5.9.2.3 Linear Regression between Perceived Usefulness, Perceived Ease of Use and Attitude toward Using.

Table 5.17: Linear Regression between Perceived Usefulness, Perceived Ease of Use and Attitude toward Using.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.992	.153		6.499	.000
	PerceivedUsefulness	.306	.056	.343	5.422	.000
	PerceivedEaseOfUse	.421	.058	.458	7.239	.000

a. Dependent Variable: AttitudeTowardUsing

The table above shows the relationship between Perceived Usefulness and Perceived Ease of Use with a significant value of 0.00 and coefficient value of 0.306 and 0.421.

5.9.2.4 Linear Regression between Perceived Usefulness and Perceived Ease of Use.

Table 5. 18: Linear Regression between Perceived Usefulness and Perceived Ease of Use

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.783	.164		4.765	.000
	PerceivedEaseOfUse	.769	.043	.747	17.707	.000

a. Dependent Variable: PerceivedUsefulness

The table above shows the relationship between Perceived Ease of Use and Perceived Usefulness with a significant value of 0.00 and coefficient value of 0.769.

5.9.2.5 Linear Regression between Perceived Usefulness and Behavioral Intention to Use.

Table 5. 19: Linear Regression between Perceived Usefulness and Behavioral Intention to Use.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.615	.135		11.932	.000
	PerceivedUsefulness	.559	.036	.700	15.434	.000

a. Dependent Variable: BehavioralIntentionToUse

The table above shows the relationship between Perceived Usefulness and Behavioral Intention to Use with a significant value of 0.00 and coefficient value of 0.559.

5.9.2.6 Linear Regression between Attitude Toward Using and Behavioral Intention to Use.

Table 5. 20: Linear Regression between Attitude Toward Using and Behavioral Intention to Use.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.317	.150		8.789	.000
	AttitudeTowardUsing	.635	.040	.710	15.873	.000

a. Dependent Variable: BehavioralIntentionToUse

The table above shows the relationship between Attitude toward Using and Behavioral Intention to Use with a significant value of 0.00 and coefficient value of 0.635.

5.10 Behavioral Intention to Use Framework based on regression

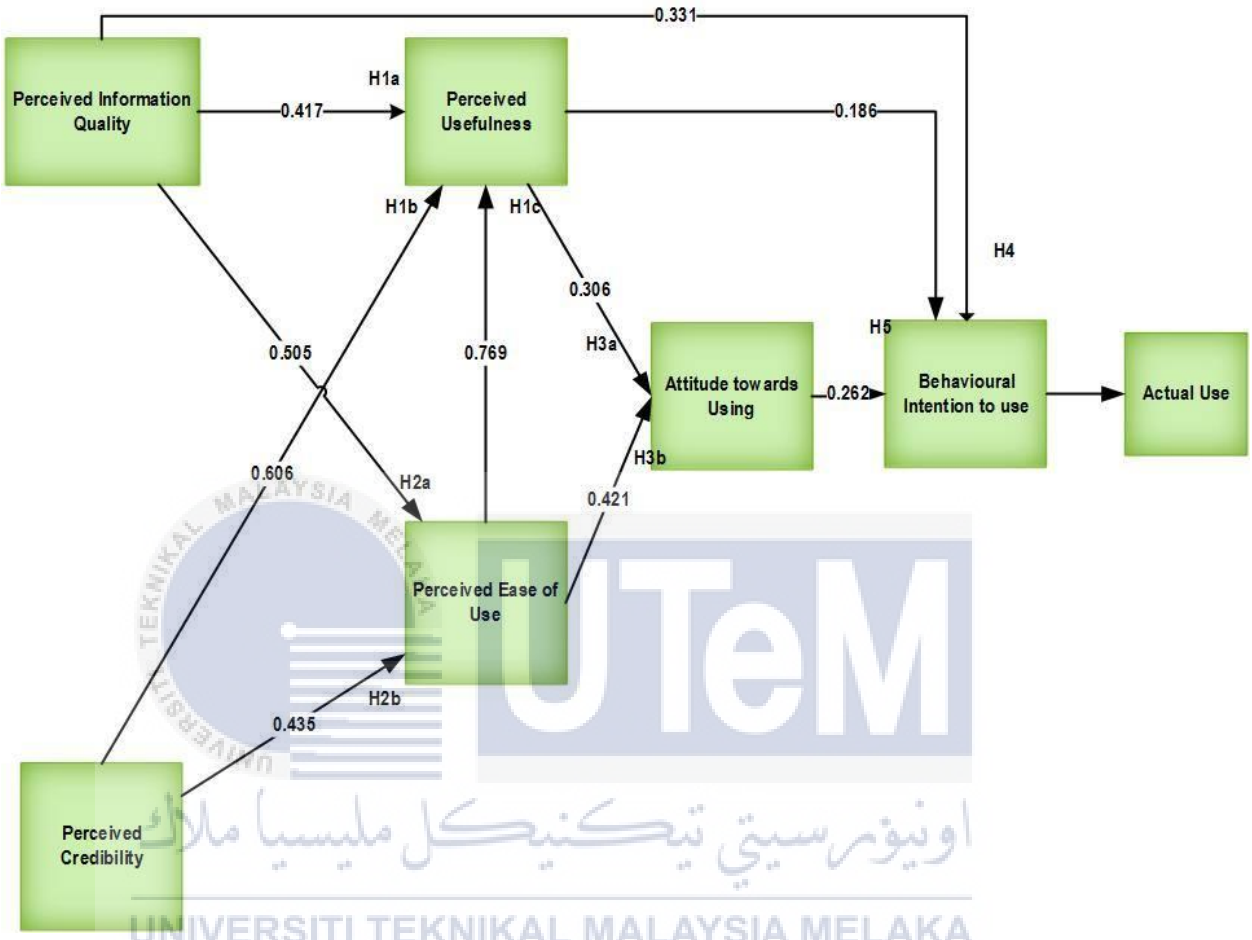


Figure 5.1: Behavioral Intention to Use Framework

5.10 Path Analysis

Path analysis is conducted to identify the dependencies in a group of variables. The diagram obtained from multiple regression analysis done previously is used to carry out path analysis. The path analysis is then carried out using this diagram to find out which variables have an effect on other variables. In this study, path analysis is carried out to determine if the diagram that was obtained from the multiple regression analysis and the correlation between the variables are significant for a fit model or not.

Table 5. 21: First Layer Multiple Regression for full model

Independent Variable	R	R Square	Standardized Coefficients	Sig.
			Beta	
Perceived Information Quality	0.792	0.627	0.375	0.000
Perceived Credibility	0.792	0.627	0.483	0.000

- Dependent variable: Perceived Usefulness

Table 5. 22: First Layer Multiple Regression for full model

Independent Variable	R	R Square	Standardized Coefficients	Sig.
			Beta	
Perceived Information Quality	0.769	0.579	0.468	0.000
Perceived Credibility	0.769	0.579	0.357	0.000

- Dependent variable: Perceived Ease of Use

Table 5. 23: First Layer Multiple Regression for full model

Independent Variable	R	R Square	Standardized Coefficients	Sig.
			Beta	
Perceived Usefulness	0.750	0.563	0.458	0.000
Perceived Ease of Use	0.750	0.563	0.343	0.000

- Dependent variable: Attitude toward Using

Table 5.24: First Layer Multiple Regression for full model

Independent Variable	R	R Square	Standardized Coefficients	Sig.
			Beta	
Attitude toward Using	0.710	0.504	0.710	0.000

- Dependent variable: Behavioral Intention to Use

The table above shows the first layer multiple regression of the full model for the independent variables Perceived Information Quality and Perceived Credibility towards dependent variables Perceived Usefulness and Perceived Ease of Use respectively, independent variables Perceived Usefulness and Perceived Ease towards dependent variable Attitude toward Using and lastly independent variable Attitude toward Using towards dependent variable Behavioral Intention to Use.

Table 5.25: Second Layer multiple regression for full model

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.812[a]	.659	.652	.51958

a. Predictors: (Constant), PerceivedInformationQuality, AttitudeTowardUsing, PerceivedUsefulness, PerceivedCredibility, PerceivedEaseOfUse

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.720	.146		4.918	.000
	AttitudeTowardUsing	.199	.055	.223	3.644	.000
	PerceivedUsefulness	.113	.053	.142	2.138	.034
	PerceivedEaseOfUse	.080	.053	.098	1.512	.132
	PerceivedCredibility	.144	.063	.143	2.268	.024
	PerceivedInformationQuality	.281	.054	.317	5.164	.000

a. Dependent Variable: BehavioralIntentionToUse

The tables showed in above shows the multiple regression value for the second layer of the full model, that is the value of independent variables Perceived Information Quality, Perceived Credibility, Perceived Usefulness, Perceived Ease of Use and Attitude toward Using towards the dependent variable Behavioral Intention to Use. The value that is required for the path analysis has been determined. The full model path analysis would be as shown below:

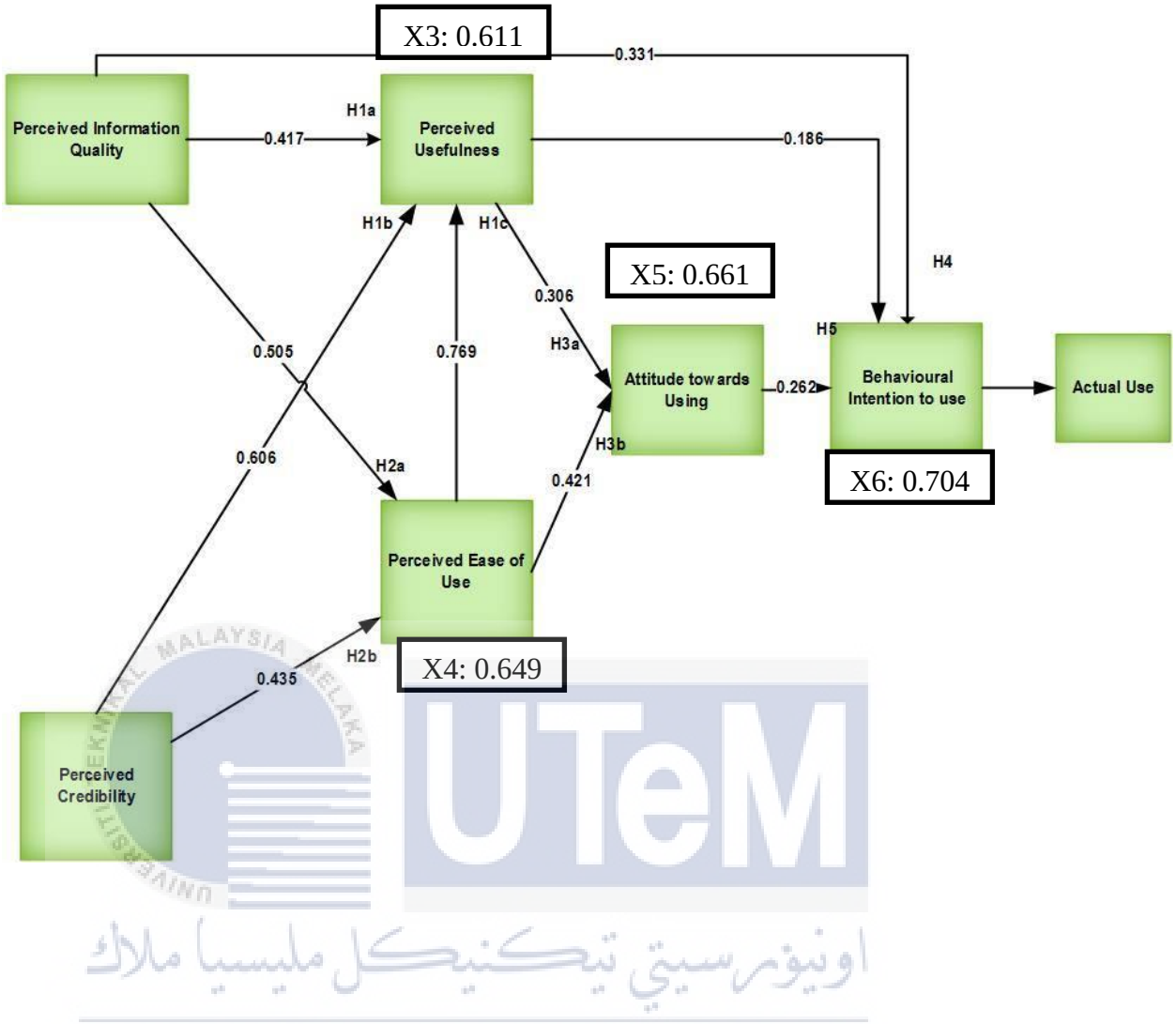


Figure above shows the full model path analysis. The Beta value from the Standardized Coefficient column from the result of the multiple regression analysis result is the path coefficient value. The formula that is used to determine the "e" values which are the roughly error variance is as shown below:

$$e_{ab} = \sqrt{(1 - (R^2))}$$

To determine the "e" or roughly error variance for each dependent variable, the equation below is used;

1. Perceived Usefulness, $e_{EV} = \sqrt{(1 - (0.627))} = 0.611$
2. Perceived Ease of Use, $e_{EV} = \sqrt{(1 - (0.579))} = 0.649$
3. Attitude toward Using, $e_{EV} = \sqrt{(1 - (0.563))} = 0.661$
4. Behavioral Intention to Use, $e_{EV} = \sqrt{(1 - (0.504))} = 0.704$

Once the roughly error variance value have been determined, the direct and indirect influence that it has on the dependent variable is determined by the referring to significant value for each variable. From the tables above, it can be concluded that all the variables with the exception of Perceived Ease of Use have direct and indirect influence on the dependent variable Behavioral Intention to use. However, the variable Perceived Ease of Use does have an indirect influence on the dependent variable Behavioral Intention to Use trough Attitude towards Using.

5.11 Conclusion

In conclusion, this chapter provides a brief description of the response gathered from respondents. The research instrument is validated and the most consistent instrument is selected for analysis. The analysis is carried out to validate the hypothesis. From the results obtained from the analysis, all hypotheses are accepted. Then, the framework is designed based on the hypothesis and regression test. This framework will then be validated in the next chapter. In the next chapter, the hypotheses that are accepted will be discussed in detail in order to support the results.

CHAPTER VI

VALIDATION AND DISCUSSION

6.1 Introduction

This chapter will elaborate in detail about the statistical validation that will be done based on the result obtained from the analysis. Statistical validation is vital in order to draw conclusion about the analysis. Structural Equation Modeling (SEM) is used validate the framework on the user acceptance of crowdsourcing technology and output obtained during regression analysis. The same set of data will be used in SEM during validation.

6.2 Structural Modelling Equation

Structural Equation modelling or SEM, is a general statistical modelling method that is used to define a large number of statistical model and evaluate to what extent the theories are valid. SEM is a combination of Factor analysis, regression and path analysis. Regression or path coefficient is used to represent the relationships between the variables constructed. Structural equation modelling provides a common framework for statistical analysis using multivariate procedure such as factor analysis, regression analysis, and discriminant analysis (J.J. Hox, T.M. Bechger). SEM is commonly pictured by graphical path diagram. The statistical model is inferred in set of matrix equation. To start SEM analysis it is compulsory to have path analysis or model. It is accustomed to start a SEM analysis by drawing a path diagram. The path diagram consists of circle, squares, and is connected with arrows. Rectangles represent independent variables and circles represent dependent variables (Wright, 1965). The relationship in model is shown by the single headed arrow, where the variable at tail influences the variable at the point whereas the double headed arrow indicates correlation. The structural equation modelling is usually used to confirmatory factor model. In this case, the main purpose of using structural equation model is to assess whether the model provides good fit. In this present study, SEM is used to validate the model that was constructed in analysis.

6.3 Validated User Acceptance Framework

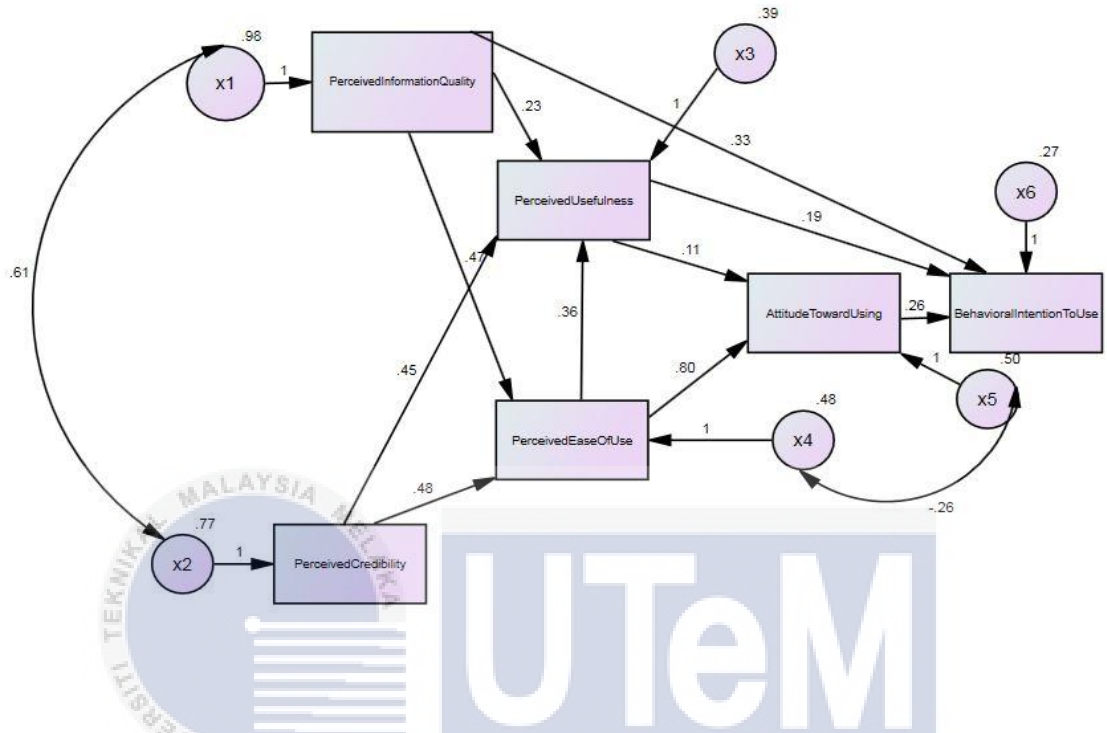


Figure 6.1 Validated Frame work for User Acceptance

The framework shown in Figure 6.1 is from regression analysis that is constructed in SEM to confirm the model fit of framework. The fit indices that are used to measure the model fit are Goodness-of-fit index (GFI), Comparative fit index (CFI), Normed fit index (NFI), Tucker Lewis index (TLI), Root Mean Square (RMR). The model is considered to be fit and sufficient if any four of the fit indices are within the acceptable range. The acceptable range for each index for GFI should be 0.95 or more (Miles and Shevlin, 1998). For CFI, NFI and TLI the value should also be 0.95 or more (Hu and Bentler,1999). The RMR value should be less than 0.05 for good fit (Browne and Cudeck, 1993). Lastly the threshold value for Model-Chi Square is less than or equals to 5 (Wheaton et al,

1977). Table 6.1 shows the fit indices value obtained for the framework. All the values are within acceptable range, therefore the model is a fit model.

Table 6.1: Fit Indices

Model	x^2/df	GFI	CFI	TLI	NFI	RMR
Accepted value	<=5	>0.95	>0.95	>0.95	>0.95	<0.5
Value for framework	3.3	0.99	0.99	0.97	0.99	0.01

6.4 Regression Weight from SEM

Table 6.2: Regression Weight from SEM

	Estimate	**S.E.**	**C.R.**	**P**	**Label**
PerceivedEaseOfUse <--- PerceivedCredibility	.481	.061	7.883	***	par_2
PerceivedEaseOfUse <--- PerceivedInformationQuality	.465	.054	8.580	***	par_9
PerceivedUsefulness <--- PerceivedCredibility	.448	.068	6.548	***	par_1
PerceivedUsefulness <--- PerceivedEaseOfUse	.363	.057	6.383	***	par_3
PerceivedUsefulness<--PerceivedInformationQuality	.233	.061	3.795	***	par_8
AttitudeTowardUsing <--PerceivedUsefulness	.106	.061	1.751	.080	par_4
AttitudeTowardUsing <--- PerceivedEaseOfUse	.802	.085	9.404	***	par_5
BehavioralIntentionToUse <---PerceivedUsefulness	.186	.046	4.066	***	par_6
BehavioralIntentionToUse <--- AttitudeTowardUsing	.262	.051	5.148	***	par_7
BehavioralIntentionToUse <--- PerceivedInformationQuality	.331	.052	6.381	***	par_10

From the table above, S.E stands for standard error and C.R means critical ratio. Critical value that is more than the threshold value of 1.96 means it is statistically significant and the p-value of three asterisk shows that the value is 0.000 which means very significant (Bain, 2011).

From the estimates, the variables that influence Behavioral Intention to Use are obtained and this value is used to verify the equation that estimated multiple regressions. From these relationships, the path coefficient between Perceived Information Quality and Behavioral Intention to Use is 0.331 followed by Perceived Usefulness and Behavioral Intention to use with a value of 0.186 and Attitude toward using and Behavioral Intention to Use with a value of 0.262. The estimated value of SEM is the same as the value obtained from regression when this result is compared with regression equation. Therefore it can conclude that the equation that was previously estimated in regression analysis is valid. Moreover, table 6.1 shows that the framework that is developed is a good model because the fit indices are within acceptable range.

Behavioral Intention to Use: 0.331Q + 0.186U +0.262A+ 0.884

Where:

Q: Perceived Information Quality

U: Perceived Usefulness

A: Attitude toward Using

The equation obtained during SEM analysis and regression analysis are the same therefore it could be said that the framework is validated. It could be seen that the highest contributor is Perceived Information Quality with the value of 0.331 and the lowest contributor is Perceived Usefulness with the value 0.186.

6.5 Discussion

The objective of this study is to determine the influence of geographical area on the variables of Technology Acceptance model on the user acceptance of crowdsourcing technology in Waze application. Two different geographical area; namely rural and urban area was selected to conduct this study and six variables were proposed that were related to the user acceptance of crowdsourcing technology in Waze. Based on the results obtained from the study, it shows that respondents from urban area have high Perceived Usefulness, Perceived Ease of Use, Perceived Credibility, Perceived Information Quality, Attitude toward Using and Behavioral Intention to Use when it comes to user acceptance of crowdsourcing technology in Waze. Even though the respondents from rural area possess high Perceived Usefulness, Perceived Ease of Use, Perceived Credibility, Perceived Information Quality, Attitude toward Using and Behavioral Intention to Use, but the frequency of respondents is lesser than that of urban area, which means more respondents from urban area.

Pearson correlation is used to investigate the relationships among six variables; which are Perceived Usefulness, Perceived Ease of Use, Perceived Credibility, Perceived Information Quality, Attitude toward Using and Behavioral Intention to Use. From the findings, it can be seen that all the relationships are strongly significant with one another. It shows that most of the variables influence one another strongly in affecting the user acceptance of crowdsourcing technology in Waze.

From the results obtained, it can be seen that Perceived Usefulness and Perceived Ease of Use in urban area is higher compared to that of rural area. According to Technology Acceptance Model, the usage of a specific technology, in this case, crowdsourcing technology in Waze application, is influenced by

these two variables; namely perceived usefulness and perceived ease of use. If users feel that a particular technology is of use and/or easy to be used, then they will show a positive attitude towards the technology (Ghias Ud Din Shah, Mansoor Nazir Bhatti, Mehwish Iftikhar, 2013). In this case, respondents from urban area find crowdsourcing technology in Waze more useful due to traffic and during peak hours and finding alternate routes during the said peak hours rather than the respondents in rural area where the need to use crowdsourcing technology in Waze did not rise since there is lesser traffic in rural areas (Bradley, 2015)The correlation between Perceived Ease of Use and Perceived Usefulness also proves to be strongly significant among respondents from both rural and urban area, though higher in urban area. According to Davis, Bagozzi and Warshaw, users are more likely to find a technology useful if they find it easy to use. Hence, hypothesis H2c is proven to be correct. Perceived Usefulness and Perceived Ease of Use are believed to be positive predictors on Attitude toward Using (Farahat, 2012). From the results obtained, Perceived Usefulness and Perceived Ease of use do have a strongly significant relationship on Attitude toward Using.

Furthermore, two external variables were incorporated in the Technology Acceptance Model, namely; Perceived Information Quality and Perceived Credibility. These external variables were chosen based on researches done previously on Technology Acceptance Model. In the research done by Siyoung Chung, Perceived Information Quality was incorporated as one of the external variable when investigating user acceptance of Wikipedia as a crowdsourcing platform. This variable was selected to test how much does the quality of information shared in a crowdsourcing tool influences user acceptance, which is similar to the current study. The second external variable, Perceived Credibility was also incorporated into the Technology Acceptance Model by Bong-Keun Jeong & Tom E Yoon in their study on the technology acceptance of M-banking. Since mobile banking requires the sharing of personal and confidential

credentials, Perceived Credibility of the information shared was tested as one of the variables to see its influence on the user acceptance of m-banking. This scenario is also similar to the current study where the credibility of information crowdsourced in Waze is taken into consideration. Based on the results, respondents in urban area possess a higher Perceived Information Quality and Perceived Credibility compared to those in rural area. The correlation also shows that both the external variables have a significantly strong relationship on the two main variables; Perceived Usefulness and Perceived Ease of Use, thus proving the hypothesis H1a, H1b, H1c and H1d to be correct.

In a previous study in understanding about academics' behavioral intention to use learning management system, Alharbi and Drew (2014) have concluded that the academic's behavioral intention to use the learning management system is positively affected by Attitude toward Using According to Wen-Chia Tsai, users' attitude toward using and willingness to use a particular technology should have a significantly positive relationship. In this study, Attitude toward using has a significant influence on behavioral intention to use. It reflects that, if users show a positive attitude towards a particular technology, they will continue to use it.

6.6 Conclusion

As conclusion, this chapter validates the User Acceptance framework for crowdsourcing technology that was constructed during the multiple regression analysis using Structural Equation Modelling. The validation is measure using model fit indices. The results obtained were discussed and the accepted hypotheses were supported in detail to strengthen the validation.

CHAPTER VII

CONCLUSION

7.1 Introduction

In this chapter, this present study is summarized. The contribution of the present study is discussed and the limitation present in this current study is also emphasized as well as the ways to overcome the limitations are elaborated.

7.2 Project summarization

An empirical research was done to investigate the contributing factors that influence user acceptance of crowdsourcing technology in Waze in urban and rural area in this paper. This study has 6 variables that influence user acceptance of crowdsourcing technology. From the results obtained, all the variables influence the user acceptance of crowdsourcing technology. The variables that were investigated in this study was adopted from Technology

Acceptance Model that is used in various previous research and the external variables used were identifies from past researches as well. These variables were then used in an empirical research to analyze whether the identified variable effect the user acceptance of crowdsourcing technology. From the result, all six variables are identified as factors that influence user acceptance of crowdsourcing technology. A framework of User Acceptance of crowdsourcing technology is constructed using these variables. This framework is then validated using Structural equation modelling. The results show that Perceived Information Quality, Perceived Usefulness and Attitude toward using have direct association with Behavioral Intention to Use.

7.3 Project contribution

This contribution contributed by this current study is Practical contribution and also community contribution. As per practical contribution, this current study provides a validated questionnaire for technology acceptance of crowdsourcing technology in Waze application. Meanwhile, in community contribution this current study helped in identifying the technology acceptance of crowdsourcing technology in Waze application based on different geographical locations and how it can make travelling on Malaysian roads a pleasant environment.

7.4 Limitation and future research

When conducting this study, a few limitations were faced. The first limitation was gathering data from the sample. The study required respondents from two different geographical area and the respondents must be Waze users. Since the data should be gathered personally from respondents to make sure the authenticity of information, the distribution of questionnaire in rural area was restricted to manual questionnaire distribution as opposed to that of in urban area. Furthermore, this study only focuses on user acceptance crowdsourcing technology based on different geographical factor. In future, this study can be expanded by considering various other factors that could affect user acceptance such as age, gender or education level. Moreover, to investigate the user acceptance of crowdsourcing technology in Waze, the Technology Acceptance Model was used in this study. Future studies can introduce new models or new external variables to garner results from a different perspective.

7.5 Conclusion

At the end of this present study, all variables that were selected to be analyzed are identified as variable of user acceptance of crowdsourcing technology. Using these variables a validated questionnaire for technology acceptance of crowdsourcing technology in Waze application is constructed. The limitations faced in this present study are identified and the possible future that can be conducted to avoid the limitation is discussed. This research work may help the Waze to expand its application in order to reach out to more users in rural area so that there will be better traffic and route management in Malaysia.

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Appendix A

QUESTIONNAIRE

SOAL SELIDIK

Title: A study on the technology acceptance of crowdsourcing technology: A case of Waze application

Tajuk: Mengkaji mengenai penerimaan teknologi terhadap teknologi "crowdsourcing: Kes aplikasi Waze

This survey is carried out to identify user acceptance of crowdsourcing technology in the case of Waze application in rural and urban area.Crowdsourcing is the act of gathering needed service or idea from a large group of people. Most common crowdsourcing platforms are Twitter and Waze. In this study, the user acceptance of crowdsourcing technology in the Waze Application is analyzed. Waze is community-driven navigation application that gathers complementary map data and traffic information from its users. It allows the users to report accidents, traffic jams, speed and police traps, and from the online map editor, can update roads, landmarks, house numbers and more.

Kajian ini dijalankan untuk mengenal pasti penerimaan teknologi terhadap teknologi "crowdsourcing" dalam aplikasi Waze di kawasan bandar dan luar bandar. "Crowdsourcing" adalah proses mendapatkan servis atau idea daripada pelbagai orang. Platform yang biasa digunakan untuk "crowdsourcing" adalah, Twitter, dan Waze. Kajian ini menganalisasi penerimaan teknologi crowdsourcing dalam aplikasi Waze . Waze adalah aplikasi navigasi yang didorong oleh masyarakat dan ia mengumpulkan data peta pelengkap dan maklumat trafik daripada penggunanya . Waze membolehkan pengguna untuk melaporkan kemalangan, kesesakan lalu lintas, kelajuan dan perangkap polis dan membolehkan pengguna mengemaskini peta dalam talian, mengemas kini jalan raya, tanda tempat , nombor rumah dan lain-lain lagi.

This questionnaire consists of two(2) sections;
Borang soal selidik ini mengandungi dua(2) bahagian;

Section/*Bahagian*	Objective/ *Tujuan*
A	Demographic Information *Maklumat demografi*
B	Variables affecting user acceptance of crowdsourcing technology in Waze application in rural and urban area. *Pemboleh ubah yang memberi kesan kepada penerimaan pengguna teknologi "crowdsourcing" dalam aplikasi Waze di kawasan bandar dan luar bandar.*

Response and personal information given are confidential. Your responses will give a clear understanding on variables influencing user acceptance of crowdsourcing technology in Waze application.

Maklum balas dan maklumat peribadi anda akan dirahsiakan. Maklum balas yang diberikan akan memberi gambaran yang lebih jelas mengenai pemboleh ubah yang mempengaruhi penerimaan teknologi"crowdsourcing"dalam aplikasi Waze.

Your cooperation and responses are highly appreciated.
Kerjasama dan maklum balas anda amat dihargai.

Thank you.

Terima kasih.

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SECTION A: DEMOGRAPHIC INFORMATION

BAHAGIAN A: MAKLUMAT DEMOGRAFI

This section is to obtain some of the demographic information of the respondent.

Bahagian ini adalah bertujuan untuk mendapatkan maklumat demografi responden.

1. **Gender / *Jantina***:

   ☐ Male/*Lelaki* ☐ Female/*Perempuan*

2. **Living Area/ *Kawasan pendudukan:***

   ☐ Urban area/*Kawasan bandar* ☐ Rural area/*Kawasan luar bandar*

3. **Age / *Umur*:**

   ☐ Below 15 years old / Kurang daripada 15 tahun

   ☐ 15 – 19 years old / 15 – 19 tahun

   ☐ 20 – 24 years old / *20 – 24 tahun*

   ☐ 25 – 29 years old / 25 – 29 tahun

☐ 30 – 34 years old / 30 – 34 tahun

☐ 35 – 39 years old / 35 – 39 tahun

☐ 40 – 44 years old / 40 – 44 tahun

☐ 45 – 49 years old / 45 – 49 tahun

☐ Above 50 years old / Lebih daripada 50 tahun

4. Education level/
Tahap pendidikan

☐ SPM

☐ STPM/Diploma

☐ Bachelor's Degree/ *Ijazah Sarjana Muda*

☐ Masters/PHD

5. Do you understand what crowdsourcing is?

Adakah anda faham apa itu "crowdsourcing"?

☐ Yes/*Ya* ☐ No/*Tidak*

SECTION B: VARIABLES AFFECTING TECHNOLOGY ACCEPTANCE OF CROWDSOURCING TECHNOLOGY IN WAZE APPLICATION

BAHAGIAN B: PEMBOLEH UBAH YANG MEMBERI KESAN KEPADA PENERIMAAN PENGGUNA TEKNOLOGI "CROWDSOURCING" DALAM APLIKASI WAZE.

Please indicate to what extend you agree or disagree with each of the following statement by circling the appropriate number. Please circle one number only in each column.

Sila nyatakan sejauh mana anda bersetuju atau tidak bersetuju dengan setiap kenyataan berikut dengan membulatkan nombor yang sesuai. Sila bulatkan salah satu nombor sahaja bagi setiap kenyataan.

	Perceived Usefulness	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
6.	I find that Waze shortens my travelling time. *Penggunaan Waze mengurangkan masa perjalanan saya.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
7.	I find that the traffic information shared in Waze helps me in making travelling decision. *Saya mendapati maklumat trafik yang dikongsi dalam Waze membantu saya membuat keputusan perjalanan.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
8.	I find it easy to find destination using the route information shared by other Waze users. *Saya mendapati pencarian destinasi senang dengan menggunakan maklumat jalan raya yang dikongsi oleh pengguna Waze lain.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***

9. I find that this technology is useful in avoiding accidents or roadblocks ahead. *Saya mendapati teknologi ini berguna dalam mengelakkan kemalangan jalan raya atau sekatan jalan raya.*	**Strongly disagree** **1 2 3 4 5 6** **Strongly agree** ***Sangat tidak setuju*** ***Sangat setuju***
10. I find interacting with other Waze users to be helpful to get the best route to a destination. *Saya mendapati berinteraksi dengan pengguna Waze yang lain membantu mendapatkan jalan yang terbaik ke destinasi yang dituju.*	**Strongly disagree** **1 2 3 4 5 6** **Strongly agree** ***Sangat tidak setuju*** ***Sangat setuju***

Perceived Ease of Use	**Strongly disagree 1 2 3 4 5 6 Strongly agree** ***Sangat tidak setuju Sangat setuju***
11. I find it easy to share real-time traffic information in Waze. *Saya rasa mudah untuk berkongsi maklumat trafik terkini dalam Waze.*	**Strongly disagree 1 2 3 4 5 6 Strongly agree** ***Sangat tidak setuju Sangat setuju***
12. I find Waze frustrating to interact with. *Saya mendapati interaksi dengan Waze ini mengecewakan*	**Strongly disagree 1 2 3 4 5 6 Strongly agree** ***Sangat tidak setuju Sangat setuju***
13. I find Waze does not require a lot of mental effort to interact with. *Saya tidak perlu banyak berfikir untuk berinteraksi dengan Waze.*	**Strongly disagree 1 2 3 4 5 6 Strongly agree** ***Sangat tidak setuju Sangat setuju***
14. Waze provides helpful guides on how to share real-time traffic information. *Waze menyediakan panduan berguna tentang bagaimana berkongsi maklumat trafik terkini.*	**Strongly disagree 1 2 3 4 5 6 Strongly agree** ***Sangat tidak setuju Sangat setuju***
15. I find it easy to remember how to share traffic and route information when using Waze. *Saya mendapati mudah untuk mengingati cara-cara berkongsi malkumat trafik dan jalan menggunakan Waze*	**Strongly disagree 1 2 3 4 5 6 Strongly agree** ***Sangat tidak setuju Sangat setuju***

Perceived Credibility	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
16. I feel comfortable reporting an incident on the road in Waze. *Saya rasa selesa untuk melaporkan kejadian di jalan raya dengan menggunakan Waze.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
17. I find that the traffic information shared in Waze to be accurate. *Saya mendapati bahawa maklumat trafik yang dikongsi dalam Waze tepat.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
18. I can trust on the incident report on the road I get from Waze. *Saya boleh percaya pada laporan kejadian di jalan raya yang saya dapat daripada Waze.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
19. I feel confident using route information from Waze *Saya merasa yakin menggunakan maklumat jalan raya daripada Waze.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
20. I find that the maps and traffic information in Waze to be true. *Saya mendapati bahawa maklumat peta dan trafik yang diperoleh dari Waze adalah benar.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***

Perceived Information Quality	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
21. I find that all route information for my travelling needs is available in Waze. *Saya mendapati bahawa maklumat jalan raya untuk keperluan semasa saya dalam perjalanan ada dalam Waze.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
22. I find the route information in Waze is sufficient and complete for my travelling needs. *Saya mendapati maklumat jalan raya dalam Waze adalah mencukupi dan lengkap untuk keperluan perjalanan saya.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
23. The maps and traffic information is up-to-date for my travelling purposes. *Maklumat peta dan trafik adalah yang terkini untuk tujuan perjalanan saya.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
24. I find the route information in Waze to be applicable to my travelling problems at hand. *Saya mendapati maklumat dalam Waze adalah berkaitan dengan masalah perjalanan saya pada masa itu.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
25. I find that the route information provided in Waze is relevant with regard to my past travelling activities. *Saya mendapati bahawa maklumat jalan raya yang ada dalam Waze adalah relevan dengan aktiviti perjalanan saya yang lalu.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***

Behavioral Intention to use	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
26. If I were to make a similar travelling decision in the future, I would use Waze again. *Jika saya hendak membuat keputusan perjalanan yang sama pada masa akan datang, saya akan menggunakan Waze lagi.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
27. I intend to use maps and traffic information shared in Waze for a long time. *Saya bercadang untuk menggunakan maklumat peta dan trafik yang dikongsi dalam Waze untuk masa yang lama.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
28. I would recommend Waze to other friends who may be faced with similar travelling needs as mine. *Saya akan mengesyorkan penggunaan Waze kepada rakan-rakan lain yang mungkin berhadapan dengan keperluan perjalanan sama seperti saya.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
29. I would use Waze if it is not recommended by other Waze users *Saya akan menggunakan Waze walaupun tidak disyorkan oleh pengguna lain.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
30. I do not intend to continue to use the maps and traffic information shared in Waze. *Saya tidak berniat untuk meneruskan penggunaan maklumat peta dan trafik yang dikongsi dalam Waze.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***

Attitude toward Using	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
31. I appreciate using information about road blocks and accidents shared in Waze when travelling. *Saya menghargai penggunaan maklumat tentang sekatan jalan raya dan emalangan yang dikongsi dalam Waze ketika dalam perjalanan.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
32. I am pleased with the incident reports on the road shared by other Waze users *Saya berpuas hati dengan laporan kejadian di jalan raya yang dikongsi oleh pengguna Waze lain.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
33. I am satisfied when using Waze when travelling on the road. *Saya tidak berpuas hati apabila menggunakan Waze semasa dalam perjalanan di jalan raya.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
34. I am dependent on the real-time traffic shared in Waze when travelling. *Saya bergantung kepada maklumat trafik terkini yang dikongsi dalam Waze apabila berada dalam perjalanan.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
35. I am interested to interact with other Waze users about sharing route information. *Saya berminat untuk berinteraksi dengan pengguna Waze yang lain untuk berkongsi maklumat jalan raya.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***

Appendix B

QUESTIONNAIRE

SOAL SELIDIK

Title: A study on the technology acceptance of crowdsourcing technology: A case of Waze application

Tajuk: Mengkaji mengenai penerimaan teknologi terhadap teknologi "crowdsourcing: Kes aplikasi Waze

This survey is carried out to identify user acceptance of crowdsourcing technology in the case of Waze application in rural and urban area.Crowdsourcing is the act of gathering needed service or idea from a large group of people. Most common crowdsourcing platforms are Twitter and Waze. In this study, the user acceptance of crowdsourcing technology in the Waze Application is analyzed. Waze is community-driven navigation application that gathers complementary map data and traffic information from its users.

It allows the users to report accidents, traffic jams, speed and police traps, and from the online map editor, can update roads, landmarks, house numbers and more.

Kajian ini dijalankan untuk mengenal pasti penerimaan teknologi terhadap teknologi "crowdsourcing" dalam aplikasi Waze di kawasan bandar dan luar bandar. "Crowdsourcing" adalah proses mendapatkan servis atau idea daripada pelbagai orang. Platform yang biasa digunakan untuk "crowdsourcing" adalah, Twitter, dan Waze. Kajian ini menganalisasi penerimaan teknologi crowdsourcing dalam aplikasi Waze . Waze adalah aplikasi navigasi yang didorong oleh masyarakat dan ia mengumpulkan data peta pelengkap dan maklumat trafik daripada penggunanya . Waze membolehkan pengguna untuk melaporkan kemalangan, kesesakan lalu lintas, kelajuan dan perangkap polis dan membolehkan pengguna mengemaskini peta dalam talian, mengemas kini jalan raya, tanda tempat , nombor rumah dan lain-lain lagi.

This questionnaire consists of two(2) sections;
Borang soal selidik ini mengandungi dua(2) bahagian;

Section/*Bahagian*	Objective/ *Tujuan*
A	Demographic Information *Maklumat demografi*
B	Variables affecting user acceptance of crowdsourcing technology in Waze application in rural and urban area. *Pemboleh ubah yang memberi kesan kepada penerimaan pengguna teknologi "crowdsourcing" dalam aplikasi Waze di kawasan bandar dan luar bandar.*

Response and personal information given are confidential. Your responses will give a clear understanding on variables influencing user acceptance of crowdsourcing technology in Waze application.

Maklum balas dan maklumat peribadi anda akan dirahsiakan. Maklum balas yang diberikan akan memberi gambaran yang lebih jelas mengenai pemboleh ubah yang mempengaruhi penerimaan teknologi"crowdsourcing"dalam aplikasi Waze.

Your cooperation and responses are highly appreciated.
Kerjasama dan maklum balas anda amat dihargai.

Thank you.
Terima kasih.

Niranjanah A/P Subramanian
Bachelor of Computer Science (Networking)
Faculty of Information and Communication Technology
Universiti Teknikal Malaysia Melaka.

SECTION A: DEMOGRAPHIC INFORMATION

BAHAGIAN A: MAKLUMAT DEMOGRAFI

This section is to obtain some of the demographic information of the respondent.

Bahagian ini adalah bertujuan untuk mendapatkan maklumat demografi responden.

1. **Gender / *Jantina***:

   ☐ Male/*Lelaki* ☐ Female/*Perempuan*

2. **Living Area/ *Kawasan pendudukan:***

   ☐ Urban area/*Kawasan bandar* ☐ Rural area/*Kawasan luar bandar*

3. **Age / *Umur***:

   ☐ Below 15 years old / Kurang daripada 15 tahun

   ☐ 15 – 19 years old / 15 – 19 tahun

☐ 20 – 24 years old / *20 – 24 tahun*

☐ 25 – 29 years old / 25 – 29 tahun

☐ 30 – 34 years old / 30 – 34 tahun

☐ 35 – 39 years old / 35 – 39 tahun

☐ 40 – 44 years old / 40 – 44 tahun

☐ 45 – 49 years old / 45 – 49 tahun

☐ Above 50 years old / Lebih daripada 50 tahun

4. Education level/
Tahap pendidikan

☐ SPM

☐ STPM/Diploma

☐ Bachelor's Degree/ *Ijazah Sarjana Muda*

☐ Masters/PHD

5. Do you understand what crowdsourcing is?

Adakah anda faham apa itu "crowdsourcing"?

☐ Yes/*Ya* ☐ No/*Tidak*

SECTION B: VARIABLES AFFECTING TECHNOLOGY ACCEPTANCE OF CROWDSOURCING TECHNOLOGY IN WAZE APPLICATION

BAHAGIAN B: PEMBOLEH UBAH YANG MEMBERI KESAN KEPADA PENERIMAAN PENGGUNA TEKNOLOGI "CROWDSOURCING" DALAM APLIKASI WAZE.

Please indicate to what extend you agree or disagree with each of the following statement by circling the appropriate number. Please circle one number only in each column.

Sila nyatakan sejauh mana anda bersetuju atau tidak bersetuju dengan setiap kenyataan berikut dengan membulatkan nombor yang sesuai. Sila bulatkan salah satu nombor sahaja bagi setiap kenyataan.

	Perceived Usefulness	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
6.	I find that the traffic information shared in Waze helps me in making travelling decision. *Saya mendapati maklumat trafik yang dikongsi dalam Waze membantu saya membuat keputusan perjalanan.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
7.	I find it easy to find destination using the route information shared by other Waze users. *Saya mendapati pencarian destinasi senang dengan menggunakan maklumat jalan raya yang dikongsi oleh pengguna Waze lain.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
8.	I find that this technology is useful in avoiding accidents or roadblocks ahead. *Saya mendapati teknologi ini berguna dalam mengelakkan kemalangan jalan raya atau sekatan jalan raya.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***

9. I find interacting with other Waze users to be helpful to get the best route to a destination. *Saya mendapati berinteraksi dengan pengguna Waze yang lain membantu mendapatkan jalan yang terbaik ke destinasi yang dituju.*	**Strongly disagree** **1 2 3 4 5 6** **Strongly agree** ***Sangat tidak setuju*** ***Sangat setuju***

Perceived Ease of Use	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
10. I find it easy to share real-time traffic information in Waze. *Saya rasa mudah untuk berkongsi maklumat trafik terkini dalam Waze.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
11. I find Waze does not require a lot of mental effort to interact with. *Saya tidak perlu banyak berfikir untuk berinteraksi dengan Waze.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
12. Waze provides helpful guides on how to share real-time traffic information. *Waze menyediakan panduan berguna tentang bagaimana berkongsi maklumat trafik terkini.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
13. I find it easy to remember how to share traffic and route information when using Waze. *Saya mendapati mudah untuk mengingati cara-cara berkongsi malkumat trafik dan jalan menggunakan Waze*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***

Perceived Credibility	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
14. I feel comfortable reporting an incident on the road in Waze. *Saya rasa selesa untuk melaporkan kejadian di jalan raya dengan menggunakan Waze.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
15. I find that the traffic information shared in Waze to be accurate. *Saya mendapati bahawa maklumat trafik yang dikongsi dalam Waze tepat.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
16. I can trust on the incident report on the road I get from Waze. *Saya boleh percaya pada laporan kejadian di jalan raya yang saya dapat daripada Waze.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
17. I feel confident using route information from Waze *Saya merasa yakin menggunakan maklumat jalan raya daripada Waze.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***

Perceived Information Quality	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
18. I find that all route information for my travelling needs is available in Waze. *Saya mendapati bahawa maklumat jalan raya untuk keperluan semasa saya dalam perjalanan ada dalam Waze.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
19. I find the route information in Waze is sufficient and complete for my travelling needs. *Saya mendapati maklumat jalan raya dalam Waze adalah mencukupi dan lengkap untuk keperluan perjalanan saya.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
20. The maps and traffic information is up-to-date for my travelling purposes. *Maklumat peta dan trafik adalah yang terkini untuk tujuan perjalanan saya.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
21. I find the route information in Waze to be applicable to my travelling problems at hand. *Saya mendapati maklumat dalam Waze adalah berkaitan dengan masalah perjalanan saya pada masa itu.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
22. I find that the route information provided in Waze is relevant with regard to my past travelling activities. *Saya mendapati bahawa maklumat jalan raya yang ada dalam Waze adalah relevan dengan aktiviti perjalanan saya yang lalu.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***

Behavioral Intention to use	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
23. If I were to make a similar travelling decision in the future, I would use Waze again. *Jika saya hendak membuat keputusan perjalanan yang sama pada masa akan datang, saya akan menggunakan Waze lagi.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
24. I intend to use maps and traffic information shared in Waze for a long time. *Saya bercadang untuk menggunakan maklumat peta dan trafik yang dikongsi dalam Waze untuk masa yang lama.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
25. I would recommend Waze to other friends who may be faced with similar travelling needs as mine. *Saya akan mengesyorkan penggunaan Waze kepada rakan-rakan lain yang mungkin berhadapan dengan keperluan perjalanan sama seperti saya.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***
26. I would use Waze if it is not recommended by other Waze users *Saya akan menggunakan Waze walaupun tidak disyorkan oleh pengguna lain.*	**Strongly disagree** **1 2 3 4 5 6** ***Sangat tidak setuju*** **Strongly agree** ***Sangat setuju***

Attitude toward Using	**Strongly disagree** **1 2 3 4 5 6** **Strongly agree** ***Sangat tidak setuju*** ***Sangat setuju***
27. I appreciate using information about road blocks and accidents shared in Waze when travelling. *Saya menghargai penggunaan maklumat tentang sekatan jalan raya dan emalangan yang dikongsi dalam Waze ketika dalam perjalanan.*	**Strongly disagree** **1 2 3 4 5 6** **Strongly agree** ***Sangat tidak setuju*** ***Sangat setuju***
28. I am pleased with the incident reports on the road shared by other Waze users *Saya berpuas hati dengan laporan kejadian di jalan raya yang dikongsi oleh pengguna Waze lain.*	**Strongly disagree** **1 2 3 4 5 6** **Strongly agree** ***Sangat tidak setuju*** ***Sangat setuju***
29. I am satisfied when using Waze when travelling on the road. *Saya tidak berpuas hati apabila menggunakan Waze semasa dalam perjalanan di jalan raya.*	**Strongly disagree** **1 2 3 4 5 6** **Strongly agree** ***Sangat tidak setuju*** ***Sangat setuju***
30. I am dependent on the real-time traffic shared in Waze when travelling. *Saya bergantung kepada maklumat trafik terkini yang dikongsi dalam Waze apabila berada dalam perjalanan.*	**Strongly disagree** **1 2 3 4 5 6** **Strongly agree** ***Sangat tidak setuju*** ***Sangat setuju***