A MODEL FOR AMATEUR RADIO COMMUNITY BEHAVIOURAL INTENTION TO USE AMATEUR RADIO COMMUNICATION TECHNOLOGY IN EMERGENCY SITUATIONS

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Abstrak

Komuniti Radio Amatur (ARC) adalah komuniti kecil yang menggunakan teknologi komunikasi radio amatur (ARCT) dengan penuh semangat untuk menyokong agensi bantuan ketika menghadapi situasi kecemasan. Memahami hasrat tingkah laku mereka (BI) akan membantu kita mengenali faktor-faktor penting yang dapat memberi peluang kepada orang ramai untuk mengambil bahagian secara aktif dan menyokong agensi bantuan kerajaan dalam situasi kecemasan. Oleh kerana ARC mempunyai perilaku yang bertanggungjawab, boleh dipercayai dan bersedia untuk menggunakan ARCT terutamanya ketika situasi kecemasan, adalah menarik untuk meneroka perilaku unik ini agar kerajaan dapat memberi mereka kuasa untuk terus menggunakan ARCT. Namun, kekurangan maklumat mengenai demografi dan faktor-faktor penting yang mendorong hasrat mereka untuk menggunakan ARCT telah membataskan usaha kerajaan untuk melibatkan mereka menyokong agensi bantuan. Maka, kajian ini membangunkan satu model untuk merungkai permasalahan ini. Kajian ini menggunakan kaedah penyelidikan kuantitatif melalui tinjauan dalam talian. Instrumen tinjauan dibina dengan mengkaji faktor-faktor yang relevan yang kemudian disahkan oleh pakar-pakar ARCT. Kajian rintis yang melibatkan 30 ARC berpengalaman telah dilakukan untuk memeriksa kebolehpercayaan instrumen. Pakar-pakar akademik telah mengesahkan instrumen kajian sebelum dan selepas kajian rintis. Untuk kajian utama, 400 responden dipilih dari kalangan ARC di seluruh Malaysia. Kajian ini membentangkan demografi ARC, seperti usia, jantina, bangsa, tahap pendidikan, pekerjaan, pendapatan, amalan dan kemahiran dalam menggunakan ARCT. Hasil kajian menunjukkan faktor yang paling penting adalah keserasian kerana menggunakan ARCT memang menjadi amalan kebiasaan mereka dalam kehidupan harian. Motivasi hedonik, yang dirujuk sebagai kegembiraan dan kesediaan ARC untuk menggunakan ARCT untuk mencapai kepuasan juga merupakan faktor yang signifikan. Faktor penting lain termasuklah amalan kebiasaan, kebolehpercayaan rakan, pengaruh sosial, prestasi jangkaan, nilai harga, jangkaan usaha dan memudahkan keadaan. Manakala, pengalaman, usia dan jantina didapati signifikan dalam memoderasi hubungan antara setiap faktor. Kesan moderasi menunjukkan perbezaan kekuatan hubungan setiap faktor. Kesimpulannya, hasil kajian ini boleh dijadikan panduan kepada pihak yang berkepentingan dalam menangani situasi kecemasan. Di samping itu, model yang dibina dapat diterokai lebih jauh oleh penyelidik seterusnya dalam kajian masa depan mereka mengenai perkara ini. Faktor-faktor penting yang dikenal pasti dari kajian menunjukkan kesiapsiagaan ARC untuk berada di barisan hadapan dalam menyokong agensi bantuan sebelum, semasa atau selepas bencana melanda.

Kata kunci: Pengaruh sosial; Motivasi hedonik; Kebolehpercayaan rakan; Penentuan kesan penyederhanaan; Pemodelan PLS-SEM.

Abstract

Amateur Radio Community (ARC) is a small community that passionately uses amateur radio communication technology (ARCT) to support relief agencies during emergency situation. Understanding their behavioural intention (BI) would help us recognize salient factors that can empower the public to participate actively and support the government relief agencies in emergency situation. As ARC exhibits responsible, trustworthy, and willing behaviour to use the ARCT, especially in emergency situation, it is interesting to explore these unique behaviours so that government can empower them to actively continue using ARCT. However, the lack of demographics information as well as salient factors that drive their intentions in using ARCT has limited the government's efforts in engaging them to support relief agencies. Thus, this study develops a model to unravel these problems.This study employs a quantitative research method via an online survey. The survey instrument is constructed by reviewing relevant factors, which the ARCT experts then confirm. A pilot study involving 30 experienced ARC was conducted to check instrument reliability. Academic experts verified the research instrument before and after the pilot study. For the main study, 400 respondents were selected from the ARC throughout Malaysia. This study presented the ARC demographics, such as age, gender, race, education level, occupation, income, practice and skill in using ARCT. The findings revealed that the most significant factors were compatibility because using ARCT is their usual practice in daily life. Hedonic motivation, which is referred to as ARC excitement and willingness to use ARCT to achieve satisfaction, was also a significant factor. Other significant factor includes habit, peer trustworthiness, social influence, performance expectancy, price value, effort expectancy and facilitating condition. While, experience, age and gender were significant in moderating the relationship between each factor. The moderating effect shows the variance in the strength of the relationship of each factor. In conclusion, this study's outcomes are meant to be included as guidelines for the stakeholders in dealing with emergency situation. In addition, the established model can be further explored by researchers in their future studies on this subject. The salient factors identified from the study showed the ARC readiness to be at the forefront in supporting relief agencies before, during or after a disaster struck.

Keywords: Social influence; Hedonic motivation; Peer trustworthiness; Moderating effect determination; PLS-SEM modelling.

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List of Abbreviations

AA	Apparatus of Amateur Radio
ADPC	Asian Disaster Preparedness Centre
AG	Age
ARC	Amateurs Radio Communities
ARCT	Amateur Radio Communication Technology
ARES	Amateur Radio Emergency Service
ARRL	American Radio Relay League
ASTRA	Persatuan Radio Amatur Melayu Utara Malaysia
BI	Behavioural Intention
CB	Compatibility
DRC	Disaster Research Centre
EC	Emergency Communication
EE	Effort Expectancy
ES	Emergency Situations
EX	Experience
FC	Facilitating Condition
GE	Gender
HAM	Hertz Armstrong and Marconi
HB	Habit
HM	Hedonic Motivation
ICT	Information Communication Technology
IS	Information System
ISD	Information System Development
IT	Information Technology
ITU	The International Telecommunication Union
MCMC	Malaysian Communications and Multimedia Commission
NADMA	National Disaster Management Agency
NSC	National Security Council
PDRM	Polis Diraja Malaysia
PE	Performance Expectancy
PLS-SEM	Partial Least Squares Structural Equation Modelling
PT	Peer trustworthiness
PV	Price Value
RADIC	Radio Amateur Disaster Information Centre
RAE	Radio Amateur Examination
RO	Research Objectives
RQ	Research Questions
SI	Social Influence
SPSS	Statistical Package for Social Sciences
UNSIDR	United Nations International Strategy for Disaster Reduction

List of Q Code - Amateur Radio Callsigns

9W2XAA	Azlee Johar: Nine Whiskey Two X-ray Alpha Alpha
9M4RHP	Perlis Repeater: Nine Mike Four Romeo Hotel Papa (Local)
9MX243	G. Jerai Repeater: Nine Mike X-ray Two Four Three (Tran)

CHAPTER ONE

INTRODUCTION

1.0 Background

The Information Communication Technology (ICT) field is very wide and not just limited to applications involving computer technology, but rather, any communication technology equipment other than a computer that allows the sharing and dissemination of information is also included in ICT (Anttiroiko, 2008; Moore, 2012; Yang, 2013; and William, 2013). Wireless communication technology, like radio is also included in ICT. The use of specific wireless communication technology equipment in specific situations in many countries is influenced by a community's desire for development and survival. There are many factors that encourage the use amongst the communities for specific wireless communication technology equipments. However, the factors that influence their use are different and depend on the requirements and situations (Wright, 2005; Kim, Chan, & Gupta, 2007; and Ooi, *et al*., 2011). ICT allows a community to use computers and other technologies, such as Amateur Radio Communication Technology (ARCT), in the sharing and dissemination of information more quickly and effectively (Lester, 2001; Hilberg & Gabriele, 2008; and Dix, 2009).

Wireless communication technology has brought relief to communities around the world by providing information sharing in emergency situations in most disasters. In fact, Amateur Radio Communication Technology (ARCT) is one of the wireless communication technologies that are prominent in contingency communication in emergency situations (ES) in many countries, such as the USA, Japan, Thailand, the Netherlands, and Canada (Jessop, 1983; Laster, 2001; and Khan, *et al*., 2014).

Amateur Radio Communication Technology (ARCT) allows the Amateur Radio Communities (ARCs) to share and disseminate information amongst the stakeholders and the public of most countries quickly and efficiently. It provides timely, quick, and continuous updated information with reference to related government relief agencies to evacuate victims in Emergency Situations (ES) during most disasters (Stephenson & Anderson, 1997; Laster, 2001; Sutiono, *et al.*, 2010; and Qiantori, *et al.*, 2012).

The beginning of ARCT's contribution in ES in the world was seen in 1953. At that time, using ARCT was a unique hobby amongst ARCs in rural areas in Britain, Holland, and Belgium. However, their hobby changed to a more important role in the aftermath of the massive floods that struck their countries. Until now, two stations are still active in Britain and Holland as benchmarks of community awareness about the role of ARCs in using ARCT in ES in the world (Flather, 1984; Lamb & Frydendahl, 1991; De Kraker, 2006; and IARU, 2013).

The worst flooding in Malaysia in 30 years affected several states, especially the northern regions, such as eastern Perlis and Kelantan, Terengganu, Pahang, and Perak. Displacing over 250,000 people and causing property damage on a large scale. This tragedy occurred at the end of 2014 (NSC, 2015; CREST, 2015). This event has been considered as an internal tsunami as houses and properties were lost and totally destroyed in some places. Estimated losses were about RM 932 million. Hence, in Malaysia, a flood disaster situation can be classified as an ES due to its frequent occurrences (Azrina, 2014; NSC, 2015; and Ahmad, 2015).

According to Bahari (2014) and Abdul Aziz (2014), when floods hit Malaysia in 2010, the ARC had been a frontline volunteer to support relief agencies when all other types of communication failed to operate. This situation occurred accidentally as some employees of the government relief agencies were ARC members. They had legal licenses and callsigns from the Malaysian Communications and Multimedia Commission (MCMC) to use the ARCT. So they communicated amongst the local ARCs to get information and shared it with the government rescue agencies for further action.

The worst flooding on December 22, 2014 that occurred in the northern and eastern regions of peninsular Malaysia was a major challenge to communication due to the failure of the existing communication services. Contingency communication in the ES during that time was only through the ARCT amongst the volunteer groups like the ARC (Ahmad, 2015; ALFA Squad, 2015). However**,** as of December 2018, Malaysia had 12,227 ARCT practitioners who were capable of giving support to relief agencies in the event of emergency situations in natural disasters (MCMC, 2018), but were not used.

Accordingly, this study was to investigate the Behavioural Intention (BI) in the use of Amateur Radio Communication Technology (ARCT) amongst the Amateur Radio Communities (ARCs) in Emergency Situations (ES) in Malaysia.

Even though the use of ARCT amongst the ARCs started as a hobby, their roles in supporting relief agencies in emergency situations (ES) cannot be denied. ARC members bought their own equipments and were willing to volunteer to provide help during the disasters. ARCs are able to use the ARCT as contingency communication in sharing and disseminating information with relief agencies in ES (Haddow, 2008; Phillips, *et al*., 2011; and Cooper, *et al.*, 2013). This is the strength and the uniqueness behaviour amongst the ARCs in using the ARCT in sharing and disseminating information, but the salient factors that drive their intentions to use the technology, volunteer and give help is not known to the stakeholders and the public.

Even though the cost of purchasing ARCT equipment is cheaper than other wireless communication technology equipment, the cost of applying for a license to be an ARCT practitioner is high and one needs to go through many processes and challenges. Thus, the percentage of ARCT practitioners in developing countries is still less than in developed countries, including Malaysia, due to other challenges as well (Akbar, 2013; MARES, 2016). People who have and want to use the ARCT in Malaysia, must have a legal license and callsign from the MCMC because it is subject to the 1998 Communication Act. According to the Communication Act 1998, a person who uses the ARCT to communicate without a license can be prosecuted by the Malaysian government (MCMC, 2015).

According to Roszeta (2014), we do not have to commit a violation of the act which has been enacted by a country; we only need to find an approach to facilitate the people who are interested in having and using ARCT as in developed countries like Japan, which has the most number of radio practitioners in the world. If more people own the ARCT, the sharing and dissemination of information to alert the public before, during and post disaster would prevent unnecessary loss of lives and properties. Thus empowering people with the knowledge to use ARCT would be positive action in light of the changing weather system. So the step to understand the behavior intention of ARC who are already users of the technology would highlight ways to attract potential users. Akbar (2013) and MARES (2016) argued that, the information regarding the demographics of this community is limited and makes it difficult for stakeholders to identify and find an approach to facilitate the people who are interested in using ARCT.

The Japanese are able to make early preparations to face ES in any disaster due to their earnest use of communication devices like ARCT. The tsunami that hit Japan in 2011, caused by the earthquake of 9.0 on the Richter scale, only resulted in 15889 deaths (Harada, *et al.*, 2012; Japanese National Police Agency, 2014). Whilst in the year 2004, the tsunami that hit Aceh along with the magnitude 9.3 earthquake on the Richter scale caused more than 126,000 deaths. The total loss of life from the tsunami in Japan was less because of the efficient sharing and dissemination through ARCT of the early warning information in the emergency situation regarding the disaster that had occurred (Yusuf, 2009; Koshimura, *et al*., 2009).

However, the salient factors that drive the ARCs in Japan to use the ARCT in ES is still less highlighted to the stakeholders in emergency management in natural disasters and to the public (Yamamoto, *et al.*, 2005; Nakamura, *et al.*, 2007; and Harada, *et al.*, 2012). Yusuf (2009) and Koshimura, *et al.* (2009) stated that no specific research had been undertaken to investigate the salient factors on that issue.

In fact, the ARC in Japan used the ARCT to share and disseminate information to the public long before the public announcements were made by their government. The number of ARCs in Japan is far higher compared to other countries in the world. However, the roles, abilities, and unique behaviours amongst the ARCs were still not recognised by the stakeholders due to the limited availability of specific studies to recognise the BI amongst ARCs to use ARCT as an emergency communication in ES when the disaster struck (Fujiki, 2007; Nollet & Ohto, 2013).

As there are now a rising number of occurrences of natural disasters in Malaysia, the government has discovered that it is hard to give support quickly to people in ES during any disaster. For example, during the floods in 2004, 2014, and 2016, there was a breakdown in communication in the areas involved (JPS, 2018). Yet there were many members of the ARCs who were willing to give support and they did so to help the victims and the relief efforts. However, the government and the relief agencies still do not know who the ARC members are, how to contact them or to what extent they can contribute in the ES during disasters around the country. Thus, studies should be carried out by researchers to identify the factors that influence people to use ARCT in ES in supporting relief agencies (Fujiki, 2007; Haddow, 2008; Cuellar, 2012; and Khan, *et al*., 2014).

Haddow (2009) argued that other than as a hobby, the members of the ARC are the first people to know about a disaster. Like the ARC in Oklahoma which is always a frontline in hunting tornado areas in ES and disseminating the information to the public through the ARCT. In other words, they are passionate and willing to spend time and money to use the ARCT for the benefit of all concerned. However, there has been few studies carried out by previous researchers and there has been limited discussion regarding the factors that drive people to be a frontliner to hunt the tornados, for example. The factors identified can help give input to stakeholders to plan, formulate policies and make it easier to get many more people to use ARCT.

ARCs often become volunteers to share and disseminate information through ARCT to support relief agencies in ES. Unlike the developed countries, such as Japan, the United Kingdom, Holland, Australia, and the USA, information regarding ARCs in Malaysia are not easily available. The demographics are not well managed and cause the government difficulties to interact with this community (Healy, 2002; De Kraker, 2006; IARU, 2013; Mohd Aris, 2014; and ARRL, 2015).

1.1 Problem Statement

It is difficult to comprehend that while there is a ready supply of ARC volunteers available, in parallel with the number of natural disasters that has increased with more deadly impact, the potential of ARC members is overlooked by the stakeholders as relief communities to support the government relief agencies in ES. There are many available resources amongst ARCs, but the government is not aware of them, and thus is unable to provide better responses to the community during a disaster due to the lack of public services resources. Although there is a list of ARC members who have applied and obtained their licenses from the MCMC, the information is not up-to-date as the researcher discovered during the study.

Mohd Aris (2014), Roszeta (2014), and Bahari (2014) stated that many ARC members have formed many groups and societies which have similar interests throughout the country including those who failed to get a license. The ARC members exhibit responsible, trustworthy, passionate and willing nature to use the ARCT as directed by the law. However, the lack of information regarding the activities and behaviour of ARC has hampered the government's efforts to engage the ARCs as a formal support unit in assisting relief agencies in ES (Laster, 2001; Cuellar, 2012; Akbar, 2013). Besides the lack of information regarding ARCs demographics, the salient factors and the relationships among the factors that influence their BI to use the ARCT in sharing and disseminating the information to support the relief agencies in ES in most countries are also not known. Research on these issues is still limited, as there is lack of resources to address this issue.

Many ARC members use ARCT voluntarily. Although there are demands for relief support due to increasing natural disaster, there is limited studies regarding ARCs regarding who they are, why they use the technology, and what available resources the ARC have to help victims of natural disaster in ES in the country. Almost all of the previous researchers only clarified and expressed the ARC's role in supporting relief agencies. Previous researchers did not describe the salient factors that drive BI amongst ARCs to use ARCT in the ES in supporting relief agencies.

Most of the previous researchers only concentrated their research on the community, in general, in the use of wireless technology in the existing situations. Whereas, this study is more meaningful as it has focused directly on the intention of ARCs who use the ARCT in ES.

In developing countries, there is a lack of empirical data on which factors influence the BI amongst the ARCs to use the ARCT as contingency communication in ES. There is also a lack of information regarding how many ARCs are practicing the use of ARCT. The information can provide valuable resources to support the government in many countries in times of ES (Haddow, 2008; Cuellar, 2012; ITU, 2013; and Akbar, 2013). The majority of the prior studies were conducted amongst overseas ARCs, however, that is also still limited. Thus, there is a need to study the BI amongst the target group, the ARCs who use the ARCT in ES and identify the factors that influenced them.

1.2 Research Questions

The main research question (RQ) was, what model should be used to determine the behavioural intention (BI) to use the amateur radio communication technology (ARCT) amongst the amateur radio communities (ARCs) in sharing and disseminating information in emergency situations (ES).

Therefore, the sub research questions were:

i. Who are the ARCs in Malaysia?
ii. What are the salient factors that influence the BI to use ARCT amongst ARCs in sharing and disseminating information in ES?
iii. How to develop a model that shows the salient factors influence the use of ARCT amongst ARCs in sharing and disseminating information in ES?

1.3 Research Objectives

The main research objective (RO) was to develop the model to determine the BI amongst ARCs to use the ARCT in sharing and disseminating information in ES.

Thus, the sub research objectives were:

i. To identify the demographics of ARCs in Malaysia.
ii. To identify the salient factors that influences the BI to use ARCT amongst ARCs in sharing and disseminating information in ES.
iii. To examine the relationships amongst the factors through modelling that influences the BI in the use of ARCT amongst ARCs in sharing and disseminating Information in ES.
iv. To verify the related factors and to validate the model through Partial Least Squares Structural Equation Modelling (PLS-SEM).

1.4 Justification and Motivation

The reason the researcher wanted to undertake this study was because of the impact of the flood disasters in Malaysia, generally, and in Perlis, particularly, that occur regularly. The floods have caused a lot of damages to schools, homes, and businesses, and have caused emergency situations which have required contingency communication through ARCT. If the people are given enough information earlier before the disaster occurs, people who live in the rural particularly, through ARCT, they can help themselves. The sharing and dissemination of information regarding the disasters that can save lives and reduce property damages rather than just wait to get help formally from the government.

In order to strengthen this study and to get preliminary information, the researcher took part in an ARC and officially became a member of the Persatuan Radio Amatur

Melayu Semenanjung Malaysia (ASTRA). It was also to collect information and experience for the study. Being an ARC member, the researcher is very interested in participating in sharing and disseminating information to the communities in ES. The information obtained has been beneficial and given the researcher meaningful experience in writing this thesis.

Japan has the most numerous ARCs in the world. During the tsunami that struck Japan in 2011, a lot of lives were saved due to the roles of the ARCs in using the ARCT in the ES; while in Indonesia, information and early warnings failed to be shared and disseminated to the Aceh people, causing many to be killed in the tsunami.

Thus, the researcher wants to know study the behaviour intention of the ARCs in Malaysia in order to highlight their role in helping the community before, during and after the disaster. There are many factors that may prevent ARCs from being fully part of the support relief agencies, therefore, in this study, the concentration has been on the BI amongst the ARCs to use the ARCT in ES, which can be highlighted to get the attention of the government agencies in order to allow ARCs to contribute and to support relief agencies in ES when any disaster strikes our country. Hopefully, the findings will allow the government to maximise the available resources without the need for added public funds.

This study has identified the salient factors that influence the BI amongst ARC members, who are volunteers, to support the relief agencies. This study is expected to provide available resources to the government and to harness the ARCs' contributions to provide relief efforts to the country before, during and after disasters. Furthermore, the researcher hopes that this study will highlight the role of ARCs and help the other communities in Malaysia to use the ARCT to be self reliant and provide more volunteers for relief operations in the future.

1.5 Research Scope

The respondents were members of the ARCs of Malaysia and those who had amateur radio communication Callsigns from the MCMC. According to the MCMC act 1998, callsign eligibility is 14 years old and above and Malaysian citizen. The licenses will be issued by the MCMC which will assign the callsigns, and then they can communicate up to the international level. The license must be renewed every year.

According to the MCMC (2015), those who are interested in ARCT but do not have official licenses (Amateur Radio Transmitting License) legally issued by the MCMC, can only be Short Wave Listener (SWL) members for the purpose of ARCT training and learning. MCMC does not give permission to SWLs to transmit and use radio frequencies on the air to communicate. According to the MCMC (1998) communicating through ARCT without a license is illegal and violators will be charged under the Malaysian government communications act. Therefore, a SWL was not justified to be a respondent due to not having a callsign from the MCMC and being prohibited to use the ARCT to communicate in Malaysia. In conclusion, the respondents were ARC members who had callsigns from the MCMC and were from all over Malaysia.

1.6 Significance of the Study

The researchers hoped to learn from this study and contribute to the field of knowledge and to provide empirical data that would provide input for public policy formulation and decision making. The significance of the study covered two aspects, the theoretical model and the practitioner's contribitions, as presented below.

1.6.1 Theoretical

This study focused on the issue to understand the factors which influence the BI in the sharing and dissemination of information amongst ARCs via ARCT in ES. Therefore, a theoretical model which was related to the BI had to be identified and investigated in order to get answers for the research questions that had emerged from the research objectives. According to Sundaravej (2014); Al Qeisi, *et al.* (2014); and Kit (2014), many models are able to determine the BI influence factors towards the use of technology amongst communities. Gunasekaran and Harmantzis (2007); Ramayah, *et al*. (2010); Moore (2012); and Sundaravej (2014) stated that the IT field is too large to explore. Study after study will continue in tandem with the development of the community attitude and the community user behaviour to use and will reform the relevant technology.

Gunasekaran and Harmantzis (2007); Ramayah, *et al.* (2010); Moore (2012); and Sundaravej (2014) stated that various theoretical models can be adapted and as long as they relate to the IT model, they are appropriate; but, it also depends on the purpose of the study to be carried out.

According to Alexander (2008), Daniel (2012), and Austin (2013), the use of a theoretical model is as a guide in the research. The theoretical model plays an important role in guiding the entire process of the research. Theories are constructed in order to clarify, predict, and master phenomena (e.g., relationships, events, or behaviours). This study has successfully established a model for investigating the Behavioural Intention (BI) in the use of Amateur Radio Communication Technology (ARCT) amongst Amateur Radio Communities (ARCs) in sharing and disseminating information in Emergency Situations (ES) in Malaysia as shown in the proposed model of the study in Figure 5.1 in Chapter Five.

The proposed theoretical model is able to use as a reference model and can be adapted by other researchers in related fields for future research. Furthermore, the study was able to extend two new factors in the Arenas-Gitan, *et al*. (2015) model. The proposed model was made to explain the influencing factors towards the BI in the use of ARCT amongst ARCs in sharing and disseminating information in ES.

Therefore, this study has been successfully implemented with the inclusion of two new factors to the Arenas-Gitan, *et al*. (2015) model. The new factors, namely, Peer trustworthiness (PT) (Ling, 2000; Al-Busaidi, *et al*., 2010; and Kay Craigie, 2011) and Compatibility (CB) (DeLone & Mclean, 2003; Wu & Wang, 2005; and Ramayah, *et al.*, 2010), and the existing factors in the model were investigated, analysed, and tested through Partial Least Squares Structural Equation Modelling (PLS-SEM) and verified by experts. Hence, in this study, the new factors of PT and CB as the direct contributing factors were extended to the conceptual model found in Figure 2.5 in Chapter Two.

The theoretical contribution will provide better evidence to benefit the stakeholders and role players in studies which are similar to this study. Furthermore, this study was successfully tested on respondents from amongst the ARCs from all over Malaysia and as a pioneer study in Malaysia regarding the use of ARCT. Hopefully, the theoretical contribution of this study can be the catalyst for the same attribute of research in the future. Feature clarification about theoretical models, corresponding models, and contributing factors are explained in detail in Chapter Two. Whilst the methods and testing techniques are in Chapter Three and the complete description of the data analysis based on the conceptual model is in Chapter Four.

1.6.2 Practical

Empirical data analysis is capable of providing useful and important information to the role players and stakeholders in the related field (Venkatesh, *et al.*, 2003; Yi, *et al.*, 2006; Venkatesh, *et al.*, 2012; and Ajzen & Fishbein, 2012).

In addition, the literature review revealed that there is a paucity of empirical data on the use of ARCT amongst ARCs in ES in Malaysia. Thus, the study has provided empirical data for the related role players, such as the ARC associations which are involved directly and indirectly in emergency communication in ES in disaster management.

This study has been undertaken to identify the factors that might influence the BI of the use of ARCT amongst the ARC. These factors form the model of BI of ARC to use the ARCT in ES to provide the relationships identified to enable stakeholders should play important roles in achieving and encouraging the ARC's continuous use of the ARCT in Malaysia. This is consistent with Baker and Bellordre (2003), Kim and Garrison (2009), and Yang (2013) who argued that the use of wireless communication technology comes from continuous usage, and that both role players and stakeholders should play important roles in achieving and encouraging the users to continuously use the wireless communication in most countries. The contribution from the determinants to use the ARCT amongst the ARCs in ES during any disaster was established in this study and has equally served as positive insight for the practitioners of the ARCT in the sharing and dissemination of information, which is appreciated by the community.

This study has further established the importance for the government to provide more infrastructures that would support the ARCs in constantly adopting and using the ARCT in their daily lives and mainly in ES. According to the Prime Minister, Najib (2015), Malaysia has taken lessons from the ES in the unusual floods that hit the country. These lessons have aided in determining the readiness for large-scale disasters in the future, and have included the formulation of standard operating procedures (SOPs) regarding the new crisis management. The SOPs cover asset improvement, simulations and exercises, review of the effectiveness of existing communication equipment, and design and planning in order to be better prepared to face any eventuality of major disasters hitting the country. In addition, it is an important requirement to use contingency communication when existing communication fails to operate in ES due to a disaster striking.

On the other hand, this study will be a support to the government by providing empirical data and important information regarding the factors that influence the BI amongst the ARCs in the use of ARCT as contingency communication to support existing communication for the improvement of the existing SOPs as suggested by the

Prime Minister. Apart from determining the factors that influence the BI in the use of ARCT amongst ARCs, this study has also provided significant data related to the demographics that could be a reference to the stakeholders and future researchers. This is in line with a statement by Drabek and Thomas (2004), Daniel (2012), and Embi and Nordin (2013), of the need to identify which factors influence user BI to use technology amongst related communities based on specific demographics. The researchers must identify the benefits to the stakeholders in many aspects. The aspects to be noted are like a background, community behaviour, their behavioural intention towards technology use, and the socio-economics of the country.

Past research has recognised the critical importance to understand and determine the benefits of the use of the related technology (Gefen & Straub, 2000; Horgan, 2003; Gikandi & Bloor, 2010; and Lynn, *et al.*, 2012). This fact is consistent with the arguments by Martinelli, *et al.* (2005), Wiemer (2005), Preston & Cawley (2008), and Goel (2009) who stated that the contribution from understanding the BI in the use of technology amongst the communities in the related areas, as established, has equally served as a positive insight for the users of the technology, which is appreciated by the community, stakeholders, and government.

In conclusion, the ARCs will be a part of the frontline to support relief agencies in sharing and disseminating information in the rescue of victims in ES when disaster strikes. An ARC can be recognised as a national volunteer force, especially in the early stages of the rescue, relief, and support activities. Based on this, the influencing factors that drive the BI amongst the ARCs in the use of the ARCT in ES, which must be highlighted to the public in order to appreciate their contribution and to get recognition from the government, have been identified.

After the huge floods that hit at the end of 2014, the Malaysian government has been encouraging studies related to communication during emergency situations. This fact became obvious when the Malaysian Government, through the MOE, had allocated special funds for flood disaster management research grants in 2015 (KPM, 2015). Thus, this study regarding the BI in the use of ARCT amongst ARCs in ES has been conducted because it is part of the incentive and encouragement by the Malaysian government. Practically, the theme of this study meets the Malaysian government's intention to support the ARC and the use of ARCT.

Henceforth, this study has been undertaken to fill the gaps in the existing literature in the use of technology amongst the communities in Malaysia towards academics and practitioners. The research about the use of ARCT is still limited around the world. This research is significant in highlighting the role and the uniqueness behavioural amongst the ARCs towards the public, which benefits them. The statements regarding this gap are supported by several of the past researchers, such as Laster (2001), Haddow (2008), Cuellar (2012), ITU (2013), Akbar (2013), and MARL (2014).

Consequently, this study has been significant in identifying the salient factors that influence the BI amongst ARCs in the use of ARCT during ES as contingency communication when existing communication fails to operate. This statement coincides with the slogan of the international ARC association, which says "when all else fails, amateur radio works" (Rubin, 2004; Silver, 2006; Zuetell (2006); and ARES, 2012).

Moreover, this study has been able to highlight their unique behaviours, as well as identify the salient factors which have influenced their BI to use ARCT in ES. It has also disclosed the ARCs roles and contributions to the public and stakeholders who had been directly or indirectly engaged in emergency communications in emergency situations in Malaysia. Hence, it may support the government in making improvements in terms of strategies to encourage more people to be ARCT practitioners registered with the MCMC and active in ARCs activities, as well as to prepare to be a volunteering force to support relief agencies in ES.

1.7 Definitions of Terms

The definitions of terms are general explanations and focused on the headline of the research. Hence, to help the readers to understand better and to describe this study more clearly. The definitions of the terms are as follows:

Behavioural Intention (BI): Refers to people's attitudes to do something and intention to perform the act when someone evaluates it positively and is influenced by emphasis, feelings, and opinions or tastes towards something (Venkatesh, *et al.*, 2012; Kit, 2014; and Arenas-Gitan, *et al.*, 2015).

The Use of Technology: Can be defined as to accept and to practice the particular technology (Venkatesh & Brown, 2001; Heeks, 2008; Chiu & Shin, 2011; Aldunate & Nussbaum 2013; and Merriam & Webster, 2015).

Amateur Radio Communication Technology (ARCT): Wireless communication technology equipment that uses radio signals (transmission in electromagnetic waves) at a specific frequency. It is a part of wireless communication technology (Karn, *et al.*, 1985; Beech, *et al.*, 1997; Coile, 1997; Haring, 2003; and Kay Craigie, 2011).

Amateur Radio Community (ARC): Can be defined as users of ARCT who communicate amongst their peers with trustworthiness around the world. The unique communities are also popularly identified as HAM. HAM is the short form of Hertz Armstrong and Marconi (Laster, 2001; Haring, 2003; Kay Craigie, 2011; Walker, 2012; Pitt, 2014; and ARRL, 2014).

Emergency Situations (ES): Are expressed as unexpected situations or unpredictable situations which can cause injury, loss of life, property damage, and / or intervene in the activities of ordinary people or firms and require immediate attention and corrective action (Thomas & Larry, 2001; Meher, 2006; Magiswary, *et al.*, 2012; and Phillips, 2012).

Partial Least Squares (PLS): Is the technique of latent variable modelling that incorporates several dependent constructs and recognises the measurements, and can be utilised for verification of the theory development (Preacher & Hayes, 2008; Hair, *et al.*, 2013; and Ringle, *et al.*, 2014).

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Structural Equation Modelling (SEM): Is about a class of multivariate (involving two or more variables) procedures that combine aspects of factor analysis and regression, enabling the researcher to simultaneously examine relationships amongst measured variables and latent variables, as well as between the latent variables themselves (Blunch, 2008; Hair, *et al.*, 2013; and Ringle, *et al.*, 2014).

Smart-PLS: The statistical software designed for analysis by PLS-SEM on a graphical user interface (GUI) which is able to generate data analysis and explanations of the algorithm technique. There are built-in explanations of the meaningful analysis and support for the researcher with an easy start into the PLS-SEM world (Hair, *et al.*, 2013; Ringle, *et al.*, 2014; Mohd Sobhi, 2015; Ringle, Wende, & Becker, 2015; and Garson, 2016).

1.8 Thesis Organisation

This thesis has been organised into five chapters. Each chapter is planned to represent the reasonable structure that this research has completed, successfully. From understanding the requirements of the study in chapter one, to the literature review in chapter two and then the clarification of the research methodology in chapter three. While, chapter four is a description about the research findings and chapter five is about the discussion and conclusion of the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Chapter two presents the literature reviews on the problem statement described in the previous chapter. The concepts, knowledge area of the study, the theoretical aspects to support the study and the critical analysis of previous studies are presented in this chapter. It is divided into several sections and present the review based on the related works done by the previous researchers.

2.1 Behavioural Intention (BI)

The behavioural Intention (BI) construct was invented from the Theory of Reasoned Action (TRA) by Fishbein and Ajzen (1975). The construct is defined as "a measure of the strength of one's intention to perform a specified behaviour (Davis *et al.*, 1989; *Venkatesh et al.*, 2003). Research has shown that BI has a direct impact on the individual actual use of a given technology in specific situation. Davis (1989) presented the BI construct to the Management Information System discipline through the Technology Acceptance Model (TAM). This construct is really important in the technology acceptance research. Due to its importance, it is referred to "as a key criterion in user acceptance research toward specific technology" (Venkatesh *et al.*, 2003; Yi *et al.*, 2006; Venkatesh *et al.*, 2012; Ajzen & Fishbein, 2012).

BI is social traits of how strong (hard) individuals are willing to attempt and of how much an effort they are planning to adopt and to use, in order to achieve the behaviour based on particular situation (Venkatesh *et al.*, 2003; Yi *et al.*, 2006; Venkatesh *et al.*, 2012 and Ajzen & Fishbein, 2012).

On the other hand, BI is able to measure the ability levels among specific communities who are willing to use specific technology and of how much an effort they intend to practice specific technology in specific situation. Definitely, many researchers argued that fusion of two or more theories ease of creating model for the use of technology.

Consequently, they integrate the Theory of Planning Behaviour (TPB) and related concept which leads to the suggestion that user's BI which determines user's usage purpose is affected by perceived usefulness and subjective norm. However, past researchers have established the use of unified theory of acceptance and use of technology model in studying user's usage of the technology and suggested that it should be integrated with another theory in order to obtain practicable outcomes (Yi *et al*., 2006; Venkatesh *et al*., 2012; Ajzen & Fishbein, 2012). The use of technology has to do with retention of BI by the users that propose to utilize the device for exchanging information with others (Lynn *et al*., 2012; Bauer & Grether, 2005).

According to Ramayah *et al*. (2010) and support by Limayem *et al*. (2008) and Ajzen & Fishbein (2012), researchers have emphasise that BI in the use of technology or system is a way of measuring achievement in the implementation related to ICT in acceptance of particular technology or certain system. Davis (1989), Venkatesh *et al*. (2003) and Ajzen & Fishbein (2012) argue that BI among community in the use of technology is affected by their perceived usefulness and perceived ease of use of the technology in future. Moreover, many researchers argue further that both perceived usefulness and ease of use affect people's intention to use a particular technology.

BI is influenced by input and output factors. Input factors such as the characteristics of individuals, the features messages / tasks, characteristics technology, modality of mobility, environment and context; process, which consists of two interacting sub processes namely use of exploration and experimentation, and evaluation of experience. While the output refers to the process of using, particularly, the actual use decision or community adoption behaviours (Venkatesh *et al*., 2003; Ajzen & Fishbein, 2012).

Therefore, the study of BI among users in the use of wireless communication technology such as ARC is important to develop a conceptual model to improve information in the emerging field in the future. Due to the urgency of getting information before, during and after a disaster, people in the disaster prone area should know how to use technology that can enable them to prepare for evacuation or have contingency plans. As users of radio communication technology need to purchase equipments, apply for licenses according to the law and be responsible members, it would appropriate to model the factors that affect the behaviour intentions of ARC members who are already using the technology. The BI model may highlight the factors and information that can promote potential users to use ARCT.

Welkowitz *et al*. (2006), Bumgarner (2008) and Steinberg (2010) argue that most researchers have set good ideas for the next generation by successfully bridging the gap among their research by emphasizing support statements from related articles that encourage other researchers to conduct a study in more depth and comprehensive.

Hence the emerging generation of researchers can expand much in the way of their own continued growth by emulating them and the supporting statements from related articles are important to conduct the specific study. Therefore, Table 2.1 highlights support statements from related articles that encourage conducting this study in more depth and comprehensive.

Table 2.1

Supportive statements from related articles

Authors	**Supportive Statements**
Laster (2001), Muller, Lee (2003), Haring (2003), Rashid & Zainal (2013), ITU (2013) and ARRL (2014).	Researches regarding the ARCT are still not widespread and salient factors which are influencing user BI in use the ARCT still less highlighted to the public.
Haddow (2008), Cuellar (2012), ITU (2013), Akbar (2013) and MARL (2014).	The research related the ARCT as the contingency communication is significance to highlight the uniqueness of ARC to the public have the future prospects.
Minges & Gray (2012), Rashid & Zainal (2013) and Bahari (2014).	The involvement of community in supporting relief agencies is undeniable. In future, a comprehensive study should be carried out in order to understand which factors influence their behaviour in the use of the wireless communication technology like ARCT in supporting relief agencies.

Table 2.1 *Continued*

Yusuf (2009), Koshimura, (2009),	Accordingly a study to understand the BI among community in the use of wireless communication technology should be implemented in the future. This

Izumi (2011) and ITU (2013).	issue is significant to highlight to the stakeholder and public due to the gap in use of wireless communication technology in Indonesia is too low in emergency situations and may be one of the main reasons why a lot of lives were lost during the 2004 tsunami.
Khan, *et al*. (2014), Chan, (2015), Muhyiddin (2015) and NSC (2015).	A potential solution may be occurring with contingency communications in information sharing and dissemination during emergency situation such as involvement and support by volunteer's community in the future. A research to understand the behavioural intention of volunteer communities in supporting government agencies in emergency situations need to be addressed in the future.
	The lack of information sharing and disseminating through existing communication in emergency situation among relief agencies and local community as highlighted by the huge floods in 2014 in Malaysia.
MOE (2015)	MOE encouraged and allocated exclusive resources with disaster management research grants after the enormous floods hit Malaysia at the end of 2014. The funds are earmarked for the study communications in an emergency situation and community awareness behaviour programs. The goal is to ensure support and relief coordination among roles player and stakeholders is more effective in contingency communication in future.

2.2 Amateur Radio Communication Technology (ARCT)

Amateur Radio Communication Technology (ARCT) is included in wireless communication technology that uses radio frequency, use in sharing and dissemination of information during Emergency Situation (ES). ARCT practitioners must have legal license and callsign from authority of regional. The world is divided into three regional by International Telecommunication Union (ITU, 2014). ARC around the world is able to communicate among each other via ARCT in real time (Laster, 2001; Haddow, 2008; Pitt, 2014; ARRL, 2014). According to Siau *et al*. (2001) and Sarker and Wells (2003), a wireless communication technology devices is a strong requirement to realize how and why individuals (potential use in related and particular situation) to use such as ARCT equipment as Emergency Communication in Emergency Situation (EC in ES).

Around the world, ARC's are also known as "*Ham Operator*". They like to be a volunteer community to support countries and communities when disasters occur through the sharing and dissemination of reliable information through Amateur Radio Communication Technology (ARCT) to support relief agencies, particularly when existing communications fail to operate such as phone failed to work and when communications infrastructure is damaged (Scott, 2001; Laster, 2011).

ARCT cost in maintenance and operation is cheaper compared to other wireless communication technology; therefore ARCT becomes a unique hobby amongst the ARCs (Healy, 2002; De Kraker, 2006; IARU. 2013; Mohd Aris, 2014; ARRL, 2015). The use of ARCT in sharing and disseminating information amongst the ARCs is a unique hobby. They use callsign as identification to communicate around the world (Haring, 2003; ARES, 2011; Kay Craigie, 2011; Walker, 2012; IARU, 2012 & ARRL, 2014).

The history of ARCT in the world has started with the use of radio communications since 1912. The U.S. Congress passed the preliminary laws regulating radio transmissions in the United States. Beginning in 1914, The ARCT has started to communicate and organize a system of sending messages between their communities

(Scott, 2001). In Malaysia, ARCT is the point of commencement of commercial radio services (MCMC, 2010). ARCT has begun transmitting the signal to the public in Malaysia since 1928 (Abdul Aziz, 2014 and MARTS, 2015). ARCs learn the use of the technical equipment, techniques and conversation protocol in sharing and dissemination of information among them. Their behaviour is very unique in that they are eager to serve as a volunteer team in emergency situation (ES) and when natural disasters occur. ARC always communicates among them via radio waves in specific frequency by using Handy, Rig Mobile Radio and Portable Set, digital code communicate to sharing and dissemination information. They also discuss important matters related to the ARC in worldwide (OSERP, 2011). Figure 2.1 below illustrates a technical part for sharing and disseminating information amongst the ARCs via ARCT station like Base, Mobile and portable with repeater linking in specific frequency (Laster, 2011).

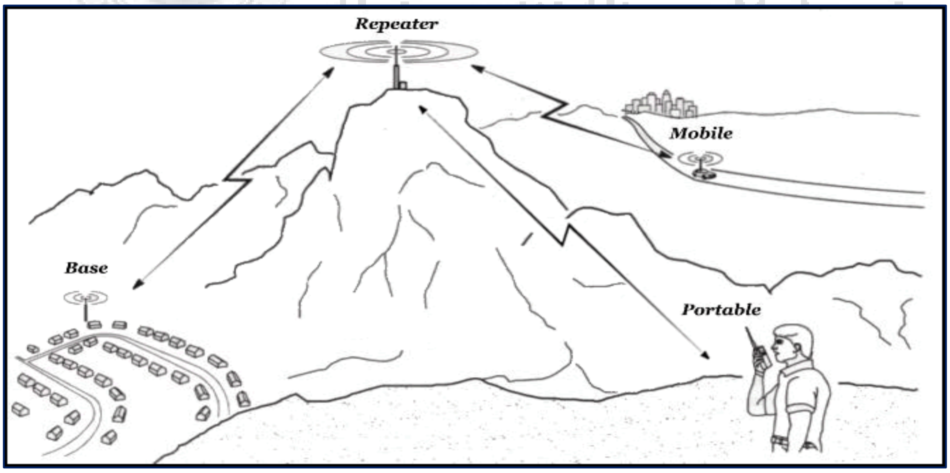

Figure 2.1. Sharing and Disseminating Information amongst the ARCs via ARCT

ARCT has earned its reputation as best the equipment of sharing and dissemination of information during disasters in areas where other means of communication have failed. Amateur radio operators provide important support to our communities and countries during disasters by providing trustworthy (reliable) communication on voice mode about the status of survivors as well as information of victim to disaster relief organizations and relatives to run an evacuation action and rescue. There are several advantages of using ARCT in sharing and dissemination information during emergency situation (Scott, 2001; Laster, 2011; Nollet & Ohto, 2013);

i. ARC often greatly appreciated by Peer trustworthiness in sharing and disseminating information due to honest and reliability information with ethic in communication.
ii. Information is easily shared and disseminated amongst the ARCs to many station simultaneously real times through ARCT.
iii. ARCT is easy to handle, durable equipment and cheaper compared to other wireless communication technology.

Despite advantages, some constraints occur in certain places while sharing and dissemination information during disaster management (Scott, 2001; Laster, 2011;Nollet & Ohto, 2013) such as some countries restrict the issuing of ARCT licenses or have time-consuming, complicated application processes.

2.2.1 ARCT Contingency Communication

The uses of ARCT as contingency communication in the emergency situation (ES) amongst the ARCs are mostly to perform emergency actions and effective response. These include to support relief agencies, to provide trustworthy information, to rescue and evacuate the victim during “pre, in and post disaster” (Goel, 2009).

According to United Nations International Strategy for Disaster Reduction (UNISDR), ARCT is a contingency communication in sharing and disseminating in ES during disaster but still not widespread used in the world (Jeb Bush, 2008; Cooper *et al*., 2013). Sharing and disseminating information through ARCT is the core to success of disaster mitigation, preparedness response and recovery. Moreover ARCT can be regarded as a medium of contingency communication in emergency situation. On the other hand, ARCT facilitates in sharing and disseminating the information to the public, to the community leaders and to the relief agencies quickly in real time and able to reduce the risk of loss of life and property in ES during any disaster (Goel, 2009).

ARCs use the ARCT to operate the SOS code (emergency signal) in sharing and disseminating information with relief agencies in ES during disaster. This is the strength and the uniqueness of ARCs in using the ARCT in sharing and disseminating of information (Phillips *et al*., 2011; Cooper *et al*., 2013).

When the tsunami struck the Indian Ocean in 2004, it was a tragedy that would not be forgotten because it involved hundreds of thousands of people. Tsunami has destroyed an existing communication infrastructure and electricity supply in the Andaman and Nicobar. At that point there was only communication through ARCT is used in sharing and disseminating of information amongst the ARCs and rescue agencies for search and rescue operations with the Indian mainland (Acharya, 2005; Laster, 2011; Nollet & Ohto, 2013).

It is clear that wireless communication technology such as ARCT is successfully used for the purpose of sharing and disseminating the early disaster warnings during the tropical storm that hit Sri Lanka. The effectiveness of ARCT has been proven in Sarvodaya in Sri Lanka. Thousands of people have been evacuated the day before the storm struck. ARCT is very useful and effective in ES because it is easy to manage and does not require a complex infrastructure (Li *et al*., 2012). However, ARCT still not widespread use in many countries in the Asian because it involves communication acts and military regulations between countries that have not been fully coordinated (ADPC, 2016).

ARCT is important when existing communication fails. It can work but not at large in sharing and dissemination of information due to lack of exposure to the public regarding its capabilities and advantages. According to ITU (2014), sharing and dissemination information through fixed services of global communication is critical at many levels in ES of disaster. In some instances, when the catastrophe destroys the wired telecommunication infrastructure, only ARCT can be implemented for disaster relief action (ADPC, 2016).

According to Onsrud (1995), the use of ARCT amongst ARCs is very significant and is the starting point of development and importance, as seen in January 31 to February 1, 1953, where the combined tides and severe weather system caused major flood in Britain, the Netherlands and Belgium together together with more than 2000 deaths. ARC was the main role player in the emergency response recorded in Britain and the response leads to official recognition of ARCT as a source of information for disasters and emergencies. This leads to the establishment of a group of ARC as emergency communication in emergency situation (ES) in the country. Until now, two ARCT stations are active in the UK and the Netherlands as benchmark and to maintain public awareness about the role of ARC in ES (IARU, 2013; Khan, *et al*., 2014).

Definitely, ARCT has many benefits such as mobility, ubiquity, ease of use, on-time information delivery, improving emergency management, quick access to role player and stakeholder services and who do not have access to cellular communication and telecommunication services provider in ES during the disaster (Schmitt *et al*., 2007; Hong *et al*., 2008; Belanger & Carter, 2009; ITU, 2011; Abdel Ghaffar & Magdy, 2012). Similarly there are many significant researchers who consider the use of ARCT in disaster areas as the effective communication technology to interact with government services, particularly to support relief agencies in ES (Quarantelli, 1988; Mathew, 2005; Sutiono *et al*., 2010; Qiantori *et al*., 2012 and Phillips *et al*., 2012).

Japanese people are the highest in the world using ARCT in the sharing and dissemination of information in ES during the disaster. Disasters that often hit them are earthquakes. They have effectively trained to face ES. Their rescue team is the best in the world in carrying out rescue missions. The early warning about disaster will be disseminated by the government to the public through ARCT in a particular area. Therefore, they are able to make early preparations to face any ES in any disaster. Tsunami attack of 2011 in Japan,, caused by the earthquake of 9.0 on the Richter scale only 15889 deaths (Harada *et al*., 2012; Japanese National Police Agency, 2014). While in the year of 2004, Tsunami attacked Aceh and the magnitude 9.3 earthquakes on the Richter scale caused more than 126,000 killed. Total loss of life of the tsunami in Japan is less because the sharing and dissemination of information as early warning in emergency situation occurs efficiently through ARCT (Yusuf, 2009; Koshimura *et al*., 2009). However, the salient factors that drive the BI among Japanese community in the usage of ARCT in ES still less highlighted due to no specific studies (Yamamoto *et al*., 2005; Nakamura *et al*., 2007; Harada *et al*., 2012).

2.3 Amateur Radio Communities (ARCs)

According to Latif (2005), Abdul Aziz (2014) and MARTS (2015), Amateur Radio Communities (ARCs) has started using Amateur Radio Communication Technology (ARCT) in Malaysia since 1928, during that time Malaysia is known as Malaya. Among the pioneers of ARC at that time, was Richard Earle, who was active in radio frequency transmission through ARCT since 1928 to 1930. In the early stages of ARC evolution, the British government was not interested in the use of ARCT. Therefore, the radio practitioners with electrical companies started to collect donation to establish ARCT network among the community who is interested and has a unique hobby in the radio broadcasting technology and now known as ARCs. In 1921, Lawrence Birch as the chief electrical engineer of the Johor state government experimented with a set of ARCT obtained from England. Subsequently in 1923, he formed the Johor Wireless Society (JWS). This is the first ARC established in Malaya during that time.

The first radio station was established by ARC in Kuala Lumpur is to share and disseminate the information among rubber estate workers and tin miners. Even though the experimental radio broadcasts among the Singapore ARC had begun earlier, the ARC in Kuala Lumpur succeed in sharing and disseminating the information than ARC in Singapore. The Kuala Lumpur ARC (KLARC) started sharing and disseminating the information in November 1929 and officially commenced its regular broadcast service from the Selangor Club as the base station (Agil & Hamzah, 2008; MARTS, 2015; MARES, 2015).

In 1931, the British government began to encourage KLARC to use the ARCT, by using the base station at Bukit Petaling Kuala Lumpur. The base station was constructed in 1928 (McDaniel, 1994). The KLARC has begun to use the transmitter crystal controlled ARCT equipment named “Marconi S3A” through government channels in May 1931. They have successfully transmitted radio wave throughout the peninsula, parts of the Netherlands East Indies and Borneo. This is the uniqueness and greatness of the expertise of ARC of that era (McDaniel, 1994; Abd Latif, 2005).

In 1933, temporary location was provided by the British government to the ARC's to establish a base station at Bukit Petaling. During that time, ARCT was used in sharing and disseminating information on the plantation sector and the tin mining sector. Then after two years of operations, the British government gave the permission to ARC to manage and established their own base station (Raja Iskandar, 2005; MARTS, 2014).

ARCT's progress has been blocked during the Japanese colonization. Anyone who has ARCT equipment will be beheaded. Broadcasting facilities were only controlled by the Japanese army. They stayed for three years and eight months. They used the radio wave to broadcast the propaganda. After Japan surrendered, the British military took over broadcasting and allowed ARCs to share and disseminate information through the ARCT (Daniels, 1982; Asiah, 1994).

With the re-establishment of sharing and dissemination of information through ARCT, the alliances independence movement has emerged in Malaya at that time. The alliance movement to fight against the Malayan Union was proposed by the British government. The Malay community during that time used the ARCT amongst ARCs to share and disseminate an information regarding their effort to against the British government. On April 1, 1946, the day the Malayan Union was launched, the British government set up the Radio Malaya as the official department of broadcasting to defend their efforts against the establishment of the Malayan Union. In addition, they also feel threatened by the sharing and dissemination of information through ARCT amongst ARCs and the public who were strongly demanding the independence from the British government. The main function of the official broadcasting until the country independence in 1957 was to help the government to control the social and political confusion that followed the war and the communist of 1948 until 1957 (Ramli & Othman, 2012). Girard (1992) and Raja Iskandar (2005) argued that the fact is ARCs is the first who started transmitting the signals on High Frequencies (HF) through the ARCT before the birth of Radio Malaya. However, their contributions are not mentioned in the history of radio broadcasting.

Nowdays, ARCT practitioner needs to take an examination from Malaysian Communications and Multimedia Commission (MCMC). They must pass the examination (RAE) to obtain a legal license and have a callsign from MCMC. Communication licenses prior to 1995 are subject to the Telecommunications Act 1950 (MART,2014).

Communications Rules 1995 came into force on June 19, 1995. After the communication license was established in 1995, only 100 people registered and have callsigns. At that time Jabatan Telekom Malaysia (JTM) was responsible for regulating and issuing a communication license. In 1998, JTM has been abolished and replaced by the Malaysian Communications and Multimedia Commission (MCMC). Therefore, since 1998 until 2001 there was no amateur radio test to get a communication license causing the development of ARCs delayed during this period. Then in the year 2001, MCMC established the Radio Amateur Examination (RAE) to encourage Malaysian community to be an ARCs member to practice and use the ARCT and subject to the 1998 Communication Act (MCMC 2014). According to MCMC (2018), from March of 2001 until December of 2018, nearly 30,000 peoples have been registered and occupied the RAE since it was introduced in 2001 and only 12,227 have passed RAE and successfully to have the license and have the callsign. Although the percentage of ARCs is lower than that of the 30 million Malaysians, their roles and contributions in sharing and dissemination of information through ARCT as a contingency communication in an ES were huge and cannot be denied.

ARCs contribution in used the ARCT during Hurricane Katrina struck the New Orleans City (2005) in the United States was phenomenal. The Hurricane Katrina caused the failure of the existing communications. ARCs entire of the United States went to support and voluntarily build a tower and setup the antenna to communicate through ARCT among them and relief agencies to report on conditions that enable further action by the government to assist the victims during that time. ARCs shared and dissemination a lot of information to the relief agencies in rescue missions and evacuation (Burby & Raymond, 2007; Leonard *et al*., 2013; ADPC, 2016).

While in Malaysia, the landslide disaster occurred at the Highlands Tower apartment in Kuala Lumpur in 1999 has led the country into panic and confusion caused by the irregular communication. The situation became tense as the relief agency stationed to support the trapped victims at that time was unable to communicate perfectly due to communications congestion. Nevertheless, the ARCT practitioner has a protocol and experienced in handling communications congestion through wireless communications in real-time. Therefore, the Polis Diraja Malaysia (PDRM) have requested a group of volunteers from ARC to support and to coordinate the emergency communication (EC) protocol among them to support relief agencies. Today, the group of volunteers from ARC during that tragedy is named Malaysian Amateur Radio Emergency Service Society (MARES) (Ashriq, 2011; Rashid & Zainal, 2013; Abdul Aziz, 2014)

According to MARES (2016), a group of ARCs were called to support and coordinate communication between Jabatan Pertahanan Awam Malaysia (JPAM), Polis Diraja Malaysia (PDRM), Department of Civil Aviation (DCA) and the Royal Malaysian Air Force (RMAF) in the forest of Mantin, Negeri Sembilan, to search and rescue (SAR) the Cessna aircraft crashed in year of 1999. The following involvement is a group of ARC from Selangor assist in the SAR activity of Cessna aircraft crashed at Dam Batu, Ulu Yam in year of 2014. The ARCs group was from Selangor to assist in the SAR activity of Cessna aircraft that crashed at Dam Batu, Ulu Yam in the year of 2014. Each relief agencies use the trunk radio communication in a different frequency, and therefore, communication is limited. Thus, ARCs acts as a coordinator of communication among relief agencies. ARCT base station and repeater communication tower were set up by ARCs near the aircraft crash area to support relief agencies (MARES; 2016)

Most expressively, the role of ARC can be seen at the time of the tsunami struck Aceh, Indonesia in year 2004. Even far away, radio frequencies from Aceh to request S.O.S (emergency message for rescue by Morse code) has been received by the MARES operator in Kuala Lumpur and respond the emergency call from ARC in Aceh that was supposed to be received by the Indonesian communication and relief team in Medan. Then, MARES operator resends the S.O.S emergency message to the Indonesian authorities. The issues may be due to terrain of mountains, hills and the weather that has deflected the radio signals to Kuala Lumpur from Aceh, even though the distance to Medan is nearer (Yusuf, 2009 ADPC, 2016; MARES, 2016). Consequently, the contributions of ARC's in Malaysia through MARES was also involved in the rescue operation for tsunami victims in Aceh by providing and donating an ARCT equipment to the affected residents (MARES, 2016). However in normal situations, MARES or other ARC are prohibited to intrude authorities' frequency or any *'Air band frequency'*. ARC in Malaysia only can use those frequencies with the order and permission of the Malaysia Multimedia and Communication Commission (MCMC) during emergencies and in a controlled manner and procedure. This is subjected to the communications policy and acts (MCMC act 1998) in order to avoid disruption of communication between the authorities (IARU, 2013; MCMC, 2014).

The ARC members in Malaysia are fully aware of the requirements by the law in using the ARCT, the processes involved in purchasing the equipments, applying for licenses and using it in daily lives or during a disaster. The members joined various ARC organizations to work together, and their experiences would be very useful for the study.

2.4. Sharing and Disseminating of Information amongst ARCs

Many countries today are prone to disasters like massive floods, tsunamis, storms, droughts and forest fires due to climate change. Indeed, there are many factors driving the phenomenon and many steps must be taken to prevent it from recurring. Therefore, the compatibility of communication technology among role players in sharing and disseminating of information in ES during disaster should be given attention by the government, stakeholder and related agencies (Jarvenpaa & Staples, 2000; Wong & Boh, 2010; Lovekamp and McMahon (2011). Hence, communication technology through ARCT is compatible medium to facilitate sharing and disseminating of information in ES during a disaster for relief operation (Norhasmah *et al*, 2013).

In ES during disaster, the compatibility factor among role players to use emergency communication technology equipment in sharing and dissemination of information through communication technology has become a very important mechanism especially in rescue operations. Compatibility factors also influence the role players' behavioural intentions on the continuity of technology use, technological development and relationships with other factors (Agarwal & Angst, 2006).

Bharosa *et al*. (2010) and Alsuraihi (2013), define that sharing and dissemination of information are various authorities, such as multi-disciplinary exchange, distribution of early warnings through communication technology or media to the public and such distribution of information between Federal, State, local, and ethnic government, private sector, and citizens. Information shared and disseminated should be from trustworthy sources. Therefore, it would require the peers' trustworthiness behavioural among role player and stakeholders in sharing and disseminating the information for future action.

Alavi and Leidner (2001) argued that information sharing through a repository management system as codification and storage process, the process of storing the explicit information for later use and disseminated to the stakeholders from roles player requires reliable sources such as peers' trustworthiness behaviour among them.

According to Al-Busaidi *et al*. (2010) and Nollet and Ohto (2013), Information sharing is a great asset that can be codified, manipulated and communicated. Role players, related stakeholders and community can achieve several benefits continuously when information sharing is effective in ES.

Therefore, Peer trustworthiness in information sharing and disseminating among community in ES should be given attention by the government, stakeholder and related agencies (Mori *et al*., 2005; Chen and Crandall, 2007). According to Wong and Boh (2010), Lovekamp and McMahon (2011) and Isaacs and Ranganathan (2012) Peer trustworthiness in information sharing and disseminating means reliability among individuals in sharing and disseminating of information.

An effective and informative information sharing and dissemination system will provide a compatibility and efficient exchange of information (horizontal and vertical) between those responsible for collecting reliable information by Peer trustworthiness among role players and will enable quick response and appropriate action is taken by the parties concerned in the management of an organization (Reinig & Amoroso, 2004).

Peer trustworthiness among role players and timely information applicable in every Federal, State, local, ethnic, provincial, local, and private sector entities to achieve coordinated awareness, prevention, protection, and response to an emergencies in ES during disaster will be able to reduce the risk of loss of life and reduce the damage of public property (Kaul, 2001; Fujiki, 2007; Goel, 2009; Al-Busaidi *et al*., 2010; Nollet & Ohto, 2013).

According to Haddow *et al*. (2009), Cuellar (2012), ITU (2013) and MARL (2014), ARCT is a contingency communication technology that has been recognized by the world as a medium of sharing and dissemination of information amongst ARCs which is important when in an ES in the natural disaster. Thus, the study indicated that the ARCT is on track to to becoming a potential medium in sharing and dissemination of information as well as an important tool for supporting relief agencies in ES. Sharing and disseminating of information as a process where innovation is delivered over the wireless communication technology like ARCT from time to time among communities. Meanwhile, innovation has been described as an idea, a technology or product that is new to the adopting unit.

2.4.1 Peer trustworthiness (PT) Aspect

The definition of Peer trustworthiness (PT) is about the quality of an individual or a thing that inspires reliability in sharing and dissemination of information through communication medium, such as the authenticity of information obtained through wireless communication among individual in certain communities. Moreover, the term PT refers to people that can be described by the quality or behaviour trait of being trustworthy. It also describes a trustworthy person for keeping promises, and can be trusted for correct reporting which is capable of providing accurate information under certain circumstances (Davenport & Prusak, 1998; Arlikatti, Lindell & Prater, 2007; Wong & Boh, 2010; Lovekamp & McMahon, 2011).

Bharosa and Janssen (2010) and Isaacs and Ranganathan (2012) have conducted field studies about PT behavioural in sharing and disseminating of information amongst multiagency engaged with disaster response. Their study is to observe BI among community in sharing and disseminating of information between organizations, processes, problems and technologies, using systematic communication schemes such as event logs and matrices which are related to disaster response. Communication method that involved is related to the sharing and dissemination of information through wireless communication technology. The study is in United States is related to the role of government and NGOs in emergency communication during critical situation through producing reliability resources, PT in sharing and dissemination of information.

Further study regarding information sharing and disseminating is conducted by Al-Busaidi *et al*. (2012). The study is an empirical investigation about students' behavioural intention in the use of e-Learning technology. One of the factors which are related is about PT behavioural among students. According to Davenport and Prusak (1998), Bharosa and Janssen (2010), Isaacs and Ranganathan (2012) and Al-

Busaidi *et al*. (2012) PT means reliable partners in sharing and the dissemination of important information under certain conditions.

Consequently, Fetchenhauer and Dunning (2009), Wong and Boh (2010) and Isaacs and Ranganathan (2012) agreed that PT behavioural could be a significant factor in understanding behavioural intention (BI) of users in a related study in use of existing technologies.

Fiona and Linda (2004) stated that the reliable of information among role players to support the stakeholders in ES are able to access through “reliable partners” and their contribution in the real situation in disaster.

Chen and Crandall (2007) claimed that “reliable partners” is one of the influence factors which able to clarify behavioural intention among particular community in use of particular technology. Bharosa and Janssen (2010), Wong and Boh (2010), Phillips (2011) and Walker (2011) argued that a "reliable partners" definition is similar to the meaning PT.

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PT can be expressed as obtaining reliable information from trusted partners who is required in a critical situation. Such as obtaining important information through communication technology equipment from trusted partners in emergency situations during natural disasters and need to be shared with relief agency for further action.

PT factor among people in sharing and dissemination of information through communication technology medium is very important. It’s important in getting information. Accurate, reliable and timely information are vital to effective decision-making in almost every aspect of human endeavour, whether it be undertaken by individuals, community organizations or governments mainly for emergency response in emergency situation (Lindell, 1992; Perry & Lindell, 2003; Phillips, 2011; Walker; 2011; Lovekamp and McMahon, 2011). For example PT factor amongst the ARCs is crucial in use ARCT in sharing and dissemination of information with relief agencies in emergency situation for emergency response.

2.4.2 Compatibility (CB) Aspect

In the era of communication technology development, Compatibility (CB) aspect among users with communication technology equipment in sharing and dissemination of information through wireless communication technology medium is very important. CB also influences the user's BI on the continuity of technology acceptance, technology development and has relationship with other factors (Karahanna, Agarwal & Angst, 2006).

CB is about a state in which two or more things are able to exist or occur together without complications or conflict or without problems. CB in sharing and dissemination of information is an important behavioural during communication among organizations, agencies, communities and individuals (Teece, 1994; Peng & Tsou, 2003; Slyke *et al*., 2008; Bhatt *et al*., 2010). CB is about the fact of being able to exist, live, or work successfully with something or someone else. For example the users being able to use particular technology like type of computer, machine, device, etc with comfortable.

According to Moore and Benbasat (1991), recent work focused on integrating various streams of research in technology use (Venkatesh *et al*. 2003) has retained only principles about practicality, ease of use and compatibility. Thus, it is obvious that compatibility is an important factor to technology use behaviours among users.

On the other hand prior to the research in information systems, which has predominantly regarded beliefs about compatibility factor as an independent antecedent of technology adoption outcomes, there are causal linkages among the CB factor and other key factors of usefulness and ease of use. Attempts so far to integrate CB in models of technology uses have had limited success. CB behavioural has been shown to have significant effects on attitude and/or intentions, with few exceptions (Chin & Gopal, 1995; Taylor & Todd, 1995), most studies have not been able to empirically discriminate toward CB factor. The operational definition of compatibility has generally to compatible with one's preferred work style and, to a more limited extent, well-matched with the existing situation, even though CB has a much bigger implication to the users in the use of related technology (Karahanna *et al*. 1999; Moore and Benbasat 1991).

Slyke *et al*. (2008), Limayem and Cheung (2008) and Ramayah *et al* (2010) concluded that, CB, PE, EE, SI and FC are the contributing and influencing BI in use of wireless communication technology among the communities in the area involved in their study.

However, their effectiveness of each factor is yet to be tested in the small domain such as ARC in use of ARCT in Malaysia. Damiani *et al*. (2008), Cheung (2008) and Ramayah *et al*. (2010); Limayem argued that a factors should be used in any domain like in large or in small domains in order to be fully regarded as an influencing factor to an issue at hand. Rogers and Shoemaker (1995), Gregor and Jones (1999) and Slyke *et al*. (2006) stated that retention of values of innovation of related technology which is referred to as CB can rapidly in use among the users. Therefore, CB in behavioural intention (BI) in the use of related technology for long-term purposes is significant. Thus, there is need to recognize the influence of CB factor and other factor in the use of ARCT in ES among the ARC in Malaysia of this study.

Karahanna (2006), Nakajima *et al*. (2007) and La Rose *et al*. (2007) concluded that the factor like CB influences the BI among users in use wireless communication technology. If the community exist in the particular areas are guaranteed that the services derived from the use of related technology would be supportive of their daily activities, there would be more usage towards continuity in future.

2.5 Emergency Situation (ES)

An emergency situation (ES) is the situation that poses an immediate threat to a person, community, security, property, or environment. Knowing how to assess the signs that make up an emergency will help you know how to handle it. An emergency situation requires urgent intervention to prevent a worsening of the situation. While some ES is self-evident (such as a natural disaster that threatens many lives), many smaller incidents require that an observer by emergency management to decide whether it qualifies to perform an emergency action by relief agencies. The agencies involved and the procedures used, in an ES is vary by jurisdiction, and this is usually set by the government, whose relief agencies (emergency services) are responsible for emergency planning and management such as emergency communication through an existing communication like wireless communication technology (FEMA, 2012; Haddow, 2013).

ES caused by natural disaster like Tsunami, volcano explosion, earthquakes, flood, drought, storm, industrial disaster and terrorist attack with extreme hazard to safety of people and properties.The main purpose of emergency communication technology plans in ES are saving human alive and protecting property. These interventions plans have to be undergoing urgently even with incomplete information and a lot of reservations. Emergency communication technology in ES through wireless communication technology like ARCT is used when normal means of communications are overwhelmed or unavailable. Community based emergency communications is based on where we live and work. It is also based on where you may have to evacuate during a disaster. The emergency communications through ARCT amongst ARCs are able to support relief agencies to coordinate emergency rescue action in ES and also require efficient and effective coordination and strength cooperation among various organization and many levels of control (Turoff *et al*., 2004; Codes, 2010; FEMA, 2012; Yin *et al*., 2012).

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The emergency communications through ARCT amongst ARCs provide clear and consistent direction to people pre, during and post disaster is the key to emergency preparedness and effective response by relief agencies (George, et.al, 2009). Based on these explanations, the use of ARCT is the core to success of disaster preparedness, response and recovery by relief agencies. The ability to gain accurate information to the general public, to elected officials and community leaders and the media reduce risk, saves lives and properties and space recovery.

Emergency communication in ES cover completely technical means and modes for public safety agencies at each levels of government (e.g., law enforcement, Fire Service, emergency medical services, relief agencies and support unit) to implement their communication routine. Emergency communication in ES occurred to those technical means and methods required to set up and maintain communication equipment such as ARCT that can be used before, during, and after authoritatively declared an emergency, disaster, or planned special security activities in developed countries (Phillips, 2011; Haddow, 2013)

Chanuka (2007) argued that a wireless communication technology like the ARCT plays an important role in disaster management in Emergency Situation (ES). With the ARCT, the information can be shared and disseminated to stakeholder and role players in the management of disasters in ES around the world. Likewise, the role of ARCs in the sharing and dissemination of information among relief agencies and stakeholders in ES.

2.6 Overview of Behavioural Intention (BI) Theoretical Model

According to Orlikowski and Robey (1991), Marchewka *et al*. (2004) and Gregor (2005), correlated theoretical is vital to be discussed to support research development that will be implemented. Each theory is helpful to determine the direction of the research to achieve research objective. Each theory has been designed to specify actions in specific research. Thus, some theories in related research will be outlined and argued on why the theory does not significant to the study and why this theory significant and appropriate to the study.

2.6.1 Diffusion of Innovation Theory (DOI)

According to Rogers (2003), Arshia *et al*. (2011) and Ros Ayu *et al*. (2013), the model of Diffusion of Innovation (DOI) is responsible for understanding the process of social and technological transform only. Therefore, Robertson *et al*. (2011) stated that DOI cannot determine the objective aspect of the technology among users and DOI is unrelated to determine the BI in use of technology. Rogers (1995) argued that DOI is a theoretical related to the concept of social process and technology transfer within the certain period and more too subjective aspects only.

Rogers (2003) stated DOI technology is the process by which innovation is communicated through certain channels over time among researchers of a social system. DOI theory increased technology innovation through certain channels over time and in a particular social system and not influenced by individual behaviour. Individual viewed as having different level of readiness to take on innovations and consequently it is usually noted that part of society to adopt innovations are more or less normal from time to time. Entities of each category usually have a certain characteristics that distinguish the technology from time to time (Rogers, 2003). DOI theory is entirely dependent on the results of innovation results of other researchers and unable to identify behaviour intention of user to use the particular technology (Orr, 2003; Arshia *et al*., 2011and Ros Ayu *et al*., 2013).

Robertson *et al*. (2011) argued the failure of technology can be caused by the implementation of incompetent among user rather than failure of technology innovation. Attitudes, intention and behaviours play a significant role in identifying the variables that influence users to adopt and to use the technology in certain situation. Tan (2003), Kijsanayotin 2009 and Kit, 2014 stated DOI is unclear to perceive factors affecting the use of technology.

Furthermore Kim, (2008), Kim & Garrison (2009) and Holden & Karsh (2010) also argued DOI unable to recognize factors may influence BI in the use of technology. However, Holden & Karsh, (2010) and Sundaravej (2014) claimed that theoretical DOI contributed an idea to Venkatesh *et al*. (2003) in constructed unified theory of acceptance and use of technology-1(UTAUT-1).

2.6.2 Technology Acceptance Model (TAM)

The technology acceptance model (TAM) is an information systems theory that models how users come to accept and use a technology. The model suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it. First construct like perceived usefulness (PU) is about the degree to which a person believes that using a particular system would enhance his or her job performance. Secondly is about perceived ease-of-use (PEOU) is the degree to which a person believes that using a particular system would be free from effort (Davis 1989). The TAM has been continuously studied and expanded-the two major upgrades being the TAM-2 (Venkatesh & Davis 2000 & Venkatesh 2000) and the UTAUT-1 (Venkatesh *et al*. 2003; Kim, 2008; Kim & Garrison, 2009 and Holden & Karsh, 2010). TAM is only to clarify the determinants of user acceptance of a wide range of end-user computing technologies and not describe detail important factors (Lu *et al*., 2003 and Fang *et al*., 2005). While, Yen (2010) and Yen and Bakken (2011), stated, DOI and TAM more too subjective element compared to objective element and not focusing the specific factors that influence the user's BI towards a technology.

According to Abdelghaffar and Galal (2012), Al-Busaidi (2012) and Barnett *et al*. (2013), TAM only to determine the relevant of technology through the evaluation by the user of the performance of a technology and not determine the influence factors in using certain technology among certain community. This model did not list significant factors to determine BI in the use of technology among users (Kim, 2008; Kim & Garrison, 2009 and Holden & Karsh, 2010).

2.6.3 Unified Theory of Acceptance and Use of Technology (UTAUT)

However, Kim and Garrison (2009) and Holden and Karsh (2010) and Sundaravej (2014) argued that DOI and TAM has contributes implication and impression to Venkatesh *et al*. (2003) to construct the the Unified Theory of Acceptance and Use of Technology-1 (UTAUT-1) to investigate and focusing the salient factors that influence the user's BI towards a technology.

According Ros Ayu *et al*. (2013) Sundaravej (2014) and Kit (2014), UTAUT-1 was developed through a review and consolidation of the constructs of eight models that earlier research had employed to explain information systems usage behaviour like theory of reasoned action, technology acceptance model, motivational model, theory of planned behaviour, a combined theory of planned behaviour/technology acceptance model, model of personal computer use, diffusion of innovations theory, and social cognitive theory. According to Venkatesh *et al*. (2003), UTAUT-1 stands on observed comparisons and concepts across different model of technology use. These theories express that user acceptance and use of advanced technology described by several aspects. Social Influence (SI) processes explain individual face opportunity to accept or reject the new system consisting of subjective norm, voluntary and images. This theory is to emphasize the relevance of cognitive processes of individuals and to stress the quality of output. These theories express that user acceptance and use of the technology described by four factors, that is performance expectations (PE), opportunities of the dealing, social influence (SI) and convenience are important determinants of Behavioural Intention (BI) directly and consumption behaviour.

Michael and Prabowo (2011), Chang (2012) and Raisamo (2014) stated that UTAUT-1 is the ultimate model that synthesizes what is known and provides a platform for guiding the future research of relevant areas like to address BI issue in the use of existing technology. Since 2003, several studies validated the UTAUT-1 model in different environments. Previous researchers have also proven that this model was able to better explain the variance in usage intention than previous models. These reasons made us confident about the choice of this integrative and global model to explain technology use by its users. Figure 2.2 demonstrate UTAUT-1 theoretical model (Venkatesh *et al*., 2003).

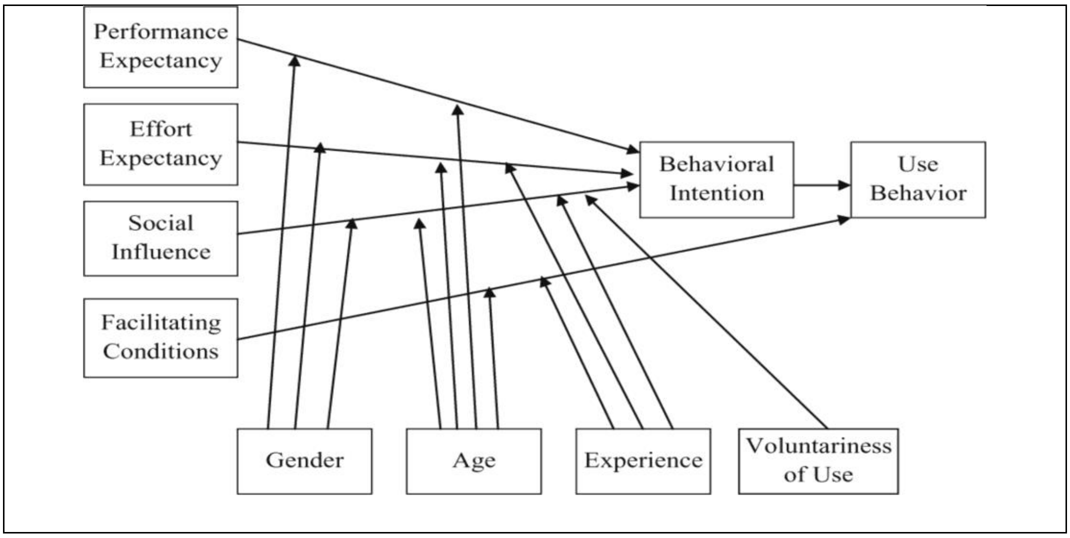


Figure 2.2. Theoretical Model of UTAUT-1

Furthermore, Venkatesh *et al*. (2012) make improvements in UTAUT-1 by dropping and adding some explanatory factors that are more appropriate and known as UTAUT-2. Abdelghaffar and Magdy (2012), Kocaleva*et al*. (2014), Sundaravej (2014), Kit (2014) and Arenas-Gitan *et al*. (2015) argued that UTAUT-2 is significant to facilitate researchers in understanding which factors influenced BI among users in use of existing technology (Refer to Figure 2.3).

UTAUT-1 is constructed by Venkatesh *et al*. (2003) in "User acceptance of technology: Toward a unified view". Consequently, this theoretical model purpose is to clarify user intentions to use technology and following practice behaviour. The theory holds with four constructs such as performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating condition (FC). While, gender, age, experience and voluntariness of use are the moderating effect among the four factors on practice BI and use behaviour. Moderating effect is about moderation (control) occurs when the relationship between two variables depends on a third variable.

Meanwhile in UTAUT-2, Venkatesh *et al*. (2012) argued to drop voluntariness as moderating effect variable due to make this theoretical relevant to the context of a voluntary behaviour, such as the one we are studying (i.e., voluntary technology use among users).

Generally, voluntariness can be perceived as a field from absolutely mandatory to absolutely voluntary, users have no organizational order and thus, most user behaviours are completely voluntary, resulting in no variance in the voluntariness construct. Thus, Venkatesh *et al*. (2012) reasoned to drop voluntariness as a relevant construct from the model. This will only affect one relationship (i.e., the social influence – BI relationship). Thus this why explain why although ARC often work as volunteers, but the factor will not be selected in the study.

Venkatesh *et al*. (2012) argued to extant an overview of the three constructs was added to UTAUT-1 and discussed the details of the three constructs. They adopt an approach that complements the current constructs in UTAUT-2. First, this model takes an approach that highlights the significance of practical value (extrinsic motivation). The construct tied to utility, namely performance expectancy (PE), has consistently been shown to be the strongest predictor of BI.

Based on motivation philosophy is intrinsic or hedonic motivation (Vallerand 1997). Hedonic motivation (HM) has been included as a key forecaster in much user behavioural research and prior IS research in the user technology use perspective (Brown and Venkatesh 2005). One more, from the perspective of effort expectancy (EE), in structural situations, users evaluate time and effort in forming views about the overall effort associated with the use of technologies. In a user technology use perspective, price is also as imperative factor, unlike workplace technologies, users have to tolerate the costs associated with the purchase of devices and services. Reliable with this argument, much user behaviour research has included constructs related to cost to clarify users' actions.

Finally, this model centre on intentionality as a significant original theoretical mechanism that drives BI among users toward the technology used. Many researchers and detractors of this class of models have argued that the inclusion of additional theoretical mechanisms is important. On the other hand, rather than initial acceptance, context habit has been shown to be a critical factor predicting technology use among users (Kim *et al*. 2005; Limayem *et al*. 2007). Based on the above explanations and the associated theoretical explanation provided, Venkatesh *et al*. (2012) argued to integrate hedonic motivation (HM), price value (PV), and habit (HB) into UTAUT-1 in order to modify it to the user technology use perspective. The combination of HM, PV, and HB brings an innovative mechanisms tied to the new constructs into the largely cognition- and intention-based unified theory of acceptance and use of technology. Figure 2.3 show the UTAUT-2 theoretical model (Venkatesh *et al*., 2012).

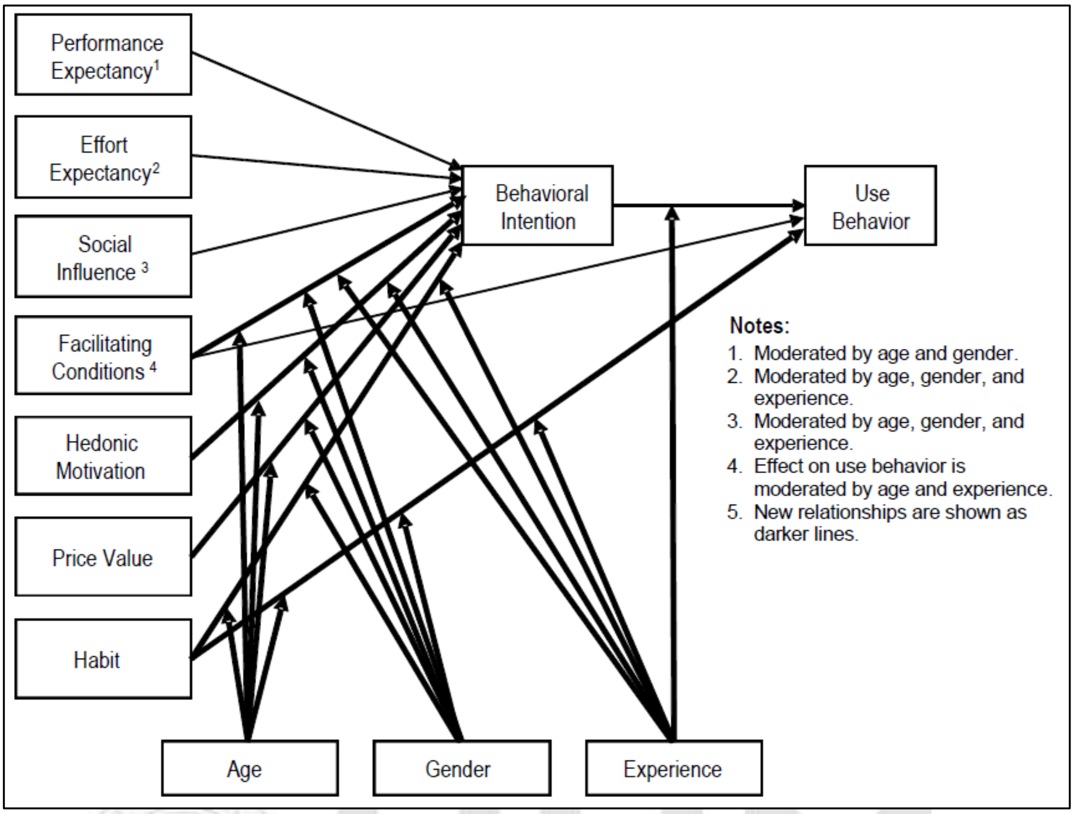


Figure 2.3. Theoretical Model of UTAUT-2

Based on a review of the extant literature, Venkatesh *et al*. (2003) developed UTAUT-1 as an inclusive combination of prior technology acceptance research. UTAUT-1 has four key constructs (PE, EE, SI, and FC) that influence BI to use a technology and / or technology use. They adapt these constructs and definitions form UTAUT-1 to UTAUT-2 to the user technology use context. According to Venkatesh *et al*. (2003), PE is about the degree to which using a technology will provide benefits to users in performing definite activities. While EE is about the degree of ease associated with users use of technology and SI is the extent to which users perceive that important others (e.g., family, friends and community) believe they should adopt and use a particular technology; and FC refer to users observations of the properties and support existing to achieve a behaviour (Brown and Venkatesh 2005; Venkatesh *et al*. 2003).

According to Venkatesh *et al*. (2003), PE, EE, SI, and FC are factors influencing behavioural intention to use a technology. Also, individual difference variables, such as age, gender, and experience, are theorized to moderate various UTAUT-1 relationships. The lighter lines in Figure 2.3 show the original (UTAUT-1) along with the one modification noted above that was necessary to make the theory applicable to this context.

Even though there are many other technology models, UTAUT-2 model has additional constructs not present in the other models mentioned like HM, PV and HB. The constructs in UTAUT-2 are combined to focus on user use context rather than technology acceptance and use of employees (Venkatesh *et al*. 2012).

In conclusion, Venkatesh *et al*. (2012) has made improvements of UTAUT-1 to UTAUT-2. Three new constructs has been added for extending and strengthen the model, such as HM related in terms of feeling satisfied in the use of technology, and as important role to determine use of technology among particular community in particular situation. While PV as a predictor of BI rate to use a technology and HB is regarding to the role of traditions in the use of technology has marked contrast to the basic processes that influence technology use behaviour among particular community in particular situation (Venkatesh *et al*. 2012; Kit, 2014; Kocaleva*et al*. 2014).

Ros Ayu *et al*. (2013), Kocaleva*et al*. (2014), Sundaravej (2014), Kit (2014) and Arenas-Gitan *et al*. (2015) argued that the UTAUT-2 simplifies the approach to investigate the influence and salient factor in understanding the BI among users in use of certain technology in related situation. However, the factors in this model can be adapted or extended based on the requirements of studies. UTAUT-2 is more appropriate and precise than UTAUT-1, TAM, DOI and other model in determining the influences and salient factors of BI to use specific technology among community in specific area. UTAUT-2 has been more explanatory and lists the suggestions for future works and can be adapted to whether existing factors are retained, removed or supplemented with new factors in line with the research conducted. The immediate implications are for researchers who wish to examine BI, and who want to confirm the use of specific technology among specific users (Arshia, 2012; Abdelghaffar & Magdy, 2012; Abdelghaffar & Galal, 2012; Chang, 2012; Kit, 2014).

Abdul Wahab and Zulkhairi (2012), Li *et al*. (2012), Sundaravej (2014) and Kit (2014) argued that BI is sufficient to indicate and to clarify the use behaviour among community of related study. According to Attuquayefio & Addo (2014) and Khechine *et al*. (2014) independent variables to identify BI are able to be a significant indicator to understand and to clarify the use behaviour of specific technology.

There is one study to support the above argument for using and adapting the UTAUT-2 for this study. The study was conducted by a group of experts in a small town in the rural area in Spain. The study was led by Arenas-Gitan *et al*. (2015). They used and adapted UTAUT-2 in research which are related to determine the factors which are significant in determining the BI in the use of internet banking among elderly community in daily life in Seiville Spain. Their study outcome successfully achieved the objective. The age of respondents is a moderating effect of their study. The model by Arenas-Gitan *et al*. (2015) is shown in Figure 2.4.

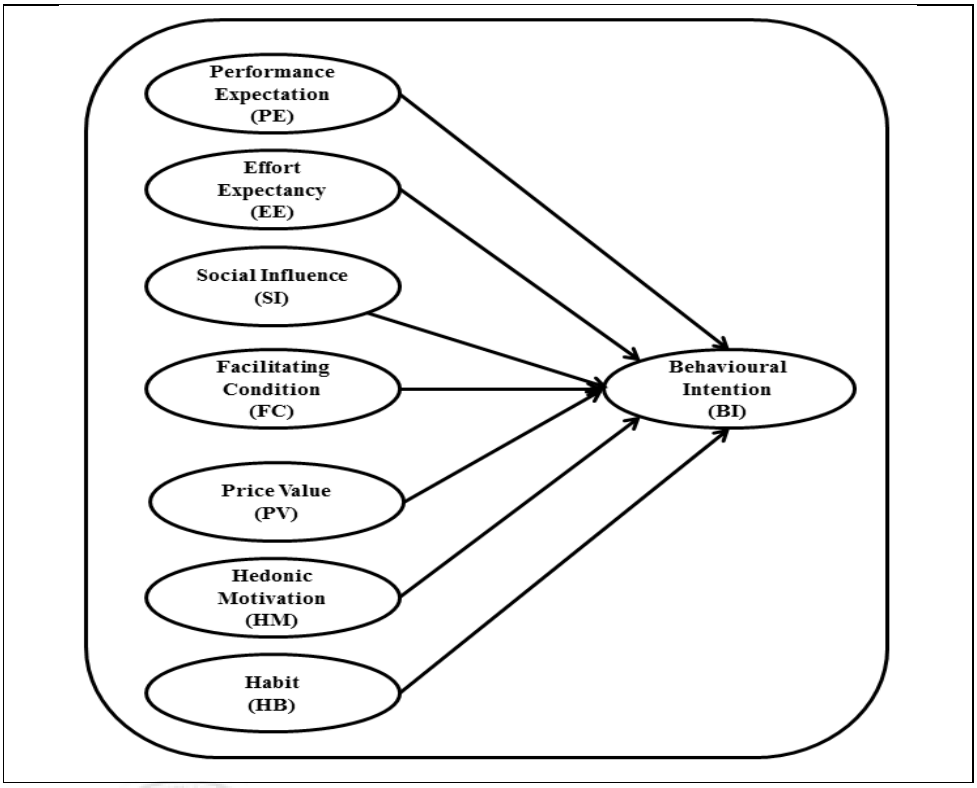


Figure 2.4. The Use of Internet Banking Model

Arenas-Gitan *et al*. (2015) model has distilled the significant factors and contingencies related to the prediction of BI to use a technology and existing technology used mainly in organizational perspectives in several research fields. In longitudinal field studies of user technology use, this model able to explain about the variance in BI among user to use the technology.

According to Neufeld *et al*. (2007), there have been many applications and replications of the entire model or part of the model in organizational settings that have contributed to fortifying its generalizability in same attribute of future research. Thus, this model has served as a baseline model and has been applied to the study of a variety of technologies in both organizational and non-organizational surroundings.

There are three broad types of these model extensions. The first type of extension examined in new contexts, like as new technologies, collaborative technology and factors which are influenced user use of technology. The second type is the addition of new constructs in order to expand the scope of the endogenous theoretical mechanisms outlined (Gupta *et al*. 2008) in this model. Lastly, the third type is the inclusion of exogenous predictors of the related factors (Neufeld *et al*. 2007; Yi *et al*. 2006) to this model. These extensive replications, applications, and extensions / integrations of this model is based on original UTAUT-2 have been valuable in expanding our understanding of technology use behaviour and extending the theoretical boundaries of the theory. Nevertheless, our review of this body of work exposed that most studies adopting and using UTAUT-2 like Arenas-Gitan *et al*. (2015) model employed only a subset of the concepts, particularly by using the moderators is related to investigate BI among elderly community in use of Internet technology.

Meanwhile, the various studies contribute to understanding the utility of UTAUT-2 in different contexts; there is still the need for a systematic study and theorizing of the unique factors that would apply to a user technology use context in a related study. Build on past connection to Arenas-Gitan *et al*. (2015) model, our goal of working is to pay special attention to the user use context and develop UTAUT-2 and to extent two new factors that relate to this study. Compared with general theory, in recent years, theories that focus on certain contexts and identifying predictors and relevant mechanisms are considered very important in giving a rich understanding of the phenomenon of focus and to broaden the meaningfully theory mainly in this study.

Definitely, Gupta *et al*. (2008), Alvesson and Kärreman (2007); Venkatesh *et al*. (2012) and Khechine *et al*. (2014) argued that new contexts or extended new factors can result in several types of important changes in theories, such as rendering originally theorized relationships to be nonsignificant, changing the direction of relationships, altering the magnitude of relationships and creating new relationships in new research field. Each change can reveal the breakdown of theories that result in the creation of new theoretical information (Alvesson and Kärreman, 2007) like in this study in investigation the salient factors regarding the BI amongst the ARCs in use ARCT in ES in Malaysia.

In the case of Arenas-Gitan *et al*. (2015), which was originally developed to explain user technology and use, it will be critical to examine how it can be extended to other contexts, such as the context of user technologies, which contributes and useful to users. Thus, the model that is used and adapted by Arenas-Gitan *et al*. (2015) in identified the BI among elderly community in use of Internet technology are significant and parallel with this study due to highlight the relationship among factors by building on and extending prior work within this broad stream.

Additionally, there is another key contribution. Firstly, by incorporating new salient factors into this model and expand the overall nomological network related to technology use like use of ARCT amongst ARCs in ES. The importance of the practice extension, for instance, is even endorsed by researchers, such as Benbasat and Barki (2007) who noted that it has been largely overlooked in this stream of work. More broadly, Bagozzi (2007) and Venkatesh *et al.* (2012) have called for alternative theoretical mechanisms in order to foster improvement in this established stream of related work. The integration of new constructs such new mechanisms tied to the new constructs into the largely cognition- and intention-based is important in determine use behaviour among users in use of technology.

Secondly, by adapting and extending new constructs and altering existing relationships, this work furthers the generalizability of this model to a different context (user of technology) that is an important step to advance a theory.

Finally, from a practical perspective, the rich understanding gained can support stakeholders in the role player of technology able to better design and develop technologies to users in various demographic groups at various stages of the use curve (Abdelghaffar & Magdy, 2012; Chang, 2012; Kit, 2014).

2.7 Significant Theoretical and Constructs

Venkatesh *et al*. (2003) have formulated a unified theory of acceptance and use of technology. It was developed by comparing the difference of the empirical and conceptual models to understand the behaviour of the specific community in use of certain technologies. This theory provides a unified interpretation to clarify user use the technology among specific committee. Therefore researcher no longer needs to choose and pick one model while ignoring the contributions of other models. Thus, this model acts as a starting point which has been applied in research by many organisational technologies in investigating user's behaviour in use related technology.

Therefore, Table 2.2 shows significant theoretical model and related constructs. According to Lewis, Fretwell, Ryan and Parham (2013), this theoretical model and construct acts as a starting point which has been applied to research on several organisational in investigating behavioural intention to use the technology among related communities.

Table 2.2

Significant Theoretical and Constructs

Theoretical Model	Constructs
Theory of Reasoned Action (TRA) by Fishbein and Ajzen (1975) derives from psychology to measure behavioural intention to use technology.	Attitude Toward Act and Subjective Norm
Technology Acceptance Model (TAM) by Davis (1989) develops new scale with two specific variables to determine user acceptance of technology and behavioural Intention to use the technology.	Perceived Usefulness and Perceived Ease of Use.

Table 2.2 *Continued*

Technology Acceptance Model 2 (TAM2) by Venkatesh and Davis (2000) is adapted from TAM and to investigate intention to use the technology and usage behaviour.	Subjective Norm, Image, Job Relevance, Output Quality, Result Demonstrability, Perceived Usefulness and Perceived Ease of Use.
Combined TAM and TPB (C-TAM-TPB) by Taylor and Todd (1995) to investigate behavioural Intention to use the technology.	Perceived Usefulness, Perceived Ease of Use, Attitude, Subjective Norm and Perceived Behavioural Control.
UTAUT 1 by Venkatesh *et al*. (2003) integrates of many theories to investigate behavioural intention to use the technology among related communities or organisational.	Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Condition.
UTAUT 2 by Venkatesh *et al*. (2012) to investigate behavioural intention to use the technology among related communities or organisational.	Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Condition, Price Value, Hedonic Motivation and Habit.

Arshia (2012), Abdelghaffar and Magdy (2012), Abdelghaffar and Galal (2012), Kit (2014) and Sundaravej (2014) argued that listed theoretical model in Table 2.2 have contributed ideas and has been indicate Venkatesh *et al*. (2012) to establish the UTAUT-2.

The construct in UTAUT-2 focuses abstract idea on something inferred from an observable phenomenon. While variable means the factor or aspect of an issue or incident or a content which should be able to be measured and based on values. The variable is the measurable expression of the construct. The construct typically is more general and it is not guaranteed that variable is actually related to the construct in the preferred way. Subsequently, Arenas-Gitan *et al*. (2015) have modified the UTAUT-2 to accomplish conduct their study in investigated BI among elderly community in use of internet technology in small town in Spain

Venkatesh *et al*. (2012), Lewis, Fretwell, Ryan and Parham (2013) and Arenas-Gitan *et al*. (2015) argued that some model is able to determine exceptional use of technology in information technology (IT) with the point view for the next issue and can be expanded with the addition of several constructs that resonate with the theme of a study.

Indeed, Arenas-Gitan *et al*. (2015) have emphasized that constructs in UTAUT-2 can be combined with multiple variables to the study related in the use of technology. This indicates that the constructs in UTAUT-2 are useful as the model in use of technological developments of information sharing and dissemination among role players, stakeholders and the community in this research.

Consequently, Venkatesh *et al*. (2012), Lewis *et al*. (2013), Sundaravej, (2014) and Kit (2014) argued that BI as dependent variable (DV), and PE, EE, SI, FC, HM, PV and HB as the independent variables (IV). Each variable are combined to focus and investigate BI of community acceptance in context technology use in specific situation of specific research.

Thus, this model is significant for this study because of its able to combine the factors of the existing and containing eight theories to form a unified theoretical source and can be extended with several factors that are parallel and in line with the research environment to be done. (Venkatesh *et al*. 2012; Lewis *et al*., 2013; Kit, 2014; Kocalevaet *al*. 2014) that will indicate researcher to understand and clarify the problem statement.

Furthermore, UTAUT-2 is selected to use and to extend in this study is based to theories of user acceptance that are constructed and synthesized by Venkatesh *et al*. (2012) and Arenas-Gitan *et al*. (2015) and has made a comprehensive exploration from the previous models and has been tested by previous researchers. Significant of theoretical models can be referred to the extensions of new constructs in related model will produce a substantial improvement in the variance explained in BI in the use of related technology (Chang, 2012; Slade *et al*, 2013; Yee, 2015).

UTAUT-2 is able to evaluate the various factors which are related to the study. Additionally, the model assign relevant supports for the existence constructs which could be used to determine the expectation of technological developments usage in the context of information sharing and dissemination among role players, stakeholders and the community in this research. Moreover, the constructs assist in identifying the requirements for usage of technological developments in the framework of information sharing and dissemination among role players, stakeholders and the community in related research (Abdul Wahab & Zulkhairi, 2012; Li *et al*., 2012; Sundaravej, 2014; Kit, 2014; Arenas-Gitan *et al*., 2015).

In fact, this theoretical model has been emphasised as theory that is significant to be used in organizations such as among role players, stakeholders and the community in this research and subsequently as prime channel, leading indicators and adopt as a prime model for this study. Furthermore, Dependent Variables (DV) like BI will be able to perform significant indicator to clarify the influences of Independent variables (IV) to use behaviour in specific study (Abdul Wahab & Zulkhairi; 2012; Li *et al*., 2012; Sundaravej, 2014; Kit, 2014). In the other word, BI is sufficient to clarify the influence of use behaviour among community of related study (Attuquayefio & Addo, 2014; Khechine *et al*., 2014). Meanwhile, after conducting review and typical discussion with the supervisor and experts, adaptation and to extend new factors to the model was implemented comprehensively in this study.

2.7.1 The Description of Construct

Consequently, to determine which the significant factors and the influence factors in the particular conceptual model, the listed constructs are considered as variables to test (Lewis *et al*., 2013; Kit, 2014; Kocaleva*et al*. 2014). According to Venkatesh *et al*. (2012), Kit (2014) and Arenas-Gitan *et al*. (2015), PE, EE, SI, FC, PV, HM and HB are able to determine the extent of BI among users to use the technology. While Age (AG), Gender (GE) and Experience (EX) are constructs as a moderator effect in UTAUT-2. Besides that, the construct such as HM and PV is an interpreter of user's BI to use a technology in particular situation. Whereas, HB is a perceptual construct that reflects the results of prior experiences based on particular situation (Ajzen and Fishbein, 2005; Brown & Venkatesh, 2005; Kim *et al*., 2005; Limayem *et al*., 2007 and Venkatesh *et al*., 2012).

2.7.1.1 Performance Expectancy (PE)

Performance expectancy (PE) is defined as the degree to which an individual believes that using the technology will help him or her to attain gains in a profession (Davis *et al*., 1992; Shin, 2009). According to Compeau & Higgins (1995), the theoretical background of this construct comes from usefulness perceptions (Technology Acceptance Model), extrinsic motivation (Motivation Model), job-fit (Model of PC Utilization), relative advantage (Innovation Diffusion Theory) and outcome expectations (Social Cognition Theory). Three factors that affect the PE are perceived usefulness, extrinsic motivation, and job fit (Shin, 2009). Within each of the individual models tested, the variables related to PE were the strongest predictor of intention to use the related technology. People who worked in Technology field exhibited a high degree of IT acceptance and use influenced by PE, EE and SI (Kijsanayotin, Pannarunothai, & Speedie, 2009).

Zhou *et al*. (2010) found that PE, SI, FC and task technology fit have significant effects on user acceptance to the technology. In addition, they also found a significant effect of task technology fit on PE. The result showed that each factors have significant influence on consumers'm-commerce BI. While Martin and Herrero (2012) stated that the online purchase intention is positively influenced by the levels of PE and EE with regard to the transaction the level of innovativeness of users. In addition, the innovativeness construct has a moderating effect on the relationship between PE and online purchase intention.

The relationship between PE and the BI to use or the new technologies has been the subject of many research questions. In studies executed around the world the practices or technologies are various, extending from electronic medical records to robotic-assisted surgery (Arman & Hartati, 2015; Haryoto; 2015). Devolder, Pynoo, Sijnave, Voet and Duyck (2012) found that the UTAUT-2 interpreters had different weights dependent on the subcategory studied and thus suggest that every type of user should be treated independently. Each hypothesized that PE predicts the acceptance of IT in organizations and most of them found evidence for this assumption. Although these results indicate a clear answer to the hypothesis, other researchers did not find a statistically significant influence of PE on BI or definite use.

2.7.1.2 Effort Expectancy (EE)

Effort expectancy (EE) is defined as the degree of ease associated with the use of the technology. Venkatesh *et al*. (2003) suggested through the UTAUT-1 model that the three variables like EE, PE, and SI directly influence BI, which subsequently influences Use Behaviour. The theory also suggested the direct influence of FC on Use Behaviour toward the technology. This factor was derived from the perceived ease of use factor as proposed in Technology Acceptance Model (TAM). Davis (1989) found that an application perceived by people which is easier to use is more likely to be acceptable. In a similar finding by Davis *et al*. (1989), effort-oriented constructs are expected to be more salient in the early stages of a new behaviour, when process issues represent hurdles to be overcome, and later become overshadowed by instrumentality concerns. This is consistent with previous findings by Davis (1989), Davis *et al*. (1989), Venkatesh and Davis (2000), (Diaz & Loraas, 2010). Both EE and PE are significant predictors of the intention to use WBQAS (Web Based Questions and Answers Services) by Deng, *et al*. (2011). PE, EE, FC and SI impact overall use intention, the perceptions of these antecedents vary significantly between potential against primary users (Yen-Ting Helena Chiu *et al*., 2010).

2.7.1.3 Social Influence (SI)

Social influence (SI) is the degree to which a user perceives that significant persons believe technology use to be important (Diaz & Loraas, 2010). It is similar to the factor “subjective norm” as defined in Technology of Acceptance Model (TAM) 2, an extension of TAM. Moore and Benbasat (1991) defined image as the degree to which using a technology innovation is perceived to enhance individual’s image or status in his or her social group. While subjective norm and image have different labels, each of these factors contains the explicit or implicit notion that the individual‘s behaviour is influenced by the way in which they believe others will view them as a result of having used the technology.

In TAM 2, subjective norm exerts a significant direct effect on usage intentions over and above perceived usefulness and perceived ease of use for mandatory systems. However, none of the social influence constructs are significant in voluntary contexts. Subjective norms were found to be partially mediated by attitude towards technology use (Schepers & Wetzels, 2007).

Venkatesh *et al*. (2003) and Keong, *et al*. (2012) argued that subjective norm significantly influences perceived usefulness by both internalizations, in which users incorporate SI into their own usefulness perceptions and identification, in which user uses a system to gain status and influence within the workgroup and thereby improve their job performance, particularly in the early stages of experience.

While, Maldonado et.al (2011) stated that learning motivation and SI had a positive influence on BI, while FC had no effect on e-learning portal use. Similarly, Gonzalez *et al*. (2012) found that the North American internal auditors are more likely to use continuous auditing due to soft social pressures of SI through peers and higher authorities. On the other hand, Middle Eastern auditors are more likely to use the technology if it is mandated by the higher authorities. SI is also affected the acceptance of IT (Kijsanayotin *et al*., 2009). People who worked in community health centers showed a high degree of IT acceptance and use. The research model analyses suggest that IT acceptance is influenced by SI, PE, EE and voluntarily. Health IT uses is predicted by previous IT experiences, intention to use the system, and SI (Kijsanayotin *et al*., 2009).

2.7.1.4 Facilitating Condition (FC)

Facilitating conditions (FC) is defined as the degree to which an individual believes that organizational and technical infrastructure exists to support use of the technology or system. Similar discussion can be found in model of personal computer utilization by Thompson *et al*. (1991). The underlying construct of facilitating condition is operated to include aspects of the technological and/or organizational environment that are designed to remove barriers to use (Keong *et al*., 2012). Previous IT experiences also predicted IT use, intention to use the IT system, and facilitating conditions (Kijsanayotin *et al*., 2009).

UTAUT-1 consists of items from perceived behavioural control and is theorized to model the relationship between the organization's attempts to overcome barriers to use and the potential users' intent to use. Like EE, the power of this variable predicts usage decreases after initial acceptance. Gupta *et al*. (2008) found that FC, PE and EE and SI completely positive impact the use of the ICT.

2.7.1.5 Price Value (PV)

The price value (PV) construct was also introduced in the UTAUT-2 model as a product value, cost, and price will influence acceptance valuations. An important difference between a user use setting and the organizational use setting, where UTAUT-2 was developed, is that users usually tolerate the financial and cost of such use whereas employees do not. The cost and pricing structure may have a significant impact on users' technology use (Devolder, Pynoo, Sijnave, Voet and Duyck, 2012). Arman and Hartati (2015) and Haryoto (2015) claimed that perception of benefits and costs incurred by the users when using the technology equipment like broadcasting technology influenced by PV factors.

Magni *et al*. (2010) and (Huang & Kao, 2015) argued that the PV concept invented from the perceived value, which is frequently regarded as a significant indicator in predicting the consumption behaviour which can influence a stakeholders and role-players competitive advantage. Traditionally, the definition of the PV is a trade-off between benefits and sacrifices. On the other hand, the PV has been highlighted by the previous researchers in the information technology fields and the marketers of user electronics devices.

The idea was adopted to evaluate users' acceptance of developing wireless communication technology like ARCT. The findings indicated that the PV concept is a key in attracting ARC. The PV is positive when the benefits of using a technology like ARCT are identified to be greater than the monetary costs. Such PV has a positive impact on ARC intentions.

2.7.1.6 Hedonic Motivation (HM)

Ahtola (1985), Childers *et al*. (2001) and Higgins (2006) argues that hedonic motivation (HM) refers to individual behaviour influenced by his / her excitement and willingness to move toward a goal to achieve satisfaction. This is linked to the classic motivational principle that people approach pleasure and is gained from acting on certain behaviours that resulted from esthetic and emotional feelings such as excited, love and happiness. According to the hedonic principle, our emotional experience can be thought of as a gauge that ranges from bad to good such as our primary motivation is to keep the needle on the gauge as close to good as possible. With regard, the HM construct was regarded as a significant interpreter and was integrated into the UTAUT-2 for more emphasizing effectiveness.

HM is defined as the fun or pleasure derived from using a technology, and it has been shown an important role in determining user BI toward technology acceptance and use (Brown and Venkatesh, 2005). In IS research, such as HM (conceptualized as perceived enjoyment) has been found to influence technology acceptance and use directly (e.g., van der Heijden 2004; Thong *et al* 2006). In the user context, HM has also been found to be a significant determinant of technology acceptance and use. Hence, HM is able to be a measurement of users‘BI to use a technology (Brown & Venkatesh, 2005; Childers *et al*., 2001).

HM is about inspiration to do something for the inner satisfaction. From the inspiration perspective of individual behaviours, the HM is related to the spirit of individual’s emotional and sensitive experiences which can be caused by both the individual personalities and the cognitive (Ryan & Deci, 2000).

Magni *et al*. (2010) and (Huang & Kao, 2015) argued that the relationships among users and technology produces by analyzing users intention. Furthermore, to explore user's consumption motivations, developed and tested a model to examine the effect of hedonic motivations. Moreover, many of previous empirical studies have demonstrated that hedonic practices and behaviours will influence user technology acceptances from both individual and organizational contexts. In other words, like individual's hedonic practice of using a wireless communication product is more likely to perform experimental behaviour.

Yang (2010) found that HM, PE, SI, and FC are critical determinants of users BI to use mobile shopping services and that the entertainment aspect of mobile shopping services is the most vital driver of users BI to continue used mobile shopping services.

Meanwhile, the perceived usefulness emerged as a significant mediator in the case of utilitarian online game and perceived enjoyment emerged as a significant mediator in the case of hedonic online game user acceptance phenomenon (Pillai & Mukheijee, 2011). Bae & Chang (2012) maintained that the relative advantage has the greatest influence on the purchase intention of smart TV, followed by compatibility, entertainment, web-browsing and n-screen.

2.7.1.7 Habit (HB)

Habit (HB) was defined by Limayem *et al*. (2007) as the degree to which people tend to perform behaviours automatically because of learning or a daily routine, while Kim *et al*. (2005) equated HB with automaticity. Automaticity means something having the capability of starting, operating and moving independently because it has become a daily routine. A HB is a routine of behaviour that is repeated regularly and tends to occur subconsciously (Kim & Malhotra, 2005). On the other hand means the level at which people often behave automatically using something technology because of daily routine.

Venkatesh *et al*. (2012) claimed that the recent studies have stressed the roles of BI and unified a new construct like PV and HB into the UTAUT-2. The outline of the HB construct was due to the following two criteria.

Firstly, the HB is regarded as prior behaviour. Secondly, the HB can be defined as the degree to which individuals believe the behaviour to be reflex. These new added constructs were verified constantly in previous researches as the critical determinants for users' technology acceptances. For example, both constructs can be used in the investigations of users' acceptance of Phablets. The phablet is a class of wireless communication technology combining or including the size format of smartphones and tablets (Huang & Kao, 2015). Although conceptualized rather similarly, HB has been organized in two distinct ways. Firstly, HB is viewed as prior behaviour (Kim & Malhotra, 2005). Secondly, HB is measured as the degree to which an individual believes the behaviour to be automatic. Recent work has challenged the role of BI is the significant predictor of technology use and introduced a new theoretical construct like habit as another significant predictor of technology use (e.g., Davis and Venkatesh 2004; Kim and Malhotra 2005; Kim *et al*. 2005; Limayem *et al*. 2007).

2.7.2 Extend the New Constructs

Factors like Peer trustworthiness (PT) amongst the ARCs and Compatibility (CB) in using ARCT in sharing and dissemination of information is believed to facilitate the distribution of information timely and preferably updated regularly to relief agencies. An effective communication mechanism through ARCT is significant to facilitate sharing and dissemination of information amongst the ARCs in ES when disaster occurrences. Important information can be shared quickly with relief agencies. So, of course, additional factors such as PT amongst the ARCs and CB with ARCT should be emphasized in this study. Detailed clarifications regarding the significance of PT and CB have been highlighted in sub section 2.4.1 and 2.4.2 in section 2.4 in Chapter Two.

Venkatesh *et al.* (2012), Martin & Herrero (2012) and Chang (2012) stated that future research can construct and can be extended another factors or can be eliminate any inappropriate factors in related study by using UTAUT-2 in different countries, different communities, and different technologies, identify other relevant factors that may help increase the applicability of unified theoretical to a wide range of user technology use in multiple contexts.

Venkatesh *et al.* (2012), Alazzam *et al*. (2013), and Martinset *et al*. (2014) claimed that there is need to search for more factors (extended factors) so as to ensure the validity of the new model that would be used in another context. Therefore, this study was extended new factor to the model that are used and adapted by Arenas-Gitan *et al*. (2015).

In fact, the based model was extended with new constructs to determine influencing factors towards the BI in the use of ARCT amongst ARCs in ES. An extended both constructs is significant, as we want to study and test whether both factors really influence or not regarding the BI in the use of ARCT amongst ARCs in ES in Malaysia. The relationship and its requirements have been described in section 2.4 and detailed in sub section 2.4.1 and sub section 2.4.2.

2.7.2.1 Peer trustworthiness (PT) Extended to the Model

Peer trustworthiness (PT) is a subjective communication approach, which the partners can be trusted with direct communication with contacts by using related communication technology (Nakajima *et al*., 2007; Fetchenhauer & Dunning, 2009). PT is about the degree of quality of an individual recognizes the reliability in sharing and dissemination of information among individuals through communication medium. The development of the use of wireless communication technology among the individuals is contributed by several factors such as the development of communication technology, modern lifestyle, the requirement for support technology in daily life and the ability factor of PT among individuals towards information sharing and disseminating should be prioritized (Ling, 2000; Al-Busaidi *et al*., 2010; Kay Craigie, 2011).

PT refers to the trustworthiness of an information is closely related to the credibility of the informant's resources. PT refers to something complex in relation to trust in honesty, truth, efficiency, and other matters or services that are trusted among individuals (Grandison and Sloman, 2000). PT is also interpreted as a trust in the source of information (Individuals or communities sharing and disseminating information) which includes the degree of expertise and credibility (Flanagin and Metzger, 2008).

PT is about taking the opinion of other colleague's confidence. While, Walker (2012) and Sherchan *et al.* (2013) argued that PT among people who involved in relief activity in ES is significant in emergency communication mainly in provided reliable information.

Ulmer *et al.* (2014), Coombs (2014) and FEMA (2014) stated PT among community in sharing and disseminating information is a factor influencing communication strategies in ES. PT is imperative to ensure that our choice of sharing and dissemination of information is trustworthy in the ES. In emergencies, it is important to ensure the media communication is functioning. Media communication like the radio communication, television, and newspaper companies must be functioning normally and efficiently.

The radio communication can be referred as ARCT. PT in communication is depends on the magnitude of the confidence peer request via communication technology such as using wireless communication or fix line communication. If peers are least confident, the peer may take the opinion of other peer. If the peer is more confident, peers who only take the opinion of the contact group considered to be more trustworthy (Haring, 2003; Nollet & Ohto, 2013).

However, PT among the ARC is very high, as they are a unique community (Hutchinson, 2000). They adopt and use ACRT as a medium to develop their unique hobby amongst the ARCs, through ARCT they share and disseminate information related to their unique hobby (Edwards, 1994; Hutchinson, 2000; Nollet & Ohto, 2013).

Sometimes they are so excited to share and disseminate information on the current situation such as an accident or a natural disaster that occurred around them (Harwit, 1984; Hutchinson, 2000; Laster, 2001). They are easy and willing to work together among their PT which often communicates through ARCT. They can easily collaborate with the organizations involved in the relief and support in disaster management during emergency situation (Acharya, 2005; Haddow, 2009; ARES, 2011; Ashriq, 2011).

Additionally, PT factor is useful in this study due to the argument of some researchers that it influences behavioural, intention and attitudes of users of technology towards use behaviour of particular technology (McAllister, 1995; Preece, 2000; Nakajima *et al*., 2007). Becerra and Gupta (2003) stated that PT factor in use of technology should be measured in terms of its attitude, behavioural and reliability in access of information which are dimensions of technology success.

Ling (2000), Reinig and Amoroso (2004), Fiona and Linda (2004), Al-Busaidi *et al.* (2010) and Wong and Boh (2010) argued that the truth and credibility of information must be from a trustworthy source. Thus the PT factor able to use in understand the BI among communities in sharing and dissemination of information through technology. PT is an important factor to understand the behavioural intentions among related community in use of technology in particular issue and would help to achieved objectives of related study, as it has been emphasized as an added value to the success of related study on the long-term use.

Fiona and Linda (2004), Bharosa and Janssen (2010) and Ranganathan (2012) argued that the factor like PT in sharing and disseminating of information among role player in supporting the stakeholders like relief agencies in emergency situation is very important because it is able to provide reliable information.With reliable information, the rescue work of the disaster victims is going smoothly and becomes more effective.

Hence the extended PT construct to the existing model is able to observe BI amongst the ARCs in using ARCT in sharing and disseminating of information between organizations, processes, problems and technologies, using systematic communication schemes such as event logs and matrices which are related to disaster response. On the other aspect, it also seeks to perceive and understanding the relationship to other factors.

The outbreak of information technology like wireless communication technologies provides a new paradigm to the process of sharing and disseminating information where PT behaviour among individual is very important to enable an accurate and real time information to be obtained (Bharosa and Janssen, 2010). This eruption refers to wireless communication technologies such as ARCT which is supreme information sharing and disseminating that has changed the rule of the world in communicating mainly during emergencies but still less exposed to communities. Here, we able to understand the extent to which behaviour such as PT factor amongst the ARCs in sharing and disseminating the information mainly in ES.

2.7.2.2 Compatibility (CB) Extended to the Model

Generally, there are also a theory that proposes that perceptions of technology characteristics, such as Compatibility (CB) factors influence the use of any technology or new product.The technology CB factor appears to have a strong influence with the area in the use of technology (Liu & Ma, 2006; Slyke, Johnson and Jiang, 2006).

Compatibility of the use of wireless communication technology among communities is a key factor that drives the development of communication technology in the course of daily life (Schaper & Pervan, 2008).Therefore, ARC's compatibility with ARCT equipment can stimulate their behaviour to continue using ARCT in their daily life.

With regard to Tan and Chou (2008) expanding perspectives in order to explore the influence of the compatibility to mobile communication technology on the off campus students and they found that mobile communication technology CB influence the off campus students BI. This suggests that CB factor need to be aligned with mobile communication technology functionalities to enhance user's behavioural intentions.

According to Schaper & Pervan (2008), CB is an important factor that influence perceived BI among users of wireless communication technology in France. In addition, Li and Yeh (2009) discuss the BI in use of 3G mobile technology and the results revealed that user BI to use 3G mobile technology is influenced by CB. Furthermore, CB is one of the important factors that influence the acceptance of m-learning technology (Wang *et al.*, 2009; Park, Nam & Cha, 2012). Therefore from another angle, CB is an important factor that influence perceived BI amongst the ARCs in using ARCT in ES in Malaysia.

The innovation of technology has been watched as new impression and practice to outline the functionality of the particular community in particular organization in line with technology compatibility towards the success of the organization in particular situation (Laster, 2001; Kotler, 2003; Slyke *et al*., 2006). Thus in this study, ARCs role has been viewed as the impact of new practices and to outline the ARCT function in supporting relief agencies in line with CB technology to the success in the rescue activity in ES.

Successful implementation of the activities in an organization can be achieved by direct practice among users in the use of a technology introduced, which is dependent on the CB of the technology among user in the organization in particular situation (DeLone & Mclean, 2003; Wu & Wang, 2005; Limayem and Cheung, 2008). Therefore the compatibility factor in using ARCT amongst ARCs is one of the important factors that influence their BI to continue using ARCT in their daily life and especially in ES.

Other than that, suitability of cost and requirements together with CB influence an innovation to be used in the organization that serve as retention factor of users to frequent use and positively influenced to behaviour in the use of particular technology in future (Wu & Wang, 2005). Moreover, studies have shown that innovation that is more compatible with values and ways of transacting productions in an organization would be chosen for behaviour of technology (DeLone & Mclean, 2003; Wu & Wang, 2005). Therefore CB aspect like suitability of ARCT cost, the suitability of equipment and other requirements can be one of influences factors that will drive the ARC BI to use ARCT to share and dissemination the information with relief agencies in ES.

However, the BI of the users towards its future usage needs to be taken into consideration (Kotler, 2003; Sang *et al*., 2009; Krieglmeyer *et al.*, 2010). Furthermore, the BI in the use of ARCT may be viewed as CB dimension of innovation to the ARC in Malaysia. Based on these arguments, CB factor has been extended to Arenas-Gitan *et al*. (2015) model.

Wu and Wang (2005), Limayem and Cheung (2008) and Hussein (2010) argued that achieving continuous usage of technology should not be limited to the factors like performance expectancy, facilitating condition and social influence, but the CB of the technology is also significant. Furthermore, previous researchers have stressed that the use of technology among users would continuously using it once they have confident that it would be CB with their routine and the way they work (Ojha *et al*., 2008; Hussein, 2010; Krieglmeyer *et al.*, 2010).

CB of wireless communication technology among communities can be seen by the diversity of sophisticated gadgets or gadgets introduced with application software that supports the requirements of users (Slyke *et al*., 2006). So, CB of ARCT amongst ARCs can be seen by the diversity of sophisticated ARCT equipment introduced with application that supports their requirement.

The diversity of the functions and CB of a tool is also seen as an important choice for the user before using it. In addition, users have the option of accessing information including sharing and sharing of wires like fixed line phones and wireless communication technology like ARCT.

Wireless communication technologies such as ARCT can give users quick access especially when emergency situations that require fast information transmission at the time of the incident. According to Ojha *et al*. (2008) Hussein (2010) and Krieglmeyer *et al*. (2010) CB in the use of wireless communication technology is seen as a catalyst for 'ubiquitous' and 'pervasive' environments where daily life is assisted by connections to digital devices to facilitate the processing of sharing and dissemination of information in an organization.

Compatibility of applications and mediums is used as a platform of information variations comprising text, audio and video are able to make sharing and dissemination of information more widely and effectively (Kotler, 2003; Sang *et al*., 2009). Therefore, compatibility of ARCT equipment is used as a platform of information variations comprising code and audio are able to make sharing and dissemination of information more widely and effectively amongst the ARCs and relief agencies in ES. With the diversity of wireless communication technology facilities such as ARCT, the aspect of compatibility and technical facilities has helped greatly in the development of information access especially in ES.

Therefore, CB is able to support in determining the contributing factors for investigating the BI in the use of ARCT amongst the ARCs in Malaysia. Particularly, ARC is an important role in sharing and dissemination of information in ES. The extend CB to the existing model is able to perceive the relationship toward BI amongst the ARCs in use the ARCT. If the ARCs exists in the ES is guaranteed that the services derived from the use of ARCT would be supportive of their effort with relief agencies, there would be more usage towards continuity in future. On the other hand, it also seeks to understand the relationship with other factors.

2.7.3 Moderator Effect

Definitely, in the background of the correlation analysis, the moderator effect is a third variable that affects the zero-order correlations of two other variables. In the more familiar analysis of variance terms, the impact basic moderator may be represented as a continuous interaction between the independent variable (IV) and dependent variable (DV) that determine the influence factors of the study sample. A moderating variable also called a moderator variable which able to change the strength or direction of an effect between two variables IV and DV. In other words, it affects the relationship between the IV or predictor variable and a DV or criterion variable. Moderating variables can be qualitative, quantitative. In addition, the demographics of the respondents such as age (AG), gender (GE) and their experience (EX) in using the technology can also be a moderating variable in determining the strength of communities behaviour toward the technology (Sherman *et al*., 2009; Zhao *et al*., 2010).

The influence of a moderating effect is categorized statistically as an interaction factor. An example of moderator effect factors such as AG and GE and EX, in other word are demographics of the respondent. While measurable is like level of experience, level of reward or individual or organization achievements in related field can be as moderator in certain field of research (Brown & Venkatesh, 2005; Kim *et al*., 2005; Sherman *et al*., 2009; Limayem *et al*., 2007 and Venkatesh *et al*., 2012).

A moderator effect, commonly denoted as just variable such as AG and GE and EX, is a third variable that affects the strength of the relationship between an independent variable (IV)and dependent variable (DV) in correlation, a moderator is a third variable that affects the correlation of two variables. A moderator is a variable (IV or DV) that affects the direction and/or asset of the relative among an independent or predictor factors and a dependent or criterion factors (Venkatesh *et al*., 2012; Hair *et al*., 2014; Mohd Sobhi, 2015). Therefore, based on the above arguments, this study decided to use AG, GE and EX as a medium to investigate the effects of moderation between IV and DV.

This fact is reinforced by Venkatesh *et al*. (2012), Teo and Noyes (2012) and Hair *et al*. (2013) which are stated that moderate variables in UTAUT-2, such as age, gender and experience are the most significant variable to investigate the moderating effect of communities BI in using the technology. Thus, the inclusions of variables like AG, GE and EX to test the moderator effect in this study is feasible because the respondents of this study are ARCs who has to use the technology such as ARCT.

2.7.4 Behavioural Intention (BI) to Use the ARCT

Behavioural Intention (BI) to use the technology in the conceptual model is significant to understand the attitudes and behaviours among particular communities for understanding the requirement to accept the particular technology (Abdulwahab &

Zulkhairi, 2012; Jambulingam, 2013; Raisamo, 2014, Bamidele, 2015 and Arenas-Gitan *et al*., 2015). Mafe, Blas & Tavera-Mesias (2010), Islam *et al*. (2013) and Arenas-Gitan *et al*. (2015) defined BI as an entity's intention to perform a given act which can predict corresponding behaviours when a specific acts voluntarily. Besides that, BI is the particular prospect of carrying out behaviour and also the source of definite practice behaviour. Thus, intentions show the motivational factors that influence behaviour and are indicators of how hard individuals are willing to try and the effort they put in to involve in behaviour.

Bauer & Grether (2005), Kuo & Yen (2009) and Blackwell *et al*. (2013) argued that using appropriate models are imperative in the determinants of BI in the use of particular technology is directly to indicate use behaviour among particular study. The particular studies which are related to determinants of BI in use of particular technology such as the trend of smartphone and its usage behaviour (Osman *et al*., 2012) and community acceptance of the Telecommunication Centre (Abdulwahab & Zulkhairi, 2012) was conducted in Malaysia. According to Yi *et al*. (2006), Venkatesh *et al*. (2012) and Ajzen & Fishbein (2012), Raisamo (2014), acceptance gives the same meaning as adoption. While, Jambulingam (2013) have undertaken PhD studies related to BI to use Mobile Technology among tertiary students also in Malaysia. Another related study that is used as a reference is Luarn & Lin (2005). Their field of study is to understand the BI to use mobile banking among community in isolated town.

The enhancement in conceptual model is to recognize the use behaviour to accept the particular technology among particular entity is significant. The Improvement and enhancement is to obtain a more accurate finding from previous studies (Bauer & Grether, 2005; Kuo & Yen, 2009 and Blackwell *et al.*, 2013). Thus, the selection of the term “BI in use of technology” is referring to BI in use of ARCT. Hence, this study makes an enhancement to use the term BI to use the ARCT amongst the ARCs and also extended new factors to the conceptual model were constructed such as PT and CB.

The conceptual model for this research can be supported by the arguments of previous researchers. As previous researchers like Yi *et al*. (2006), Venkatesh *et al*. (2012) and Ajzen & Fishbein (2012), Raisamo (2014) and Bamidele (2015) argued that BI is an indication of how strong (hard) entities are willing to try and of how much an effort they are planning to use the technology, in order to achieve the behaviour based on particular situation. It is influenced by three components. Firstly is an entity’s attitude toward performing the behaviour, secondly is the perceived (apparent) community pressure, entitled as subjective norm and thirdly is perceived behavioural control the description of each element is as follows.

i. Attitude - The first determinant of BI. It is the degree to which the person has a favourable or unfavourable evaluation of the behaviour in question based on specific situation in use of technology.

ii. Subjective Norm - It is considered the second predictors of BI to use behaviour the related technology. This is the influence of social pressure that is perceived by the individual (normative beliefs) to perform or not perform a certain behaviour based on particular situation. This is weighted by the individual’s motivation to comply with those perceived expectations (motivation to observe).

iii. Perceived Behavioural Control - Remains the third pre-existing of BI. This construct is defined as the individual’s belief concerning how easy or difficult performing the behaviour will be. It often reflects actual behavioural control based on specific situation in use of related technology.

Abdulwahab and Zulkhairi (2012), Raisamo (2014) and Bamidele (2015) argued that the UTAUT-2 constructed by Venkatesh *et al*. (2012) can be accepted to determine the extent of the BI in use of related technology among related entities only. There are considered to be able to show and use behaviour of that technology has been adopted by the entities concerned. The statement has been supported by previous researchers like Luarn & Lin (2005), Yi *et al*. (2006), Kuo & Yen (2009), Ajzen & Fishbein (2012), Fadare *et al*. (2013) and Arenas-Gitan *et al*. (2015), whereas the factors that influence have been identified in determining BI is directly reflect their use behaviour of related technologies. Acording to Chan & Lu (2004) and Blackwell *et al*. (2013) the factors that influence have been identified in determining BI is directly to express positive relationship in use behaviour in the acceptance of the related technology among the particular entity in related situation.

2.7.5 The Classification of Measurement

A summary about classification of measurement from related model is based on past studies and source of reference as specified in Table 2.3. Classification of measurement is to facilitate and perceive the relationship between Independent Variable (IV) and Dependent Variable (DV) of the study. IV is the variable that is changed or controlled in a scientific experiment to test the effects on the DV. While DV is the variable being tested and measured in the study. The DV is 'dependent' on the IV. As the experimenter changes the IV, the effect on the DV can be observed.

Table 2.3

Classification of Measurement

Measurement	Factors	Reference
Independent Variable (IV)	PE EE SI FC	Davis, 1989; Venkatesh *et al.* ,2003; Wu, Tao & Yang, 2007; Akour, 2009; Sun, Cao & You, 2010; Yeoh & Chan, 2011; Teo & Noyes, 2012; Kit, 2014; Venkatesh *et al.*, 2012 and Arenas-Gitan *et al.*, 2015.
	HB HM PV	Munnukka, 2004; Prata, Kuo & Yen, 2009; Venkatesh *et al.*, 2012; Moraes & Quaresma, 2012; Suki *et al.* , 2012; Chong, 2013 and Arenas-Gitan *et al.* , 2015.
	PT	Ling, 2000; Reinig & Amoroso, 2004; Fiona & Linda, 2004; Al-Busaidi *et al.*, 2010 and Bharosa & Janssen, 2010.
	CB	Moore & Benbasat 1991; Peng & Tsou, 2003; DeLone & Mclean, 2003; Wu & Wang, 2005; Slyke *et al.*, 2008 Tan & Chou, 2008; Kuo & Yen, 2009 and Bhatt *et al.*, 2010.
Dependent Variable (DV)	BI	Venkatesh *et al.* ,2003; Liang, *et al.* ,2007; Ramayah *et al.* ,2010; Venkatesh *et al.* ,2010; Osman *et al.*, 2012;Kit, 2014 and Arenas-Gitan *et al.* , 2015.
Moderator	AG GE EX	Venkatesh *et al.*, 2012; Osman *et al.* , 2012; Kang & Hong , 2013; Slade *et al.* ,2013; Kit, 2014 and Arenas-Gitan *et al.* , 2015.

Based on this study, the influence factors that have been identified extended and believed to be able to determine to the extent of the BI in use of ARCT amongst the ARCs in ES in Malaysia. The IV's are variables performed to investigate the DV. The DV is represented by the BI to use the ARCT amongst the ARCs in ES, which is considered as ARC acceptance toward ARCT. The influence of the IV directly causes a change in the DV. The effect on the DV is measured and recorded will detailed explained during data analysis in chapter four.

2.8 Conceptual Research Model

A conceptual research model is a demonstration of the research structure, made of composition concept used to support researcher to know and understand, or simulate a model that represents the subject. Some models are physical objects; for example, the engine model that can be installed, and can be made to work like object it represented (Allen & Hauptman, 1987; Bharadwaj & Fahy, 1993; Agarwal & Prasad, 1998).

Indeed, this study uses conceptual research model and to extend innovative information features with model constructed by Venkatesh *et al*. (2012) and Arenas-Gitan *et al*. (2015). Each construct in the conceptual model is to determine the BI amongst the ARCs in the use of ARCT in ES. It is credible that the present study would be considered among the pioneer studies which are related to ARCT in this area in Malaysia. Combination of several technology acceptance models and theories has been applied to diverse condition and different cultural settings in many studies, yielding different results. Reliability with the specific constructs to the related conceptual model can be referred and adapted from the corresponding model from past researchers to construct the hypotheses and new conceptual research model (Yeoh & Chan, 2011; Teo & Noyes, 2012; Venkatesh *et al*., 2012). Therefore, Table 2.4 is a source reference for each factor and overview describes the operational definition adapted to construct the hypothesis and used in the conceptual model of this study.

Table 2.4
Overview of Operational Definitions

Construct	References	Operational Definitions were modified and to use in this study
EE	Wu, Tao & Yang, 2007; Sun, Cao &You, 2010; Venkatesh *et al*., 2012.	The extent of ease associated with the use of ARCT amongst the ARCs in sharing and dissemination of information in ES.
FC	Wu, Tao & Yang, 2007; Yeoh & Chan, 2011; Teo & Noyes, 2012.	The extent to which an ARC believes that organizational and technical infrastructure exists to support use of the ARCT in sharing and dissemination of information in ES.
PE	Venkatesh *et al*., 2012; Kit, 2014; Sun, Cao & You, 2010.	The extent to which the ARC expects that using the ARCT in sharing and dissemination of information in ES will help them to gains important information.
SI	Akour, 2009; Venkatesh *et al*., 2012; Kit, 2014.	The extent of community to perceive and to think that ARC should use ARCT in sharing and dissemination of information in ES.
HB	Venkatesh *et al*., 2012; Suki *et al*., 2012; Arenas-Gitan *et al*., 2015.	The extent of routine behaviour amongst the ARCs that is repeated regularly and tends to occur subconsciously to use ARCT in sharing and dissemination of information in ES.
HM	Kuo & Yen, 2009; 2012; Venkatesh *et al*., 2012; Arenas-Gitan *et al*., 2015.	The extent of excitement amongst the ARCs to use ARCT in sharing and dissemination of information in ES.
PV	Munnukka, 2004; Prata, Moraes & Quaresma, 2012; Venkatesh *et al*., 2012; Chong, 2013.	The cost and pricing structures may have a significant impact on ARC to have ARCT equipment and to use it.

Table 2.4 *Continued*

PT	Reinig & Amoroso, 2004; Fiona & Linda, 2004; Al-Busaidi *et al*., 2010 and Bharosa & Janssen, 2010.	The extent of reliability amongst the ARCs to use ARCT in sharing and dissemination of information in ES.
CB	Moore & Benbasat 1991; Peng & Tsou, 2003; DeLone & Mclean, 2003; Wu & Wang, 2005; Slyke *et al*., 2008 Tan & Chou, 2008;	The extent of compatibility amongst the ARCs to use ARCT in sharing and dissemination of information in ES

	Kuo & Yen, 2009 and Bhatt *et al*., 2010.	
BI	Venkatesh *et al*. ,2003; Liang, *et al*. ,2007; Ramayah *et al*. ,2010; Venkatesh *et al*. ,2010; Osman *et al*., 2012;Kit, 2014 and Arenas-Gitan *et al*. , 2015.	Consequently able to describe the ARC extent of intent to continue using ARCT in ES.

Based on previous literature review, the model which is constructed by Venkatesh *et al*. (2012) as in Figure 2.3 and model by Arenas-Gitan *et al*. (2015) like in Figure 2.4 was modified and used with extended two new factors for this study is show in the conceptual model and hypothesis in Figure 2.5.

Venkatesh et al., (2012), Abdelghaffar and Galal (2012) and Kit (2014) stated an extended moderated effect such as AG, GE and EX can determine the strength and direction factor of specific research which is related to implement precise technology. Hence variables such as AG, GE and EX are retained to the conceptual model as shown in Figure 2.5.

The conceptual research model includes hypotheses linked is to investigate the salient factors toward the BI amongst ARC to use the ARCT in sharing and disseminating of information in ES to support relief agencies in Malaysia.

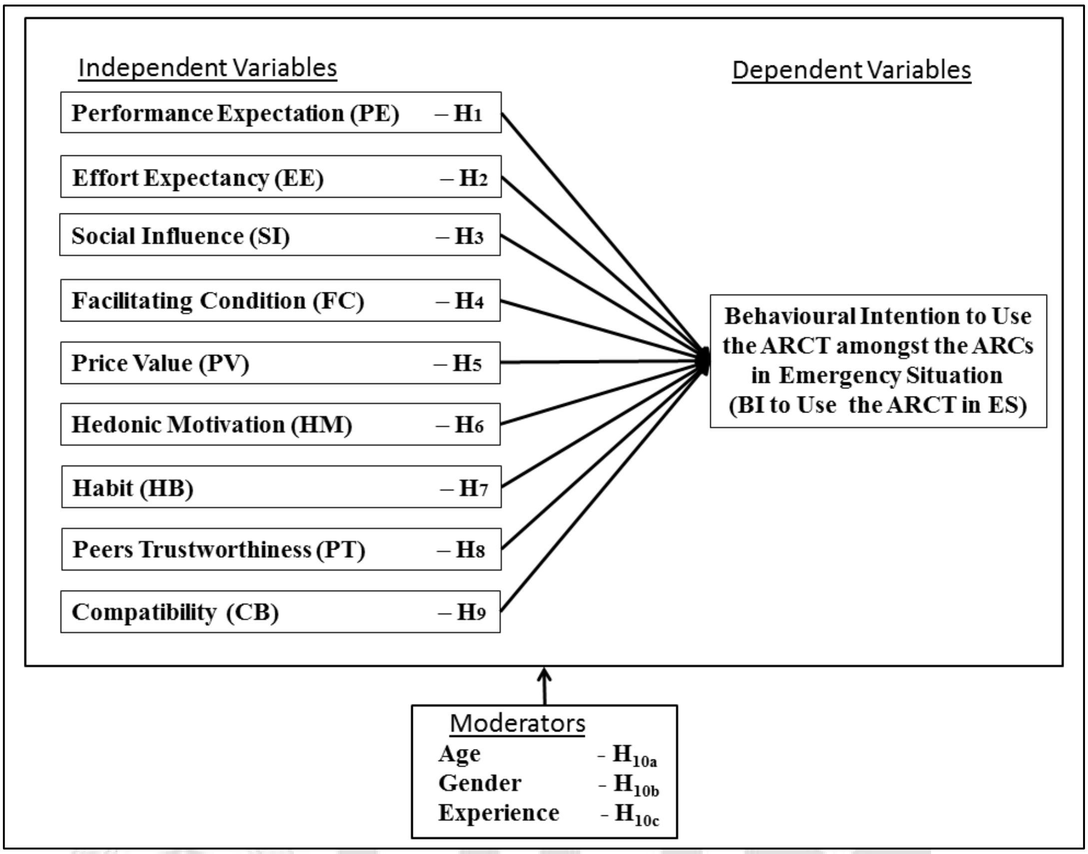


Figure 2.5. Conceptual Research Model and Hypothesis

Indeed, a previous studies that have investigated the contributing factors in use of technology by taking predictors of related model into consideration on the use of technology among the community in the related areas (Martinelli*et al*., 2005; Eriksson & Nilsson, 2007; Cheng, 2010; Chen *et al*., 2011; Ham *et al*., 2012; Osman *et al*., 2012; Kit, 2014).

The factors which are extended to the conceptual model such as PT and CB are represent the independent research streams from related models that have been discussed previously in this chapter. Furthermore, this study is to provide information and empirical data to stakeholders which are related organization in ICT by developing and validating an instrument for collecting data towards continuous use of ARCT amongst the ARCs in sharing and disseminating of information in ES. This is consistent with the arguments of David (1986), Straub *et al*. (2004) and Phillips *et al*. (2011) that it is significant to develop and validate an instrument in cases where the theory developed with the influences factors in specific research.

2.8.1 The Hypothesis of Study

According to Sekaran (2003), the hypothesis is utilized to explain the nature of variable relationships, to establish the differences between groups or to establish the independence of more factors in a study. Several testable statements, or hypotheses, can be drawn from the theoretical model.

Benbassat and Barker (2007), Venkatesh *et al*. (2007) and Arenas-Gitan *et al*. (2015) argued that, to determine and to understand community BI in use of certain technology is one of the most mature paths of information systems research. While, Venkatesh *et al*. (2012) argued that UTAUT-2 by identifying extended key factor and relationships to be integrated into UTAUT-1, thus connecting it to a user used context will indicate and to support the researcher to construct the accurate hypothesis.

An Overview of operational definitions from corresponding models by past researchers and detail discussion regarding the classification to formulate the hypothesis is in Table 2.4. Based on the conceptual research model, the research hypotheses formulated as illustrated in Figure 2.5. Ten research hypotheses formulated in Table 2.5.

Table 2.5

The Hypothesis of Study

H_x	Hypothesis
H_1	PE positively influences the BI in the use of ARCT amongst the ARCs in ES.
H_2	EE positively influences the BI in the use of ARCT amongst the ARCs in ES.
H_3	SI positively influences the BI in the use of ARCT amongst the ARCs in ES.
H_4	FC positively influences the BI in the use of ARCT amongst the ARCs in ES.
H_5	PV positively influences the BI in the use of ARCT amongst the ARCs in ES.
H_6	HM positively influences the BI in the use of ARCT amongst the ARCs in ES.
H_7	HB positively influences the BI in the use of ARCT amongst the ARCs in ES.
H_8	PT positively influences the BI in the use of ARCT amongst the ARCs in ES.
H_9	CB positively influences the BI in the use of ARCT amongst the ARCs in ES.
H_{10a}	AG is a moderating effect between IV and DV in the use of ARCT amongst the ARCs in ES.
H_{10b}	GE is a moderating effect between IV and DV in the use of ARCT amongst the ARCs in ES.
H_{10c}	EX is a moderating effect between IV and DV in the use of ARCT amongst the ARCs in ES.

Linked of each hypothesis is based on the adaptation and reference from past studies and guidance from experts and discussion with the supervisor of the study as shown in Figure 2.5. The conceptual research model and hypothesis were implemented comprehensively in this study. Partial Least Squares Structural Equation Modelling (PLS-SEM) was used to validate and verified the conceptual research model and hypothesis. Ringle *et al*. (2012) and Hair *et al*. (2013) stated an appropriate model implemented to determine the level of acceptance of certain technologies among certain respondents in a specific study can be analyzed by using PLS-SEM. As a conclusion, the hypothesis was tested using Structural Equation Modelling (SEM) with the support of software Partial Least Square (PLS) or known as the PLS-SEM.

PLS-SEM is path modelling and is primarily used to develop theories in exploratory research (Mohd Sobhi, 2015). It does this by focusing on explaining the variance in the dependent variable when to test the conceptual model. It also to check the validity of new model that are developed by research through related indicators during conducted the study (Monecke & Leisch, 2012 and Hair *et al*., 2013). More detail regarding PLS-SEM will be described detail in Chapter Three.

2.8.2 Operationalization of Hypotheses

The operations of hypotheses defined as variables present the useful terms to describe the relationship between the variables that were used in this study. Therefore, this study performed and used ten hypotheses in the conceptual model in contributing and influencing for the use of ARCT amongst the ARCs in ES in Malaysia. The link of the hypothesis is shown in Figure 2.5. The overview of operational definitions that are used in this study is shown in Table 2.4. This table explains in detail regarding a source reference for each factor and overview describes the definition adapted to construct the hypothesis and used in the conceptual model of this study.

Meanwhile, the BI is defined as the frequent behaviour and desire in use of certain technologies among certain communities in a specific situation (Benbassat & Barker, 2007; Martin *et al*., 2014 & Arenas-Gitan *et al*., 2015). According to Im *et al*. (2011), Yu (2012), Martins *et al*. (2014) and Chen & Chan (2014), previous studies are essential in supporting the idea that BI clarifies use behaviour in using the specific technology. Thus in this study, the technology refers to ARCT, certain community state to ARCs and the specific situation is an indication to ES. Indeed, H_8 and H_9 are new factors that extend to the model.

2.8.2.1 Performance Expectancy (PE) and Behavioural Intention (BI)

The current study postulated that PE would positively influence the BI to Use of ARCT amongst ARCs. Previous research that demonstrated the significant relationships between PE to the BI appears to corroborate this postulation (Ramayah *et al*., 2010; Al-Busaidi, 2012).

The PE toward technology as a variety of IS is one of the key measures of success to ensure its sustained use amongst users (Al-Busaidi, 2012). Numerous researches focused on the connection between PE and BI had results that indicate both significant relationships (Al-Busaidi; 2012; Al Qeisi *et al*, 2014; Arenas-Gitan *et al*., 2015) and only Halawi *et al*., (2008) found insignificant relationships between PE and BI.

Many published works have described the correlation between PE and BI. Within the IS literature, a diverse level of support for this relationship was found at the individual level of analysis. A few research concluded that PE is not connected to BI (Agarwal & Prasad, 1997; Ramayah *et al*., 2010; Kit, 2014), but others found a positive relationship between these two IS success dimensions (Ramayah et al., 2010; Teo *et al*., 2012; Arenas-Gitan *et al*., 2015). Meanwhile, Teo and Noyes (2012) further added that BI should have been directly impacted by PE although there may be various levels of density in the relationship across disparate IS atmosphere in specific a situation. From these findings, it is assumed that the characteristics of the ARCT, which are readily available, easy to use and convenient to use, would lead to higher BI to use amongst ARCs. This will then give the ARCs reason to keep on using the ARCT in ES to support relief agencies when disaster hit. Hence, the H_1 is constructed and accepted for this study.

2.8.2.2 Effort Expectancy (EE) and Behavioural Intention (BI)

In accordance, EE is a positive predictor of BI to Use ATMs with fingerprint authentication in the financial institution. The researchers made recommendations that the financial institution should sensitize users about the benefits of fingerprint biometrics authentication for auto teller machine, should ensure they implement systems that are secure, easy to use and reliable in the present situation (Catherine *et al.*, 2018). Studies establishing the importance of EE in enhancing technology acceptance exist (Venkatesh et al., 2012). However, there is no specific research done to identify the use of ARCT amongst ARCs. Most of previous study investigated users' acceptance of mobile communication technology, internet technology, and fix line technology (Teo & Noyes, 2012; Kit, 2014; Arenas-Gitan *et al.*, 2015) but previous studies seem to overlook the use of ARCT amongst ARCs.

Venkatesh *et al.*, (2003) define EE as the level of easiness related while using any system. This means that EE refers to the effort needed to use the system, whether it is simple or complicated. User-friendly technology could be easily accepted and adopted by users. Most users prefer technology that provides flexibility, usefulness, and ease of use.

In the present context, EE refers to the perception of ease using ARCT amongst ARCs. EE probably is a positive significant factor influencing BI amongst ARcs to use ARCT in ES to support relief agencies when disaster struck. This is basically a knowledge that this study intends to identify the strengths of the relationship between EE and BI amongst ARCs. Thus in this study, the H_2 is constructed and accepted to use.

2.8.2.3 Social Influence (SI) and Behavioural Intention (BI)

Diaz and Loraas (2010) and Keong, et al. (2012) argued that SI is the extent to which one perceives that the community around believes that the technology he or she uses is vital in certain situations.

The importance of understanding the role of SI, how others affect user emotions, opinions, or behaviours, in consumption has a long and varied history in the fields of technology, sociology, psychology and marketing. As a topic area, SI is incredibly broad, covering everything from mere presence effects and mimicry to more direct forms of social persuasion often seen in consumption contexts such as technology used by most researchers (Dahl, 2013).

On the other hand, SI states to the lifestyles of people to change their attitudes or behaviour of others. Typically SI results from a specific action in specific situation, command, or request, but people also develop their attitudes and behaviours in response to what they perceive others might do or think (Schepers & Wetzels, 2007; Arenas-Gitan *et al*., 2015).

Accordingly, past studies have positively supported the relationship of SI and BI, including those conducted by prominent researchers like Schepers and Wetzels (2007), Venkatesh *et al.* (2012) and Arenas-Gitan *et al*. (2015). Based on these findings, the current study also expected similar outcomes. In the present context, H_3 is accepted to be used as an approach to identify the strengths of the relationship between SI and BI amongst ARCs used the ARCT in ES of this study.

2.8.2.4 Facilitating Conditions (FC) and Behavioural Intention (BI)

FC is defined as the degree to which an individual perceives that organizational and technical infrastructure exists to support the use of the technology amongst individuals (Venkatesh *et al*., 2003). Keong *et al*. (2012) argued that there is a positive relationship between FC and BI to use and adapt the technology with a properly managed infrastructure. In the context of this study, it referred to the objective factors like infrastructures, support structure by the government and resources that influence BI to use ARCT amongst ARCs in ES to support relief agencies in ES.

Catherine *et al*. (2018) claiming that FC on BI to use, which helped to understand the users, continue to use auto teller machine with fingerprint authentication in the financial institution bring positive influence on various financial transactions.

Comparative with this study, the assumption that ARCs is continuous users of ARCT based on the discussion in the earlier section. The positive initial use of ARCT amongst ARCs is a prediction of a BI to keep on using it in ES to support relief agencies. Thus, H_4 is accepted to use in this study.

2.8.2.5 PriceValue (PV) and Behavioural Intention (BI)

In UTAUT-2, PV was defined as user cognitive trade-off between the perceived benefits of the applications and the monetary cost for using them (Venkatesh *et al*., 2012). Accordance to the positive PV of mobile communication technology will lead the BI amongst user continue to use this technology in the current situation (Teo *et al*., 2012; Kit, 2014; Arenas-Gitan *et al*., 2015). In other words, if the users believed that mobile communication technology is beneficial for them, they would intend to use it again in the future.

The PV in the current study is measured based on cost-saving and personal valuation. Consequently, the assumption of the current study is that the ARCs would intend to use ARCT if these aspects are positive to them. Several empirical studies have also shown support for the relationship between PV and BI (Venkatesh *et al*., 2012; Zheng *et al*., 2013; Kit, 2014). Therefore, based on this argument, this study puts forward the H_5 to identify to what extent PV influences the BI among ARCs to use the ARCT in ES.

2.8.2.6 Hedonic Motivation (HM) and Behavioural Intention (BI)

The HM refers to the influence of a person's pleasure or enjoyment on their readiness to move towards the intended goal. Somebody is spending for luxury purposes, which are desirable objects that allow the user to feel pleasure, fun, and enjoyment from having and to use a particular product (Ryan & Deci, 2000).

Yang (2010) found that HM, is significant determinants of users BI to use mobile shopping services and that the entertainment aspect of mobile shopping services is the most vital driver of users BI to continue used mobile shopping services. Accordance with this study, HM, is significant determinants of ARCs like to use ARCT in daily life and a vital driver of ARCs BI to continue used ARCT in ES to support relief agencies when disaster occurrence.

Hedonic motivation is about a person's desire to have the pleasure of having something and enjoy using it in everyday life. An example like a person's desire to have the fun of having a sports car like Ferrari and enjoy using it in everyday life (Magni *et al*. ,2010; Huang & Kao, 2015). Meanwhile, ARCs enjoy using ARCT in their daily life and are a driving factor in their BI to continue using it to support relief agencies in ES.

The postulation that ARCs is continuous users of ARCT based on this discussion, the positive initial use of ARCT amongst ARCs is a prediction of a higher BI to keep on using it in ES to support relief agencies. Accordingly, H_6 is recognized and appropriate to identify to what extent PV influences the BI among ARCs to use the ARCT in ES.

2.8.2.7 Habit (HB) and Behavioural Intention (BI)

The initial habit and BI to use specific technology in a specific situation may differ under different situations. Most of the past researchers described that habit is a result of good experience in the frequent use of specific technology in a specific situation. Thus, there will be a higher BI to use specific technology again and again due to frequent use as a user habit (Venkatesh *et al*., 2012; Zheng *et al*., 2013; Kit, 2014).

This postulation was made based on two major studies. Agarwal and Prasad (1997) carried out an empirical investigation regarding an individual's perceptions on the attributes of the facility portal, as explanatory and predictive variables for acceptable behaviour. The finding shows that the HB factor influences user BI to continue to use the portal in future.

Kit (2014) stated that their study related to the pre- and post-adoption of mobile communication technology found that different factors are influencing potential and continuous users due to their habit frequent use mobile technology in their daily life. Potential users' BI is only determined by normative pressure, while continuous users' towards mobile technology is determined by frequent use, which is their habit since the first use of mobile technology. Comparatively, the current study (post-adoption) makes the postulation that ARCs are continuous users based on the discussion in the previous section. The positive use of ARCT in ES is a prediction of a higher BI amongst ARCs to keep on using it. Hence, the basis for the current study proposal of the H_7 is accepted to use in this study to identify to what extent PV influences the BI among ARCs to use the ARCT in ES.

2.8.2.8 Peer trustworthiness (PT) and Behavioural Intention (BI)

PT is about trust in honesty among the communities in a particular situation like a peaceful situation or crowded situation or existed in a state of the emergency situation. It meant something truth information or services that are trusted among individuals and also interpreted as a trust in the source of information similar to an Individuals or communities sharing and disseminating information which includes the credibility and reliability among them. In other words, it is about the reliability of information is thoroughly related to the trustworthiness of the informant's resources (Grandison and Sloman, 2000; Flanagin and Metzger, 2008).

PT is about concerning the colleague confidence in sharing and dissemination of information is trustworthy in any situation (Ling, 2000), Nakajima *et al*.(2007), Walker (2012), Kay Craigie (2011) and Sherchan et al. (2013) argued that PT among people who involved in relief activity in ES is significant in provided reliable information to the stakeholders to evacuate the victim to a safe place from the disaster area. Previous studies have positively supported the relationship of PT and BI, as well as those conducted by prominent researchers like (Ling, 2000; Nakajima *et al*., 2007; Fetchenhauer & Dunning, 2009;Al-Busaidi *et al*., 2010; Kay Craigie, 2011; Walker, 2012).

Accordingly, the present study also expected similar outcomes with the past study. The positive use of ARCT amongst ARCs is a prediction of a higher BI to keep on using it in ES to support relief agencies. In the present context, H_8 is accepted to be used as an approach to identify the strengths of the relationship between SI and BI amongst ARCs used the ARCT in ES of this study.

2.8.2.9 Compatibility (CB) and Behavioural Intention (BI)

Compatibility is the capacity for two things or more than two things to work together without having to be altered to do so. For example, compatible software applications use the same data formats, if word processor applications are compatible, the user should be able to open their document files in either product. On the other hand, compatibility also can refer to interoperability between any two things like users and technology. Most researchers argued that users who are compatible with the initial use should trigger their BI for future usage of the particular system in a casual sense (Tan & Chou, 2008; Zheng *et al.*, 2013).

Hence, the current study postulates that ARCs who are pleased and compatible with the ARCT in their daily life would be motivated to keep using it. Slyke, *et al.* (2006) and Tan and Chou (2008) supported a similar assumption and suggested that compatibility aspect with the technology will lead someone to carry on using it due to the positive experience and they will be positively reinforced in attitude towards the technology used. The relationship between CB and BI has also been positively demonstrated by several empirical studies (Slyke, et al., 2006; Halawi *et al.,* 2008; Tan & Chou, 2008). Thus, based on these arguments, this study stated the H_9 is accepted to use to identify to what extent CB influences the BI among ARCs to use the ARCT in ES.

2.8.2.10 Age (AG), Gender (GE) and Experience (EX)

Venkatesh et al. (2012), Teo and Noyes (2012) and Arenas-Gitan et al. (2015) stated that variables like age (AG), gender (GE) and experience (EX) are the moderator effect to determine the strength of the relationship between IV and DV. Moreover Tan and Chou (2008), Zheng *et al.,* (2013) and Keong *et al*. (2012) argued that the effect of a moderating variable is characterised statistically as an interaction that affects the direction or strength of the relationship between IV and DV have a negative and positive impact.

Based on previous research, numerous empirical studies use AG, GE and EX as a moderating effect to determine the strength or direction of the relationship between IV and DV. Therefore, based on this argument, the current study puts forward the following H_{10} are represented by three sub-hypotheses is to clarify the moderating effects proposed such as H_{10a}, H_{10}b and H_{10c} like in Figure 2.5

Moderation effects can be modelled by using product term in the regression equation by using PLS-SEM (Blunch, 2008; Hair *et al.*, 2013; and Ringle, *et al.*, 2014). Explanation regarding the use of moderation effects to the conceptual model has been described well in sub-section 2.7.3.

2.9 Summary

This chapter illustrated the literature review of the study. An explanation regarding the theoretical model has been described comprehensively. In the present context, ten hypotheses tested by using PLS-SEM in the study are successful, Thorough discussion of these hypotheses are discussed in the upcoming section 5.1 in Chapter Five. As a part of the research, these studies validate the importance in the use of technology like ARCT amongst ARCs and hopefully inspire subsequent research questions and ideas in this exciting area of investigation.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter will elaborate on the research process phase of the study. The research concept and dimensions are discussed in the chapter too. Data collection and data analysis method approach are the main aspects highlighted in this chapter. Data analysis will be carried out by using Statistical Package for Social Science (SPSS) version 20 and Partial Least Squares Structural Equation Modelling (PLS-SEM) version 3.0 discussed in this chapter.

3.1 Research Approach

If the study involves a large population, a quantitative study is more appropriate and effective because it facilitates the researchers, not time-consuming and do not require more costs (Sekaran, 2003), Wu *et al*., 2007; Kothari, 2009). Quantitative research put more emphasis on the measurement objectives of social phenomena that can be focused on a large population on issues of problems observed. While, qualitative research only emphasizes on aspects of understanding of issues ranging from problems observed in limited scales (Cohen & Morrison, 2007; Herman, Gideon & David, 2008).

Quantitative research involves a greater number of subjects, and enhancing the generalization of the results. Generally, quantitative research is designed to provide summaries of data that support overviews about the phenomenon under study (Bauer & Gaskell, 2000; Burns & Grove, 2003). In line with the above opinions, this study uses a quantitative research in providing a comprehensive overview to determine influence factors such as salient factors and factor relationships towards the BI amongst the ARCs in using the ARCT in sharing and disseminating the information to support relief agencies in ES in Malaysia.

3.1.1 Quantitative Research

According to Bauer and Gaskell (2000) and Burns and Grove (2003), quantitative research is the systematic empirical investigation of observable phenomena through statistical, mathematical, or computational techniques. The objective of quantitative research is to develop and employ models, theories, and hypotheses concerning phenomena. The process of measurement is significant to quantitative research because it provides the fundamental relationship amongst empirical observation and mathematical expression of quantitative relationships.

Jelke (2009) and Sekaran (2000) stated the study uses a survey method for gathering data due to its ability to produce useful facts and statistics respond to the research instrument and serve as a research approach to collect, explore and give detail description of an existing phenomena. Meanwhile, Garson (2002) argued that the survey is a method of gathering efficient data from respondents that represents a broad population by using specific instruments that composed of closed or open-ended items.

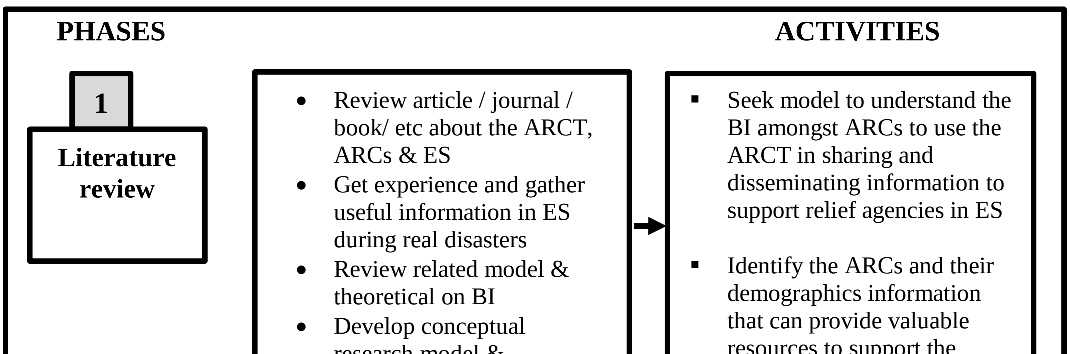
According to Pricillia (2005), quantitative research focuses on gathering numerical data and generalizing it across groups of people or to explain a particular phenomenon. The objective in conducting quantitative research is to determine the relationship between one thing (IV) and another (DV) in a specific population.

Quantitative research designs are either descriptive (subjects usually measured once) or experimental (subjects measured before and after a treatment). A descriptive study establishes only associations between variables; an experimental study establishes causality. Quantitative research deals in numbers, logic, and an objective stance. Quantitative research focuses on numeric and unchanging data and detailed, convergent reasoning rather than divergent reasoning (i.e., the generation of a variety of ideas about a research problem in a spontaneous, free-flowing manner) (Sekaran, 2000; Pricillia; 2005; Jelke, 2009).

Thus the descriptive study is suitable here as the researchers carries out statistical surveys with a view towards compiling data about the population being studied, and such inferences depend strongly on the survey questions used. Descriptive study design is based on surveys conducted through questionnaire about community opinion, public surveys, market-research surveys, government surveys and censuses. These are all examples of quantitative research that use survey methodology to answer questions about a population (Herman, Gideon & David, 2008). Therefore, a research design for this study is a descriptive study through survey methodology.

3.2 Research Process

According to Sekaran and Roger (2011), the research process is the number of stages that signify the real actions in the research. The research process framework is as follows. The research design will be more organized with planned research process.



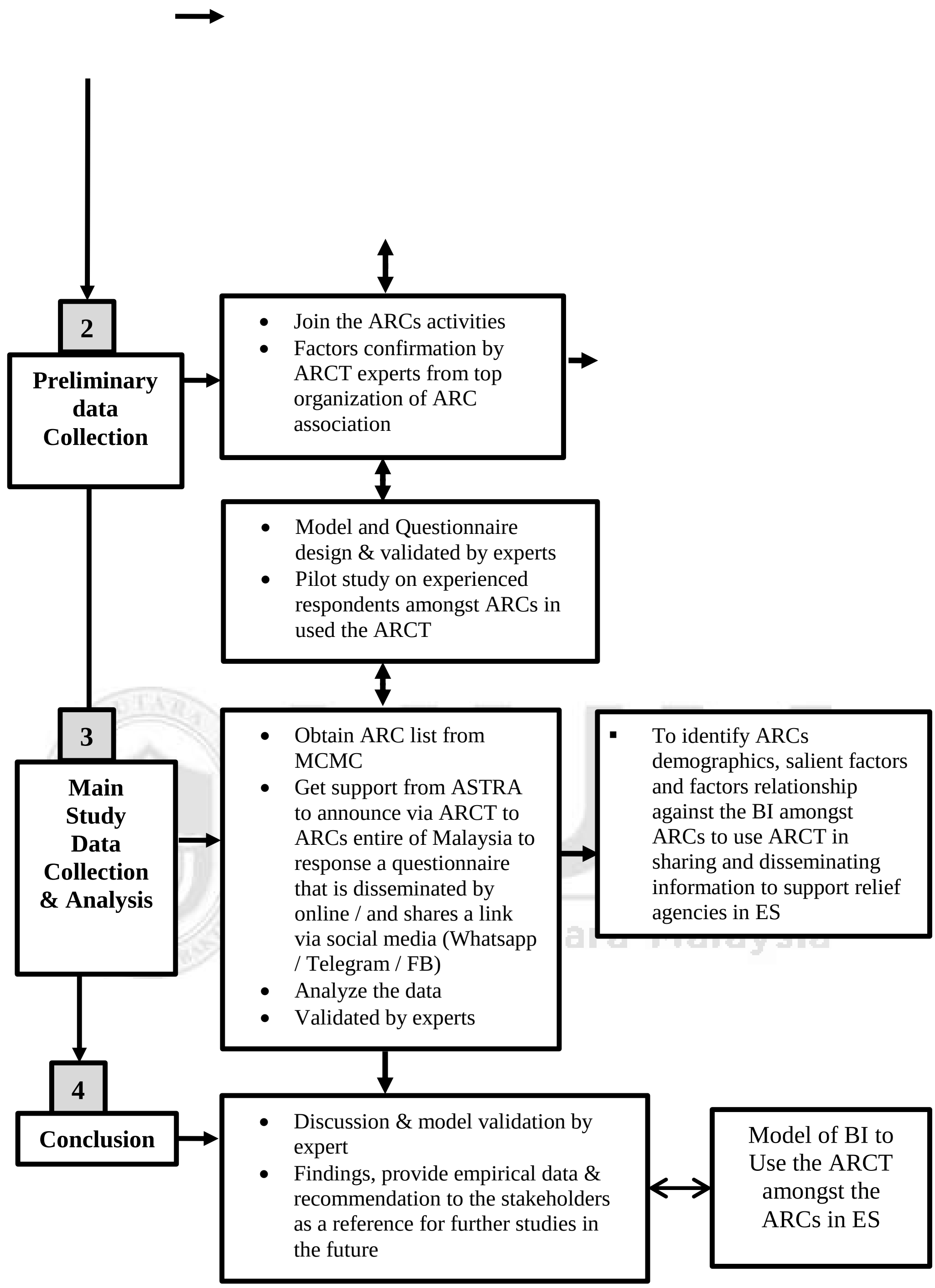


Figure 3.1. Research Process

A research process is a direction to researcher thoughts and efforts while conducting the study. This process enables researchers to conduct research systematically and on schedule to produce a quality output of the study. So it requires a systematic review to design good research process (Herman, Gideon & David, 2008; Sekaran & Roger, 2011). Research process on schedule is able to produce quality results of the study (Hair et al., 2013). Thus, Figure 3.1 is to show the overview research process of this study and generally, has four phases.

3.2.1 Phase One

The first phase is about the literature review of related articles, journal, book, magazine etc and the observation use of ARCT amongst the ARCs in sharing and disseminating information to support relief agencies in ES. Besides that, the researcher also gathered the information from MCMC, NSC, ASTRA, JKM, JPAM and related agencies which are the authorities in emergency communication and manage ES. The researcher also visits disaster area to know the real ES and involved with local ARC in supporting relief agencies in Kelantan during the huge flood (December 2014). This tragedy has provided the inspiration and motivation to the researcher to conduct the study in understanding the behaviour of the ARC in using ARCT to support relief agencies in ES.

The purpose of this phase is to gather relevant information and useful facts for this study. In this phase, a theoretical model will be developed based on the related models and theories of BI to use the technology and the development of a conceptual research model and hypothesis of the study.

3.2.2 Phase Two

The researcher has observed from experience in ES such as flood situations, and the people who put their lives and time aside to support the government. Thus, in this phase, the researcher decided to join the ARCs association and became a registered and qualified ARCT practitioner to gain an experience and to understand the BI amongst the ARCs in use the ARCT. Thus from the personal interest in trying to solve the problems impacted from the disaster such as ES during floods, the researcher can get formal and informal experience when joining the activities with the ARCs (refer to Appendix H and I).

In order to conduct better research and to gain experience in the related field, the researcher joined ARCs through The Malay Amateur Radio Society of Northern Peninsular Malaysia (ASTRA) and automatically became a volunteer of Jabatan Kebajikan Masyarakat Perlis (JKM) and have collaborated with Majlis Keselamatan Negara (MKN). This was the first stage as explained in Figure 3.1 in getting related information about the behaviour of ARCs in their daily life in use the ARCT.

Researcher finds their relationship and behaviour unique. The uniqueness is that they are approachable, passionate, compatible and friendly. Even the first time meet, especially if an individual has ARCT callsign and shows interest to use ARCT. Therefore, this was the one reason that encouraged the researcher's interest to carry out the study.

Hence, the researcher really wanted to understand their BI to use the ARCT in sharing and disseminating information to support relief agencies in ES when disasters strike. The researcher seeks to understand the factors that influence their BI and develop their demographic profile. Along with ASTRA community, the researcher gained a lot of experiences in the seminar, conference and forum which are related to ARC and ARCT. Furthermore, the researcher engaged actively and was involved in the ARCT technical workshop. It is important to explore the knowledge regarding the ARCT and to understand the unique behaviour of the ARC. A casual discussion with related stakeholders in ARCT is already done; it is very significant to ensure this research working smoothly and to get accurate information.

3.2.2.1 Factors Confirmation by Expert

During the preliminary stage of the study, factors confirmation by ARCT experts from top management of several the ARCT association is carried out. Reliability of factors is important are validated by experts during this phase (refer to Appendix E). In this phase, conceptual model is also developed with the hypotheses and then followed by the questionnaire. Reliability of the questionnaire instrument is important and verified by academic experts before conducted the pilot study (refer to Appendix F).

3.2.2.2 Pilot Study of Experienced Respondents

Furthermore, a pilot study by experienced respondent amongst the ARCs in using the ARCT is able to check instrument reliability and validated by experts has been implemented. Thirty experienced respondents amongst the ARCs have been selected to answer the questionnaire in this phase.Whereas, this phase is to clarify the main study to perform quantitative research that involved developing and validating the instrument by experts, implement pilot study and reliability and validity tests and lastly disseminating questionnaire to respondent as stated in scope and limitation. In this phase, conceptual research model and hypothesis was developed and ready to be analyzed.

3.2.3 Phase Three

The next phase is the main study data collection and data analysis. During this phase, the researcher obtained support from ASTRA to announce via ARCT to ARC entire of Malaysia to answer the questionnaire that is disseminated through online and shares a link via email and social media (WhatsApp/ Telegram/ Facebook). The conceptual research model was used to analyze and investigate the influence factors, salient factors and factors relationship regarding the BI amongst the ARCs to use ARCT in sharing and disseminating information to support relief agencies in ES. Chapter Four described in detailed about data analysis and validation by experts in the specific field.

3.2.4 Phase Four

The last phase is about the conclusion of the study and a detailed explanation is in Chapter Five. Furthermore, comprehensive discussion about empirical data and model validation was conducted by academic experts. The recommendation to the stakeholders, limitation of the study and the recommendation for future research are also discussed in this phase.

3.3 Research Instrument

According to Leiyu (2008), research, concept and dimensions required proper understanding before designing of the research instrument. Therefore, the researchers tolerate the objectives of research together with their dimensions and the participants in mind while designing the research instrument for this study.

Daniel (2012) and David and Robert (2007) stated that, many researchers have concerns that designing of research instrument needs to understand some basic statement which help to formulate good questions that require to be answered by the respondent. Leiyu (2008) stated that redesigning of research instrument for data collection is required in some cases that the previous and existing instruments are to be used in a scope that different from previous research.

Outline to construct instrument of quantitative research is based on Likert and Guttman scale. The results of this study will provide an exploratory factor analysis model, indicates the scale is reliable and valid satisfying than building a model, and propose further analysis to validate the model as an appropriate way to evaluate and to determine user acceptance of information technology in the future (Massof, 2004).

3.3.1 Questionnaire

Rajendra (2003), Amin (2005) and Kothari (2009) argued that reliability, effectiveness and validity of the questionnaire are important. Choosing a suitable instrument for previous study is able to reduce the loss of time to prepare the questionnaire. Adaptation and reference instrument for previous study can reduce the errors in the answers and make the response rate better due to already used in related field of study and has been confirmed by experts in previous studies.

The research involved different types of respondents from various demographic. Hence, time very important to them. It was imperative that the design of the questionnaire was not too long. Respondents are always busy and do not want to spend time in these kinds of academic surveys. So, a good questionnaire is important in gathering information immediately with minimal time consumption from the respondent (Kothari; 2009; Ringle *et al*., 2012 and Hair *et al*.; 2013). In addition, the study that used a questionnaire was able to meet the research objectives and controlled by the use of IS theories in IT, models and hypotheses (Choudhury, 2001) and Venkatesh *et al*. (2003), argued that the sources of a questionnaire from previous research were able to measure the constructs of the research model based on the concept of multiple models and methods that have been tested and successfully meet the objectives of the study.

A past study represented as an indicator to design multiple instruments of the questionnaire in the research model of this study and will be adapted to the qualification of study scope. In addition, several other sources that their goods are useful to measure the constructs used in the design of the questionnaire (Davis, 1989; Venkatesh *et al*., 2003; David *et al*., 2012; Venkatesh, *et al*., 2012 and Ringle *et al*., 2012). Therefore, the past studies were used to collect the sources of the item for questionnaire for the study of measuring the constructs are shown in Appendix D.

Before conducting pilot studies, the questionnaire was revised and set in an appropriate method by supervisor and co-supervisor then checked and verified by three experts in the area of research (refer to Appendix F).

3.3.2 Structure of Questionnaire

According to Rajendra (2003), supported by Sharma (2007) and Mugenda (2008), says that a structured questionnaire is a list of questions that will be presented to respondents in a set order to add value to the reliability of the study by ensuring that each respondent was asked the same questions. Meanwhile, Amin (2005) suggests a structured questionnaire can be given at the same time a large amount posted to the respondents and cheaper, saving time and does not require a high level of skill.

Whereas Venkatesh *et al*. (2003) pointed out that the main data collection through structured questionnaire is easier to conduct is Likert scale. The design questionnaire in quantitative research instrument frequently is based on Likert and Guttman scale (Venkatesh *et al*., 2003; Ringle *et al*., 2012). While Andrich (1982), Massof (2004) and Wu (2009) recognized that there are two types of scales are widespread and often used in designing the questionnaire instruments. The two types of scales are *"Likert Scale"* and *"Guttman Scale".* Likert scale is a scale that can be used to measure;

i. Behavioural Intention in the use of technology.

ii. Attitude in use of technology.

iii. Opinions and ideas for improvement,perceived usefulness and perceived ease of use of technology.

iv. The perception of a person or group of people about phenomena related symptoms or a study.

Based on this scale, there are two types of scores of positive and negative questions. Negative questions scores start from number [1] until [3], number 4 is an uncertainty to answer the questions which is Neutral and positive score questions start from number [5] until [7] (Massof, 2004; Wu, 2009 and Venkatesh *et al*., 2012). The sequence alignments from strongly negative until strongly positive aspect are as follows;

[1]. Strongly Disagree.
[2]. Somewhat Disagree.
[3]. Disagree.
[4]. Neutral.
[5]. Agree.
[6]. Somewhat Agree.
[7]. Strongly Agree.

Guttman scaling goal is to realize and to determine the one-dimensional continuity to the concept that we want to measure such as demographic in certain field of research. Basically, Guttman scaling is a set of the fact that respondents who agree or disagree with the related question in the related field of research (Massof, 2004; Venkatesh *et al*., 2003; Ringle *et al*., 2012 and Hair *et al*.; 2013). Guttman scale is only for determining the demographic of this study. A scale only provides two options only, explicitly agree and disagree such as;

- Yes-No
- True-False
- Ever-Never
- Positive-Negative
- High-Low
- Pros-Cons

The seven point Likert scale is significant with PLS-SEM because it consists a set of pre-defined customized with a written statement that is easy to be shared and disseminated to the respondent (Ringle *et al*.; 2012, Hair *et al*.; 2013; Mohd Sobhi, 2015).

The questionnaire constructed from English to Bahasa Melayu (also provided in both languages) to establish a better understanding of the questions amongst the ARCs. Thus mitigate any response bias. The QR code is included at the front page of the questionnaire to increase the response rate and speed up the data collections process.

Accordingly, the instrument was referred to the experts from UUM before conducting a pilot study and the main study to check the contents and language structure of the questionnaire and then verified. Items structures of the questionnaire are referred to classification of measurement in Table 2.3 and based on the overview definition in Table 2.4 in Chapter Two.

While, Figure 2.5 in Chapter Two showed the conceptual research model with the relationship of each hypothesis. The study uses and designs questionnaire that meets the set research objectives and supported by the information system (IS) theories, the conceptual research model and the proposed hypothesis. The designed questionnaire was used to measure the constructs through the conceptual research model.

Therefore, the designed questionnaire covers introductory statement regarding the constructs of the conceptual research model which was reviewed and placed in a proper way by the experts in the field of study before conducting the pilot study and main study. In addition, the construct of factors was confirmed by experts in ARCT amongst the ARCs in Malaysia, They are from superior management of ARC association in Malaysia (refer to Appendix E). The references and sources of the items for each construct are shown in Table 3.1.

Table 3.1

Source of items

Construct	**Code of Items**	**References and Sources**
Performance expectancy	PE1	Venkatesh *et al*., 2012.
	PE2	Kit, 2014.
	PE3	Sun, Cao & You, 2010.
Effort expectancy	EE1	Wu, Tao & Yang, 2007.
	EE2	Venkatesh *et al*., 2012.
	EE3	Sun, Cao &You, 2010.
	EE4	Sun, Cao &You, 2010.
Social influence	SI1	Akour, 2009.

	SI2	Akour, 2009.
	SI3	Akour, 2009.
Facilitating condition	FC1	Yeoh & Chan, 2011.
	FC2	Wu, Tao & Yang, 2007.
	FC3	Teo & Noyes, 2012.
	FC4	Teo & Noyes, 2012.
Price value	PV1	Prata, Moraes & Quaresma, 2012.
	PV2	Munnukka, 2004.
	PV3	Chong, 2013.
Hedonic motivation	HM1	Kuo & Yen, 2009.
	HM2	Kuo & Yen, 2009.
	HM3	Kuo & Yen, 2009.
Habit	HB1	Venkatesh *et al*., 2012.
	HB2	Venkatesh *et al*., 2012.
	HB3	Venkatesh *et al*., 2012.
	HB4	Suki *et al*., 2012.
Peer trustworthiness	PT1	Bharosa & Janssen, 2010.
	PT2	Fiona & Linda, 2004.
	PT3	Fiona & Linda, 2004.
Compatibility	CB1	Tan & Chou, 2008.
	CB2	Kuo & Yen, 2009.
	CB3	Kuo & Yen, 2009.
Behavioural intention	BI1	Venkatesh *et al*., 2012; Kit, 2014.
	BI2	Venkatesh *et al*., 2012; Kit, 2014.
	BI3	Venkatesh *et al*., 2012; Kit, 2014.

The designed questionnaire is shown in Appendix (A). The seven (7) point Likert scale is used, because it is appropriate with PLS-SEM (Ringle *et al.*, 2012, Hair *et al.*, 2013; Mohd Sobhi, 2015). Survey item of this study consists of two sections. The designed questionnaire in quantitative research instrument is frequently based on a Guttman scale for Section A and Likert scale in Section B. Section A is about demographic, consists of 14 items and Section B consists of 33 items for 10 constructs. References from previous researchers and corresponding questionnaire from past studies can contribute an idea to modify and to construct the survey item of future study (Venkatesh *et al.*, 2003; David *et al.*, 2012; Venkatesh, *et al.*, 2012 and Kit, 2014).

Thus, this study adopts the ideas and views of previous researchers for the construction of each item. The list and layout of survey item of this study are in the Appendix (A). Consequently, the total is 47 items. The distribution of the measurement items of section B with the construct is shown in Table 3.2.

Table 3.2

The Measurement Items of Section B

Construct	**Number of Items**
PE	3
EE	4
SI	3
FC	4
PV	3
HM	3
HB	4
PT	3
CB	3
BI	3
Total	33

3.3.3 Questionnaire Verification by Experts

Twomey and Smith, (1997), Hofmann and Lehner (2001) and Sekaran and Roger (2011), stated that survey questionnaire is considered valid if it is evaluated and verified by a group of expert judges in the related field of research. There are various kinds of validity include feature validity, content validity and construct validity (Balci, 1994 and Embretson, 2007). Weiner (2003) and Kenneth (2005) argued that the survey questionnaire designed for collecting data needs to be validated to ensure high quality and rationality of research data. Therefore, the questionnaire for collecting data was presented to the experts and experienced in quantitative research and instrument development for verification.

The experts referred are those who have the expertise and experience in the field related to this study. An expert review form has been provided like in Appendix C. Sources of the questionnaire in Appendix D and confirmation that has been signed by the experts like in Appendix F.

3.3.4 Distribution of Questionnaire

The questionnaire distribution approach does affect the quality, quantity, adequacy and appropriateness of data. This implies that some precautions need to be taken before embarking on the distribution and collection of final data to be used for the analysis. In fact, data dissemination and collection has been required to be subjected to systematic study in order to find sufficient and enough scientific evidences which would produce solutions to the existing problem.

A sample of the population can be made randomly among respondents as a mechanism for collecting data (Rushton, *et al*., 2003; Johnson & Turner, 2003; Wendy, 2012 and Ringle *et al*., 2012). As there are many AR associations in the country, a sample of the population will be taken randomly to take part in this study through a survey involving the use of questionnaires to the respondents as a mechanism to collect the data.

The distribution of the questionnaire was issued through colleagues amongst the ARCs and online survey (Google Form) to the respondents' throughout Malaysia.

Limitations of scope and respondents' information are already described in research scope in Chapter One. Announcement to get feedback was shared and disseminated through the radio frequency via ASTRA local repeater (9M4RPH - Bukit Tunjung) and ASTRA transnational repeater (9MX243 - Gunung Jerai).

3.3.5 Unit of Analysis

The unit of analysis refers to the level of combination of the data collected during the subsequent data analysis stage. It may comprise of an individual or community (Ringle *et al*., 2012 and Hair *et al*., 2013). The unit of analysis must reliable, suitable and relevant with the objectives of the study (Sekaran and Bougie, 2010; Ringle *et al*., 2012 and Mohd Sobhi, 2015). Thus, an individual of ARC that has callsign from MCMC is considered the unit of analysis. More importantly, they will be questioned to give their opinions on their BI to use the ARCT in sharing and dissemination of information to support relief agencies in ES. Consequently, the ARC entire of Malaysia is considered as the unit of analysis because they are reliable, appropriate and relevant to the objectives of the study. In addition, they are a community that has an exclusive personality in using the ARCT.

3.4 Sampling Method

A research population is normally a large collection of population that is the key of a technical or scientific inquiry. It is for the advantage of the population in which the research is done (Ringle *et al*., 2012 and Hair *et al*., 2013). However, due to the large size of populations, researchers are frequently unable to test each individual in the population because it is too expensive and time consuming. This is the reason why researchers depend on a sample (Castillo, 2009). Many researchers have argued that random sampling is useful while conducting an investigation about theory testing as well as formulation due to non-inductive of the result of a unit on the other (Wicander *et al*., 2010; Wilson, 2010; Whitacre *et al*., 2009). A sample will be randomly selected from the study population to do quantitative survey. The probability sampling method ensures an equal chance of being selected for each member of the population, while non-probability allow the researcher to choose appropriate respondents according to the nature of the problem being studied (Ranjit, 2011 and Hair *et al*., 2013). Thus the probability sampling method was adapted for this study for an unbiased approach and was taken randomly amongst the ARCs registered with MCMC (have callsign).

3.4.1 Sampling Technique

According to Creswell (2009) and Ranjit (2011)), the quantitative survey through questionnaire is important for validation and verification of the research. This stage is important to know the extent of respondent's acceptance of the research successfully. The quantitative survey through questionnaire was conduct in this research. The questionnaire included the requirement of the user. A questionnaire is concerning the background or demographic of the respondents, user acceptance, and user intention and to gain information on what the user wants to accept and what they need to satisfaction in the use of ARCT amongst the ARCs in sharing and dissemination of information to support relief agencies in ES

According to Ranjit (2011), Sekaran and Roger (2011), Creswell (2009) and Jeff (2010), earlier researchers have a point and stress that the sampling technique in quantitative research could be categorized into random sampling and non-random sampling. Random sampling is referred to as prospect sampling, where each factor of the sampling has dependent and independent chances of being selected for the study. Mostly researcher has argued that random sampling is practical in conducting an investigation about theory testing as well as formulation due to the non-inductive of the result of a unit on the other this implies that the selection or rejection of an element of the population does not affect other elements in the same respondent.

However, non-random sampling is used in the population where the exact number of respondents is unknown and the selection of one element depends on the consideration of others. Thus, the random sampling technique is proper in this research as the total number of the respondent is identified. The random sampling method amongst the ARCs entire of Malaysia was the best selected because it supplied every component of population independently and with equal changes of being selected.

Furthermore, the random sampling method is free from categorization errors, and easy to get a representative group without requiring detailed information about the population. Sampling had to be made with great care because the respondents were diverse in background and experiences (Ranjit, 2011; Sekaran and Roger, 2011). Therefore, in this study, the random sampling method is appropriate because the ARC's has been diverse in background and experiences in using ARCT in Malaysia.

3.4.2 Sampling Design

Jeff (2007), Izham (2008), Ellison (2009) and Ranjit (2011) stated that the randomized sampling design among specific population is the proper process in choosing the sample, because it gives total freedom in selecting the respondent, particularly when the total subject is small. Thus, this study was used to randomize sampling design in selecting the samples from the respondent to the proper data collection.

Based on data, 12,227 Malaysian people are ARC members who have renewed the license and have callsign from MCMC (MARTS, 2018; MCMC, 2018). Accordingly, based on the formula from Figure 3.2 in Chapter Three, only 400 samples (respondent) are sufficient for this study. Indeed, Table 3.3 in Chapter Three shows the sample size that already designed to determine sample size from a specific population (Krejcie & Morgan, 1970).

3.4.3 Sampling Frame

Martyn (2007), Pierre (2007) and Herman *et al*. (2008), stated that sampling frame is served to deal with the community or individual should be the various registers of elements of the population, such as from society members, certain association's members and related records.

However, researchers have emphasized that a sampling frame may create bias in the research once it is not latest and contain foreign elements that are not common to every member of the respondents (Carl-Erik, 2003; Pierre, 2007 and Herman *et al.*, 2008). This sampling frame must contain lists of elements that are unique to every member of the respondents.

Thus, sampling frame to deal in this study is amongst the ARCs entire of Malaysia. A sampling frame is claimed as the lists of elements of respondent from which a sample is drawn which could be geographical areas, institutions, individual or community which are related to certain study (Churchill *et al*., 2010; Earl, 2011 and Michael & Earl, 2012). Therefore, the sampling frame is the registered list of ARC and has callsign from MCMC. ARC comprised of people from entire of Malaysia regardless of age, race, sex and education. Indeed, they are from different demographic or background.

3.4.4 Sampling Location

Sampling locations are throughout Malaysia. They are ARCs that used ARCT in Malaysia. They were registered and have callsign from MCMC. Detail and specific regarding location already stated in the scope and limitations of Chapter One.

3.4.5 Sampling Population

The purpose of sampling is to infer the actual population by using statistical inference. Sampling reduces costs, energy, and research time. Samplings as a purpose for collecting information from some individual compared to the overall population. Thus, researchers must be careful that the sample is truly representative population. This technique allows the researcher to conduct the study in the wide area or space larger of the research. Sampling allows researchers to obtain information that really required when measuring the total population cannot be performed (Cohen, 1988; Ograph & Morgens, 2008 and Sekaran, 2011).

According to Krejcie & Morgan (1970), the relationship between sample dimension and amount of population should be noted that when the population size increase the sample size also increases at a diminishing rate and remains relatively constant at slightly more than three cases. Stratified (Covered) sampling procedure is the method most effective and efficient in sampling to obtain a representative sample of the population. It involves members of the population to categorize groups of mutually exclusive and collectively exhaustive (Ograph & Morgens, 2008).

A simple random sample was taken from each independent group. Stratified sampling method can provide more accurate estimates if the communities surveyed are more heterogeneous than groups categorized. This technique helps researchers determine the level of accuracy of sampling for each group, and may provide administrative efficiency.

The advantage of this approach is that it can provide the most representative sample of the population (Hunt & Tyrrell, 2001 and Sekaran, 2011). Due to the small sample population, the use of the Krejcie Morgan model (1970) can be utilized to determine the sample for this research. Further discussions about statistics and survey will be outlined in the next chapter. Consequently, Figure 3.2 explains the theoretical to determine sample size of research (Krejcie& Morgan, 1970).

DETERMINING SAMPLE SIZE FOR RESEARCH ACTIVITIES

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The ever increasing demand for research has created a need for an efficient method of determining the sample size needed to be representative of a given population. In the article "Small Sample Techniques," the research division of the National Education Association has published a formula for determining sample size. Regrettably a table has not bee available for ready, easy reference which could have been constructed using the following formula.

$$s = X^2NP(1-P) \div d^2(N-1) + X^2P(1-P).$$

s = required sample size.

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841).

N = the population size.

P = the population proportion (assumed to be .50 since this would provide the maximum sample size).

d = the degree of accuracy expressed as a proportion (.05).

Figure 3.2. Theoretical to Determine Sample Size

Based on the formula from Figure 3.2, only 400 samples (respondents) are relevant to this study. The Table 3.3 shows the sample size that already calculated to determine sample size from explicit population (Krejcie & Morgan, 1970).

Table 3.3

Population and Sample Size

N	S	N	S	N	S
10	10	220	140	1,200	291
15	14	230	144	1,300	297
20	19	240	148	1,400	302
25	24	250	152	1,500	306
30	28	260	155	1,600	310
35	32	270	159	1,700	313
40	36	280	162	1,800	317
45	40	290	165	1,900	320

50	44	300	169	2,000	322
55	48	320	175	2,200	327
60	52	340	181	2,400	331
65	56	360	186	2,600	335
70	59	380	191	2,800	338
75	63	400	196	3,000	341
80	66	420	201	3,500	346
85	70	440	205	4,000	351
90	73	400	210	4,500	354
95	76	480	214	5,000	357
100	80	500	217	6,000	361
110	86	550	226	7,000	364
120	92	600	234	8,000	367
130	97	650	242	9,000	368
140	103	700	248	10,000	370
150	108	750	254	15,000	375
160	113	800	260	20,000	377
170	118	850	265	30,000	379
180	123	900	269	40,000	380
190	127	950	274	50,000	381
200	132	1,000	278	75,000	382
210	136	1,100	285	100,000	384

Note: N is population size; S is sample size

3.5 Data Collection Approach

The data collection approach does not affect the quality, quantity and suitability of the data. Therefore, it should be careful before starting to collect data that will be used for the final analysis. Indeed, the collection of data was required to be subject to a comprehensive study to obtain evidence sufficient scientific evidence that will produce good results (Izham, 2008; Wendy, 2012). Researchers need to carry out a pilot study as an investigation into the standardization of the instrument before starting collecting data in the actual study later (Sekaran *et al*., 2011). Consequently, a pilot study is a requirement to the main data collection from the ARC as the respondent that already stated in scope and limitation that can help the researcher to obtain quality and validated data for the main study.

3.5.1 Pilot Study

According to Izham (2008), Sekaran *et al*. (2011) and Ranjit (2011), a pilot study acts as a guide and an indication of the survey. It only uses a small random sample of the population. It is important to determine the feasibility of instruments designed to collect data and serves as a step to find weaknesses that reduce bias and reliability of access measurements before the actual distribution of questionnaires conducted.

Brown (2002), Sekaran *et al*. (2011) and Ranjit (2011) argued that Cronbach Alpha Test is an appropriate test used to evaluate and verify the reliability in quantitative analysis. The Cronbach Alpha Test is able to estimate reliability of the questionnaire and the most commonly conducted in many studies by previous researchers. It also shows stability or consistency tests entire forms of tests, which will be better, estimated using the same form of reliability during the analysis of pilot studies and main study.

3.5.2 Analysis of Pilot Study

The random sampling technique in the particular community is a method that can be adopted in a study involving pilot studies or actual research. The random sampling technique is like distributing questionnaires, interviews and observations in communities that have been established within the scope of the study by the researchers (Heckathorn, 1997; Wilmot, 2005; Volz *et al* 2008; Izham, 2008). Therefore the random sampling technique amongst the ARCs was used during conducted the pilot study in this research. According to Wang and Shih (2008), Loo *et al*. (2009) and Park *et al*., 2007, the type of data collection is consistent with the existing literatures in the technology adoption that researches should have a pilot study conducted before the main study.

Brown (2002), Ahmad (2009), Nadeem (2011) and Ringle *et al*. (2014) argued that the pilot test with about 30 respondents is acceptable and sufficient to find the feasibility weakness and strength of instruments in any academic study. Pallant, 2011, Sekaran *et al*. (2011) and Jan (2013) stated that 30 respondents are sufficient for a pilot study and as a measure to discover lacks, which reduce biases (prejudices) and access reliability of measurement factors before distribute a questionnaire in the main study.

The pilot test was conducted by sending a questionnaire link by WhatsApp and Telegram to the ARC representative from ASTRA, MARES and MARTS, and asks them to personal message (PM) WhatsApp to ten ARCT practitioners which are eligible callsign by MCMC in their respective communities. Each selected respondent should have experience in the ARCT world for at least five years. According to Parrott

(2001), Constantinides (2004) and Hauer (2014), experience factors are essential to understanding community behaviour. One can be considered experienced in a technology used with at least five years of using that technology.

The data collection was undertaken for the duration of two weeks from 24 February 2019 to 10 March 2019. During the pilot study, 33 respondents were successfully selected at random by representatives from the ARC association entire of Malaysia is shown in Table 3.4. Reliability of data analysis through Cronbach Alpha Test is sufficient and significant are validated by experts during this phase.

Table 3.4

ARC Respondents of Pilot Study

ARC Respondent	**Numbers**
1. Kedah/Perlis (North Region)	13
2. Kelantan/Terengganu (East Region)	10
3. Johor/Pahang (South Region)	10
Total	33

3.5.3 Demographic of ARC in Pilot Study

The descriptive analysis is about the demographics of the respondents involved in this pilot study. The findings are presented in tabular data (table) for easy understanding. A frequency, demographic of respondents was analyzed by SPSS 20. The Table 3.5 shows the analysis of frequency, percent valid and percent cumulative of each respondent, such as age, gender, race, education level, occupation and their monthly income.

Table 3.5

The analysis of demographic in pilot study

Demographic	Frequency	Valid %	Cumulative %
Age			
30-39 years old	5	15.2	15.2
40-49 years old	16	48.5	63.6
50-59 years old	10	30.3	93.9
Above 60 years old	2	6.1	100.0
Total	33	100.0	
Education Level			
Bachelor	10	30.3	30.3
Diploma	9	27.3	57.6
STPM	3	9.1	66.7
SPM	9	27.3	93.9
SRP/PMR	2	6.1	100.0
Total	33	100.0	
Race			
Malay	28	84.8	84.8
Chinese	2	6.1	90.9
Others	3	9.1	100.0
Total	33	100.0	
Gender			
Male	30	90.9	90.9
Female	3	9.1	100.0
Total	33	100.0	
Occupation			
Self-employed	9	27.3	27.3
Private sector	8	24.2	51.5
Government servants	16	48.5	100.0
Total	33	100.0	
Monthly Income			
RM 2001-3000	8	24.2	24.2
RM 3001-4000	9	27.3	51.5
RM 4001-5000	4	12.1	63.6
Above RM 5000	12	36.4	100.0
Total	33	100.0	

3.5.4 Experience of ARC in Pilot Study

The experience of the respondents in the use of ARCT was described in Table 3.6. The questionnaires begin with question number 7 to number 14. The findings are analyzed by SPSS 20 and presented in frequency and valid percentage for ease of understanding.

Table 3.6

The Analysis of Experience in Pilot Study

The experience of ARC	**Frequency**	**Valid %**
Have Callsign from SKMM		
Yes		
Total	33	100.0
Have ARCT devices		
Yes		
Total	33	100.0
Practice and using ARCT		
Yes		
Total	33	100.0
Frequencies of ARCT use in their daily life		
Seldom	9	27.3
Sometimes	7	21.2
Often	8	24.4
Very often	3	9.1
Always	6	18.2
Total	33	100.0
Experience in use the ARCT		
Above 5 years		
Total	33	100.0

Table 3.6 *Continued*

The type ARCT equipment that they use		
Handy Radio	3	9.1
Rig Mobile Radio	2	6.0
Base Station Radio	0	0.0
Handy & Rig Mobile Radio	7	21.2
Handy, Rig Mobile & Base Station Radio	21	63.6
Total	33	100.0
Communication that they always practice and use		
Mobile Comm	3	9.1
Portable Comm	2	6.0
Base Station Comm	0	0.0
Mobile & Portable Comm	7	21.2
Mobile, Portable & Base Station Comm	21	63.6
Total	33	100.0
The method of transmitting radio waves that they often practice		
Via Simplex	2	6.1
Via Repeater Station	4	12.1
Via Simplex & Repeater Station	22	81.8
Total	33	100.0

3.5.5 Reliability Test of Questionnaire

Thomas (2008), Zoltan and Tatsuya (2010) and Pallant (2011) argued that the reliability of a questionnaire shows how free (independent) it is from random error and brings about the magnitude of the correlation found between several scales. Therefore the internal consistency is required to measure while checking for the reliability of each questionnaire. Reliability test of each item was analyzed by SPSS 20. Zoltan and Tatsuya (2010), Baker *et al*. (2011) and Pallant (2011) stated the internal consistency is the point to which the items that make up the scale are all measuring the same fundamental quality which can be done by Cronbach Alpha Test. The coefficient is a statistic that provides an indication of the average correlation among the items that make up the scale which ranges from 0 to 1.

Therefore the exact value is predictable to be of high value when the correlation between the specific questionnaires is high, whereas the minimum level of 0.7 is optional and the best clarification (DeVellis, 2003; Pallant, 2011; Baker *et al*., 2011; Ruth, 2011). Consequently, 33 items were used to measure the reliability through Cronbach Alpha Test. Ten constructs from the conceptual research model during the pilot study was shown in Table 3.2. Hence, the outcomes of the reliability test are acceptable for further analysis based on the recommendation of some researchers (Bland & Altman, 1997; Baker *et al*., 2011; Ruth, 2011).

Kaiser-Meyer-Olkin (KMO) test is to measure how suited sampling data for factor analysis. The test measures sampling adequacy for each variable in the model and for the complete model. The statistic is a measure of the proportion of variance among variables that might be common variance. The lower the proportion, the more suited your data is to factor analysis. KMO values between 0.50 or above indicate the sampling is adequate. If KMO values are less than 0.50, it indicates the sampling is not adequate and that corrective action must be taken. KMO Values close to zero (0.00) mean that there are large partial correlations compared to the sum of correlations. In other words, there are widespread correlations which are a large problem for factor analysis. The appropriate value for factor analysis, KMO values must be between 0.60 and 1.00 indicates that sampling is sufficient (Brown, 2002; Sekaran *et al*., 2011; Ruth, 2011; Ringle *et al*., 2014).

Therefore, the total of 10 constructs with 33 items have been analyzed using the reliability of Items by Cronbach Alpha Test and KMO test is shown in Table 3.7, meets the requirement of parameter range.

.Table 3.7

The Analysis Reliability of Items

Code	**Cronbach's Alpha Test**	**KOM Test**	**Cronbach's Alpha Based on Standardized Items**
PE1	0.972	0.600	0.970
PE2	0.971	0.849	
PE3	0.971	0.676	
EE1	0.970	0.823	
EE2	0.970	0.781	
EE3	0.970	0.882	
EE4	0.970	0.880	
SI1	0.970	0.787	
SI2	0.970	0.734	
SI3	.970	0.814	
FC1	0.972	0.829	
FC2	0.971	0.791	
FC3	0.970	0.629	
FC4	0.970	0.732	
PV1	0.972	0.686	
PV2	0.973	0.699	
PV3	0.971	0.793	
HM1	0.970	0.703	
HM2	0.970	0.852	
HM3	0.970	0.707	
HB1	0.971	0.756	
HB2	0.973	0.739	
HB3	0.970	0.827	
HB4	0.970	0.782	
PT1	0.971	0.737	
PT2	0.971	0.907	
PT3	0.971	0.763	
CB1	0.970	0.843	
CB2	0.971	0.809	
CB3	0.970	0.812	
BI1	0.970	0.906	
BI2	0.970	0.826	
BI3	0.970	0.789	

Type of analysis	*Parameter range*
Cronbach's Alpha Test (CAT)	*> 0.70* *Reliability coefficient of each items is 0.70 or higher is considered acceptable*
Kaiser-Meyer-Olkin Test (KMO)	*0.60 – 1.00* *0.60 until 1.00 indicate the sampling is adequate.*

Zoltan and Tatsuya (2010), Baker *et al*. (2011) and Pallant (2011) argued that, the coefficient each item is more than 0.70, suggesting that the items have relatively high internal consistency and KMO values for each item of each construct is more than 0.60 indicate the sampling is sufficient and the data analysis is valid.

So, based on data analyzed by SPSS, the coefficient for each item is more than 0.70, suggesting that the items have relatively high internal consistency. In addition, KMO values for each item is more than 0.60 indicate the sampling is sufficient and can be accepted to conduct the main study.

3.5.6 Main Study

The questionnaires were distributed among the ARC as stated in unit analysis and detailed of the respondent is already described in scope and limitation in Chapter One. Those who answered the questionnaire during the pilot study were not allowed to answer the questionnaire again.

During the main study, an announcement through ARCT was conducted by colleagues from ASTRA to ARC throughout Malaysia to response to the questionnaire that is disseminated through online / and shares a link via social media (WhatsApp / Telegram / Facebook). Colleagues from ASTRA were also asked to announce through ARCT to those who have answered the questionnaire during the pilot study need not to answer the questionnaire again. The feature analyses were discussed in Chapter Four.

3.6 Data Analysis Method

Based on discussions with supervisor, co-supervisor and experts in the statistic, Partial Least Square of Structural Equation Modeling (PLS-SEM) version 3.0, and Microsoft Office (MSO) Excel 2010 and SPSS version 22 were used to analyze the data.

SPSS (statistical software) is one of the first made in 1996 by three students at Stanford University, the Norman, Hull and Dale. The software operates on a mainframe computer and finally the publisher McGraw-Hill published the user manual SPSS. In the beginning, SPSS was created to process data processing in the field of social sciences, and it stands for SPSS Statistical Package for the Social Science (Pallant, 2001).

Nowadays, the function analysis of SPSS has expanded to serve different types of users, such as for the factory production process, research science, and others (O'connor, 2010). The latest version of this program is SPSS 25, which was released in 2017.

3.6.1 Structural Equation Modelling

Structural Equation Modelling (SEM) is a second generation techniques. SEM enables researchers to incorporate unobservable variables measured indirectly by indicator variable factors. Researchers also facilitate accounting for measurement in experimental variables. Equation modelling can be measured by Covariance-based SEM (CB-SEM) and Partial Least Square of Structural Equation Modeling (PLS-SEM) (Hair *et al*., 2013 and Mohd Sobhi, 2015).

CB-SEM is primarily used to confirm or to reject certain theories (i.e., a set of systematic relationship between multiply variables that can be tested empirically. It does this by determining how well a proposed theoretical model can estimate the covariance matrix for sample data set without focusing on explaining variance. It cannot provide statistical objective, While PLS-SEM is easy to determine the statistical objective of data. CB-SEM focused on explaining the variance, but PLS-SEM can produce to maximise the explained variance of the endogenous latent construct (DV) (Hair *et al*., 2013). Thus, CB-SEM is not relevant to this research because it cannot demonstrate path modelling to test certain model and develop theories in exploratory studies.

Hair *et al*. (2013) and Mohd Sobhi (2015) stated that the Partial Least Square technique of SEM (PLS-SEM) is a quantitative research approach in nature to analyze the collected data and can assist the researcher to maximize the variance explained of dependent variables which are related to the instrument. It also called path modeling in the conceptual model. It does this by focusing on explaining the variance in the IV and DV when examining the conceptual model. The method of data analysis using the PLS-SEM is more useful and easier to analyze complex models and can be used in a variety of framework studies involving various samples. The following features have been selected in performing data analysis because;

i. Clearly measurement error model variables observed.
ii. Simultaneously model the relationship between several independent variables and the dependent variables or external or internal.
iii. Include hidden variable that are not directly measured by indicators.
iv. Combine and test a priori information and hypotheses with an empirical data.
v. Loading rate was observed at the construct of those goods item.

Based on a comparison, PLS-SEM is easier to use and more proper to the quantitative research approach (Hair *et al*., 2014; Mohd Sobhi, 2015). Table 3.8 is to show a comparison between PLS-SEM and CB-SEM (Mohd Sobhi, 2015).

Table 3.8

PLS-SEM vs. CB-SEM

PLS-SEM	**CB-SEM**
To validate and to develop theories in exploratory conceptual research model that is related to quantitative research field.	To confirm or to reject theories that can be tested empirically in qualitative research field.
It works by focusing on explaining the variance in IV or DV when examining the model.	It works by determining how well a proposed theoretical model can estimate the covariance matrix for a sample data set.
It is a statistical objective to maximize the explained variance of endogenous latent constructs (DV).	It is a statistical objective to reproduce the theoretical covariance matrix without focusing on e explained variance.
Normality of data distribution not assumed.	Assumes normality of data distribution.
Measurement models can include a large number of IV	Difficult with more than 50 items
Assumes all measured variance is useful for clarified or prediction of structural relationships.	Difficult to assume all measured variance is useful for clarified or prediction of structural relationships.
Ease of use of researcher in data interpreting	Sometimes data interpreted misleading of researcher.

3.7 Verification and Validation

Verification and validation of the model is the principal procedures for quantifying and construction constancy (reliability) in conceptual models in any research in related fields. This procedure is a qualifying practice for the progress of conceptual models that can be used to make research predictions with quantified confidence (Logan & Nitta, 2002; Thacker *et al*., 2004 and Forster, 2004).

The conceptual research model can be illustrated as a collection of assumptions, algorithms, relationships, and data that describe the reality of interest from the model and validation experiment can be constructed (Ramesh & Jarke, 2001). Validation of the model is required by management /government or any organization to reduce the time, cost, and risk associated with complete testing of products, materials, and to determine the lacking of systems in related factors (Thacker *et al*., 2004). As a conclusion, validation is the process to determine the conceptual model is an accurate reflection of the main study through the model perspective (Thacker *et al*., 2004).

Observing and discussion on the progress of the study are always carried out by the supervisor and co-supervisor is to ensure the smooth running of this study. The study was checked by supervisor and co-supervisor and involved several experts from related fields. They are professional and have experience in the relevant field. As for the instrument used to collect the data for the study, the experts agree on the significance of each construct and its relationship in the conceptual research model.

Apart from the supervisor and co-supervisor, team of experts is also involved in analysis data verification and validation, and to support for the completion of this study. They are expert in content of study, statistical expert and ARCT professional. The experts and professional referred are as follows;

1. Content expert, Professor Dr. Huda Hj. Ibrahim, who has experience in research instrument field (Expert verification for questionnaire and factors confirmation). She is a dean accompanying as senior lecturer at School of Computing Science, College of Art and Science, UUM.

2. Content expert, Associate Professor Dr. Mazida Ahmad, who has experience in research instrument field (Expert verification for questionnaire, factors confirmation and data analysis). She is a senior lecturer at School of Computing Science, College of Art and Science, UUM.

3. Content expert, Dr. Massudi Mahmuddin, who has experience in research instrument field (Expert verification for questionnaire, factors confirmation and data analysis). He is a Director of the UUM Student Affairs Department accompanying as senior lecturer at School of Computing Science, College of Art and Science, UUM.

4. Content expert, Professor Dr. Hj. Zulkhairi Md Dahalin, who has experience in the behavioural intention model research field and as a senior lecturer at School of Computing Science, College of Art and Science, UUM.

5. Content expert, Dr. Azizi Ab. Aziz, who has experience in modelling field and as a senior lecturer at School of Computing Science, College of Art and Science, UUM.

6. Statistical expert, Associate Professor Dr. Mohd Sobhi Ishak, who has experience in PLS-SEM and as a primary reference for PLS-SEM and statistical analysis. He is a senior lecturer at School of Multimedia Technology and Communication, College of Art and Science, UUM.

7. ARCT professional – 9W2DBT, Dato Bahari Taib, who has experience in using ARCT (Factors confirmation and final validation by ARCT practitioner). He is a president of Persatuan Radio Amatur Melayu Utara Malaysia (ASTRA).

8. ARCT professional – 9M2ZS, En. Mat Zain Shaari, who has experience in using ARCT (Factors confirmation and final validation by ARCT practitioner). He is from MARTS.

9. ARCT professional – 9W2KRE, En. Bakri Ramli, who has experience in using ARCT (Factors confirmation by ARCT practitioner). He He is from ASTRA.

Based on their recommendations, comments and advice, the researcher made improvements and corrective actions to the study and to be better and meet the goals of the study. Recommendations, comments, and advice, as well as their views, have been placed in the appendices section.

3.8 Summary

This chapter described the methodology of the study involved the research approach and research process in the form of flow charts. An explanation regarding the procedures used in designing the research instrument, sampling method and statically procedures used to analyse the data also detailed described. This chapter also discussed data collection approach, like the pilot study process to check the reliability of the questionnaire. Data analysis method by structural equation modelling has been described comprehensively.

CHAPTER FOUR

ANALYSIS AND FINDINGS

4.0 Introduction

The analysis stage starts with the description of the analysis related to respondents' demographics during pilot study and main study. Additionally, this chapter is presents the outcome of constructive factor analysis, measurement and structural model. The hypothesized structural model is presented to test the proposed research model and the extent of how the research model fits with the data. Lastly, the chapter discusses on the findings of the hypothesis testing with the influence of the study.

4.1 Main Data Distribution and Collection

The main data distribution and collection was conducted from 01 April until 10 May 2019. The main data distribution and collection for this study was performed for 40 days.

4.1.1 Distribution and Collection by ARC Representatives

The questionnaires were distributed and collected through online (Google Form) amongst the ARCs entire of Malaysia. According to Brin and Page (2012), Rowe *et al.* (2013) and Wolber (2016), the Google Form is a new approach to distribute and collect information related to exploratory study in understanding human behaviour through the Internet in a particular scope.. Google Form provides a fast track to create an online survey through the questionnaire, with responses collected in an online spread sheet in Google Drive. Invitation to answer the questionnaire can be made through email and social media like Facebook, WhatsApp application, Telegram, etc.

Online questionnaire was constructed using Google Form application is stored on Google Drive and easy to manage.

An announcement through ARCT was supported by colleagues from ASTRA to ARCs throughout of Malaysia to respond to a questionnaire that is distributed through online / and shares a link via social media (Whatsapp / Telegram / Facebook) was conducted. Colleagues from ASTRA help the researcher to communicate with ARCs entire of Malaysia through repeater station (Trans and Local repeater) and simplex.

4.1.2 Distribution and Collection via Online

The online questionnaire was established through Google Form and stored in Google Drive. The information related to the online survey by Google Form procedure and embeds link procedure shown in Table 4.1.

Table 4.1

Google Form Information and Embed Link

Procedure	
Google Form	
Registered Email	azleejohar@gmail.com
URL	https://goo.gl/7wfsw5
Embed Link	
URL	http://radicmalaysia.blogspot.my/
Login Email	radicradioamateur@gmail.com
Registered Email	radicradioamateur@ymail.com
Backup Email	azlee@ymail.com

Online questionnaire through Google Form was published to the internet on 01 April 2019. An announcement regarding online questionnaire has been communicated through ARCT to the ARC's throughout Malaysia included Sabah and Sarawak was conducted and supported by colleagues from ASTRA. ARCT Communication is via Simplex, Local Repeater and Trans Repeater.

ARCs supports are very strong and they give full cooperation and voluntarily to share and disseminate the questionnaire link through social media. They have shared and distribute the questionnaire link through ARC group email, social media like Facebook amongst the ARCs, through web 2.0 tools like WhatsApp and Telegram application. Here we can see their have unique behaviours mainly in information sharing and dissemination.

Table 4.2 shows the ARC's has been communicated through ARCT by colleagues from ASTRA as Trans Net Controller and shared through the Internet (social media). They are 9W2EXO, 9W2XJKM, 9W2XKM, 9W2AHU and 9W2KGR.

Table 4.2

Questionnaires distributed amongst the ARCs

No	**Year 2019**	**ARC**	**Distributed by**
1	02 Apr	PRECOMM - Perlis Recreation And Communication Club	9M4RPH - Local WhatsApp Facebook Telegram
2	02 Apr	KSARC- Kelab Radio Amatur Kota Setar	9M2RGJ - Local Facebook Email

Table 4.2 *Continued*

3	02 Apr	HAM V38 – Simplex Terengganu	9M2RGJ - Trans WhatsApp
4	02 Apr	Pelaut Malaya	9M2RGJ - Local Email Facebook
5	10 Apr	JASRA- Jalur Selatan Radio Amatur Johor	9M2RGJ - Trans Email Facebook
6	10 Apr	LARSCA - Langkawi Amateur Radio Satellite Communications Astronomy Club	9M2RGJ - Trans Facebook
7	10 Apr	ARCS- Amateur Radio Club Sarawak	9M2RGJ - Trans Facebook
8	10 Apr	KAM- Komuniti Astra Manjung	9M4RPH - Local Facebook
9	10 Apr	AWIT- Astra Wilayah Tengah	9M4RPH - Local Facebook
10	20 Apr	ARKB- Amateur Radio Kota Bharu	9M2RGJ - Trans Facebook
11	20 Apr	BARC – Sabah Sarawak Borneo Amateur Radio Club	9M2RGJ - Trans Facebook
12	20 Apr	SIAR- Kelab Radio Amatur Sik, Kedah	9M4RPH - Local Facebook
13	20 Apr	PARTS- Perak Amateur Radio Transmitters Society	9M4RPH - Local Facebook
14	20 Apr	Pengakap SARES-Pengakap Sarawak Amateur Radio Emergency Services	9M2RGJ - Trans Facebook
15	20 Apr	Pasukan Kelana Kanan Komunikasi Ibu Pejabat Persekutuan Pengakap Malaysia Organization	9M2RGJ - Trans Facebook
16	20 Apr	KRAPB- Komuniti Radio Amatur Pahang Barat	9M2RGJ - Trans Facebook
17	20 Apr	PERAMAH- Persatuan Radio Amatur Negeri Pahang	9M2RGJ - Trans Facebook

Table 4.2 *Continued*

18	20 Apr	Kuala Tahan FWD Club- Ham Radio 4x4 Off-road	9M4RPH - Local Facebook WhatsApp Telegram
19	28 Apr	PEMANCAR- Terengganu	9M2RGJ - Trans Facebook
20	28 Apr	SARC- Sabah Amateur Radio Society	9M2RGJ - Trans Facebook

According to the Communication Act 1998 by MCMC, only whose have license and callsign are authorized to use and communicate through ARCT. Those, who have license and callsign from MCMC, have been selected as respondents. Online questionnaire through Google Forms has collected 416 respondents (have callsign) throughout Malaysia. Therefore, Table 4.3 shows the total number of responders in the study.

Table 4.3

The Number of responders

Method	**Total**	**No Callsign**	**Missing Value**	**Have Callsign**
Online Survey	416	3	13	400

Berg and Lune (2004), Wilmot (2005). Cohen *et al*. (2007) , Churchill *et al*. (2010), Earl (2011) and Michael and Earl (2012), argued that if the total population in range 10, 000 to 40,000, the minimum sampling respondents of around 400 is sufficient. Thus, the sampling method is successful and meets the requirements of the study. Based on Table 4.3, 400 respondents from ARC entire of Malaysia has been selected due to having the license and callsign from MCMC and contributed in answering the online questionnaire with completed and without missing values.

4.2 Data Analysis and Finding

Descriptive statistics analysis was used to describe the demographic and experience of respondents. Data analysis in the form of frequency and percentage was collected using SPSS 20. The statistical analysis used in testing hypothesis of the study is based on the analysis techniques Structural Equation Modelling (SEM) by using software SmartPLS and known as PLS-SEM.

PLS-SEM is a complex statistical analysis technique is to maximize the explanation of the variance in the dependent and independent variables through modelling. PLS-SEM 3.0 software is used to replace the software AMOS (Analysis of Moment Structures) due to the complexity of the procedure, the sample size and distribution of the data. SmartPLS software is appropriate and practical to use as a data analysis in modelling technique (Hair, Ringle & Sarstedt, 2011; Ringle, Sarstedt & Straub, 2012; Hair *et al*., 2013). PLS-SEM showed the direct effect of the relationship between variables simultaneously. Among the studies in related fields that have been tested in PLS-SEM data analysis is Augusto (2011), Ayeh, Au and Law (2012; 2013) and Raihan (2014). SEM is a technique that is able to combine the analysis of basic components such as factor analysis, multiple regression, canonical correlation (canonical correlation) and path analysis simultaneously (Hair *et al*., 2010).

There are some explanations why PLS-SEM is a favourite among researchers (Byrne, 2010; Schumacker & Lomax, 2010) such as;

i User-friendly software and able to analyse multidimensional variables.

ii Able to analyses advanced theoretical model which a complex of relations multivariate analysis iii Able to test multiple groups, multivariate levels of data, testing the direct and indirect effects and to test effects interaction.

iv Able to focus specifically on the issue of the validity and reliability as it involves measurement error.

4.2.1 Demographic of ARCs

Demography is the study of the characteristics of the community (population, employment status, current income, age factor, gender effects, years of experience etc.) in a particular environment for a certain period (Chatman & Flynn, 2001; Ying & Ling, 2004; Yamaguchi *et al*., 2006; Wanless *et al*., 2011).

The sample used in this study is 400 respondents amongst the ARCs throughout Malaysia. The findings are presented in tabular data (table) for ease of understanding. Frequencies demographic data of ARC respondents was analysed by SPSS 20. Table 4.4 shows the frequency analysis about the demographic of respondents, such as age, gender, race, education level, occupation and respondent monthly income.

Table 4.4

Demographic of Respondents

Demographic	**Frequency**	**Percent**	**Cumulative Percent**
Age			
14-20 years old	18	4.5	4.5
21-29 years old	66	16.5	21.0
30-39 years old	154	38.5	59.5
40-49 years old	114	28.5	88.0
50-59 years old	35	8.8	96.8
Above 60 years old	13	3.3	100.0
Total	400	100.0	

Table 4.4 *Continued*

Gender			
Male	359	89.8	89.8
Female	41	10.3	100.0
Total	400	100.0	
Race			
Malay	334	83.5	83.5
Chinese	28	7.0	90.5
Indian	12	3.0	93.5
Others	26	6.5	100.0
Total	400	100.0	
Education Level			
PhD	3	0.8	0.8
Master	16	4.0	4.8
Bachelor	101	25.3	30.0
Diploma	99	24.8	54.8
STPM	32	8.0	62.7
SPM	128	32.0	94.8
SRP/PMR	21	5.3	100.0
Total	400	100.0	
Occupation			
Student	25	6.3	6.3
Unemployed	19	4.8	11.0
Self-employed	67	16.8	27.8
Private sector	118	29.5	57.3
Government servants	171	42.8	100.0
Total	400	100.0	
Income			
Less RM 1000	51	12.8	12.8
RM 1001-2000	69	17.3	30.0
RM 2001-3000	91	22.8	52.8
RM 3001-4000	82	20.5	73.3
RM 4001-5000	53	13.3	86.5
Above RM 5000	54	13.5	100.0
Total	400	100.0	

Based on Table 4.4, the age of respondents was characterized in bar chart in Figure 4.1, 154 (38.5%) respondents are between the ages group of 30-39 years and 114 (28.5.%) respondents are between the age group of 40-49 years. Both groups are dominant respondents in this study. As for the gender of respondents in this study, 359 (89.8%) are male and 41 (10.3%) are female.

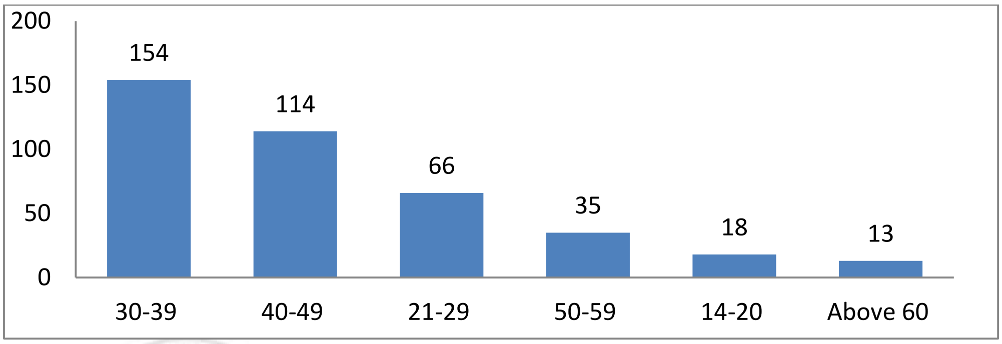

Figure 4.1. Age of the Respondents

In terms of the education level among the respondents as characterized in Figure 4.2, SPM education level has the highest number of respondents ~~is~~ which are 128 (32.0%), 99 (24.8%) respondents possess a diploma and 101 (25.3 %) respondents have a Bachelor degree. These are the dominant respondents in this study. While STPM has 32 (8.0%) respondents and a lower education level like SRP/PMR has 21 (5.3%) respondents only. 16 (4.0%) respondents possess a Master degree and PhD as the highest educational attainment has only 3 (0.8%) respondents.

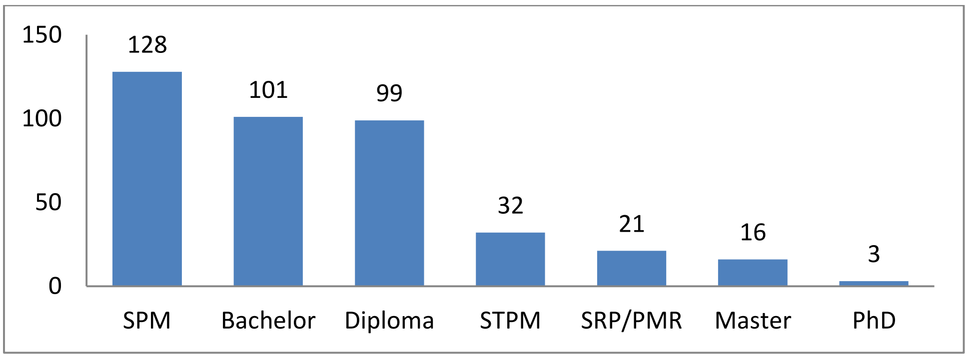

Figure 4.2. Education Level of the Respondents

The subsequent is to present empirical data about occupation of the respondents in Figure 4.3. 171 (42.8%) respondents work as government servants and 118 (29.5%) involved in private sector. Self-employed are only 67(16.8%), 25 (6.3%) respondents are students and only 19 (4.8%) respondents are unemployed. Most unemployed are those who have retired from public services such as military, police and former teachers.

Figure 4.3. Occupation of the Respondents

While, Figure 4.4 presents variation in monthly income amongst the ARCs and found 51 (12.8%) earning less than RM1000, 61 (13.3%) respondents' earning between RM4001 – RM5000, only 54 (13.5%) respondents' earning above RM5000 and 69 (17.3%) respondents earning between RM1001 – RM2000. Furthermore, 82 (20.5%) respondents have their monthly income from RM3001 – RM4000 and 91 (22.8%) respondents have their monthly earning between RM2001 – RM3000.

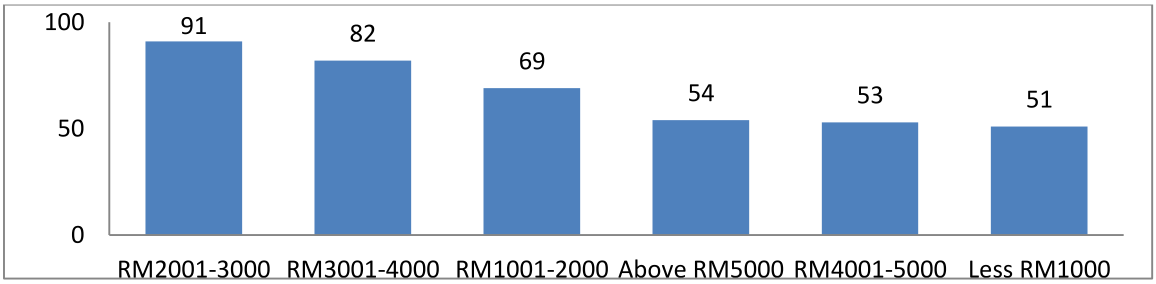

Figure 4.4. Monthly Income of the Respondents

4.2.2 Practice and skill amongst the ARCs

Dawson and Rakes (2003), Berger (2008) and Wanless *et al*. (2011) claimed that the practice and skill are parts of demographics. Practice and skill are able to demonstrate the experience of people to use technology in particular situations.

Accordingly, this part is about an analysis of the aspect of practice and skill among respondents involved in this study.The frequencies of the empirical data of respondents were analysed through SPSS 20. Furthermore, Table 4.5 shows the empirical data in the form of frequency about the practice and skill of the ARCs used the ARCT in Malaysia.

Table 4.5

The Practice and Skill of Respondents

The practice and skill of ARC	**Frequency**	**Percent**
Have Callsign from SKMM & ARCT devices		
Total of Respondents	400	100.0
Frequencies ARCT use in their daily life		
Seldom	94	23.5
Sometimes	108	27.0
Often	118	29.5
Very often	43	10.8
Always	37	9.3
Total	400	100.0
Experience in use of ARCT		
Below 1 years	12	3.0
1-2years	76	19.0
2-3 years	153	38.3
3-4 years	77	19.3
Above 5 years	82	20.5
Total	400	100.0

Table 4.5 *continued*

The type ARCT device that they use		
Handy Radio	123	30.6
Rig Mobile Radio	21	5.3
Base Station Radio	11	2.8
Handy & Rig Mobile Radio	104	26.0
Handy, Rig Mobile & Base Station Radio	141	35.3
Total	400	100.0
Communication that they always practice		
Mobile Comm	106	26.5
Portable Comm	41	10.3
Base Station Comm	20	5.0
Mobile & Portable Comm	83	20.8
Mobile, Portable & Base Station Comm	150	37.5
Total	400	100.0
The method of transmitting radio waves that they often practice		
Via Simplex	101	25.3
Via Repeater Station	51	12.8
Via Simplex & Repeater Station	248	62.0
Total	400	100.0

Based on the empirical data in Table 4.5, 400 respondents have a callsign that means 100% have legal license to use ARCT from MCMC. Besides that, Table 4.5 shows details about the type of ARCT device that they use, communication that they always practice and the method of transmitting radio waves that they often practice. While Figure 4.5 is to present the frequencies ARCT use in their daily life and Figure 4.6 is to show years of experience in using ARCT among 400 respondents of this study.

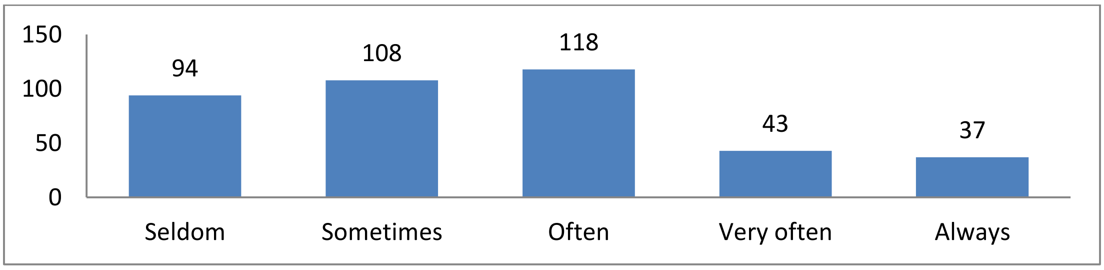

Figure 4.5. Frequencies of ARCT use in daily life

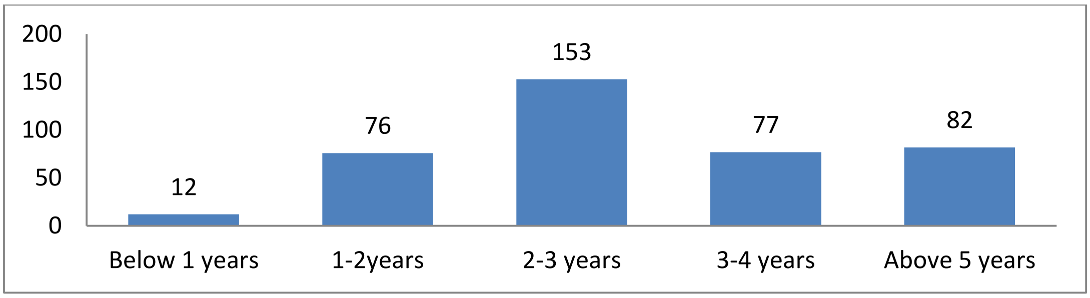

Figure 4.6. Experience in using the ARCT

Rao and Monroe (1988), Dawson and Rakes (2003),Berger (2008), Wilson (2010) and Wanless *et al*. (2011) claimed that the demographic factors like an age, gender and experience are able to use as moderator effect to the study which are related to conceptual model. Therefore this study used demographic factor such as age, gender and experience as moderating effect.

4.3 Evaluation of Measurement Model

Ringle *et al*. (2006), Hair *et al*. (2011) and Wilson (2010) stated that an evaluation model through PLS-SEM follows the two phases' that involve measurement model (outer model) and structural model assessments (inner model). Researchers have pointed out that the main activities in the evaluation of the measurement model deal with the reliability of internal consistency, reliability indicators, convergent validity and discriminant validity.

The first phase is the assessment of the measurement model is to focus on the reliability and validity of measures which form each of the constructs. While the second phase is the discriminant validity of the measurement model in inspecting either each item relates to each construct and how strongly the measured construct is related to the construct it intends to reflect (Hair *et al*., 2014; Latan & Ghozali, 2015). Therefore, the parameter to evaluate the model is shown in the Table 4.6.

Table 4.6

The Model Evaluation Parameter

Evaluation Themes	**Measures**	**Parameter**
Internal Consistency Reliability	Composite Reliability	> 0.7
Indicator Reliability	Factor Loadings	> 0.7
Convergent Validity	Average Variance Extracted (AVE)	> 0.5
Discriminant Validity	Cross-loadings criterion Comparison	The indicators loading should be higher than all the consistent cross loading

4.4 Reliability and Validity Test of Construct

The PLS algorithm is a sequence of regressions in terms of weight vectors to test the reliability and validity of the construct. The weight vectors obtained at convergence satisfy fixed point equations for a general analysis such as to test Cronbach alpha through modelling (Hair *et al*., 2014; Latan & Ghozali, 2015; Henseler *et al*., 2015). Thus, Figure 4.7 is to show the Cronbach Alpha Test result of each construct by PLS-SEM algorithm.

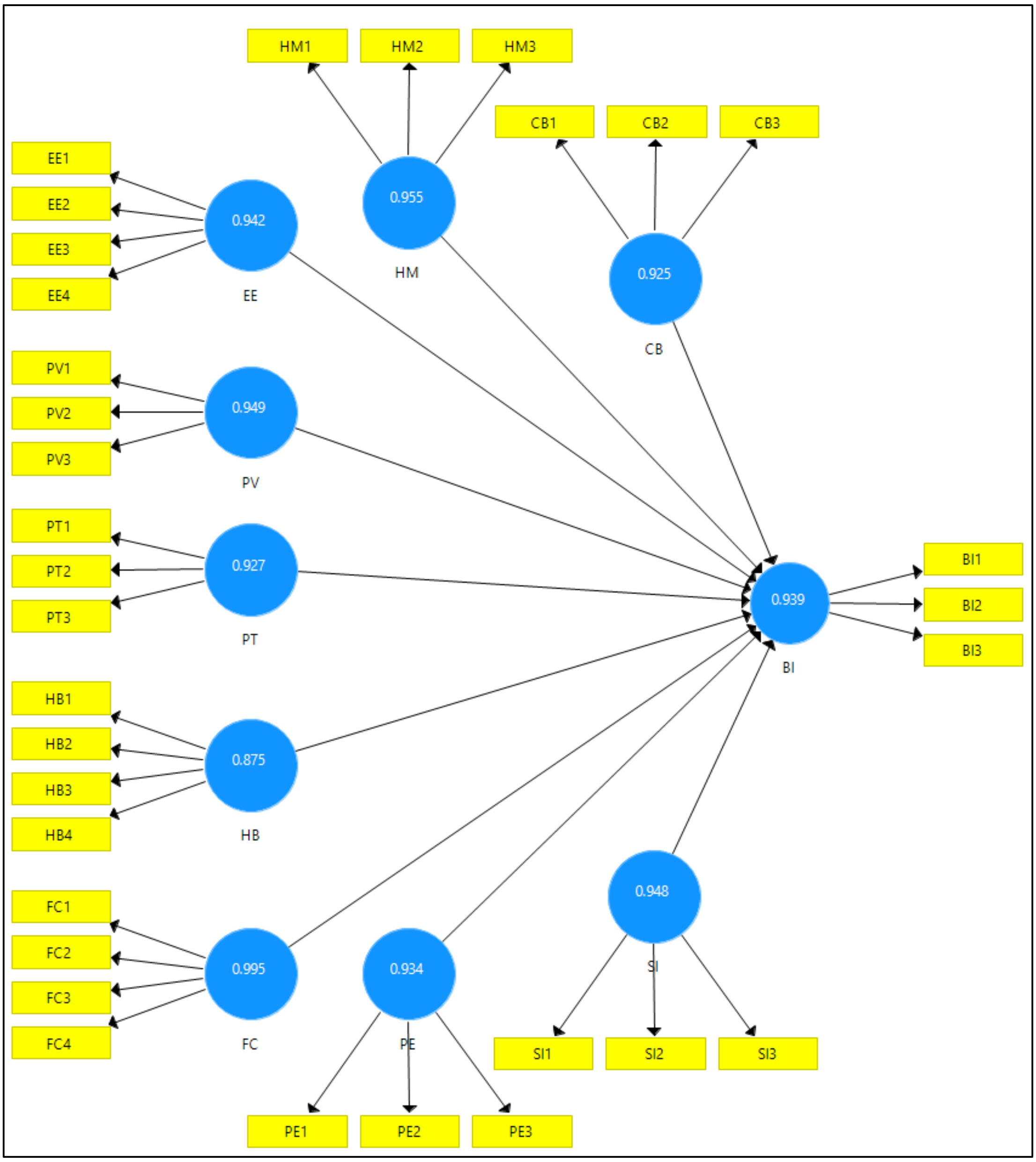

Figure 4.7. Cronbach Alpha Test by PLS-SEM Algorithm

Thomas (2008), Zoltan and Tatsuya (2010) and Pallant (2011) argued that the reliability and validity of a construct is to show how free (independent) it is from random error and brings about the magnitude of the correlation found between several scales. Therefore the internal consistency is required to check the reliability of each construct. Zoltan and Tatsuya (2010), Baker *et al*. (2011) and Pallant (2011) stated that the internal consistency is the point to which the items that make up the scale are all measuring the same fundamental quality which can be done by Cronbach Alpha Test. The coefficient is a statistic that provides indication of the average correlation among the items of each construct that make up the scale which ranges is from 0 to 1.

Table 4.7 is to show the Cronbach Alpha, the construct reliability and validity of main data among 400 respondents who have callsign from MCMC by using PLS-SEM. Accordingly, 33 items of 10 construct were used to ensure the reliability and validity test by using PLS-SEM. The tests conducted using Cronbach Alpha and Composite Reliability found more than 0.7 for each item. While the AVE values of each construct are more than 0.5, thus each item is reliable and valid in this study. Reliability and validity test of each item of each construct was analysed by PLS-SEM (The latest release is version 3.2.4). Based on the analysis the Cronbach Alpha Test of each item in the construct is more than 0.7, thus every item in the construct are reliable and valid to use in the study. The composite reliability and average variance extracted is also shown in Table 4.7.

Table 4.7

Construct Reliability and Validity Test of 400 Respondents

Construct	Cronbach Alpha	Composite Reliability	Average Variance Extracted (AVE)
BI	0.939	0.961	0.891
CB	0.925	0.952	0.870
EE	0.942	0.958	0.852
FC	0.995	0.901	0.696
HB	0.875	0.914	0.727
HM	0.955	0.971	0.918

Table 4.7 *continued*

PE	0.936	0.968	0.911
PT	0.927	0.967	0.908
PV	0.949	0.982	0.947
SI	0.948	0.954	0.872

According to Coltman *et al*. (2008), Monecke and Leisch (2012) and Diamantopoulos and Winklhofer (2014), reflective measurement relationship is from the construct to indicators. While formative measurement relationship is pointed toward the indicators to the construct. Definitely, this study is the reflective measurement model involved 10 construct with 33 items. Further evaluation procedure of PLS Algorithm in PLS-SEM is to examine the discriminant validity through the Fornell-Larcker Criterion. The criterion indicated the square root of the AVE must be higher than any other latent constructs (Hair *et al*., 2014; Latan & Ghozali, 2015; Henseler *et al*., 2015).

Consequently, the Table 4.8 is about discriminant validity is to expose the outcome that the square roots values of AVE (Bold & Colour highlighted) are higher than the rest of the correspondent latent constructs.

Table 4.8

The Discriminant Validity (Fornell-Larcker Criterion)

Constructs	**BI**	**CB**	**EE**	**FC**	**HB**	**HM**	**PE**	**PT**	**PV**	**SI**
BI	**0.949**									
CB	0.873	**0.938**								
EE	0.771	0.786	**0.929**							
FC	0.760	0.792	0.672	**0.841**						
HB	0.797	0.822	0.704	0.833	**0.857**					
HM	0.809	0.799	0.771	0.757	0.779	**0.962**				

Table 4.8 *continued*

PE	0.803	0.795	0.771	0.749	0.768	0.870	**0.927**			

PT	0.799	0.795	0.770	0.755	0.777	0.995	0.876	**0.950**		
PV	0.605	0.640	0.603	0.601	0.608	0.801	0.785	0.813	**0.907**	
SI	0.848	0.985	0.768	0.772	0.804	0.786	0.782	0.782	0.637	**0.915**

According to Wilson (2010), Hair *et al.* (2014) and Latan and Ghozali (2015), a further stage of validity procedure must conduct a discriminant validity examination through the cross loading criterion. The cross loading criterion suggests that each indicator loadings should be higher than all the corresponding cross loading.

While Anderson and Tatham (2006) and Henseler *et al.* (2015) argued that the discriminate validity is able to evaluate by exploratory the cross-loadings of each item in the constructs and the square root of AVE calculated for each construct. Every item must have higher loading on their corresponding construct than the cross-loadings on the other constructs in the model. Average Variance Extracted (AVE) is a common method of testing discriminant validity. Therefore Table 4.9 is to show that each value of constructs (Bold & Colour highlighted) are higher than the values of the cross loading variables which exposed the founding of discriminant validity. Thus, the data meet the required criteria and is acceptable.

Table 4.9

The Discriminant Validity (Cross Loading Criterion)

Constructs	BI	CB	EE	FC	HB	HM	PE	PT	PV	SI
BI1	**0.938**	0.829	0.743	0.693	0.750	0.779	0.636	0.733	0.543	0.656
BI2	**0.959**	0.835	0.739	0.714	0.777	0.771	0.622	0.744	0.577	0.688
BI3	**0.949**	0.848	0.720	0.733	0.785	0.784	0.617	0.763	0.599	0.667
CB1	0.800	**0.935**	0.759	0.752	0.767	0.764	0.637	0.820	0.624	0.735

CB2	0.828	**0.946**	0.715	0.723	0.768	0.751	0.605	0.816	0.581	0.641

Table 4.9 *continued*

CB3	0.854	**0.934**	0.751	0.725	0.814	0.780	0.632	0.751	0.592	0.707
EE1	0.703	0.728	**0.919**	0.710	0.647	0.731	0.716	0.613	0.504	0.701
EE2	0.731	0.750	**0.938**	0.736	0.665	0.717	0.699	0.657	0.562	0.738
EE3	0.735	0.733	**0.941**	0.693	0.643	0.723	0.721	0.657	0.498	0.732
EE4	0.697	0.717	**0.918**	0.717	0.663	0.716	0.666	0.640	0.556	0.786
FC1	0.582	0.593	0.590	**0.825**	0.555	0.525	0.447	0.565	0.601	0.611
FC2	0.556	0.610	0.578	**0.846**	0.590	0.533	0.406	0.563	0.677	0.626
FC3	0.681	0.697	0.711	**0.835**	0.716	0.681	0.542	0.617	0.588	0.663
FC4	0.690	0.712	0.692	**0.858**	0.686	0.722	0.549	0.650	0.547	0.648
HB1	0.757	0.744	0.681	0.674	**0.885**	0.740	0.571	0.639	0.537	0.627
HB2	0.575	0.608	0.480	0.591	**0.805**	0.550	0.392	0.546	0.611	0.570
HB3	0.682	0.712	0.584	0.676	**0.886**	0.643	0.465	0.644	0.654	0.638
HB4	0.748	0.782	0.652	0.672	**0.853**	0.751	0.606	0.679	0.524	0.610
HM1	0.782	0.781	0.752	0.730	0.752	**0.964**	0.695	0.693	0.550	0.652
HM2	0.805	0.800	0.768	0.714	0.752	**0.977**	0.703	0.694	0.544	0.661
HM3	0.778	0.770	0.727	0.691	0.777	**0.946**	0.664	0.675	0.533	0.666
PE1	0.515	0.506	0.581	0.455	0.477	0.599	**0.876**	0.467	0.293	0.478
PE2	0.657	0.659	0.745	0.589	0.578	0.685	**0.957**	0.603	0.402	0.633
PE3	0.644	0.668	0.758	0.566	0.605	0.695	**0.949**	0.614	0.397	0.637
PT1	0.744	0.804	0.655	0.673	0.703	0.675	0.579	**0.946**	0.540	0.636
PT2	0.765	0.813	0.672	0.677	0.703	0.688	0.595	**0.963**	0.577	0.642
PT3	0.731	0.797	0.647	0.688	0.686	0.673	0.567	**0.942**	0.583	0.621
PV1	0.541	0.574	0.518	0.620	0.594	0.502	0.340	0.562	**0.922**	0.548
PV2	0.538	0.589	0.506	0.637	0.597	0.484	0.333	0.563	**0.939**	0.544
PV3	0.563	0.573	0.531	0.680	0.636	0.548	0.407	0.501	**0.861**	0.514
SI1	0.728	0.738	0.810	0.711	0.688	0.716	0.676	0.684	0.528	**0.891**
SI2	0.602	0.654	0.693	0.683	0.620	0.567	0.543	0.582	0.555	**0.940**
SI3	0.589	0.625	0.668	0.685	0.641	0.581	0.503	0.547	0.538	**0.913**

In conclusion, the validity of entire process was conducted by examining the discriminant validity through the procedure in Algorithm PLS-SEM of this study. Thus, each construct is valid and complies with the criterions.

4.5 PLS Algorithm to Evaluate the Reliability of Model

Basically, the Partial Least Squares (PLS) algorithm is an arrangement of controlled in terms of weight vector. The weight vector obtained in the convergence (focus) of fixed point satisfies the calculation. Evaluation of research model was carried out after establishing the significance of the measurement in the conceptual research model. The evaluation of research model characteristic is basically on the establishment of variance explained (R^2) of the model and the significance of each estimated path coefficients (Ringle & Spreen, 2007; Hair *et al*., 2014; Ringle *et al*., 2015).

Definitely, PLS algorithm technique is to find the R^2 for endogenous variables in this study. Therefore Table 4.10 is to show the parameter to evaluate the path coefficient and outer loading of the research model.

Table 4.10

The Parameter to Evaluate Coefficient and Outer Loading

Evaluation Themes		Parameter
Coefficient of Determination	R^2	> 0.67 (Significant) > 0.33 (Moderate) > 0.19 (Weak)
Outer Loadings	R^2	> 0.708 (Reliable)

Indeed, Table 4.10 shows the parameter to evaluate the research Model through PLS Algorithm like coefficient of determination (R^2) and Outer Loadings criterion which is recognized as rules of thumb (Ringle *et al*., 2006; Ringle & Spreen, 2007; Henseler *et al*., 2009; Hair *et al*., 2014). Consequently, Figure 4.8 shows PLS Algorithm analysis the coefficient of determination (R^2) and outer loadings criterion.

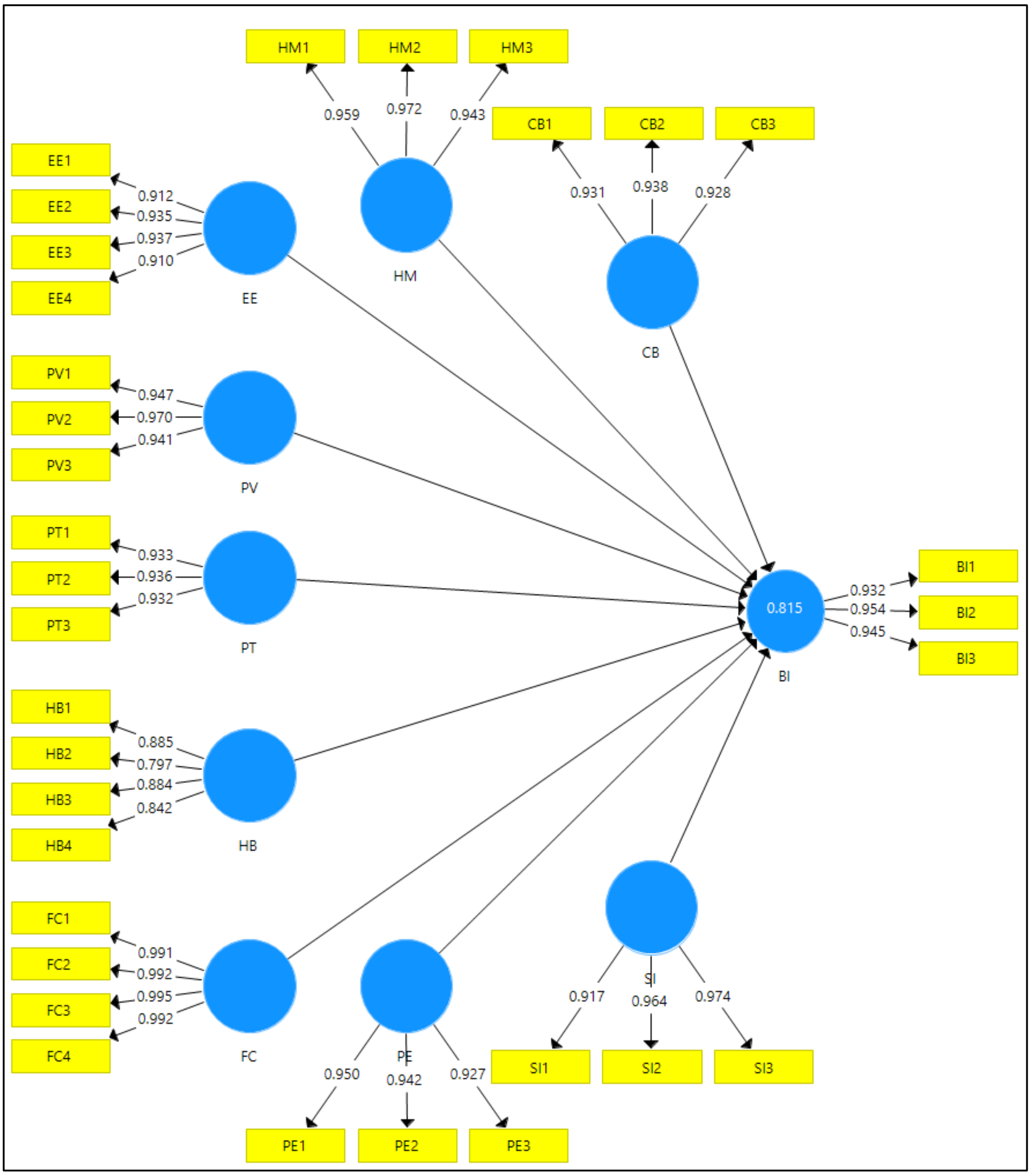

Figure 4.8. Coefficient of Determination (R^2) and Outer Loadings

Based to PLS Algorithm analysis in Figure 4.8, coefficient of determination (R^2) is 0.815. Clearly, the coefficient of determination (R^2) in this model achieves the significant level due to minimum parameter is 0.670. Indeed, the outer loading values of each item is higher than 0.708, thus each item are reliable to the model of this study.

4.6 Bootstrapping Technique to Evaluate the Path Coefficients

Bootstrapping is a nonparametric procedure that allows testing the statistical significance of various PLS-SEM results such as path coefficients. The nonparametric procedure is also called distribution-free tests because it does not assume that the data follow in specific population distribution. While parametric, information about the population is completely recognized. Bootstrapping technique is to obtain the significances of each path coefficients among specific variables. Bootstrapping technique is used to test for the implication (significance) of the path coefficient since the PLS-SEM assumes that used data are not normally distributed and thus, the non-parametric bootstrap procedure needs to be applied in order to obtain the significance of inner weights (Hair *et al*., 2014; Latan & Ghozali, 2015; Hair *et al*., 2015).

The bootstrapping technique uses the repeated random sampling with replacement from the original sample in order to create bootstrap samples which eventually obtain standard errors for hypothesis testing (Monecke and Leisch, 2012; Ringle *et al*., 2013; Latan & Ghozali, 2015).

While, Henseler *et al*. (2009), Ringle *et al*. (2013) and Hair *et al*. (2014) recommended that the number samples of bootstrap are set to 5,000 to obtain the significances of each path coefficients among variables in specific model with the significant level at $p < 0.05$ (2-tailed test). Through the bootstrapping test technique, the probability of obtaining a test statistic (P-value) with a value ranging from zero to one, if the P value is less than or equal to 0.05 probability level, it is considered significant.

4.6.1 Coefficients Evaluation for the Dimensional Model

According to Linsmeier & Pearson (2000), Hair, Ringle and Sarstedt (2011) and Latan & Ghozali (2015), the indicator of a significant relationship between the constructs can be seen through bootstrapping. To test the significant hypothesis, T value must be higher than 1.645 ($T > 1.645$) to indicate that the constructs are significant at the P level 0.05 (+/- 0.001).

The bootstrapping technique is used to indicate the level of significance between constructs through T statistical value. The coefficients evaluation of the dimensional model of research is able to explain the significance and correlation of each hypothesis. The higher the absolute value of T value, the smaller the P value and the greater the evidence against the hypothesis. That means the higher the T value, the stronger hypothesis (Efron & Tibshirani, 1993; Davison & Hinkley, 1997; Latan & Ghozali, 2015).

Consequently, categorized validity conceptual models by using PLS-SEM bootstrapping technique and significance level is set to 0.05 (95% degree of confidence) with two-tailed test type. Indeed to clarify the supported and non-supported path coefficients from the formulated hypotheses. Nine hypotheses were formulated in this study as clarified in Chapter Three. Thus, T values and path coefficients correlation among 9 hypotheses were shown in Figure 4.9.

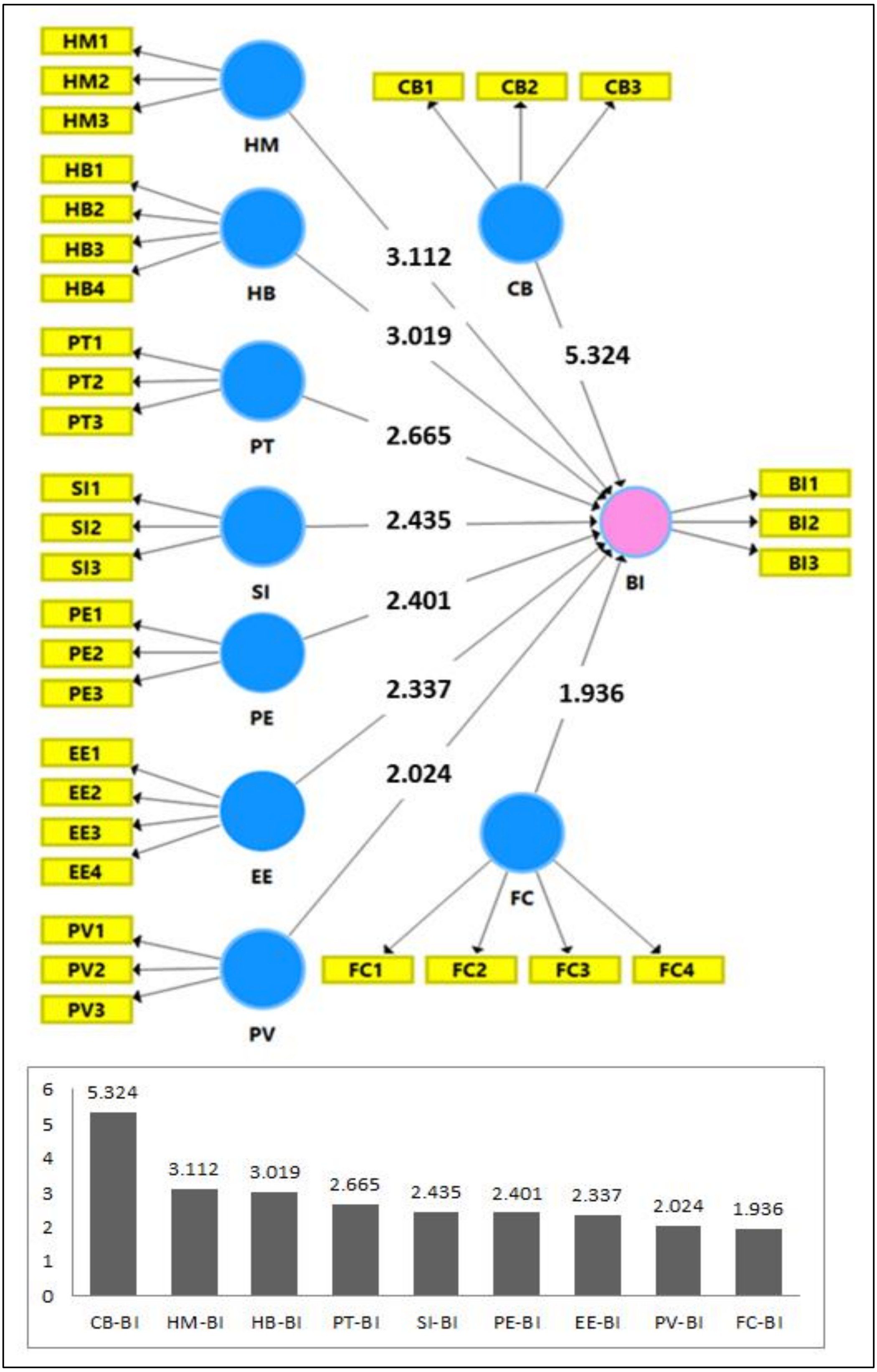

Figure 4.9. T Values and Path Coefficients Correlation

The path coefficients for the dimension model relationships of the study are able to evaluate the significant level of each hypothesis through bootstrapping test at degree of freedom 5000 subsamples with significant level at $p < 0.05$ (2-tailed test) (Monecke and Leisch, 2012; Ringle *et al.* ,2013; Latan & Ghozali, 2015). Definitely,

Table 4.11 is the bootstrapping result to describe the descending order of the hypothesis significant and path coefficients for the dimension model relationships of the study.

Table 4.11

Path Coefficients for the Dimension Model

Hypotheses	**Path (β)**	**Correlation among Factor**	**T Values**	**P Values**	**Outcome**
H_9	1	CB→BI	5.324	0.000	
H_6	2	HM→BI	3.112	0.002	
H_7	3	HB→BI	3.019	0.003	
H_8	5	PT→BI	2.665	0.008	The higher the T value, the smaller the P value is to show the stronger hypothesis
H_3	7	SI→BI	2.435	0.015	
H_1	9	PE→BI	2.401	0.016	
H_2	4	EE→BI	2.337	0.019	
H_5	8	PV→BI	2.024	0.043	
H_4	6	FC→BI	1.936	0.053	

PLS-SEM Bootstrapping technique:
T value must exceed 1.645 ($T > 1.645$)
Degree of freedom sample 5,000 (95% degree of confidence)

Based on the result in Table 4.11, the bootstrapping procedure in PLS-SEM is able to analyze T values and path coefficients correlation among IV and DV. Therefore, bootstrapping technique is able to show the strongest support hypothesis with the T value must exceed 1.645 (T> 1.645) (Monecke and Leisch, 2012; Ringle *et al.*, 2013; Latan & Ghozali, 2015). Based on the outcome in Table 4.11, each hypothesis is supported by the path coefficients for the dimensional model relationships of this study.

According to Monecke and Leisch (2012), Ringle *et al*. (2013) and Latan & Ghozali (2015), there is another technique to evaluate and to ensure that this hypothesis can be accepted or not for a particular study which involved conceptual modelling. The technique is blindfolding through PLS-SEM analysis. Through the bootstrapping and the blindfolding technique, the influencing factors can be seen clearly and was able to describe and to predict the relationship of the hypotheses that have been constructed for a particular study (Monecke and Leisch, 2012, 2011; Ringle *et al.,* 2013; Latan & Ghozali, 2015). Therefore the hypothesis is able to evaluate through bootstrapping and blindfolding technique.

4.7 Hypothesis Evaluation

According to Clauset, Shalizi and Newman (2009), the hypothesis of the research is must be tested, which means it is referred to the validation. Thus, "empirical data" refers to the use of hypotheses that can be tested by observation and experiment work. The empirical data generated by experiments and observations are able to support or non-support the hypothesis.

The significance (relevance) level of each hypothesis through bootstrapping technique already described. Clearly, this study was conducted to identify the consequent hypotheses from the conceptual research model to determine the salient factors toward the behavioural intention in the use of ARCT amongst ARC in Malaysia in ES. Therefore the hypotheses of this study are successfully evaluated through bootstrapping technique in PLS-SEM.

Furthermore, blindfolding technique in PLS-SEM is use to identify the relationship and to predict significance (Q^2) of each hypothesis. Ringle *et al*. (2006); Ringle & Spreen (2007), Henseler *et al*. (2009), Hair *et al*. (2011), Hair *et al*. (2014) and Latan & Ghozali (2015) argued that blindfolding technique is sufficient to support cross-validated in assessing the relevance (significance) of the excess while checking model predictions involving hypotheses and include every factor of the path model and structure model during the procedure. Therefore to examine the predictive significance (Q^2) by using blindfolding procedure through the cross-validated redundancy technique is carried out in this study. On the other hand, Q^2 values to the particular latent construct or factor which is larger than zero (0) indicates that the latent variable that explain the factor have the predictive significance (Henseler *et al*.,2009; Hair *et al*. ,2011; Hair *et al*. ,2014; Latan & Ghozali (2015). Furthermore, a parameter to evaluate the Q^2 with the consequent hypothesis among constructs (Influences factors) as shown in Table 4.12.

Table 4.12

Parameter to Predict Significance of Model

Evaluation Themes		**Parameter**
Predictive Significance	Q^2	> 0.350 (higher) > 0.150 (medium) > 0.020 (low)

Clearly, Table 4.12 shows the parameters used to evaluate Predictive Significance (Q^2) of the model through the blindfolding procedure in PLS-SEM. Thus, Figure 4.10 shows blindfolding procedure to calculate Q^2.

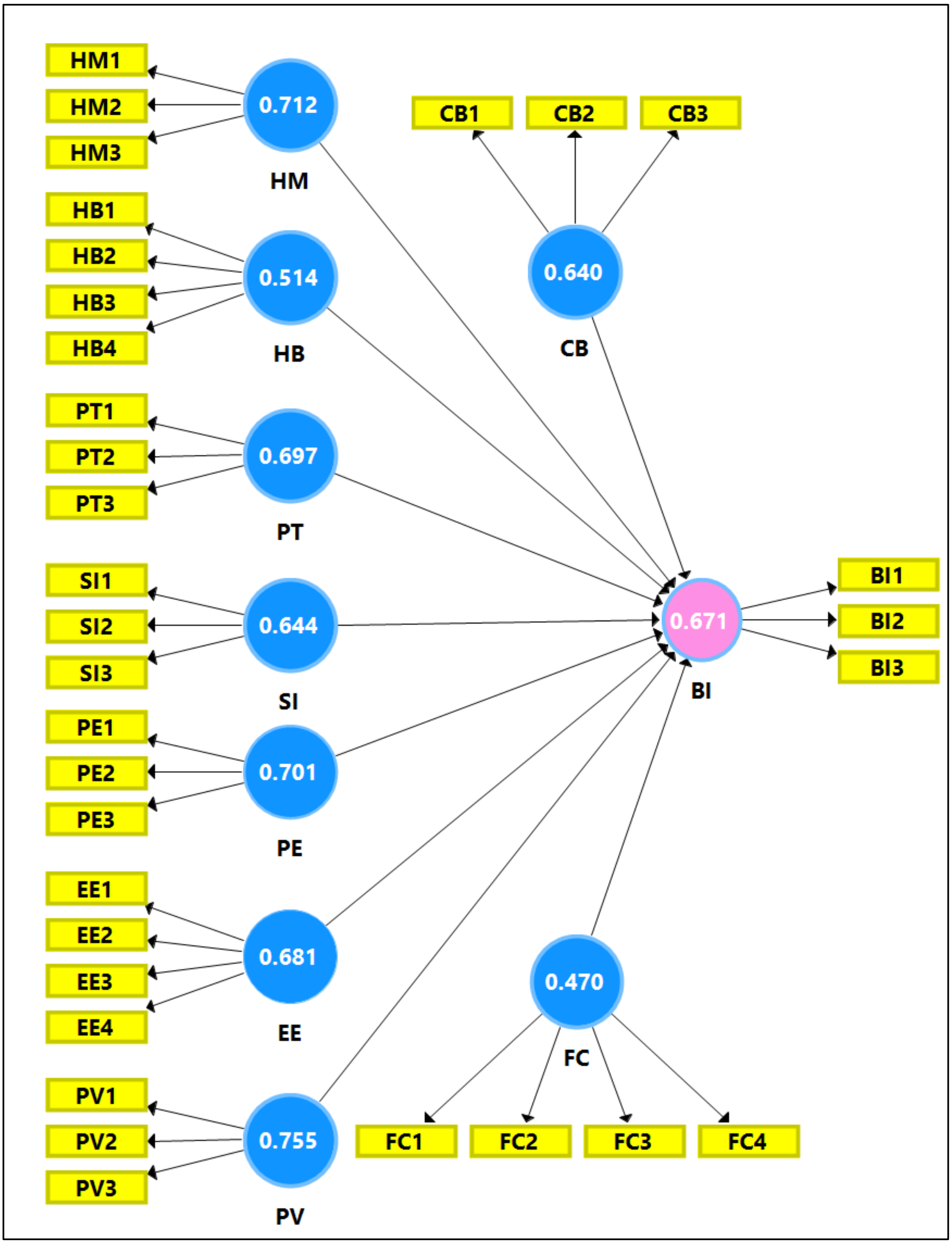

Figure 4.10. Blindfolding Procedure to Evaluate Predictive Significance

According to Henseler *et al*. (2009), and Ringle, Wende & Becker (2015), blindfolding Q^2 with a value large than 0.350 indicate the higher level of significance of each construct. The commonality is a combination of indicators that arise to show the significance of the hypothesis of a specific objective. Based on blindfolding procedure, Q^2 evaluates the predictive validity of a large complex model using PLS-SEM. While estimating parameters for a model under blindfolding procedure, this technique omits data for a given block of indicators and then predicts the omitted part based on the calculated parameters. Thus, Q^2 shows how well the data collected empirically can be constructed with the help of model and the PLS-SEM parameters. Thus, Table 4.13 shows the result of blindfolding Q^2.

Table 4.13

Result of Blindfolding Predictive Significance (Q^2)

Construct Crossvalidated	**Q^2 (=1-SSE/SSO)**
	Communality
BI	0.671
CB	0.640
EE	0.681
FC	0.470
HB	0.514
HM	0.712
PT	0.697
PE	0.701
PV	0.755
SI	0.644

Based on the empirical data in Table 4.13, predictive significance (Q^2) of each construct in this study is significant to support each hypothesis due to Q^2 among each construct is higher than 0.350, so each hypothesis is accepted and the model of this study is convinced and validated.

Based on the analysis obtained through bootstrapping in Table 4.9, each hypothesis found supported the path coefficients for the dimension model relationships of this study (Figure 4.10: T Values and Path Coefficients Correlation) due to T Value is higher than 1.645 (Henseler *et al.*, 2009; Hair *et al.*, 2011; Hair *et al.*, 2014; Latan & Ghozali, 2015).

Consequently, each hypothesis of the study was accepted and validated based on blindfolding predictive significance (Q^2) procedure through PLS-SEM modelling analysis and able to identify which salient factors (factors that contribute the most) and to clarify which factors have the least impact to the study. Thus the research question of this study was answered by PLS-SEM modelling analysis through blindfolding predictive significance (Q^2) procedure.

4.8 Moderation Effect Evaluation

Moderator effect is able to determine through multi-group analysis by using PLS-SEM. The multi-group analysis is to relate parameters between two or more groups of data such as age, gender experience and others. Bootstrapping technique is able to indicate and highlight significant path among IV and DV using relative P values of moderating effect (Monecke and Leisch, 2012, 2011; Ringle *et al.*, 2013; Latan & Ghozali, 2015). The moderating effect of this study is the age (AG), gender (GE) and experience (EX) amongst the ARCs in using ARCT. Therefore, Figure 4.11 is to show moderating effect evaluation using bootstrapping technique.

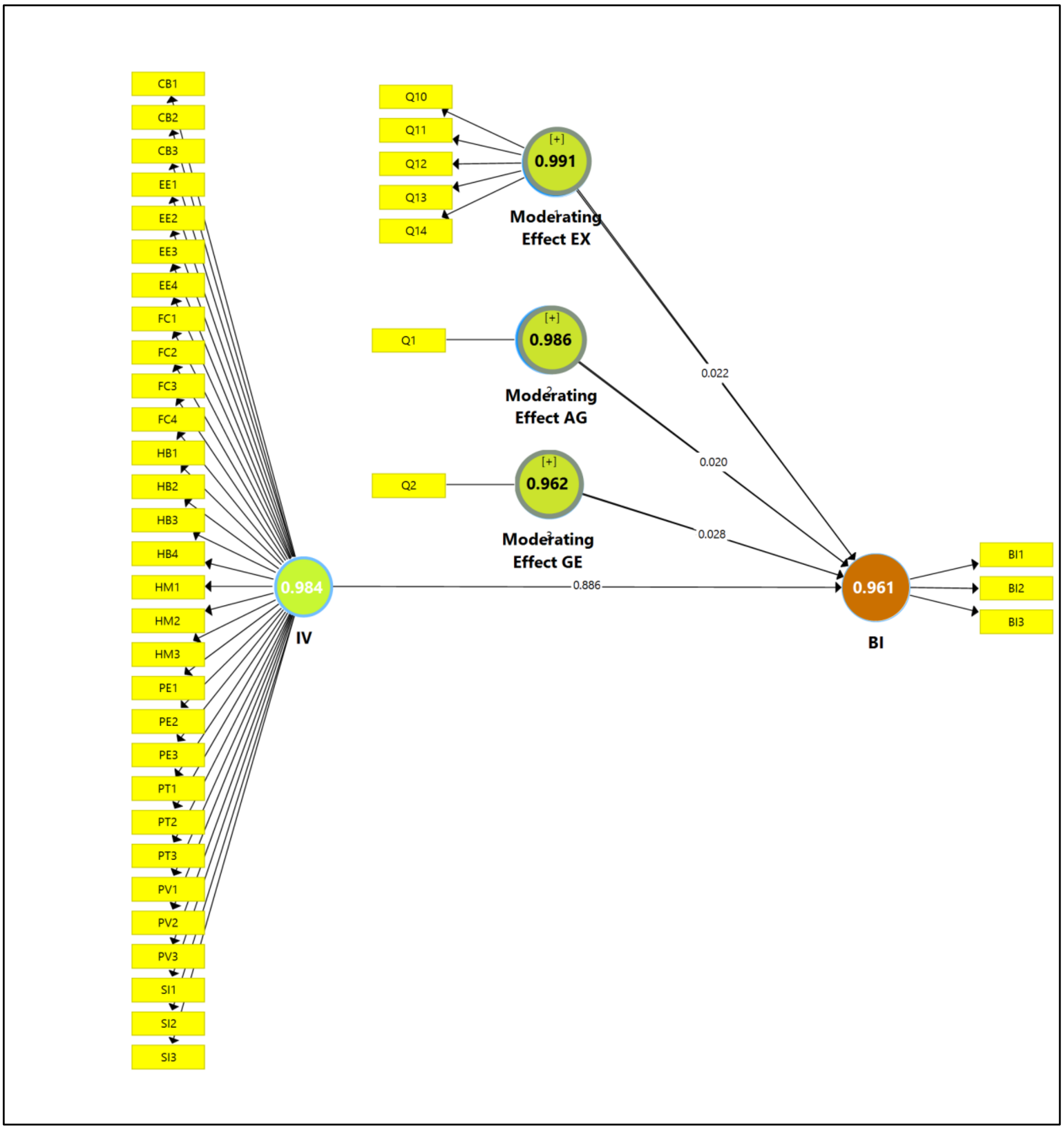

Figure 4.11. Bootstrapping to Show the Path Significance Using Relative Values

Based on this analysis procedure, it was found that the composite reliability of each IV exceeds 0.7, so the internal consistency reliability relationship of each IV (0.984) to DV (0.961) is reliable and show the moderating analysis are valid due to meet the parameter requirement in Table 4.6 (The Parameter for Model Evaluation).

Bootstrapping technique is to show R-Square (R^2) and able to highlight the significance path using relative values of moderating effect (Ringle *et al.*, 2013; Hair *et al*., 2014, Latan & Ghozali, 2015). Indeed, a moderating effect is to show variances (differences) in the strength of the relationship as shown in Figure 4.11.

According to Baron (1986), Holmbeck (1997) and Ringle *et al*. (2013), moderating effect is an additional variable is to disclose the changes affect the external stability to internal variables with a positive value of standard deviation (STDEV). Moreover, Baron (1986), Holmbeck (1997) and Ringle *et al*. (2013) argued that the usefulness and the effectiveness of moderating variable cannot be denied in the complex model as it simplifies variations in the stands of researchers.

Therefore, moderator effect is able to introduce and showed the variations in the view of the researchers on the relationship among internal and external variables of this study. Indeed, Table 4.14 shows moderating effect result by using PLS-SEM Bootstrapping technique.

Table 4.14

Result of Moderating Effect through Bootstrapping Technique

Hypotheses	**Path(β)**	**Moderating Effect**	**STDEV**	**R^2**
H_c	c	EX→BI	0.022	0.991
H_a	a	AG→BI	0.020	0.986
H_b	b	GE→BI	0.028	0.962

PLS-SEM Bootstrapping technique:
Degree of freedom sample 5,000 & Significant level at 95% degree of confidence (0.05)
Test type =Two Tailed
R^2 > 0.67 (Significant)
R^2 > 0.33 (Moderate)
R^2 > 0.19 (Weak)

Welkowitz *et al*. (2006), Kurniawan (2008) and Henseler and Fassott (2010) stated that the R^2 value through the bootstrapping procedure is able to use to determine whether the moderating effect is highly significant or less significant of the statistical analysis of the specific study. In statistics, the standard deviation (STDEV) is to measure the number of variations or deployments of a set of data values. A low STDEV indicates that the data points inclined to be close to the min (also known as the expected value) set, while high standard deviations indicate that the data points are dispersed in a wider range of values. Most researchers agree that the value of STDEV of each construct is below 0.05 is an appropriate distribution of the data and acceptable to test the moderating effect.

Thus, the output data of this study is appropriate to determine the moderating effect due to the STDEV of each construct is below than 0.05 (H_a 0.020, H_b 0.028, and H_c 0.022). Linsmeier and Pearson (2000), Hair, Ringle and Sarstedt (2011) and Latan and Ghozali (2015), argued that the indicator of a significant path can be seen with R^2 value must more than 0.67 ($R^2 > 0.67$) to indicate that the moderator is significant at a 95% degree of confidence (0.05). While R^2 value more than 0.33($R^2 > 0.33$) indicate that the moderator is moderate and If R^2 less than 0.33 and more than 0.19 ($R^2 > 0.19$) indicate that the moderator is weak.

Based on the moderating effect analysis through PLS-SEM bootstrapping procedure, the EX (0.991), AG (0.986) and followed by the GE (0.962) are supported due to R^2 values are more than 0.67 ($R^2 > 0.67$). Therefore, the most influential moderating effect begins from the EX, AG and followed by the GE.

4.9 Summary

This chapter clarifies the distribution and collection method and the data analysis using SPSS Version 22. The data analysis and outcomes used PLS-SEM Version 3.2 and upgraded to the latest release version 3.2.4. The evaluations of dimension model, reliability and validity test of the construct is feature analyse through the PLS algorithm, bootstrapping technique and blindfolding.

This chapter also evaluates the significance of the hypothesis for the dimensional model of this study and provided the empirical data and validated the conceptual research model. Clearly, this chapter discovers the analysis procedure to investigate the salient factors and influence and relationships among factors through modelling analysis in understanding the BI amongst ARC's in use the ARCT in ES in Malaysia. Moreover, this chapter has been successful to clarify the relationship between the construct and to show which hypothesis is accepted based on PLS-SEM analysis procedure. The discussions which are related to the hypothesis and the research objective will be discussed in the next chapter.

CHAPTER FIVE

CONCLUSION

5.0 Introduction

This chapter addresses the findings, which leads to the accomplishment of the research questions and objectives of the study. The result obtained concluded that there is correlation between the BI of the ARC and the use of ARCT as verified by the constructed model. Hence, this chapter focus on the analysis of research limitations and also directions for future research.

It is significant to understand the salient factors influencing BI of ARC when using ARCT since the success of present activities are attributed to the use of technological innovation which are required in sharing and disseminating information. Assessment the influence factors was done and verified by relevant theoretical model (Hendriks, 1999; Sarker & Wells, 2003; Thacker *et al*., 2004; Fiona & Linda, 2004).

5.1 Discussion of the Hypotheses

The hypotheses highlighted the direct effect and moderate effect which showed the interactions between factors toward the BI amongst the ARCs using ARCT in ES around Malaysia. Initially, ten hypotheses were constructed based on the research objective of the study (Refer to Figure 2.5 from Chapter Two).

A hypothesis is a proposed answer to a question or problem that can be verified or rejected through testing. A hypothesis statement is typically an educated guess to explain the relationship between factors and it serves as the basis for an experiment, to test whether the relationship is true. Thus, hypotheses generated in this study are to determine the best combinations of relationship among the factors. This study investigated the factors that influence the BI among the ARC in using ARCT during ES. A detailed explanation as to how hypotheses were constructed is described in section 2.8 of Chapter Two. The hypotheses are stated as positive statements on how the factors are influencing BI of ARC are shown in Table 2.5 of Chapter Two. Based on the analysis in Chapter Four, each hypothesis is accepted because it fulfils the predefined parameter. Statistical analysis was conducted and empirical data were presented in the form of tables and figures in section 4.1 until 4.8

Almost all of the previous researchers have stated that a hypothesis is supported if T value exceeds 1.645 ($T > 1.645$). This study used bootstrapping method for the statistical analysis. The basic idea of bootstrapping is that inference about a population from sample data, (sample from population), can be modelled by resampling the sample data and making inference about the sample from the resampled data (resampled from sample). In bootstrapping, the 'population' is in fact the sample, with this known fact, hence the quality of inference of the 'true' sample from the resampled data, is determined (Henseler *et al*., 2009; Hair *et al*., 2014; Ringle, Wende & Becker; 2015). Bootstrapping procedure is able to clarify the significant relationship with T value level and path coefficients correlation (95% degree of confidence) is more than 1.645 at significant level at $P < 0.05$. The T values are able to illustrate path coefficients correlation among hypotheses and are able to emphasize the strength of the hypothesis. High T value reflects that the hypothesis is increasingly influencing the dimension of the study and when the T value is lower, this reflects that the hypothesis has less influence in the dimensions of the study (Ringle *et al*., 2013; Hair *et al*., 2014, Latan & Ghozali, 2015). Cohen and Morrison (2007), Kock (2014) and

Wasserstein and Lazar (2016), stated that when the T value is high, this reflects the smaller P value, the greater the evidence against the hypothesis. The T values and path coefficients correlation among the 9 hypotheses are as shown in Figure 4.11 in Chapter Four. Table 5.1 showed how the hypotheses are influencing the dimensions in descending order based on T Value.

Table 5.1

The hypothesis sequence of this study

No	Sequence	T Values	Hypotheses
1	H_9	5.324	CB positively influences the BI in the use of ARCT amongst the ARCs in ES.
2	H_6	3.112	HM positively influences the BI in the use of ARCT amongst the ARCs in ES.
3	H_7	3.019	HB positively influences the BI in the use of ARCT amongst the ARCs in ES.
4	H_8	2.665	PT positively influences the BI in the use of ARCT amongst the ARCs in ES.
5	H_3	2.435	SI positively influences the BI in the use of ARCT amongst the ARCs in ES.
6	H_1	2.401	PE positively influences the BI in the use of ARCT amongst the ARCs in ES.
7	H_2	2.337	EE positively influences the BI in the use of ARCT amongst the ARCs in ES.
8	H_5	2.024	PV positively influences the BI in the use of ARCT amongst the ARCs in ES.
9	H_4	1.936	FC positively influences the BI in the use of ARCT amongst the ARCs in ES.

PLS-SEM Bootstrapping technique:
T value must exceed 1.645 ($T > 1.645$)

Table 5.1 showed the sustained hypothesis in descending order based on T Value (T > 1.645). The strongest hypotheses are beginning from H9, H6, and H7 and followed by H8, H3, H1, H2, H5 and finally, H4. Thus the strongest salient factors influencing BI amongst ARC used the ARCT to support relief agencies in ES in Malaysia is begun from CB, HM, HB, PT, SI, PE, PV, EE and FC.

5.1.1 H_9 - CB positively influences the BI

H9 has a T Value of 5.324 with the significant level range at $P < 0.05$, therefore this hypothesis is accepted. This definitely shows that CB is the strongest factor influencing the BI amongst the ARCs in using ARCT to support relief agencies in sharing and disseminating information during ES in Malaysia. In the context of this study, H_9 clarifies the extent of compatibility in BI amongst the ARCs that are using ARCT in sharing and disseminating information to support relief agencies in ES.

CB is defined as the degree of compatibility in the usage of ARCT amongst the ARCs when sharing and disseminating information in ES. Therefore, H9 is able to describe the extent of compatibility in influencing BI in the usage of ARCT amongst the ARCs when sharing and disseminating information with relief agencies during ES.

Noteworthy, in the cases that are compatible, CB may influence an innovation to be created in the organization and also serves as a retention factor for the technology. CB usually positively influences BI of users to adopt and use the particular technology for a long time. Studies have shown that innovation and CB with technology in an organization will influence the BI amongst the people to use the related technology (Kotler, 2003; DeLone & Mclean, 2003; Wu & Wang, 2005; Sang *et al*., 2009).

Thus, the positive relationship between CB and BI in this study is due to Arcs' compatibility with the usage of ARCT in sharing and disseminating information to support relief agencies during ES in Malaysia. This factor can be observed when ARCs feels compatible (with the technology) and volunteer to use ARCT in sharing and dissemination of information to support relief agencies such as BOMBA, JKM, JPAM, and PDRM during 2014 huge flood disaster in Perlis, Kedah and Kelantan (MARES, 2015; Ahmad Shabery, 2015; ALFA Squad, 2015).

5.1.2 H_6 - HM positively influences the BI

H_6 has a T value of 3.112 with significant level range $P < 0.05$; therefore, the hypothesis is accepted. HM explains the extent of pleasure and enjoyment derived when ARCs use ARCT during ES in Malaysia. HM is the second most influential factor which affects the BI of ARCs when using the ARCT to support relief agencies in sharing and disseminating information in ES.

According to Venkatesh *et al*. (2012), Akbar (2013), and Prins (2014), the HM indicated that the use of a certain technology in a community will improve the understanding of that technology thus resulting in the community to be more confident with the technology. The HM factor is used to know and satisfy the intrinsic inspiration of the communities, such as the use of technology as a social network for sharing information in particular condition.

HM is defined as the experience of fun or pleasure derived from the intention to use certain technologies in certain population. HM has direct influence in the intention to continue to adopt the technology. This is also reflected in the hedonic factors influencing individuals to use related technologies (Venkatesh & Brown, 2005; Liao & Lin, 2007; AbuShanab & Pearson, 2007; Magni *et al*., 2010). Notably, in this study, HM is about the ARC experience of fun or pleasure derived from using ARCT during ES in Malaysia. It is in the perspective of HM that directly influences the ARC intention to continue to adopt the ARCT in in the future.

HM is about the feeling of pleasure that drives the ARCs' intention to use certain technology. HM is directly influenced intention of a certain community to continue to adopt certain technology. This is also reflected in the HM factors which influence communities to adopt and use technologies and continue to use as long as it is enjoyable.

HM is about the degree of fun or pleasure amongst the ARCs in using the ARCT. Therefore, HM positively influences the adoption intention as supported by previous research in the field of technology such as Venkatesh *et al*. (2012), Kit (2014), and Arenas-Gitan *et al*. (2015). Thus, BI amongst the ARCs is driven by the aspirations of fun and enjoyment, engagement in the pleasurable activity and also entertainment while adopting and using the ARCT during ES in Malaysia.

5.1.3 H_7 - HB positively influences the BI

HB in psychology refers to repetitive behaviour that requires little or no thought and is innate. Enforcement can encourage repetition of behaviour or response. Every time a stimulus is given, it produces a repeat behaviour. Behaviours become more automated with every repetition. However, HB can also result from a single experience, especially when emotions are involved. HB can be a part of any activity, ranging from eating, sleeping to thinking and responding. HB can be developed through enforcement, for instance, repetition in using technology continuously. HB, as argued in psychological context, is a convenient way to keep higher mental processes for more demanding tasks, but it can also promote behavioural stubbornness (James, 2013).

Currently, recent work has challenged the role of BI as the key point predictor of technology usage among users. Instead they have introduced a new construct into the theoretical model for example, HB, as an alternative critical predictor of technology use. Integrating HB into the theoretical model will match the theory's focus on intentionality as the primary mechanism and key factor of behaviour. In fact, HB as a key alternative mechanism has been lauded as a valuable next step in the theoretical model (Davis and Venkatesh, 2004; Kim and Malhotra, 2005; Kim *et al*., 2005; Limayem *et al*., 2007).

Venkatesh *et al*. (2012) argued that the role of HB—although operationalized differently in each paper of the past researchers—has a direct effect on technology use and/or practice. It weakens or limits the strength of the relationship between BI and specific technology used by specific users. For example, the integration of several workflows provides an explanation of the other interesting phenomena that is important from a scientific point of view.

Venkatesh *et al*. (2007) have called for alternative hypothetical mechanisms in order to foster development in this mature stream of work. The combination of HM, PV, and

HB resulted in new mechanisms, (i.e., affect, monetary constraints, and automaticity) when tied to the new constructs will produce large cognition and intention-based theoretical model.

In the course of this research, H7 is defined as to identify the extent of HB in influencing ARC's behaviour. The study has shown to support this hypothesis where HB does influence the ARC to behave spontaneously when using ARCT in ES.

Based on the data analysis, it is found that H_7 influenced BI of ARCs in using ARCT. ARCs use ARCT as a hobby in their daily life and not only during ES. The use of ARCT has become common practice in their daily life among respondent in this study. This spontaneous behaviour is unique, in a way that they are always adapting and using ARCT for information sharing, even though not in ES.

Due to the unique behaviour of ARCs using ARCT as a hobby in their daily life, therefore, HB is the third factors that influence ARC behaviour when using ARCT in the ES in Malaysia. This further clarifies the reason why ARCs are very excited to use ARCT in ES to support the relief agencies in providing important information. Since the T value is 3.019 with the significant level range at $P < 0.05$, H_7 is accepted.

5.1.4 H_8 - PT positively influences the BI

H_8 is accepted because it has a T value of 2.665 and is within the significant level range of $P < 0.05$. H_8 explains the significance of PT among the ARCs towards BI when using ARCT in sharing and disseminating information during ES in Malaysia.

PT is the fourth factor which has strong influence towards BI to use the ARCT. H_8 is about the extent of reliability among the ARCs when using ARCT in sharing and disseminating information in ES in Malaysia. This study found that ARCs are confident that the information shared and disseminated through ARCT is trustworthy (reliable). PT amongst the ARCs is significant during ES and it provides an important resource to the relief agencies in Malaysia.

ARCs contributions and support in emergency cases cannot be denied. As evidence, when the huge floods hit Johor, Kelantan, Terengganu and Perlis in 2007, ARC has extended support in terms of online and mobile communication systems due to disruption and failure of landline to operate. They have been at the forefront in emergency communication in emergency situation during that time. However, the BI amongst the ARCs to be volunteers to support relief agencies is limited due to minimum support by the government (Mohd Aris, 2014; Roszeta, 2014; Bahari, 2014).

PT is a reliable and significant communication attitude among the trusted partners when using communication technology (Nakajima *et al*., 2007; Walker, 2012; Petty & Cacioppo, 2012).

PT among communities in sharing information is a factor influencing communication strategies in ES (Ulmer *et al*., 2014; Coombs, 2014; FEMA; 2014). PT is able to explain the confident behaviour among the ARCs when they decide to share and disseminate of information during ES. In an emergency situation, PT is important to ensure the media communication is functioning and reliable information disseminated in order to evacuae by relief agencies (Haring, 2003; Nollet & Ohto, 2013).

5.1.5 H_3 - SI positively influences the BI

Venkatesh *et al*. (2012) stated that SI is defined as the degree to which a technology is perceived by users to be important that influence their decision to use the related technology in a given situation. This study has identified SI influencing the BI of ARCs to use the ARCT in ES.

According to Ajzen & Fishbein (2012), other than the surrounding communities, there are another four social groups, namely, politicians, economists, IT professional and general workers who have behavioural characteristics that can influence communities' intention to use specific technologies in a given situation.

Past researchers stated that the SI, which measures the effect of social environments attitude among communities, was found to be statistically significant on BI to use a particular technology. This was discovered through modelling research. They also stated that SI has a positive influence on the BI of users, where users tend to choose technologies which are related to their demographics (Slade *et al*. 2014). The operational definition of SI is to investigate the extent of people's perception that ARC should adopt and use ARCT in ES. In this study, the appropriate constructs are used to understand the interpretations of respondents (amongst the ARCs) whether what the communities, who are important to them, think that they should use ARCT in sharing and disseminating information in ES.

SI is defined as the degree to which ARC perceives how important others believe they should adopt and use ARCT in ES. Hence, this factor is to recognize whether the participants expect others such relative, friends, partners, co-workers, partners, spouses or neighbours, to appreciate them, when adopting and using ARCT in ES.

Based on observations in the study conducted, it was found that the ARC is always aware of the SI from the public and surroundings because they only will share and disseminate trustworthy information among their communities with ethics. Thus, in this study, SI positively influences the BI of ARCs in the use of ARCT to support relief agencies in ES. Indeed, H_3 is the fifth factor with strong influence towards the BI of ARCs to use ARCT. T Value is 2.435 with the significant level range at $P < 0.05$; therefore, H3 is accepted.

5.1.6 H_1 - PE positively influences the BI

PE is a user's requirement which includes expected results, behaviour and actions. PE is usually documented in contracts, job descriptions, company policies and performance management documentation. An example of PE is life long learning, which is the opportunity to continue to develop talents and acquire knowledge when using the new technology. PE also refers to the individual effort to learn and use the technological resources, planning tools to become fully skilled and specialised in the technology within the prescribed time frame (Mayne, 2004).

PE affects the expectations that contributors have to form relationships and influence stakeholders to gain support for team objectives. For example, the government hopes that more volunteers will come forward to support relief agencies during emergencies, therefore PE refers to the effort made by government to get more volunteers. It also refers to how are the efforts communicated to achieve the objectives. For example, role-player in disaster management develops action plans for all initiatives and communicates to stakeholders to publish their effort (Horgan, 2003; Mayne, 2004).

According to ARES (2012), PE factor has been identified by everyone and is no doubt that ARCs performance and proficiency to use the ARCT is popular in supporting relief agencies in ES and very admired around the world.

Based on data analysis, ARCs agreed and decided that the use of wireless communication technology like ARCT is able to increase people's chance in sharing and disseminating information, which is important in ES. Indeed, ARCT helped people in sharing and disseminating information more quickly in any situation and not only in ES. According to previous researchers, PE factors are able to be used as a measurement to determine the influence of factors not only in ES because it is significant in any situation.

This sudy showed that PE has positive influence among the ARCs. ARCs believed that, using ARCT makes them appear more professional and produce better quality work. They also believe that PE is important to enable them to set a standard among ARC for the future use in ES.

H_1 is the sixth factor influencing the BI of ARCs to use ARCT in sharing and disseminating information during ES in Malaysia. The T Value is 2.401 and within the significant level range at $P < 0.05$. Therefore, this hypothesis is accepted.

5.1.7 H_2 - EE positively influences the BI

H_2 is defined as the extent of usefulness and ease in the usage of ARCT among the ARCs in ES. H_2 is the seventh factor influencing the BI of ARC to use ARCT in sharing and disseminating information during ES in Malaysia. T Value is 2.337 and within the significant level range at $P < 0.05$; therefore, this hypothesis is accepted.

Generally, EE is about the degree of ease associated with the use of technology. This means, learning how to use a technology such as mobile communication, is easy and manageable in an organization (Sun *et al*., 2010).

Learning how to use the ARCT in sharing and disseminating information in ES is easy for ARC. Most of them are skilful in using the ARCT. Their interaction through ARCT in sharing and dissemination of information in ES is clear and can be understood by relief agencies because most of them have experience in handling and using the ARCT equipment in their daily life. Acharya (2005), Haddow (2009), and ARES (2011) stated that most of them have extensive experience in handling ARCT equipment in their daily life.

In addition, Ashriq (2011) stated that ARCT is easy to use and handle in daily life, and this has caused a habit among the ARC to share and disseminate information with relief agencies in ES. ARCs skills using ARCT in sharing and dissemination of information in supporting relief agencies are undeniable. ARCs can support relief agencies in search and rescue in ES. ARCT would also be most useful when ES occurs because there is limit for people to come into contact to share and disseminate information (MERCY, 2012; Rashid & Zainal, 2013).

5.1.8 H_5 - PV positively influences the BI

H_5 identifies the compromise between the price of using the ARCT and the perceived benefits to the role-player (respondents among the ARCs). Based on data analysis, PV which is H_5 has a T Value of 2.024 and is within the significant level range at $P < 0.05$. Therefore, H_5 can be accepted as the eighth factor affecting BI of ARCs to use ARCT in ES.

According to the current market, ARCT price is reasonable compared to other wireless technology. ARCT has a good and reasonable PV for the current situation in Malaysia. However, sales of ARCT equipment and its accessories are limited in Malaysia. ARCT practitioners have to buy it from outside the country, which involves increasing the cost of the purchase. Nevertheless, for the sake of interests and hobbies toward the ARCT, they are willing to spend more to get it. According to Francken & Raaij (1981), Selwyn (2004) and Allsopp (2005), for the sake of interests and hobbies, people are willing to spend more to get the product of their interest.

PV refers to the approach the user determines the price of a product based on what they consider as worthy and their willingness to pay for it. They do not consider the cost to produce it. The cost and pricing structure may have a significant impact on users of the product. The improved product is the outcome of intended enhancements brought about by the producer in order to enhance the PV of their product, which are neither suggested by the user nor expected by them. The dealer, on his own initiative, augments the product, by adding an extra feature or an extra facility to the product (Devolder, Pynoo, Sijnave, Voet and Duyck, 2012). This is most commonly observed in the wireless communication technology market. For example, in the ARCT market, more technology is being introduced just because the producer is accomplished in upgrading the equipment. But the ARCs will still buy because they are willing to pay for the equipment. So, the PV is no longer a problem to the ARCT practitioners as they will do anything to get it.

5.1.9 H_4 - FC positively influences the BI

H_4 is about FC, it is to clarify the extent of ARC perceptions (awareness) in Malaysia regarding the resources and management/government support and availability in using ARCT. The hypothesis is accepted because the T Value is 1.936 which is more than 1.645 and within the significant level at $P < 0.05$ (95% degree of confidence through PLS-SEM bootstrapping test technique). H_4 is the ninth factor for this study.

According to Slyke *et al*. (2008), Limayem and Cheung (2008) and Venkatesh *et al*. (2012), FC is focused on the extent of individuals' perceptions regarding the availability of resources and government support for a particular technology.

The Malaysian government encourages and allows the ARCs to contribute and support relief agencies in ES. The government made efforts to involve ARCs in international disaster simulation. However, the government is still less supportive in providing ARCT equipment and infrastructure to ARCs in preparation to face ES.

This issue can be seen during the ASEAN Regional Forum Disaster Relief Exercise (ARF DiREx) 2015. Volunteers from various fields including ARC were involved in supporting government agencies during the simulation. ARCT and technical equipment used in this simulation were provided by ARC themselves, without support from the government/management (Faisal, 2015; NSC 2015; Easton, 2015; Said, 2015). ARCs from ASTRA Malaysia were involved in managing emergency communication in ES in the ARF-DiREx 2015 simulation to support JKM. ARC behaviour is exceptional because they were willing to use their own expenses to participate in ARF DiREx 2015. Their BI should be highlighted to the public and the government should appreciate the role of ARC in the noble mission to support the government in ES. In ARF DiREx 2015, researchers were directly involved and became Bravo team leader and acted as person in charge of emergency communications in ES for the simulation. ARC used ARCT to coordinate JKM and other relief agencies during the simulation. JKM only provided a space as a station to place ARCT equipment for the simulation. Work on installing the antenna and ARCT equipment was voluntarily done by the ARC (JKM, 2015, NSC, 2015). The use of ARCT in ES in Malaysia and the issue of lack in support from the government should be emphasized to increase the country's readiness to cope with the ES in any possible disaster.

5.2 Moderating Effect Clarification

Moderator variables are introduced in this study. Moderator variable will affect the relationship of the other criterion variables. This effect is termed interaction. Moderator can be qualitative for example, age, gender, race, class and experience (Baron, 1986). The detailed clarification on moderating effect is in sub topic 4.8 in Chapter Four. Moderating effect is variable which affects the path or strength of the relationship between internal (endogenous) variables and external (exogenous) variables. Moderating effect is an additional variable that helps to explain the changes affecting the external instability to internal variables for a specific research hypothesis. Moderating effect such as age, gender and experience can be determined through multi group analysis by using PLS-SEM (Baron, 1986; Holmbeck, 1997; Ringle *et al*., 2013).

Bootstrapping technique in PLS-SEM is able to clarify the strength of the path between IV and DV using R^2 values of moderating effect (Monecke and Leisch, 2012, 2011; Ringle *et al*., 2013; Latan & Ghozali, 2015). Based on Figure 4.11 in Chapter Four, the output of bootstrapping analysis had successfully explained the significance of the moderator effect by using R^2 values. (Table 4.14: Result of Moderating Effect by PLS-SEM Bootstrapping technique), Most of the influence begins from the H_{10c} which refers to the EX in using ARCT, H_{10a} refers to AG and H_{10b} which refers to the GE of respondents.

Practice (Training) and skill are a part of demographics and are able to demonstrate the experience of people that use the technology (Dawson & Rakes, 2003; Berger, 2008; Wanless *et al*., 2011). Accordingly, Table 4.5 in Chapter Four showed the empirical data, in the form of frequency, on the practice (training) and skill of the ARCs using the ARCT in Malaysia. Table 4.5 also described findings from other aspects; (a) frequencies of ARCT usage in their daily life, (b) years of experience in the use of ARCT, (c) the type ARCT device that they use, (d) communication that they always practice and (e) the method of transmitting radio waves that they often practice. Each aspect refers to an EX among ARCs using the ARCT in Malaysia. Data analyzed through bootstrapping techniques had successfully described EX as the most significant moderator effect between IV and DV in the use of ARCT among the ARCs in ES. The next moderating effect is AG and followed by GE, which is predominantly dominated by men (Table 4.4 in Chapter Four).

Based on the statistical analysis conducted in section 4.8 (in Chapter Four, H_{10c}, H_{10a}, and H_{10b} of this study), it was notably accepted due to the R^2 values which are more than 0.67 ($R^2 > 0.67$). This indicates that the moderator is significant at 95% degree of confidence (0.05). In conclusion, the most significant moderator effect begins from the H_{10c}, which refers to the EX, H_{10a} refers to AG, and H_{10b} which refers to GE.

5.3 Achieving the Main Research Objective

Based on statistical analysis and comprehensive discussion, which started from section 4.2 until section 4.8 in Chapter Four, the main research objective (RO) was achieved. The RO was to propose a model to determine the BI amongst the ARCs to use the ARCT in ES had been accomplished. The demographics, practice and skill of ARCs have been analysed and presented in subsection 4.2.1 and 4.2.2 in Chapter Four.

Thus, the model of this study was successfully established and presented in Figure 5.1 which comprises of salient factors and significant relationships between the factors.

Each factor has positive influences toward the BI among the ARCs in using ARCT in ES. The variables are arranged in ascending order.

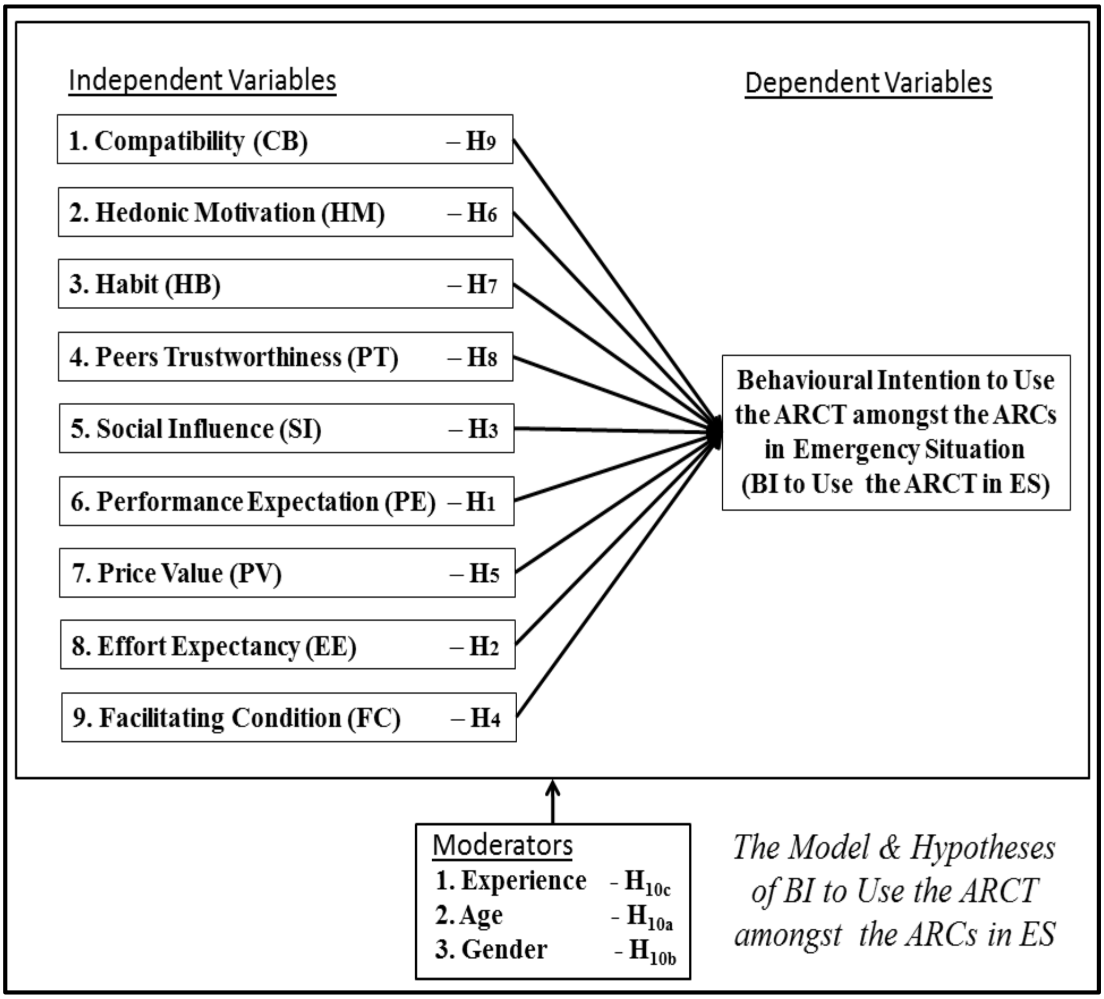

Figure 5.1. The Model of Study

The main RO was achieved through statistical analysis and explanation for the analysis is in Chapter Four. The study modified and extended new factors to the model constructed by Venkatesh *et al*. (2012) and Arenas-Gitan *et al*. (2015). Detailed explanation on how the model was constructed, with extended new factors are as explained in Figure 2.5 of Chapter Two. Subsequently, explanation for sub-RO is as stated below.

5.3.1 Sub Research Objective - One

Drabek and Thomas (2004), Daniel (2012), and Embi and Nordin (2013) argued that to identify the demographics of the study population is significant due to provide benefits to the stakeholders in many aspects. The aspects of being noted are like a background, community behavioural and their socio-economics.

The first sub research objective is to identify the demographics of ARCs to use ARCT in sharing and disseminating information in ES. Identifying the demographics is able to provide beneficial information to the researcher to conduct these studies and can provide a basic overview of the background of this community. Demographic information able to provide statistical data about the research contributor and is necessary for the identification of whether the communities in a particular study are a representative sample of the target population for generalization purposes. Generally, demographics characteristics are reported and serve as independent variables in the research design. Demographic variables are independent variables by definition because it cannot be manipulated. Thus, characteristics and explanation about the demographics of ARCs in Malaysia are described in detail in subsection 4.2.1 and 4.2.2 in Chapter Four.

Thus, Characteristics and descriptions about the demographics of ARCs in Malaysia are described in detail in subsection 4.2.1 and 4.2.2 in Chapter Four.

5.3.2 Sub Research Objective - Two

The second sub research objective is to identify the salient factors that influence the BI among ARCs to use ARCT in sharing and disseminating information in ES.

According to Henseler *et al*. (2009), Hair *et al*. (2014) and Ringle, Wende and Becker (2015), the hypotheses constructed are used to determine the salient factors that influence BI and to establish a relationship among the factor. Salient factors mean the most noticeable or important factors that influence the BI to use a specific technology or a specific tool among the users in a particular domain. Domain means an area of territory owned or controlled by a particular ruler or under the control of a particular organization or community. The factors were selected from the literature review and confirmed by experts who are practitioner from ARCs.

Furthermore, Table 4.11 in Chapter Four described the bootstrapping results in descending order of the significant hypothesis and path coefficients for the dimension model relationships of this study. Concerning to this study, salient factors refer to the most noticeable or important factors which are influencing the BI to use the ARCT amongst the ARCs during ES in Malaysia. Based on the data analysed, the salient factors were identified as in Figure 5.1 and useful to facilitate future researchers which are the same attribute to this study.

Indeed, the most salient factors that influence the BI amongst the ARCs to use the ARCT in sharing and disseminating information in supporting relief agencies during ES in Malaysia are identified. The most salient factor is CB, next is HM, and the third is HB and followed by PT, SI, PE, PV, EE, and the last one is FC.

5.3.3 Sub Research Objective - Three

The third sub research objective is to examine the relationships amongst the factors that influence the BI in the use of ARCT amongst ARCs in sharing and disseminating information in ES. Notably, the relationships and contributing factors in the model used in this study were analysed through Partial Least Squares Structural Equation Modelling (PLS-SEM).

The procedures and analysis data are detailed and explained in Chapter Four. The purpose to examine the relationship between the factors of the model is to focus on the reliability and validity of measurements that form each of the constructs.

Evaluation of the relationship amongst the constructs in the model is to understand how strongly the measured construct is related to the construct it intends to reflect. The aspects that are being examined are internal consistency reliability, indicator reliability, convergent validity and discriminant validity (Hair *et al*., 2014; Latan & Ghozali, 2015). The parameter to examine the relationship between the constructs in the model is shown in Table 4.6 in Chapter Four. Based on the Figure 4.10 in Chapter Four, the bootstrapping method is able to highlight the path coefficients correlation using the relative T values. With increasing T values, the significance of the relationship is getting stronger. Meanwhile, when T Value is decreasing, this represents the lower level of significance in the relationship of each factor. Furthermore, Table 4.11 in Chapter Four demonstrates the bootstrapping results to describe the descending order of the significant hypothesis and path coefficients for the dimension of the model in this study. In conclusion, if the T value is higher, the *P* value is smaller and this shows a stronger hypothesis relationship.

The most significant relationships between factors are confirmed by the study's hypotheses and are presented in the measurements as in Figure 5.1. Nine factors that have significant relationships have been identified through PLS-SEM analysis. The nine factors which have significant relationships towards BI are CB followed by HM, HB, PT, SI, PE, PV, EE, and FC.

Bootstrapping technique shows R-Square (R^2) and highlights the significance path using relative values of moderating effect (Ringle *et al*., 2013; Hair *et al*., 2014, Latan & Ghozali, 2015). Definitely, moderating effect shows variances (differences) in the strength of the relationship as shown in Figure 4.11. Thus, the most influential moderating effect begins from the EX, AG, and then followed by GE.

5.3.4 Sub Research Objective - Four

Observation and discussion on the progress of the study were conducted by the supervisor and co-supervisor to ensure the smooth running of the study. The study was checked and verified by several experts who are professional and have experience in the related fields. They consist of expert in the content of study, statistical expert, and ARCT professional (Refer to Appendix F).

Factors confirmation has been conducted by ARCT professional such in subsection 3.2.1. This step is important to ensure that each factor fulfils the requirements of ARCs behavioural in Malaysia. Further, drove the researcher to identify the salient factors with confidence. After conducted comprehensive review regarding the relevant of questionnaire items and discussed with supervisors and experts in the related field, verification the questionnaire by experts has been done such in subsection 3.3.3. Each aspect regarding the verification and validation was clarified in subsection 3.7 in Chapter 3.

Validity test through Partial Least Squares Structural Equation Modelling (PLS-SEM) are required for quantifying and constructing constancy (reliability) of the model in this study. This process is a qualifying preparation for the evolution of the model so that it can be used to make research expectations with quantified confidence.

Validity test through PLS-SEM was successful and analytical data met the predetermined testing criterion. Discussion regarding the data analysis, testing criterion and outcomes by using SPSS Version 22 and PLS-SEM Version 3.2.4 is in section 4.4 on reliability and validity test of the construct. While section 4.5 is about PLS algorithm to evaluate the reliability of the model, section 4.6 is about bootstrapping technique to evaluate the path coefficients, section 4.7 explanation regarding the significance of hypothesis for the dimensional model of the study and lastly, the moderation effect evaluation in section 4.8 in Chapter Four.

The validity test of the measured model for each contributing factor is done via PLS algorithm, bootstrapping and blindfolding in PLS-SEM is explained in Chapter Four. The validity test is able to evaluate the significance of the hypothesis for the dimensions of this study. Statistical analysis was facilitated and verified by statistical experts.

5.4 Contribution of the Study

Contribution of the study in the theoretical and practical implications aspects are as explained in the next part.

5.4.1 Theoretical Implications

This study has successfully developed a model that clarifies the salient factors influencing the BI in the use of ARCT amongst the ARCs in sharing and disseminating information in ES in Malaysia is as shown in Figure 5.1 of Chapter Five. The revised theoretical implication model is able to demonstrate sufficient model fit. There is a good explanation for the modification and the model should be fit to be used in future research, which is related to BI of a community using a given technology. New factors relating to the BI can be integrated to produce a new model (Yi *et al.*, 2006; Mafe *et al.*, 2013; Islam *et al.*, 2013). The revised model that is presented can be utilized in similar studies in future research.

BI can explain an individual's attitudes and can indicate an individuals' inclination. A person will intend to perform certain behaviour when someone evaluates it positively. Intention is a function of two basic determinants that are the attitudes toward the behaviour and the subjective norms of the behaviour. In other words, it is based on/or influenced by someone feelings, opinions or perception towards a related behaviour. This can be determined through constructed relationship model (Venkatesh *et al*., 2012; Kit, 2014; Arenas-Gitan; *et al*., 2015).

Notably, the study is able to modify and integrate several prominent IS theoretical model. This study has modified and extended new factor to the prominent IS model and it produced a new theoretical model that can be adopted after being tested and analyzed using PLS-SEM (Ringle *et al*., 2006; Ringle & Spreen, 2007; Henseler *et al*., 2009; Hair *et al*., 2011).

Ling (2000), Al-Busaidi *et al*. (2010), Kay Craigie, (2011) and Isaacs & Ranganathan (2012) stated that the relationship between influencing factors toward BI in using a particular technology in a particular community for a particular field, can be investigated and verified by constructing a conceptual model.

Therefore, this study has successfully focused and clarified the relationship of the influencing factors such CB and followed by HM, HB, PT, SI, PE, PV, EE and FC toward BI among the ARCs during ES in Malaysia. This was investigated and verified through a conceptual model and analyzed through PLS-SEM. Future researchers can use this study as a guide, mainly for PLS-SEM methods used in the study to analyze the data. Hence, the theoretical implication of the model that had been constructed in this study can be customized and can be used in other research fields that involve influence factors toward the BI when using technology.

In addition, this study had successfully included new factors such as PT and CB as direct contributing factors to the prominent IS theoretical model that was constructed by Venkatesh *et al*. (2012) and Arenas-Gitan *et al*. (2015). Further implications showed that this theoretical model can be used as an indicator or reference model for future researchers mainly in determining the factors which are influencing user BI in using specific technology among communities.

Moreover, extending new factors such as PT and CB to the model has contributed to this study with the combination of different explanations from the theory of planned behaviour and the UTAUT-2 theory. These are good factors to consider when examining the community behavioural intention toward technology in a different situation. Nine factors were identified in this study that could necessarily be the basis and reference for future study that is equivalent, particularly to understand the BI amongst user towards the technology. The nine factors that are mentioned are CB, HM, HB, PT, SI, PE, PV, EE, and FC.

Earlier researchers have argued that for a study model to be accepted to provide solution in an IS research, it must show that R^2 must be more than 0.67 ($R^2 > 0.67$) to indicate that the moderator is significant at a 95% degree of confidence (0.05) (Monecke and Leisch, 2012, 2011; Ringle *et al*., 2013; Latan & Ghozali, 2015). In this research, R^2 as shown in Table 4.14 (Result of Moderating Effect by PLS-SEM Bootstrapping technique) is significant and able to indicate that the model is viable to be used as a reference for future research. They can also use EX, AG and GE as the moderator effect in their study.

Another theoretical implication that has been made in the study is the method of analysis using PLS- SEM. The application of PLS-SEM in this study eases the analysis with composite model, explicitly in modelling multivariate (various variables) relationships (Ringle & Spreen, 2007; Henseler *et al*., 2009; Hair *et al*., 2011). PLS-SEM is able to produce immediate evaluation, in which, the analysed model is measured with ease and facilitate the verification of hypothesized model for the influence factors.

In addition, the revised model of this study provided a useful way to understand the BI amongst the ARCs in the use of wireless communication technologies such as ARCT in future. Finally, the study done through modelling had successfully extracted the most salient factors that influence the BI amongst the ARCs when using the ARCT in sharing and disseminating the information to support relief agencies in ES.

Hopefully, the revised model and techniques in data analysis done in this study will be a guide, an indicator and as a reference for future research. It is also expected, this revised model will be able to provide benefits to role players and stakeholders who are pertinent to this study.

5.4.2 Practical Implications

The practical implications obtained from the results of the analysis and the review of previous works, can bring benefits to future researchers (Arenas-Gitan *et al*., 2015; Abdulraheem, & Yusof; 2016). This study has practical implications that validates the development of survey tools and instrument that can be expanded for further research which are in line with this study.

The research instrument and procedure were developed based on past studies and adapted to suit this study are able to use in future research by other researchers. Details of research instrument and procedure, is in Chapter Three of this report. Future researchers can follow the research approach pattern of this study. The study focused on quantitative approaches as described in subsection 3.1.1. The research process was developed as explained in section 3.3 and it can also be used as reference by new researchers who are in the similar field with this study.

Other practical implications that are very meaningful and can be a guide for future researchers are research instrument in section 3.3, sampling method in section 3.4, data collection approach in section 3.5, data analysis method in section 3.6 and lastly verification and validation procedure in section 3.7. All of these approaches are carefully crafted by referring to the previous studies that were successful in their field of study, mainly studies which are related in determining BI of the user to use a certain technology. The practical contribution of this study is the success to provide empirical data that are related to the use the ARCT amongst ARCs in supporting relief agencies in ES in our country. What can be summed up is, the success of today's researchers is due to the success of previous researchers and the success of today's researchers is pioneering the success of future researchers.

5.5 Recommendation to the Stakeholders

The research finding (analysis data in Chapter 4) and the following recommendation were presented to MCMC and accepted. MCMC states that they need time for proper consideration of the information provided as they involve various stakeholders in various organisations of the Malaysian government. The essence of the recommendations is as follows.

The Malaysian government must encourage civilian to be ARCs, to get experience and awareness regarding emergency communication and to be part of relief agencies in ES. ARCs are able to provide information and alert each other as well as other stakeholders quickly. Factors that need to be applied are like the compatibility (CB) to use the ARCT in catalysing habit (HB) behavioural to use the ARCT in daily life and able to encourage them to be an ARCs and further encourage them to use ARCT in ES. They can play a supportive role in an early warning for search and rescue for relief agencies in ES during disaster strikes.

Even though ARC has contributed in ES around the world, ARC's in Malaysia has to face several challenges and issues before they can be authorised ARCT practitioners. They have to go through various procedures to take the Radio Amateur Examination (RAE) to enable them to get the license and callsign. They are also required to apply for Assignment Application (AA) to have ARCT equipment. Facilitating condition (FC) is an important factor in attracting people to join the ARC to use ARCT. Those who are responsible for this issue need to formulate a facilitation effort to make easier condition for people to obtain a license and callsign to use ARCT in their daily life. As in Japan, people are encouraged to use ARCT in daily life and they only need to occupy a short course on ethics in communication and they will be given a callsign and a license to use ARCT. These efforts are closely linked in driving effort expectancy (EE) behavioural, performance expectancy (PE) behavioural and social influence (SI) behavioural amongst ARCs to continue to thrive in exploring ARCTs. Furthermore, it is able to expose to the community to perceive and to think that ARC should use ARCT in sharing and disseminating information to support relief agencies in ES in any disaster.

Currently, only 12,377 individuals have obtained the license and callsign and are able to use ARCT in Malaysia (MCMC, 2019). If compared to the total Malaysians population which has reached 29.4 million of people (Department of Statistics Malaysia, 2019), the percentage of ARC is very low, only 0.0004%. Numbers of ARC in Malaysia is too low if compared to Japan, Thailand and other developed countries. This is because the people of these countries already have hedonic motivation (HM) behavioural to use ARCT in their lives mainly to support relief agencies in ES. Thus, in order to get more ARCT practitioners, support, campaign, awareness and training are required to generate public interest to use ARCT and to join ARCs. Stakeholders, such as the Ministry of Communications & Multimedia, should be addressed this issue.

The ARCT practitioners in Malaysia are required to follow long strenuous application procedures unlike procedures in other countries such as Japan and Thailand where ARCT practitioners only have to participate in short courses on communication act and international regulation before entitled to be legitimate ARCT practitioners (Rashid & Zainal, 2013). RAE is a difficult exam as the questions is of high level and technical. As a result, many candidates failed the exam and cannot be ARCT practitioners. Therefore, the government through MCMC should identify the solution to make easier condition for the public to get communications license to be legitimate ARCT practitioners and join ARCs in Malaysia.

In the year 2000, the Japanese government facilitated the process for their citizens who were keen to become ARCT practitioners. It is very easy to become a radio practitioner in Japan. One simply needs to register and sit for a short course. Then, they are encouraged to participate in ARC to learn more about ARCT (Yamamoto *et al*., 2005; Nakamura *et al.*, 2007; Koshimura, *et al.,* 2009; Harada *et al*., 2012). As a matter of fact, it is unnecessary to obligate a violation of the act that has been enacted by the country. What is needed is to emulate the approaches to facilitate the process as the Japanese government does.

In the case of disaster simulation amongst ARCs and relief agencies, the Malaysian government has opened the door to ARCs to participate in a simulation in the ASEAN Regional Forum Disaster Relief Exercise (ARFDiREx, 2015). This is a good move and should be continued in the future to further strengthen disaster management mainly in ES.

However, there are issues that occur during ARFDiREx 2015. ARCT and technical equipment used, in this simulation were provided by ARC without government/management support. ARCs from ASTRA Malaysia manage their own expenses to participate in this simulation mainly in the provision of ARCT equipment (Faisal, 2015; NSC 2015; Easton, 2015; Said, 2015). The government should have supported and provided the facilities used in this simulation. The ARC's behaviour is exceptional and should be honoured because they were willing to spend their own expense to participate in this simulation. This shows that the price value (PV) factor is not an obstacle to them to use the ARCT. Therefore, the government and the community should appreciate ARC efforts and their sacrifices in supporting relief agencies ES.

In addition to that, stakeholders such as the National Security Council (NSC), the National Disaster Management Agency (NADMA) and Malaysian Communications and Multimedia Commission (MCMC) should strengthen their efforts to encourage people to use ARCT in their daily life. Specific studies regarding policies and legislation of communication in developed countries such as Japan, Holland, and

Canada should be done in the future. The study is significant to improve the existing policy generally in wireless communication and particularly in ARCT.

Based on this study, it was found that the ARCs agree with the legal processes, procedures but need management/government support to seek solutions to facilitate them to obtain a license to use ARCT. Thus, stakeholders such as MCMC must find the solution to solve this issue.

The stakeholders must support and improve communication infrastructure to encourage the involvement of ARCs in the use of ARCT. In addition, under the provision of ARCT infrastructure, agencies involved in the communication industry should contribute in building a network of repeater towers across the country as a form of encouragement to ARCs and the public. Hence, the government of Malaysia and ministry in charged must be ready to provide more encouragement and to enlighten the public regarding the ARCs and ARCT.

The significance of this study are Malaysian community and stakeholders are able to understand the ARCs behaviour such as in performing contingency communication when an existing communication technology fails due to disaster. Hence, the Malaysian communities will be more appreciative towards ARCs contribution in supporting the relief agencies when a disaster occurs. Maybe, when the public understands the ARCs behaviour and appreciates their contributions, the number of amateur radio practitioners in Malaysia will increase. In another perspective, ARCT can play an important role as alternative communication in ES (Mohd, 2011; Jailani, 2014; Pettit *et al*., 2014).

The ARCs contribution to the country and public as a voluntary non-commercial communication service in supporting relief agencies in ES should be recognised. Thirteenth of February is the date publicised by UNESCO as "World Amateur Radio Day". The objective is to appreciate and celebrate radio broadcasts, enhance international co-operation amongst ARCT practitioners, and encourage the role-players in wireless communication technology to make and provide access to information through ARCT (UNESCO, 2017). On the other hand, Malaysia has not yet officially celebrates “World Amateur Radio Day" as it is celebrated by other developed countries to convey appreciation to active ARCs that assist relief agencies in ES (MARES, 2019). As a country that is moving towards the development of wireless communication technology, this issue should be considered because it can have a positive impact on the nation, particularly to the stakeholders who should work and find ways to attract people to adopt and use ARCT in their life.

The government is recommended to provide training to enhance skill and expose ARCs to technical knowledge. ARCs should participate in technical workshops to enhance their technical capabilities. This is because ARCs have a high intention to learn how to use ARCT in sharing and dissemination of information to relief agencies in ES.

Most ARCs agree that using the ARCT, is compatible with all aspect of sharing and disseminating information to relief agencies in ES. The Government is advised to make improvements to the ARCT facility and to provide opportunities to improve skills and experience among ARCs by systematic training in communication skills.

This training should focus on emergency communication skill which is important in ES.

Addition of new skills such as communication ethics through ARCT amongst public service personnel is important. They have to be trained to be trustworthy ARCT practitioner, especially Peer trustworthiness (PT) behavioural in sharing and disseminating information to support relief agencies in ES. In addition, they can also be trained to be technicians and/or electronics experts in ARCT. This effort should be able to open the minds of the public service personnel to join the ARCs as they have realized the advantages of ARCT as contingency communication in ES.

ARCs reactions and contribution in supporting relief agencies at International level has been proven during the Tsunami 2004. The ARCT operator in Kuala Lumpur, received the emergency message from ARCs in Aceh and forwarded it to the Indonesian relief agencies (Yusuf, 2009 ADPC, 2016; MARES, 2016). The government should motivate and encourage ARCs international connections as having international rapport is especially important in ES. The continued motivation and support from the government is also crucial to convince the public of the importance of ARCT in ES. It is important for the public to recognize the ARCT and attract them to participate in ARCs in the future.

The stakeholders in the government, which are related to emergency management, should always have campaigns that can attract people to become ARC. Exhibitions on the capabilities and the role of ARC in supporting relief agencies in ES should be held and expanded to all levels of communities. This effort is important to attract the public to join ARCs, especially in ES when disaster strikes. Buhalis (2000) and Simpson (2014) stated that exhibitions and campaigns are able to attract people or community and change their BI and perception towards something.

Although ARCT's market price is affordable and in line with the current market, the industries that manufacture and sell ARCT equipment’s, are still limited in Malaysia. This issue had been highlighted by ASTRA in ARFDirex 2015 post-mortem (NADMA, 2018). Stakeholders in this area need to find opportunities to expand this industry so it grows in line with other wireless communication technology industries like the mobile phone industry. The opportunities and business space of ARCT equipment and anything else associated with it should be considered for expansion like the mobile communications industry, which is growing rapidly.

The stakeholders which are related to disaster management need to disclose the role of ARCs in supporting relief agencies in ES, such as providing a special documentary or special advertisement or special publication on the role and the exceptional ARCs behaviour in supporting relief agencies in ES and the importance of ARCT, periodically through mass media. In addition, publishing and promoting through social media can be done because of its enormous influence today

5.6 Limitations of the Study

Indeed, this is a pioneer study to determine the salient factors that influence the BI in the use of ARCT amongst the ARCs to support relief agencies in sharing and disseminating information during ES in Malaysia. There are some limitations in this study in terms of the theoretical and practical implications. The limitations of this study are as explained.

i. The scope of this study is limited. Most respondents are from ARCs, which are members of the Amateur Radio Association in Malaysia and Malaysia Callsign which are registered with MCMC. It is hoped that the next study will cover those who are interested in ARCT but still unregistered with MCMC. With this, the scope of the study will be greater to obtain information from various perspectives.

ii. Being the pioneer, it is suggested that further studies to focus on the different research objective which is related to ARCs and ARCT are required to carry out to obtain a variety of useful information to further enhance the findings of the study.

iii. The researcher finds it difficult to collect data in multiple times as it requires a lot of costs. Thus, the researcher used the cross-sectional design for the survey which is a kind of observational study that analyzed data collected from the population, or subsets representative, at a certain point in time. This study design is significant due to the cost-effectiveness and time factors.

iv. The identified influencing factors are prone to changes due to time and trend and differences in culture among people in Malaysia. Therefore, further studies are encouraged. A longitudinal study should be conducted in order to fully determine the dynamic nature of the factors that have been derived from this study.

v. Some of the answers of the respondents to the questionnaire were incomplete; thus, making some responses invalid and could not be used for analysis.

vi. The revised model is only limited in determining the influence factors toward BI when using ARCT amongst the ARCs in sharing and disseminating information in ES in Malaysia. Adaption should be made to generalise the model to another context in different areas.

vii. Financial resource is one of the limitations of the study. All costs are borne by the researcher without any funds from the stakeholders. It is hoped that in future studies, stakeholders will give support especially in terms of financial.

5.7 Directions for Future Research

The directions for future studies are as explained.

i. This study suggests that more research should be carried out. Additional factors should be studied in order to assess the revised model in determining the influence factors toward BI in a different area as well as to compare the obtained results.

ii. Future research should diversify in providing the data that is important to the stakeholders, additional factors that are appropriate in explaining the used the ARCT or other technologies should be used in future studies.

iii. One of the scopes of this study is the use of ARCT amongst ARCs in sharing and disseminating information to support relief agencies in ES in Malaysia. The future research should consider other communities (non ARC) to confirm the relationship among contributing factors. Hence, a longitudinal study horizon is suggested to be applied in future research, which is related to a factor that is characterised and be accumulated over time.

iv. This study is a pioneer study related to the use of ARCT in Malaysia. It is hoped that the proposed model from this study will be able to spark off other communication wireless technology studies that also investigate the community behavioural intention. Hence, the information aforementioned could hopefully provide benefit to everyone and is significant to stakeholders and role players in the related field in the future study.

5.8 Conclusion

Laster (2001), Sutiono *et al*. (2010), and Qiantori *et al*. (2012) stated that the ARCs with their unique behaviour are able to use the ARCT to share and disseminate information among the relief agencies quickly and efficiently. ARCT provides timely, quick, and continuous updated information with related government relief agencies, to evacuate victim during ES. This unique behaviour should receive praise and recognition from the stakeholder in disaster management for the government.

Unique behaviour means an individual's distinctive behaviour relative to other individuals. The uniqueness of the behaviour can reflect the actual perception of a person's with respect to his or her good moral value. Many factors reflect the unique behaviour of an individual and it may differ according to situations (Burns & Krampf, 1992; Schofield & Thompson, 2007).

This study was achieved by involving 400 respondents amongst the ARCs across Malaysia and was able to highlight their unique behaviour in using the ARCT. This study was empirically conducted based on previous studies and assessment of conceptual research model with the objectives of discovering the demographics of the ARCs in Malaysia and also discovering the relationship factors toward the BI in the use of ARCT amongst the ARCs in sharing and disseminating information during ES in Malaysia. The revised model is illustrated in Figure 5.1 in this chapter. The revised model includes other perspectives that influence BI and it may be useful for future research.

This study highlighted the ARCT and exposed the ARCs behavioural to the public, as well as understanding the salient factors and the role of ARCs in supporting relief agencies during ES in Malaysia. Consequently, it can also contribute some idea to stakeholders and role players to synchronize the ARCT with other information shared and disseminated to the public when disaster strikes. Eventhough the use of ACRT among the ARCs is very widespread but it is only as a hobby throughout the world, and their capacity and capability are still less adopted as a contingency communication during ES in most countries. In some countries, the military strictly control and give special emphasis to the communication methods for special security forces when using ARCT and the public is prohibited from using ARCT.

Almost all of the existing papers, only discuss the factors that influence the BI amongst the communities towards wireless communication technology, internet mobile, smartphone technology *etc*. Therefore, this study has the advantage to highlight and discuss something other than the existing literature. This study described and highlighted the relationship between factors towards the BI of ARCs in using ARCT when sharing and disseminating information to support relief agencies during ES in Malaysia.

Furthermore, the significance of this study can be a catalyst and indicator to other researchers to perform further study to comprehend the various issues (Acharya, 2005; Abu Hassan; 2008) related to ARCs and ARCT in the future. The conceptual model should be used to investigate more variables in community behaviour using a given technology. ARCT has a lot of benefits to the stakeholders and role players in Malaysia, but there are still a lot of issues abounded. Thus, there is a need to carry out further studies related to ARCT in Malaysia. The findings are very important for stakeholders and role players in the related fields to prepare for the future. Hence, this study is imperative to provide significant information to the stakeholders and role players. The information aforementioned hopefully provides benefits for everyone.

It is hoped that the established model in Figure 5.1 in this chapter can be shared with other researchers using the same attributes. Other researchers should carry out a related study on ARCT in various perspectives to identify other benefit to the stakeholders, the public and the ARC community to cope with ES in the future.

Disasters are not sought, disaster is not invited, but a disaster is an event that could not be avoided. Hence, the preparedness to face it should always be enhanced. The public should be enlightened to attract them to join ARCs in our country to support relief agencies. Hopefully, the public appreciates the sincerity of ARCs who are always ready to be at the forefront in supporting relief agencies in ES, before, during or after a disaster struck.

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Appendix A
Statistical analysis of main data (SPSS)

Demographic of respondent

Frequency Table

Age		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	14-20 years old	18	4.5	4.5	4.5
	21-29 years old	66	16.5	16.5	21.0
	30-39 years old	154	38.5	38.5	59.5
	40-49 years old	114	28.5	28.5	88.0
	50-59 years old	35	8.8	8.8	96.8
	Above 60 years old	13	3.3	3.3	100.0
	Total	400	100.0	100.0	

Gender		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	359	89.8	89.8	89.8
	Female	41	10.3	10.3	100.0
	Total	400	100.0	100.0	

Race		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Malay	334	83.5	83.5	83.5
	Chinese	28	7.0	7.0	90.5
	Indian	12	3.0	3.0	93.5
	Others	26	6.5	6.5	100.0
	Total	400	100.0	100.0	

Education Level		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	PhD	3	.8	.8	.8
	Master	16	4.0	4.0	4.8
	Bachelor	101	25.3	25.3	30.0
	Diploma	99	24.8	24.8	54.8
	STPM	32	8.0	8.0	62.7
	SPM	128	32.0	32.0	94.8
	SRP/PMR	21	5.3	5.3	100.0
	Total	400	100.0	100.0	

Occupation		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Student	25	6.3	6.3	6.3
	Unemployed	19	4.8	4.8	11.0
	Self-employed	67	16.8	16.8	27.8
	Private sector	118	29.5	29.5	57.3
	Government servants	171	42.8	42.8	100.0
	Total	400	100.0	100.0	

Income		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less RM 1000	51	12.8	12.8	12.8
	RM 1001-2000	69	17.3	17.3	30.0
	RM 2001-3000	91	22.8	22.8	52.8
	RM 3001-4000	82	20.5	20.5	73.3
	RM 4001-5000	53	13.3	13.3	86.5
	Above RM 5000	54	13.5	13.5	100.0
	Total	400	100.0	100.0	

Experience1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	400	100.0	100.0	100.0

Experience2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	400	100.0	100.0	100.0

Experience3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	379	94.8	94.8	94.8
	No	21	5.3	5.3	100.0
	Total	400	100.0	100.0	

Experience4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Seldom	94	23.5	23.5	23.5
	Sometimes	108	27.0	27.0	50.5
	Often	118	29.5	29.5	80.0
	Very often	43	10.8	10.8	90.8
	Always	37	9.3	9.3	100.0
	Total	400	100.0	100.0	

Experience5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 1 years	12	3.0	3.0	3.0
	1-2 years	76	19.0	19.0	22.0
	2-3 years	153	38.3	38.3	60.3
	3-4 years	77	19.3	19.3	79.5
	Above 5 years	82	20.5	20.5	100.0
	Total	400	100.0	100.0	

Experience6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Handy Radio	123	30.8	30.8	30.8
	Rig Mobile Radio	21	5.3	5.3	36.0
	Base Station Radio	11	2.8	2.8	38.8
	Handy & Rig Mobile Radio	104	26.0	26.0	64.8
	Handy, Rig Mobile & Base Station Radio	141	35.3	35.3	100.0
	Total	400	100.0	100.0	

Experience7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Mobile Comm	106	26.5	26.5	26.5
	Portable Comm	41	10.3	10.3	36.8
	Base Station Comm	20	5.0	5.0	41.8
	Mobile & Portable Comm	83	20.8	20.8	62.5
	Mobile, Portable & Base Station Comm	150	37.5	37.5	100.0
	Total	400	100.0	100.0	

Experience8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Via Simplex	101	25.3	25.3	25.3
	Via Repeater Station	51	12.8	12.8	38.0
	Via Simplex & Repeater Station	248	62.0	62.0	100.0
	Total	400	100.0	100.0	

Reliability analysis

Case Processing Summary by SPSS

		N	%
Cases	Valid	400	100.0
	Excluded[a]	0	.0
	Total	400	100.0

Reliability Statistics by SPSS

Cronbach's Alpha	N of Items
0.981	33

Frequencies analysis

PE1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Disagree	2	.5	.5	.5
	Disagree	6	1.5	1.5	2.0
	Neutral	27	6.8	6.8	8.8
	Agree	146	36.5	36.5	45.3
	Somewhat Agree	98	24.5	24.5	69.8
	Strongly Agree	121	30.3	30.3	100.0
	Total	400	100.0	100.0	

PE2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Disagree	2	.5	.5	.5
	Disagree	5	1.3	1.3	1.8
	Neutral	26	6.5	6.5	8.3
	Agree	140	35.0	35.0	43.3
	Somewhat Agree	98	24.5	24.5	67.8
	Strongly Agree	129	32.3	32.3	100.0
	Total	400	100.0	100.0	

PE3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Disagree	2	.5	.5	.5
	Disagree	5	1.3	1.3	1.8
	Neutral	23	5.8	5.8	7.5
	Agree	146	36.5	36.5	44.0
	Somewhat Agree	104	26.0	26.0	70.0
	Strongly Agree	120	30.0	30.0	100.0
	Total	400	100.0	100.0	

EE1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Disagree	2	.5	.5	.5
	Disagree	6	1.5	1.5	2.0
	Neutral	28	7.0	7.0	9.0
	Agree	121	30.3	30.3	39.3
	Somewhat Agree	113	28.2	28.2	67.5
	Strongly Agree	130	32.5	32.5	100.0
	Total	400	100.0	100.0	

EE2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Disagree	1	.3	.3	.3
	Disagree	7	1.8	1.8	2.0
	Neutral	35	8.8	8.8	10.8
	Agree	128	32.0	32.0	42.8
	Somewhat Agree	103	25.8	25.8	68.5
	Strongly Agree	126	31.5	31.5	100.0
	Total	400	100.0	100.0	

EE3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Disagree	2	.5	.5	.5
	Disagree	1	.3	.3	.8
	Neutral	22	5.5	5.5	6.3
	Agree	128	32.0	32.0	38.3
	Somewhat Agree	100	25.0	25.0	63.2
	Strongly Agree	147	36.8	36.8	100.0
	Total	400	100.0	100.0	

EE4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	.3	.3	.3
	Somewhat Disagree	1	.3	.3	.5
	Disagree	9	2.3	2.3	2.8
	Neutral	33	8.3	8.3	11.0
	Agree	141	35.3	35.3	46.3
	Somewhat Agree	90	22.5	22.5	68.8
	Strongly Agree	125	31.3	31.3	100.0
	Total	400	100.0	100.0	

SI1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	3	.8	.8	.8
	Neutral	43	10.8	10.8	11.5
	Agree	154	38.5	38.5	50.0
	Somewhat Agree	104	26.0	26.0	76.0
	Strongly Agree	96	24.0	24.0	100.0
	Total	400	100.0	100.0	

SI2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	.3	.3	.3
	Neutral	32	8.0	8.0	8.3
	Agree	157	39.3	39.3	47.5
	Somewhat Agree	126	31.5	31.5	79.0
	Strongly Agree	84	21.0	21.0	100.0
	Total	400	100.0	100.0	

SI3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	1.3	1.3	1.3
	Neutral	40	10.0	10.0	11.3
	Agree	147	36.8	36.8	48.0
	Somewhat Agree	117	29.3	29.3	77.3
	Strongly Agree	91	22.8	22.8	100.0
	Total	400	100.0	100.0	

FC1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Disagree	8	2.0	2.0	2.0
	Disagree	66	16.5	16.5	18.5
	Neutral	106	26.5	26.5	45.0
	Agree	99	24.8	24.8	69.8
	Somewhat Agree	59	14.8	14.8	84.5
	Strongly Agree	62	15.5	15.5	100.0
	Total	400	100.0	100.0	

FC2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Disagree	1	.3	.3	.3
	Disagree	27	6.8	6.8	7.0
	Neutral	15	3.8	3.8	10.8
	Agree	154	38.5	38.5	49.3
	Somewhat Agree	92	23.0	23.0	72.3
	Strongly Agree	111	27.8	27.8	100.0
	Total	400	100.0	100.0	

FC3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Disagree	1	.3	.3	.3
	Disagree	7	1.8	1.8	2.0
	Neutral	12	3.0	3.0	5.0
	Agree	148	37.0	37.0	42.0
	Somewhat Agree	113	28.2	28.2	70.3
	Strongly Agree	119	29.8	29.8	100.0
	Total	400	100.0	100.0	

FC4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	6	1.5	1.5	1.5
	Neutral	9	2.3	2.3	3.8
	Agree	214	53.5	53.5	57.3
	Somewhat Agree	71	17.8	17.8	75.0
	Strongly Agree	100	25.0	25.0	100.0
	Total	400	100.0	100.0	

PV1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	16	4.0	4.0	4.0
	Agree	123	30.8	30.8	34.8
	Somewhat Agree	117	29.3	29.3	64.0
	Strongly Agree	144	36.0	36.0	100.0
	Total	400	100.0	100.0	

PV2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	16	4.0	4.0	4.0
	Agree	121	30.3	30.3	34.3
	Somewhat Agree	126	31.5	31.5	65.8
	Strongly Agree	137	34.3	34.3	100.0
	Total	400	100.0	100.0	

PV3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Disagree	4	1.0	1.0	1.0
	Disagree	20	5.0	5.0	6.0
	Agree	128	32.0	32.0	38.0
	Somewhat Agree	142	35.5	35.5	73.5
	Strongly Agree	106	26.5	26.5	100.0
	Total	400	100.0	100.0	

HM1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Disagree	1	.3	.3	.3
	Disagree	2	.5	.5	.8
	Neutral	29	7.2	7.2	8.0
	Agree	138	34.5	34.5	42.5
	Somewhat Agree	104	26.0	26.0	68.5
	Strongly Agree	126	31.5	31.5	100.0
	Total	400	100.0	100.0	

HM2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Disagree	1	.3	.3	.3
	Disagree	1	.3	.3	.5
	Neutral	29	7.2	7.2	7.8
	Agree	145	36.3	36.3	44.0
	Somewhat Agree	98	24.5	24.5	68.5
	Strongly Agree	126	31.5	31.5	100.0
	Total	400	100.0	100.0	

HM3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Disagree	2	.5	.5	.5
	Disagree	2	.5	.5	1.0
	Neutral	37	9.3	9.3	10.3
	Agree	138	34.5	34.5	44.8
	Somewhat Agree	93	23.3	23.3	68.0
	Strongly Agree	128	32.0	32.0	100.0
	Total	400	100.0	100.0	

HB1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	3	.8	.8	.8
	Neutral	34	8.5	8.5	9.3
	Agree	151	37.8	37.8	47.0
	Somewhat Agree	89	22.3	22.3	69.3
	Strongly Agree	123	30.8	30.8	100.0
	Total	400	100.0	100.0	

HB2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Disagree	7	1.8	1.8	1.8
	Disagree	41	10.3	10.3	12.0
	Neutral	132	33.0	33.0	45.0
	Agree	94	23.5	23.5	68.5
	Somewhat Agree	59	14.8	14.8	83.3
	Strongly Agree	67	16.8	16.8	100.0
	Total	400	100.0	100.0	

HB3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Disagree	1	.3	.3	.3
	Disagree	6	1.5	1.5	1.8
	Neutral	70	17.5	17.5	19.3
	Agree	152	38.0	38.0	57.3
	Somewhat Agree	71	17.8	17.8	75.0
	Strongly Agree	100	25.0	25.0	100.0
	Total	400	100.0	100.0	

HB4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	.3	.3	.3
	Somewhat Disagree	1	.3	.3	.5
	Disagree	7	1.8	1.8	2.3
	Neutral	38	9.5	9.5	11.8
	Agree	121	30.3	30.3	42.0
	Somewhat Agree	97	24.3	24.3	66.3
	Strongly Agree	135	33.8	33.8	100.0
	Total	400	100.0	100.0	

PT1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Disagree	1	.3	.3	.3
	Disagree	2	.5	.5	.8
	Neutral	29	7.2	7.2	8.0
	Agree	140	35.0	35.0	43.0
	Somewhat Agree	92	23.0	23.0	66.0
	Strongly Agree	136	34.0	34.0	100.0
	Total	400	100.0	100.0	

PT2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Disagree	2	.5	.5	.5
	Disagree	1	.3	.3	.8
	Neutral	26	6.5	6.5	7.2
	Agree	146	36.5	36.5	43.8
	Somewhat Agree	98	24.5	24.5	68.3
	Strongly Agree	127	31.8	31.8	100.0
	Total	400	100.0	100.0	

PT3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Disagree	2	.5	.5	.5
	Disagree	2	.5	.5	1.0
	Neutral	30	7.5	7.5	8.5
	Agree	146	36.5	36.5	45.0
	Somewhat Agree	92	23.0	23.0	68.0
	Strongly Agree	128	32.0	32.0	100.0
	Total	400	100.0	100.0	

CB1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	3	.8	.8	.8
	Neutral	43	10.8	10.8	11.5
	Agree	163	40.8	40.8	52.3
	Somewhat Agree	93	23.3	23.3	75.5
	Strongly Agree	98	24.5	24.5	100.0
	Total	400	100.0	100.0	

CB2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	.3	.3	.3
	Neutral	32	8.0	8.0	8.3
	Agree	155	38.8	38.8	47.0
	Somewhat Agree	106	26.5	26.5	73.5
	Strongly Agree	106	26.5	26.5	100.0
	Total	400	100.0	100.0	

CB3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	1.3	1.3	1.3
	Neutral	40	10.0	10.0	11.3
	Agree	147	36.8	36.8	48.0
	Somewhat Agree	100	25.0	25.0	73.0
	Strongly Agree	108	27.0	27.0	100.0
	Total	400	100.0	100.0	

BI1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	2	.5	.5	.5
	Neutral	24	6.0	6.0	6.5
	Agree	137	34.3	34.3	40.8
	Somewhat Agree	107	26.8	26.8	67.5
	Strongly Agree	130	32.5	32.5	100.0
	Total	400	100.0	100.0	

BI2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	28	7.0	7.0	7.0
	Agree	155	38.8	38.8	45.8
	Somewhat Agree	81	20.3	20.3	66.0
	Strongly Agree	136	34.0	34.0	100.0
	Total	400	100.0	100.0	

BI3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	.3	.3	.3
	Neutral	37	9.3	9.3	9.5
	Agree	143	35.8	35.8	45.3
	Somewhat Agree	88	22.0	22.0	67.3
	Strongly Agree	131	32.8	32.8	100.0
	Total	400	100.0	100.0	

Appendix B
Questionnaire

Universiti Utara Malaysia School of Computing UUM College of Arts and Sciences Universiti Utara Malaysia 06010 UUM Sintok Kedah Malaysia	No: ______________________

Responden yang dihormati / Dear Respondents

Maklumat yang diberikan dalam kajian ini akan digunakan semata-mata untuk tujuan kajian ini sahaja. Kajian ini adalah untuk mengetahui faktor yang mempengaruhi Hasrat Tingkahlaku (BI) dalam penggunaan Teknologi Komunikasi Radio Amatur (ARCT) di kalangan Komuniti Radio Amatur (ARC) dalam perkongsian dan penyebaran maklumat dalam Keadaan Kecemasan (ES) di Malaysia. Soal selidik kajian ini mempunyai 2 seksyen. Ia hanya akan mengambil kira-kira 10-15 minit. Penyertaan dan perhatian anda sangat membantu untuk mendapatkan hasil kajian yang tepat.

Information provided in this survey will be used exclusively for this research purpose only. The questionnaire is to investigate the factors influencing Behavioural Intention (BI) in the use of Amateur Radio Communication Technology (ARCT) amongst Amateur Radio Communities (ARCs) in sharing and disseminating information in Emergency Situations (ES) in Malaysia. This questionnaire has 2 sections. It will only take 10 -15 minutes approximately. Your participation and selection will be very helpful for accurate results.

Yang Ikhlas /*Your Sincerely,*
Azlee bin Johar (9W2XAA)
Hp – 0194807144
Email – azlee@ymail.com

Sebagai alternatif, anda boleh menjawab secara atas talian dengan mengimbas Kod QR
Alternatively, you can answer online by scanning the QR Code

SECTION A / *BAHAGIAN A*

Demographic / *Demografi*

- **Please choose one answer only. / *Sila pilih satu jawapan sahaja.***

1. What is your age? / ***Berapakah usia anda?***

[1]. 14 - 20 years old / *tahun*	[4]. 40 - 49 years old / *tahun*
[2]. 21 - 29 years old / *tahun*	[5]. 50 - 59 years old / *tahun*
[3]. 30 - 39 years old / *tahun*	[6]. 60 years old and above / *60 tahun dan ke atas*

2. What is your Gender? / ***Apakah jantina anda?***

[1]. Male / Lelaki [2]. Female / Wanita

3. What is your Race? / ***Apakah bangsa anda?***

[1]. Malay *Melayu*	[2]. Chinese *China*	[3]. Indian *India*	[4]. Others/ *lain-lain* :_____________

4. The highest level of your education?
   Tahap pendidikan tertinggi anda?

[1]. PhD	[2]. Master	[3]. Bachelor	[4]. Diploma
[5]. STPM	[6]. SPM	[7]. SRP/PMR	[8]. None / *Tiada*

5. Which of the following describe your occupation?
   Antara berikut yang manakah menerangkan pekerjaan anda?
   [1]. Student / *Pelajar*
   [2]. Unemployed / *Tidak berkerja*
   [3]. Self-employed / *Berkerja sendiri*
   [4]. Private sector / *Sektor Swasta*
   [5]. Government servant / *Kakitangan Kerajaan*

6. Your monthly income?
   Pendapatan bulanan anda?
   [1]. Less than / *Kurang* RM 1000
   [2]. RM 1001 – 2000
   [3]. RM 2001 – 3000
   [4]. RM 3001 – 4000
   [5]. RM 4001 – 5000
   [6]. Above / *Melebihi* RM 5000

➢ **Please choose one answer only. /** ***Sila pilih satu jawapan sahaja.***

	Indicator:-	***Petunjuk:-***
ARC	*Amateur Radio Community*	*Komuniti Radio Amatur*
ARCT	*Amateur Radio Communication Technology*	*Teknologi Komunikasi Radio Amatur*
MCMC ***SKMM***	Malaysian Communications and Multimedia Commission	*Suruhanjaya Komunikasi dan Multimedia Malaysia*

7. Do you have an Amateur Radio callsign from the MCMC?
   Adakah anda mempunyai callsign Radio Amatur dari SKMM?
   [1]. Yes / *Ya* [2]. No / *Tidak*

8. Do you have an Amateur Radio Communication Technology (ARCT) decvice?
   Adakah anda mempunyai peralatan Teknologi Komunikasi Radio Amatur (ARCT)?
   [1]. Yes / *Ya* [2]. No / *Tidak*

9. Are you practicing and using the ARCT?
   Adakah anda mengamalkan dan menggunakan ARCT?
   [1]. Yes / *Ya* [2]. No / *Tidak*

10. How often do you use ARCT in your daily life?
Berapa kerap anda menggunakan ARCT dalam kehidupan harian?
[1]. Never / *Tidak pernah*
[2]. Seldom / *Jarang-jarang*
[3]. Sometimes / *Kaadang-kadang*
[4]. Often / *Sering*
[5]. Very often / *Sering kali*
[6]. Always / *Sentiasa*

11. Experience in use of ARCT.
Pengalaman dalam menggunakan ARCT.
[1]. Below 1 year / *Kurang 1 tahun*
[2]. 1– 2 years / *1 – 2 tahun*
[3]. 2– 3 years / *2 – 3 tahun*
[4]. 3– 4 years / *3 – 4 tahun*
[5]. 5 years and above / *5 tahun keatas*

12. The type of ARCT device that you use.
Jenis alat ARCT yang anda gunakan.
[1]. Handy Radio
[2]. Rig Mobile Radio
[3]. Base Station Radio
[4]. Handy Radio and Rig Mobile Radio
[5]. Handy Radio, Rig Mobile Radio, and Base Station Radio

13. Communication that you always practice and use.
Komunikasi yang sering anda amalkan dan gunakan.
[1]. Mobile Communication / *Komunikasi Mobile*
[2]. Portable Communication / *Komunikasi Portable*
[3]. Base Station Communication / *Komunikasi Base Station*
[4]. Mobile and Portable Communication / *Komunikasi Mobile dan Portable*
[5]. Mobile, Portable, and Base Station Communication / *Komunikasi Mobile, Portable dan Base Station*

14. The method of transmitting radio waves that you often practice.
Kaedah pemancaran gelombang radio yang anda sering amalkan.
[1]. Via Simplex / *Melalui Simpleks*
[2]. Via Repeater Station / *Melalui Stesen Pengulang*
[3]. Via Simplex and Repeater / *Melalui Simpleks dan Stesen Pengulang*

SECTION B / *BAHAGIAN B*		
	Indicator:-	***Petunjuk:-***
ARC	*Amateur Radio Community*	***Komuniti Radio Amatur***
ARCT	*Amateur Radio Communication Technology*	***Teknologi Komunikasi Radio Amatur***
ES	*Emergency Situations*	***Keadaan Kecemasan***

Please rate your agreement with the following sentences based on the Likert Scale
Sila nilaikan persetujuan anda dengan ayat berikut berdasarkan Skala Likert

Strongly Disagree	**Somewhat Disagree**	**Disagree**	**Neutral**	**Agree**	**Somewhat Agree**	**Strongly Agree**
Teramat Tidak Setuju	**Sangat Tidak Setuju**	**Tidak Setuju**	**Neutral**	**Setuju**	**Sangat Setuju**	**Teramat Setuju**
1	**2**	**3**	**4**	**5**	**6**	**7**

Please circle your choice
Sila bulatkan pilihan anda

No	**Survey items** ***Item soal selidik***	**Teramat Tidak Setuju**	**Sangat Tidak Setuju**	**Tidak Setuju**	**Neutral**	**Setuju**	**Sangat Setuju**	**Teramat Setuju**
Performance Expectancy / *Prestasi Jangkaan*								
PE1	I find Amateur Radio Communication Technology (ARCT) useful for sharing and disseminating information amongst Amateur Radio Communities (ARCs) with relief agencies in Emergency Situations (ES). ***Saya mendapati Teknologi Komunikasi Radio Amatur (ARCT) berguna untuk perkongsian dan penyebaran maklumat di Kalangan Komuniti Radio Amatur (ARC) dengan agensi bantuan dalam Situasi Kecemasan (ES) berlaku.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
PE2	Using ARCT amongst ARCs increases my chances to access important information that can be shared and disseminated to relief agencies in ES. ***Menggunakan ARCT di kalangan ARC meningkatkan peluang saya untuk mengakses maklumat penting yang boleh***	**1**	**2**	**3**	**4**	**5**	**6**	**7**

	dikongsi dan disebarkan kepada agensi bantuan dalam ES.							
PE3	Using ARCT amongst ARCs helps me to share and disseminate information to relief agencies more quickly in ES. ***Menggunakan ARCT kalangan ARC membantu saya untuk berkongsi dan menyebarkan maklumat kepada agensi bantuan dengan lebih cepat dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Effort Expectancy / ***Jangkaan usaha***								
EE1	Learning how to use ARCT amongst ARCs in sharing and disseminating information to relief agencies in ES is easy for me. ***Belajar bagaimana menggunakan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat kepada agensi bantuan di ES adalah mudah bagi saya.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
EE2	My interaction through ARCT amongst ARCs in sharing and disseminating information is clear and understandable by relief agencies in ES. ***Interaksi saya melalui ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat adalah jelas dan mudah difahami oleh agensi-agensi bantuan dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
EE3	I find that ARCT is easy to use in sharing and disseminating information to relief agencies in ES. ***Saya mendapati ARCT mudah digunakan dalam perkongsian dan penyebaran maklumat kepada agensi-agensi bantuan dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**

EE4	It is easy for me to become skillful at using ARCT in sharing and disseminating information to relief agencies in ES. ***Adalah mudah bagi saya menguasai kemahiran menggunakan ARCT dalam dalam perkongsian dan penyebaran maklumat kepada agensi-agensi bantuan dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Social Influence / ***Pengaruh Sosial***								
SI1	Communities which are important to me think that I should use ARCT amongst ARCs in sharing and disseminating information to relief agencies in ES. ***Masyarakat yang penting kepada saya berfikir bahawa saya harus menggunakan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat kepada agensi-agensi bantuan dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
SI2	Communities which influence my behaviour think that I should use ARCT amongst ARCs in sharing and disseminating information to relief agencies in ES. ***Masyarakat yang mempengaruhi tingkah laku saya berfikir bahawa saya perlu menggunakan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat kepada agensi-agensi bantuan dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
SI3	Community members whose opinions I value prefer to use-ARCT amongst ARCs in sharing and disseminating information to relief agencies in ES. ***Masyarakat yang berpendapat bahawa saya suka menggunakan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat kepada agensi-agensi bantuan dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Facilitating Condition / *Memudahkan Keadaan*								
FC1	I have the resources necessary from the government to use ARCT amongst ARCs in sharing and disseminating information to relief agencies in ES. ***Saya mempunyai sumber yang diperlukan daripada kerajaan untuk menggunakan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat kepada agensi-agensi bantuan dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
FC2	It is easy to get the government's support in the use of ARCT amongst ARCs in sharing and disseminating information to relief agencies in ES. ***Sangat mudah untuk mendapatkan sokongan kerajaan dalam penggunaan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat kepada agensi-agensi bantuan dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
FC3	I have the necessary knowledge to use ARCT amongst ARCs in sharing and disseminating information to relief agencies in ES. ***Saya mempunyai pengetahuan yang diperlukan untuk menggunakan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat kepada agensi-agensi bantuan dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
FC4	I can get help from other ARCs when I have difficulties using the ARCT in sharing and disseminating information to relief agencies in ES. ***Saya boleh mendapatkan bantuan daripada ARC yang lain apabila saya mengalami kesukaran untuk menggunakan ARCT dalam perkongsian dan penyebaran maklumat kepada agensi-agensi bantuan dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Price Value / *Nilai Harga*								
PV1	ARCT is reasonably priced compared to other wireless communication technology. ***Harga ARCT berpatutan berbanding dengan harga teknologi komunikasi tanpa wayar yang lain.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
PV2	ARCT is a good and suitable price value for the current situation. ***Nilai harga ARCT adalah baik dan sesuai untuk keadaan semasa.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
PV3	I do not mind spending more in getting anything that is related to ARCT. ***Saya tidak kisah untuk berbelanja lebih untuk mendapatkan apa-apa yang berkaitan dengan ARCT.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Hedonic Motivation / *Motivasi yang menyeronokkan*								
HM1	I like to use ARCT amongst ARCs to support relief agencies in sharing and disseminating information in ES. ***Saya suka untuk menggunakan ARCT di kalangan ARC untuk menyokong agensi-agensi bantuan dalam perkongsian dan penyebaran maklumat dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
HM2	I like to and voluntarily use ARCT amongst ARCs to support relief agencies in sharing and disseminating information in ES. ***Saya suka dan secara sukarela menggunakan ARCT di kalangan ARC untuk menyokong agensi-agensi bantuan dalam perkongsian dan penyebaran maklumat dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
HM3	I am excited to be a volunteer using ARCT amongst ARCs to support relief agencies in sharing and disseminating information in ES. ***Saya teruja untuk menjadi sukarelawan yang menggunakan ARCT di kalangan ARC bagi menyokong agensi-agensi bantuan dalam perkongsian dan penyebaran maklumat dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Habit / *Amalan Kebiasaan*								
HB1	Using ARCT amongst ARCs in sharing and disseminating information has become a habit for me to support relief agencies in ES.	**1**	**2**	**3**	**4**	**5**	**6**	**7**

	Menggunakan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat menjadi satu kebiasaan bagi saya untuk menyokong agensi-agensi bantuan di ES.							
HB2	Using ARCT amongst ARCs in sharing and disseminating information has become a necessity for me to support relief agencies in ES. ***Menggunakan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat telah menjadi satu keperluan kepada saya untuk menyokong agensi-agensi bantuan dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
HB3	I must use ARCT amongst the ARCs to support relief agencies in sharing and disseminating information in ES. ***Saya mesti menggunakan ARCT di kalangan ARC untuk menyokong agensi-agensi bantuan dalam perkongsian dan penyebaran maklumat dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
HB4	I always feel responsibility towards using ARCT amongst ARCs to support relief agencies in sharing and disseminating information in ES. ***Saya sentiasa merasa bertanggungjawab untuk menggunakan ARCT di kalangan ARC bagi menyokong agensi bantuan dalam berkongsi dan menyebarkan maklumat dalam ES***.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Peer trustworthiness / ***kebolehpercayaan rakan-rakan***								
PT1	I am confident that the information being shared and disseminated amongst ARCs to relief agencies in ES through ARCT is trustworthy. ***Saya yakin bahawa maklumat yang dikongsi dan disebarkan di kalangan ARC kepada agensi-agensi bantuan melalui ARCT dalam ES adalah boleh dipercayai.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
PT2	Peer trustworthiness amongst ARCs in sharing and disseminating information through the use of ARCT is strong in ES. ***Kebolehpercayaan rakan di kalangan ARC dalam perkongsian dan penyebaran***	**1**	**2**	**3**	**4**	**5**	**6**	**7**

	maklumat melalui penggunaan ARCT sangatlah kuat dalam ES.							
PT3	Peer trustworthiness amongst ARCs in sharing and disseminating information through the ARCT is able to provide an important resource to relief agencies in ES. ***Kebolehpercayaan rakan di kalangan ARC dalam perkongsian dan penyebaran maklumat melalui penggunaan ARCT dapat membekalkan sumber yang penting kepada agensi-agensi bantuan dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Compatibility / ***Keserasian***								
CB1	Using the ARCT amongst ARCs is compatible with all aspecof in sharing and disseminating information to relief agencies in ES. ***Menggunakan ARCT di kalangan ARC adalah bersesuaian dengan semua aspek dalam perkongsian dan penyebaran maklumat kepada agensi bantuan dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
CB2	The use of ARCT in sharing and disseminating information amongst ARCs and relief agencies is compatible in ES. ***Menggunakan ARCT untuk perkongsian dan penyebaran maklumat di kalangan ARC dan agensi-agensi bantuan adalah sesuai dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
CB3	I am feeling compatible towards the use of ARCT in sharing and disseminating information to support relief agencies in ES. ***Saya merasa serasi untuk menggunakan ARCT dalam perkongsian dan penyebaran maklumat demi membantu agensi-agensi bantuan dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Behavioural Intention / *Hasrat tingkahlaku*								
BI1	I intend to continue using ARCT amongst ARCs to support relief agencies in ES in the future. ***Saya berhasrat untuk terus menggunakan ARCT di kalangan ARC untuk menyokong agensi-agensi bantuan dalam ES di masa hadapan.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
BI2	I will always try to use ARCT amongst ARCs in sharing and disseminating information to support relief agencies in ES. ***Saya akan sentiasa cuba menggunakan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat untuk menyokong agensi bantuan dalam ES.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
BI3	I plan to continue to use ARCT frequently amongst ARCs and always prepare to share and disseminate the information in ES with relief agencies in Malaysia. ***Saya merancang untuk terus menggunakan ARCT secara kerap di kalangan ARC dan sentiasa bersedia untuk perkongsian dan penyebaran maklumat dalam ES dengan agensi-agensi bantuan di Malaysia.***	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Thank you very much for your cooperation.
Terima kasih atas kerjasama anda.

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Appendix C
Form for Experts verification

UNIVERSITI UTARA MALAYSIA
EXPERTS VERIFICATION FOR QUESTIONNAIRE

To whom it may concern

Based on literature review from related study, these questionnaires are appropriate to investigate the influence factors toward the Behavioural Intention (BI) to use the Amateur Radio Communication Technology (ARCT) among Amateur Radio Community (ARC) in Emergency Situation (ES) to support relief agencies.

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Thank you very much for your cooperation.

Please state your confirmation (√)

Agree to verify the questionnaires	
Disagree to verify the questionnaires	

Please give suggestions or comments.
....
....
....

Name / Nama　　　　Signature /Tandatangan

....　　　　...................................

Official Stamp/ Cop Rasmi

Appendix D
Sources of questionnaire

Indicator:-

ARC *Amateur Radio Community*
ARCT *Amateur Radio Communication Technology*
ES *Emergency Situation*

Factor	References	Code	Original question	Adapted question
Performance expectancy *Prestasi jangkaan*	Venkatesh et al., 2012.	PE1	I find mobile Internetuseful in my daily life.	I find Amateur Radio Communication Technology (ARCT) useful for sharing and disseminating information amongst Amateur Radio Communities (ARCs) with relief agencies in Emergency Situations (ES). ***Saya mendapati Teknologi Komunikasi Radio Amatur (ARCT) berguna untuk perkongsian dan penyebaran maklumat di Kalangan Komuniti Radio Amatur (ARC) dengan agensi bantuan dalam Situasi Kecemasan (ES) berlaku***
	Kit, 2014.	PE2	Using mobile apps increases my chances to achieve important information in my daily life.	Using ARCT amongst ARCs increases my chances to access important information that can be shared and disseminated to relief agencies in ES. ***Menggunakan ARCT di kalangan ARC meningkatkan peluang saya untuk mengakses maklumat penting yang boleh dikongsi***

				dan disebarkan kepada agensi bantuan dalam ES.
	Sun, Cao & You, 2010.	PE3	Using mobile service helped me accomplish in sharing information more quickly in China.	Using ARCT amongst ARCs helps me to share and disseminate information to relief agencies more quickly in ES. ***Menggunakan ARCT kalangan ARC membantu saya untuk berkongsi dan menyebarkan maklumat kepada agensi bantuan dengan lebih cepat dalam ES.***
Effort expectancy *Jangkaan usaha*	Wu, Tao & Yang, 2007.	EE1	Learning how to use mobile communication services in sharing information is easy for me.	Learning how to use ARCT amongst ARCs in sharing and disseminating information to relief agencies in ES is easy for me. ***Belajar bagaimana menggunakan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat kepada agensi bantuan di ES adalah mudah bagi saya.***
	Venkatesh et al., 2012.	EE2	My interaction with Internet mobile is clear and understandable.	My interaction through ARCT amongst ARCs in sharing and disseminating information is clear and understandable by relief agencies in ES. ***Interaksi saya melalui ARCT di kalangan ARC dalam perkongsian dan penyebaran***

				maklumat adalah jelas dan mudah difahami oleh agensi-agensi bantuan dalam ES.
	Sun, Cao &You, 2010.	EE3	I find a mobile service is easy to use in sharing information in China.	I find that ARCT is easy to use in sharing and disseminating information to relief agencies in ES. ***Saya mendapati ARCT mudah digunakan dalam perkongsian dan penyebaran maklumat kepada agensi-agensi bantuan dalam ES.***
	Sun, Cao &You, 2010.	EE4	It is easy for me to become skilful at using mobile service in sharing information in China.	It is easy for me to become skillful at using ARCT in sharing and disseminating information to relief agencies in ES. ***Adalah mudah bagi saya menguasai kemahiran menggunakan ARCT dalam dalam perkongsian dan penyebaran maklumat kepada agensi-agensi bantuan dalam ES.***
Social influence *Pengaruh sosial*	Akour, 2009.	SI1	Communities who are important to me think that I should use m-learning in higher education.	Communities which are important to me think that I should use ARCT amongst ARCs in sharing and disseminating information to relief agencies in ES. ***Masyarakat yang penting kepada saya berfikir bahawa saya harus menggunakan ARCT di kalangan***

				ARC dalam perkongsian dan penyebaran maklumat kepada agensi-agensi bantuan dalam ES.
	Akour, 2009.	SI2	Communities who influence my behaviour think that I should use m-learning in higher education.	Communities which influence my behaviour think that I should use ARCT amongst ARCs in sharing and disseminating information to relief agencies in ES. ***Masyarakat yang mempengaruhi tingkah laku saya berfikir bahawa saya perlu menggunakan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat kepada agensi-agensi bantuan dalam ES.***
	Akour, 2009.	SI3	Community whose opinions that I value prefer to use m-learning in higher education.	Community members whose opinions I value prefer to use-ARCT amongst ARCs in sharing and disseminating information to relief agencies in ES. ***Masyarakat yang berpendapat bahawa saya suka menggunakan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat kepada agensi-agensi bantuan dalam ES.***
Facilitating condition	Yeoh & Chan, 2011.	FC1	I have the resources necessary from the government to use	I have the resources necessary from the government to use

Memudahkan keadaan			internet banking in Malaysia.	ARCT amongst ARCs in sharing and disseminating information to relief agencies in ES. ***Saya mempunyai sumber yang diperlukan daripada kerajaan untuk menggunakan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat kepada agensi-agensi bantuan dalam ES.***
	Wu, Tao & Yang, 2007.	FC2	It's easy to get the government support in the use of 3G mobile telecommunication in sharing information in Taiwan.	It is easy to get the government's support in the use of ARCT amongst ARCs in sharing and disseminating information to relief agencies in ES. ***Sangat mudah untuk mendapatkan sokongan kerajaan dalam penggunaan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat kepada agensi-agensi bantuan dalam ES.***
	Teo & Noyes, 2012.	FC3	I have the necessary knowledge to use technology in education sector.	I have the necessary knowledge to use ARCT amongst ARCs in sharing and disseminating information to relief agencies in ES. ***Saya mempunyai pengetahuan yang diperlukan untuk menggunakan ARCT di kalangan ARC dalam perkongsian dan***

				penyebaran maklumat kepada agensi-agensi bantuan dalam ES.
	Teo & Noyes, 2012.	FC4	I can get help from others when I have difficulties using mobile Internet.	I can get help from other ARCs when I have difficulties using the ARCT in sharing and disseminating information to relief agencies in ES. ***Saya boleh mendapatkan bantuan daripada ARC yang lain apabila saya mengalami kesukaran untuk menggunakan ARCT dalam perkongsian dan penyebaran maklumat kepada agensi-agensi bantuan dalam ES.***
Price value *Nilai harga*	Prata, Moraes & Quaresma, 2012.	PV1	Mobile apps store is reasonably priced compared to other technology store.	ARCT is reasonably priced compared to other wireless communication technology. ***Harga ARCT berpatutan berbanding dengan harga teknologi komunikasi tanpa wayar yang lain.***
	Munnukka, 2004.	PV2	A mobile service is a good and suitable price value for the current situation.	ARCT is a good and suitable price value for the current situation. ***Nilai harga ARCT adalah baik dan sesuai untuk keadaan semasa.***
	Chong, 2013.	PV3	I do not mind to spend much in getting anything	I do not mind spending more in

			that is related to mobile devices.	getting anything that is related to ARCT. ***Saya tidak kisah untuk berbelanja lebih untuk mendapatkan apa-apa yang berkaitan dengan ARCT.***
Hedonic motivation *Motivasi yang menyenangkan*	Kuo & Yen, 2009.	HM1	I like and volunteer to support relief agencies in ES	I like to use ARCT amongst ARCs to support relief agencies in sharing and disseminating information in ES. ***Saya suka untuk menggunakan ARCT di kalangan ARC untuk menyokong agensi-agensi bantuan dalam perkongsian dan penyebaran maklumat dalam ES.***
	Kuo & Yen, 2009.	HM2	I enjoy and voluntarily to support relief agencies in ES.	I like to and voluntarily use ARCT amongst ARCs to support relief agencies in sharing and disseminating information in ES. ***Saya suka dan secara sukarela menggunakan ARCT di kalangan ARC untuk menyokong agensi-agensi bantuan dalam perkongsian dan penyebaran maklumat dalam ES.***
	Kuo & Yen, 2009.	HM3	I am excited to be a volunteer to support relief agencies in ES.	I am excited to be a volunteer using ARCT amongst ARCs to support relief agencies in sharing and

				disseminating information in ES. ***Saya teruja untuk menjadi sukarelawan yang menggunakan ARCT di kalangan ARC bagi menyokong agensi-agensi bantuan dalam perkongsian dan penyebaran maklumat dalam ES.***
Habit *Amalan kebiasaan*	Venkatesh et al., 2012.	HB1	Using mobile Internet has become a habit and as a hobby for me.	Using ARCT amongst ARCs in sharing and disseminating information has become a habit for me to support relief agencies in ES. ***Menggunakan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat menjadi satu kebiasaan bagi saya untuk menyokong agensi-agensi bantuan di ES.***
	Venkatesh et al., 2012.	HB2	I am excited to use mobile Internet in daily life.	Using ARCT amongst ARCs in sharing and disseminating information has become a necessity for me to support relief agencies in ES. ***Menggunakan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat telah menjadi satu keperluan kepada saya untuk***

				menyokong agensi-agensi bantuan dalam ES.
	Venkatesh et al., 2012.	HB3	I must use mobile Internet in daily life.	I must use ARCT amongst the ARCs to support relief agencies in sharing and disseminating information in ES. ***Saya mesti menggunakan ARCT di kalangan ARC untuk menyokong agensi-agensi bantuan dalam perkongsian dan penyebaran maklumat dalam ES.***
	Suki et al. , 2012.	HB4	I always feel responsibility to use Facebook and to update my daily activities.	I always feel responsibility towards using ARCT amongst ARCs to support relief agencies in sharing and disseminating information in ES. ***Saya sentiasa merasa bertanggungjawab untuk menggunakan ARCT di kalangan ARC bagi menyokong agensi bantuan dalam berkongsi dan menyebarkan maklumat dalam ES***.
Peer trustworthiness *Kebolehpercayaan rakan*	Bharosa & Janssen, 2010.	PT1	I am confident that information is shared and disseminated among multi-agency is trustworthy.	I am confident that the information being shared and disseminated amongst ARCs to relief agencies in ES through ARCT is trustworthy.

				Saya yakin bahawa maklumat yang dikongsi dan disebarkan di kalangan ARC kepada agensi-agensi bantuan melalui ARCT dalam ES adalah boleh dipercayai.
	Fiona & Linda, 2004.	PT2	Peer trustworthiness among rescue agencies in sharing and dissemination of information is strongly in ES.	Peer trustworthiness amongst ARCs in sharing and disseminating information through the use of ARCT is strong in ES. ***Kebolehpercayaan rakan di kalangan ARC dalam perkongsian dan penyebaran maklumat melalui penggunaan ARCT sangatlah kuat dalam ES.***
	Fiona & Linda, 2004.	PT3	Peer trustworthiness among rescue agencies in sharing and dissemination of information provides an important resource in ES.	Peer trustworthiness amongst ARCs in sharing and disseminating information through the ARCT is able to provide an important resource to relief agencies in ES. ***Kebolehpercayaan rakan di kalangan ARC dalam perkongsian dan penyebaran maklumat melalui penggunaan ARCT dapat membekalkan sumber yang penting kepada agensi-agensi bantuan dalam ES.***

Compatibility *Keserasian*	Tan & Chou, 2008	CB1	Using the mobile communication technology in knowledge sharing between off campus students is compatible.	Using the ARCT amongst ARCs is compatible with all aspect of in sharing and disseminating information to relief agencies in ES. ***Menggunakan ARCT di kalangan ARC adalah bersesuaian dengan semua aspek dalam perkongsian dan penyebaran maklumat kepada agensi bantuan dalam ES.***
	Kuo & Yen, 2009	CB2	The use of mobile communication technology between relief agencies is compatible in ES.	The use of ARCT in sharing and disseminating information amongst ARCs and relief agencies is compatible in ES. ***Menggunakan ARCT untuk perkongsian dan penyebaran maklumat di kalangan ARC dan agensi-agensi bantuan adalah sesuai dalam ES.***
	Kuo & Yen, 2009	CB3	I am feeling compatible to use mobile communication technology to support relief agencies in ES.	I am feeling compatible towards the use of ARCT in sharing and disseminating information to support relief agencies in ES. ***Saya merasa serasi untuk menggunakan ARCT dalam perkongsian dan penyebaran maklumat demi***

				membantu agensi-agensi bantuan dalam ES.
Behavioural intention *Hasrat tingkahlaku*	Kit, 2014	BI1	I intend to continue using mobile apps in the future	I intend to continue using ARCT amongst ARCs to support relief agencies in ES in the future. ***Saya berhasrat untuk terus menggunakan ARCT di kalangan ARC untuk menyokong agensi-agensi bantuan dalam ES di masa hadapan.***
	Kit, 2014	BI2	I will always try to use mobile apps in my daily life.	I will always try to use ARCT amongst ARCs in sharing and disseminating information to support relief agencies in ES. ***Saya akan sentiasa cuba menggunakan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat untuk menyokong agensi bantuan dalam ES.***
	Kit, 2014	BI3	I plan to continue to use mobile apps frequently	I plan to continue to use ARCT frequently amongst ARCs and always prepare to share and disseminate the information in ES with relief agencies in Malaysia. ***Saya merancang untuk terus***

				menggunakan ARCT secara kerap di kalangan ARC dan sentiasa bersedia untuk perkongsian dan penyebaran maklumat dalam ES dengan agensi-agensi bantuan di Malaysia.

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Appendix E
Factors confirmation by ARCT professional practitioner

UNIVERSITI UTARA MALAYSIA
FACTORS CONFIRMATION
PENGESAHAN FAKTOR

Dear Respondents
Based on literature review from related study, these factors have a significant influence toward the Behavioural Intention (BI) in use the Amateur Radio Communication Technology (ARCT) among Amateur Radio Community (ARC) in Emergency Situation (ES) to support relief agencies.

Responden yang dihormati
Berdasarkan tinjauan ilmiah dari kajian yang berkaitan, faktor-faktor ini mempunyai pengaruh yang signifikan terhadap hasrat tingkah laku dalam menggunakan teknologi komunikasi radio amatur (ARCT) di kalangan komuniti radio amatur (ARC) dalam keadaan kecemasan (ES) untuk menyokong agensi bantuan.

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Supervisor:
Prof Dr Wan Rozaini binti Sheik Osman
School of Computing, Universiti Utara Malaysia

Thank you very much for your cooperation.
Terima kasih atas kerjasama anda.
Please state your confirmation (√)
Sila nyatakan pengesahan anda(√)

Agree to confirm ***Setuju untuk mengesahkan***	✓
Disagree to confirm **Tidak bersetuju untuk mengesahkan**	

Please state other factors you consider important or give suggestions or comments.
Sila nyatakan faktor lain yang anda anggap penting atau berikan cadangan atau komen.
....
....
....

Name / Nama

Dzaf Bahari bin Taib.
9W2DBT

Signature /Tandatangan

Official Stamp/ Cop Rasmi

PERSATUAN RADIO AMATUR MELAYU UTARA MALAYSIA
9W2DBT
PRESIDEN
(ASTRA MALAYSIA)

UNIVERSITI UTARA MALAYSIA

FACTORS CONFIRMATION

PENGESAHAN FAKTOR

Please tick (√) whether you agree to confirm the following factors;
Sila tandakan (√) sama ada anda bersetuju untuk mengesahkan faktor-faktor berikut;

No	Factor *Faktor*	Definition *Definisi*	Please (√) *Sila(√)*
1	Compatibility ***Keserasian***	The extent of compatibility among ARC to use ARCT in sharing and dissemination of information in ES. ***Tahap keserasian di kalangan ARC untuk menggunakan ARCT dalam perkongsian dan penyebaran maklumat di ES.***	√
2	Effort expectancy ***Jangkaan usaha***	The extent of ease associated with the use of ARCT among ARC in sharing and dissemination of information in ES. ***Tahap kemudahan yang berkaitan dengan penggunaan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat dalam ES.***	√
3	Facilitating condition ***Memudahkan keadaan***	The extent to which an ARC believes that organizational and technical infrastructure exists to support use of the ARCT in sharing and dissemination of information in ES. ***Tahap yang mana ARC percaya bahawa organisasi dan infrastruktur teknikal wujud untuk menyokong penggunaan ARCT dalam perkongsian dan penyebaran maklumat dalam ES.***	√
4	Habit ***Kebiasaan***	The extent of routine behaviour among ARC that is repeated regularly and tends to occur subconsciously to use ARCT in sharing and dissemination of information in ES. ***Tahap kelakuan rutin di kalangan ARC yang diulangi secara berkala dan cenderung berlaku secara tidak sedar untuk menggunakan ARCT dalam perkongsian dan penyebaran maklumat dalam ES.***	√
5	Hedonic motivation ***Motivasi hedonik***	The extent of excitement among ARC to use ARCT in sharing and dissemination of information in ES. ***Tahap keterujaan di kalangan ARC untuk menggunakan ARCT dalam perkongsian dan penyebaran maklumat dalam ES.***	√
6	Peers trustworthiness ***kebolehpercayaan ~~di kalangan~~ rakan***	The extent of reliability among ARC to use ARCT in sharing and dissemination of information in ES. ***Tahap kebolehpercayaan di kalangan ARC untuk menggunakan ARCT dalam perkongsian dan penyebaran maklumat dalam ES.***	√
7	Performance expectancy ***Jangkaan prestasi***	The extent to which the ARC expects that using the ARCT in sharing and dissemination of information in ES will help them to gains important information. ***Sejauh mana ARC menjangkakan bahawa menggunakan ARCT dalam perkongsian dan penyebaran maklumat dalam ES akan membantu mereka memperoleh maklumat penting.***	√
8	Price value ***Nilai harga***	The cost and pricing structures may have a significant impact on ARC to have ARCT equipment and to use it. ***Struktur kos dan penetapan harga mungkin mempunyai kesan yang signifikan terhadap ARC untuk memiliki peralatan ARCT dan menggunakannya.***	√
9	Social influence ***Pengaruh sosial***	The extent of community to perceive and to think that ARC should use ARCT in sharing and dissemination of information in ES. ***Tahap yang mana masyarakat melihat dan berfikir bahawa ARC harus menggunakan ARCT dalam perkongsian dan penyebaran maklumat dalam ES.***	√

PERSATUAN RADIO AMATUR MELAYU UTARA MALAYSIA (ASTRA MALAYSIA)
9W2DBT
PRESIDEN

UNIVERSITI UTARA MALAYSIA

FACTORS CONFIRMATION

PENGESAHAN FAKTOR

Dear Respondents
Based on literature review from related study, these factors have a significant influence toward the Behavioural Intention (BI) in use the Amateur Radio Communication Technology (ARCT) among Amateur Radio Community (ARC) in Emergency Situation (ES) to support relief agencies.

Responden yang dihormati
Berdasarkan tinjauan ilmiah dari kajian yang berkaitan, faktor-faktor ini mempunyai pengaruh yang signifikan terhadap hasrat tingkah laku dalam menggunakan teknologi komunikasi radio amatur (ARCT) di kalangan komuniti radio amatur (ARC) dalam keadaan kecemasan (ES) untuk menyokong agensi bantuan.

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Thank you very much for your cooperation.
Terima kasih atas kerjasama anda.

Please state your confirmation (√)
Sila nyatakan pengesahan anda(√)

Agree to confirm ***Setuju untuk mengesahkan***	√
Disagree to confirm **Tidak bersetuju untuk mengesahkan**	

Please state other factors you consider important or give suggestions or comments.
Sila nyatakan faktor lain yang anda anggap penting atau berikan cadangan atau komen.

Menyokong kajian ini

Name / Nama

Bakri Bin Ramli

Signature /Tandatangan

Official Stamp/ Cop Rasmi

PERSATUAN RADIO AMATUR MELAYU UTARA MALAYSIA (ASTRA MALAYSIA)

UNIVERSITI UTARA MALAYSIA

FACTORS CONFIRMATION

PENGESAHAN FAKTOR

Please tick (√) whether you agree to confirm the following factors;
Sila tandakan (√) sama ada anda bersetuju untuk mengesahkan faktor-faktor berikut;

No	Factor *Faktor*	Definition *Definisi*	Please (√) *Sila(√)*
1	Compatibility ***Keserasian***	The extent of compatibility among ARC to use ARCT in sharing and dissemination of information in ES. ***Tahap keserasian di kalangan ARC untuk menggunakan ARCT dalam perkongsian dan penyebaran maklumat di ES.***	√
2	Effort expectancy ***Jangkaan usaha***	The extent of ease associated with the use of ARCT among ARC in sharing and dissemination of information in ES. ***Tahap kemudahan yang berkaitan dengan penggunaan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat dalam ES.***	√
3	Facilitating condition ***Memudahkan keadaan***	The extent to which an ARC believes that organizational and technical infrastructure exists to support use of the ARCT in sharing and dissemination of information in ES. ***Tahap yang mana ARC percaya bahawa organisasi dan infrastruktur teknikal wujud untuk menyokong penggunaan ARCT dalam perkongsian dan penyebaran maklumat dalam ES.***	√
4	Habit ***Kebiasaan***	The extent of routine behaviour among ARC that is repeated regularly and tends to occur subconsciously to use ARCT in sharing and dissemination of information in ES. ***Tahap kelakuan rutin di kalangan ARC yang diulangi secara berkala dan cenderung berlaku secara tidak sedar untuk menggunakan ARCT dalam perkongsian dan penyebaran maklumat dalam ES.***	√
5	Hedonic motivation ***Motivasi hedonik***	The extent of excitement among ARC to use ARCT in sharing and dissemination of information in ES. ***Tahap keterujaan di kalangan ARC untuk menggunakan ARCT dalam perkongsian dan penyebaran maklumat dalam ES.***	√
6	Peers trustworthiness ***kebolehpercayaan ~~di kalangan~~ rakan***	The extent of reliability among ARC to use ARCT in sharing and dissemination of information in ES. ***Tahap kebolehpercayaan di kalangan ARC untuk menggunakan ARCT dalam perkongsian dan penyebaran maklumat dalam ES.***	√
7	Performance expectancy ***Jangkaan prestasi***	The extent to which the ARC expects that using the ARCT in sharing and dissemination of information in ES will help them to gains important information. ***Sejauh mana ARC menjangkakan bahawa menggunakan ARCT dalam perkongsian dan penyebaran maklumat dalam ES akan membantu mereka memperoleh maklumat penting.***	√
8	Price value ***Nilai harga***	The cost and pricing structures may have a significant impact on ARC to have ARCT equipment and to use it. ***Struktur kos dan penetapan harga mungkin mempunyai kesan yang signifikan terhadap ARC untuk memiliki peralatan ARCT dan menggunakannya.***	√
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UNIVERSITI UTARA MALAYSIA

FACTORS CONFIRMATION

PENGESAHAN FAKTOR

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Responden yang dihormati
Berdasarkan tinjauan ilmiah dari kajian yang berkaitan, faktor-faktor ini mempunyai pengaruh yang signifikan terhadap hasrat tingkah laku dalam menggunakan teknologi komunikasi radio amatur (ARCT) di kalangan komuniti radio amatur (ARC) dalam keadaan kecemasan (ES) untuk menyokong agensi bantuan.

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Malaysia

Thank you very much for your cooperation.
Terima kasih atas kerjasama anda.

Please state your confirmation (√)
Sila nyatakan pengesahan anda(√)

Agree to confirm ***Setuju untuk mengesahkan***	✓
Disagree to confirm **Tidak bersetuju untuk mengesahkan**	

Please state other factors you consider important or give suggestions or comments.
Sila nyatakan faktor lain yang anda anggap penting atau berikan cadangan atau komen.

Satu kajian yang bagus untuk menjadikan radio Amatur sebagai satu aktiviti yang dikenali ramai

Name / Nama

MAT ZAIN SHAARI / 9M2YS.

Signature / Tandatangan

Official Stamp/ Cop Rasmi

UNIVERSITI UTARA MALAYSIA

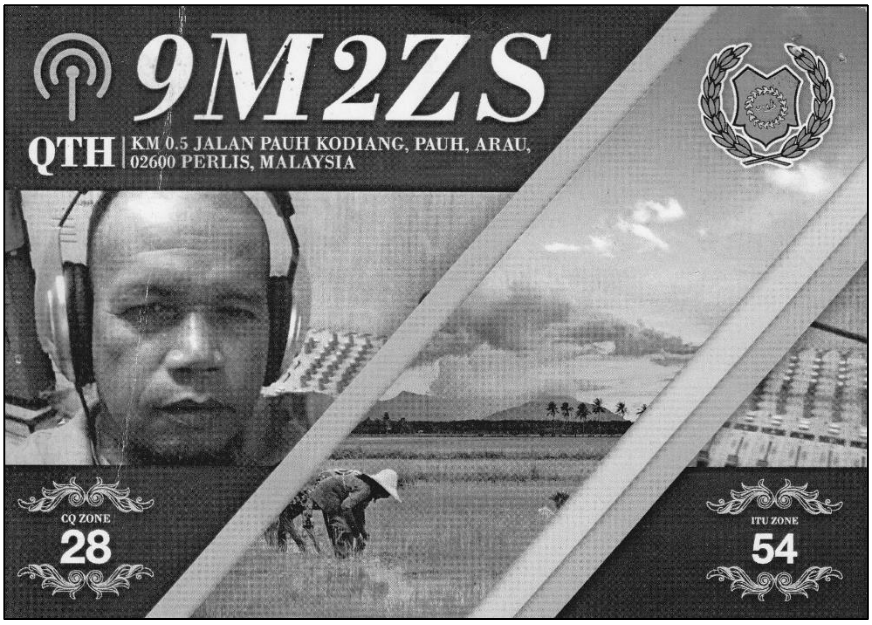
FACTORS CONFIRMATION

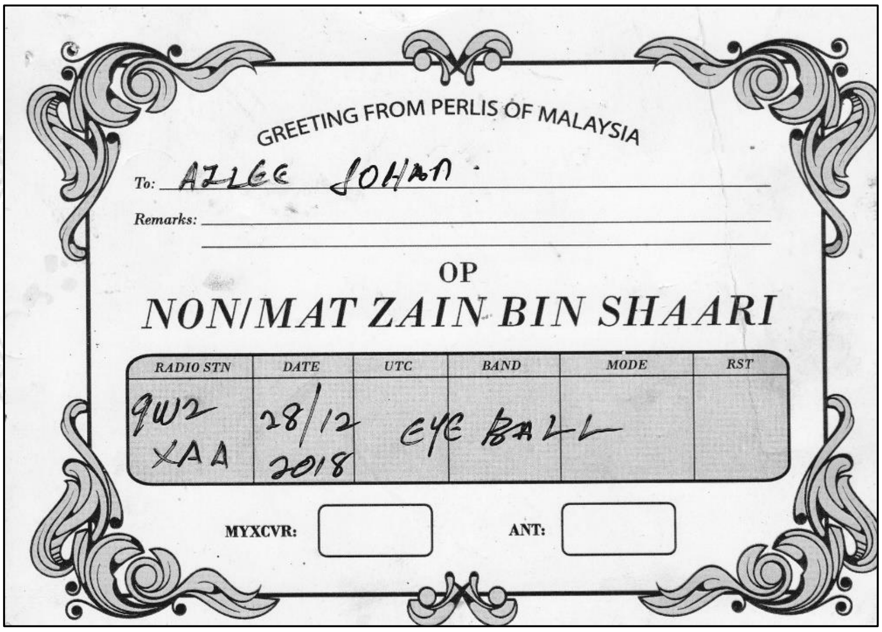
PENGESAHAN FAKTOR

Please tick (√) whether you agree to confirm the following factors;
Sila tandakan (√) sama ada anda bersetuju untuk mengesahkan faktor-faktor berikut;

No	Factor *Faktor*	Definition *Definisi*	Please (√) *Sila(√)*
1	Compatibility ***Keserasian***	The extent of compatibility among ARC to use ARCT in sharing and dissemination of information in ES. ***Tahap keserasian di kalangan ARC untuk menggunakan ARCT dalam perkongsian dan penyebaran maklumat di ES.***	√
2	Effort expectancy ***Jangkaan usaha***	The extent of ease associated with the use of ARCT among ARC in sharing and dissemination of information in ES. ***Tahap kemudahan yang berkaitan dengan penggunaan ARCT di kalangan ARC dalam perkongsian dan penyebaran maklumat dalam ES.***	√
3	Facilitating condition ***Memudahkan keadaan***	The extent to which an ARC believes that organizational and technical infrastructure exists to support use of the ARCT in sharing and dissemination of information in ES. ***Tahap yang mana ARC percaya bahawa organisasi dan infrastruktur teknikal wujud untuk menyokong penggunaan ARCT dalam perkongsian dan penyebaran maklumat dalam ES.***	√
4	Habit ***Kebiasaan***	The extent of routine behaviour among ARC that is repeated regularly and tends to occur subconsciously to use ARCT in sharing and dissemination of information in ES. ***Tahap kelakuan rutin di kalangan ARC yang diulangi secara berkala dan cenderung berlaku secara tidak sedar untuk menggunakan ARCT dalam perkongsian dan penyebaran maklumat dalam ES.***	√
5	Hedonic motivation ***Motivasi hedonik***	The extent of excitement among ARC to use ARCT in sharing and dissemination of information in ES. ***Tahap keterujaan di kalangan ARC untuk menggunakan ARCT dalam perkongsian dan penyebaran maklumat dalam ES.***	√
6	Peers trustworthiness ***kebolehpercayaan ~~di kalangan~~ rakan***	The extent of reliability among ARC to use ARCT in sharing and dissemination of information in ES. ***Tahap kebolehpercayaan di kalangan ARC untuk menggunakan ARCT dalam perkongsian dan penyebaran maklumat dalam ES.***	√
7	Performance expectancy ***Jangkaan prestasi***	The extent to which the ARC expects that using the ARCT in sharing and dissemination of information in ES will help them to gains important information. ***Sejauh mana ARC menjangkakan bahawa menggunakan ARCT dalam perkongsian dan penyebaran maklumat dalam ES akan membantu mereka memperoleh maklumat penting.***	√
8	Price value ***Nilai harga***	The cost and pricing structures may have a significant impact on ARC to have ARCT equipment and to use it. ***Struktur kos dan penetapan harga mungkin mempunyai kesan yang signifikan terhadap ARC untuk memiliki peralatan ARCT dan menggunakannya.***	√
9	Social influence ***Pengaruh sosial***	The extent of community to perceive and to think that ARC should use ARCT in sharing and dissemination of information in ES. ***Tahap yang mana masyarakat melihat dan berfikir bahawa ARC harus menggunakan ARCT dalam perkongsian dan penyebaran maklumat dalam ES.***	√

9M228




GREETING FROM PERLIS OF MALAYSIA

To: AZLEE JOHAN.

Remarks:

OP

NON/MAT ZAIN BIN SHAARI

RADIO STN	DATE	UTC	BAND	MODE	RST
9W2 XAA	28/12 2018	EYE BALL			

MYXCVR:

ANT:

Appendix F
Experts verification by academic professional
(Professor Dr. Huda Hj. Ibrahim)

UNIVERSITI UTARA MALAYSIA
EXPERTS VERIFICATION FOR QUESTIONNAIRE

To whom it may concern

Based on literature review from related studies, this questionnaire is designed to investigate the influence factors toward the Behavioural Intention (BI) to use the Amateur Radio Communication Technology (ARCT) among Amateur Radio Community (ARC) in Emergency Situation (ES) to support relief agencies.

Examples of ARCT include - - - -

Researcher:
Azlee Johar
H/P: 0194807144
Matric: 93597

Mail Address:
No.20 Jln Cemerlang 6,
Tmn Guru Jaya,
01000 Kangar, Perlis.

Supervisor:
Prof. Dr. Wan Rozaini Sheik Osman
Email: rozai174@uum.edu.my

Email: azlee@ymail.com

azleejohar@gmail.com

Callsign: 9W2XAA

Thank you very much for your cooperation.

Please state your confirmation (√)

Agree to verify the questionnaires	✓
Disagree to verify the questionnaires	

Please give suggestions or comments.

See the comments inside.

Name / Nama

Signature /Tandatangan

Official Stamp/ Cop Rasmi

PROF. DR. HUDA HJ. IBRAHIM
Dekan
Pusat Pengajian Pengkomputeran
UUM College of Arts and Sciences
Universiti Utara Malaysia

29/1/19.

Experts verification by academic professional
(Associate Professor Dr. Mazida Ahmad)

UNIVERSITI UTARA MALAYSIA
EXPERTS VERIFICATION FOR QUESTIONNAIRE

To whom it may concern

Based on literature review from related studies, this questionnaire is designed to investigate the influence factors toward the Behavioural Intention (BI) to use the Amateur Radio Communication Technology (ARCT) among Amateur Radio Community (ARC) in Emergency Situation (ES) to support relief agencies.

Researcher:
Azlee Johar
H/P: 0194807144
Matric: 93597

Mail Address:
No.20 Jln Cemerlang 6,
Tmn Guru Jaya,
01000 Kangar, Perlis.

Supervisor:
Prof. Dr. Wan Rozaini Sheik Osman
Email: rozai174@uum.edu.my

Email: azlee@ymail.com

azleejohar@gmail.com

Callsign: 9W2XAA

Thank you very much for your cooperation.

Please state your confirmation (√)

Agree to verify the questionnaires	✓
Disagree to verify the questionnaires	

Please give suggestions or comments

1. Perlu pelarasan bagi ~~teks~~ perkataan² tertentu
2. Mohon rujuk guru bahasa untuk back 2 back translation sekiranya perlu.
3. Ubah suai perkataan BM yang sesuai.

Name / Nama

Mzid

Signature /Tandatangan

Mzid

Official Stamp / Cop Rasmi

DR. MAZIDA BT AHMAD
Associate Professor
School of Computing
UUM College of Arts and Sciences
Universiti Utara Malaysia

Experts verification by academic professional
(Dr. Massudi Mahmuddin)

UNIVERSITI UTARA MALAYSIA

EXPERTS VERIFICATION FOR QUESTIONNAIRE

To whom it may concern

Based on literature review from related studies, this questionnaire is-designed to investigate the influence factors toward the Behavioural Intention (BI) to use the Amateur Radio *Communication Technology (ARCT) among Amateur Radio Community (ARC) in* Emergency Situation (ES) to support relief agencies.

Researcher:
Azlee Johar
H/P: 0194807144
Matric: 93597

Mail Address:
No.20 Jln Cemerlang 6,
Tmn Guru Jaya,
01000 Kangar, Perlis.

Supervisor:
Prof. Dr. Wan Rozaini Sheik Osman
Email: rozai174@uum.edu.my

Email: azlee@ymail.com

azleejohar@gmail.com

Callsign: 9W2XAA

Thank you very much for your cooperation.

Please state your confirmation (√)

Agree to verify the questionnaires	✓
Disagree to verify the questionnaires	

Please give suggestions or comments.

- Please, there should alignment between the exiting question to adjust with the ARCT environment / questions.

mobile internet
mobile service
mobile app
m-learning
→ ARC

Name / Nama

Massudi Mahmuddin

Signature / Tandatangan

Official Stamp/ Cop Rasmi

Experts verification by academic professional
(Associate Professor Dr. Kerk Kee)

Gmail Azlee Jo <azleejohar@gmail.com>

Verification for data analysis (Chapter 4)
1 message

Kerk F. Kee <kerk.kee@gmail.com> 8 June 2019 at 02:05
To: Azlee Jo <azleejohar@gmail.com>

Hello Azlee,

Yes, I remember you.

Thanks for sharing the photo & sorry for a late reply.

Your study is the reflective measurement model. So please review previous studies which are related to the reflective measurement model.

Sec 4.5 - PLS algorithm able to evaluate the reliability of the model, so use the parameter to determine R square. Because these involve the basic properties of R square, you should be able to find references to these properties. Refer this link to interpret https://statisticsbyjim.com/regression/interpret-r-squared-regression/

Sec 4.6 - Why the bootstrapping technique is required to use. Please explain. Refer to
https://machinelearningmastery.com/a-gentle-introduction-to-the-bootstrap-method/
https://stat.rutgers.edu/home/mxie/RCPapers/bootstrap.pdf

Sec 4.6.1- Please present in the form of a table to show path coefficients for the dimension of the model.

I've read the whole chap 4, I'm sure your supervisor has reviewed it well. So I agreed to confirm your data meets the requirements of the study and verified the measurement model.

Best,

Kerk

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ ~~~~~~~~~~~~~~~~
Kerk F. Kee,
Associate Professor, School of Communication,
Chapman University, Doti #205, Orange, California 92866,
Phone Appointment: https://callkerk.youcanbook. me/
Homepage: www.ekerk.com
OCT Group: www.octgroup.org
SEC Lab: https://seclaboratory. wordpress.com/
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Appendix G
Certificate of the workshop for data analysis and model validation

Stat-ResQ Consultancy
JM0364172-U
Consultation and Statistical Analysis

Smart PLS

Certificate of Attendance

Hereby we certify that

AZLEE B. JOHAR
(740422-09-5083)

attended the workshop

STRUCTURAL EQUATION MODELING (SmartPLS)-PLS-SEM
BASIC AND INTERMEDIATE

30th and 31st January 2015
Universiti Utara Malaysia
Sintok, Kedah

Contents of the Attended Sessions:

- Structural Model
- PLS Path Model Estimation
- Reflective Measurement Model
- Formative Measurement Model
- Assessing PLS-SEM Result
- Mediation Effect
- Moderation Effect
- Higher Order Construct

NORAIHAN BT. MOHAMAD
Organizer
Stat-ResQ Consultancy
(JM0364172-U)

DR. MOHD SOBHI B. ISHAK
Instructor
Universiti Utara Malaysia
Sintok, Kedah

Stat-ResQ Consultancy
Consultation and Statistical Analysis

Smart PLS
Next Generation Path Modeling

Certificate of Attendance

Hereby we certify that

AZLEE BIN JOHAR
(740422-09-5083)

Attended the workshop of

PARTIAL LEAST SQUARE-
STRUCTURAL EQUATION MODELING (PLS-SEM)
SmartPLS 3.0

1st and 2nd April 2016
Universiti Utara Malaysia
Sintok, Kedah

Contents of the Attended Sessions:

- Structural Model
- PLS Path Model Estimation
- Reflective Measurement Model
- Formative Measurement Model
- Assessing PLS-SEM Result
- Higher Order Construct
- Mediation Effect
- Moderation Effect

NORAIHAN BT. MOHAMAD
Organizer
Stat-ResQ Consultancy
(UA001642-P)

DR. HJ. MOHD SOBHI B. ISHAK
Instructor
Universiti Utara Malaysia
Sintok, Kedah

Appendix H

Researcher participates in the conference, workshop, meeting and joining ARCs activities during carried out the research

Year	Month	Participated
2012	Mac	Conferences and Forum ITU UUM *"Radio Amatur Komunikasi Dua Hala Dalam Menghadapi Bencana"* *ITU UUM, ASTRA & NSC* - TSO UUM - 1 Mac 2012
2013	Jan to Mac	Workshop ASTRA Perlis Technical & apparatus of ARCT - SMK Tengku Suleiman Perlis - Every Saturday (8.30 – 11.30 pm)
	Jun	Workshop ASTRA Perlis ARCT Antenna assembly and 9M4RPH repeater maintenance - Bukit Tunjong Perlis - 8 – 9 Jun 2013
	Aug	Camping and workshops ASTRA Perlis - JOTAJOTI Jamboree on The Air & Jamboree on The Internet Scouts Worldwide - Timah Tasoh Lake Resort Perlis - 145 – 18 Aug 2013
	Nov	Conference ASTRA Perlis Q Code, Morse Code and Practice application Rig and Handy - JKM Meeting Room - 15 – 16 Nov 2013
2014	Mac	Seminar ASTRA Malaysia. Amateur Radio Effective Communication in Disaster - UNIMAP - 29 Mac 2014
	Apr	Ceremony of Official Membership Appointments ASTRA. ASTRA Community automatically as JKM Perlis volunteer - JKM Meeting Room - 20 Apr 2014
	Apr	JKM Perlis Volunteer Annual Conference Discuss and purpose annually volunteer activities - NSC Perlis Meeting Room - 26 Apr 2014

	May	JKM Perlis Volunteer Collaborate MMD Perlis and NSC Perlis Launching " *Kampen dan Forum Kesedaran Awam Bencana Gempa Bumi, Tsunami & Cuaca Ekstrem Tahun 2014*" - Participate:- teacher, school student & parent and UNIMEP - SMK Kuala Perlis - 6 – 7 May 2014
	Aug	Eyeball ceremony to the new members passed the RAE 2/2014 - Kurong Tengar Resort Kuala Perlis - 31 Aug 2014
	Oct	Conference and Meeting – ASTRA Perlis & NSC Preparation of ASEAN Regional Forum Disaster Relief Exercise 2015 - JKM Meeting Room - 1- 6 Oct 2014
	Nov	JKM Ceremony "*Aprisiasi Sukarelawaan JKM 2014*" Gathering and dinner ASTRA Perlis & NSC Perlis organized by JKM - Komplek Tun Dr Siti Hasmah Jejawi Perlis - 2 Nov 2014
	Dec	Conference and Meeting – ASTRA Perlis Preparation for RAE 2/2014 Discussion about training ARFDiREx 2015 - JKM Meeting Room
2015	Feb to Apr	Conference and Meeting of ARFDiREx 2015(Future Planning) Involved as volunteers and have the opportunity to use ARCT in ES simulation. Discussion with NSC Perlis and ASTRA Perlis. Simulation postponed to May 2015, due to major flood disaster at the end of year 2014 - JKM Meeting Room
	Mac	ASTRA Annually Meeting 2015 Involved as ASTRA Communitty Perlis - 20 Mac 2015 - Dewan Al-Ghazali SK Sri Kulim, 09000 Kulim, Kedah Darul Aman (5.359250, 100.544904)
	Mac	Visit MCMC Cyberjaya - To obtain related information to the study - 9 Mac 2015
	May	ARFDiREx 2015 –EC in ES Simulation

		Leader of Bravo Team (Malaysia) – ARC Volunteers Team - In charge Secondary Emergency Communications via ARCT - Station in Timah Tasoh Lake Perlis (Ground Zero Simulation Location) - 20 – 20 May - 27 countries participated
	Aug	IOTA 2015 In charge of program equipment - Latitude 5.813098 (5° 48' 47" N) and Longitude 100.293503 (100° 17' 36" E) - AS-058 Songsong Island IOTA Dx-pedition Callsign - Yan, Kedah 09600 West Malaysia
2016	Apr	Visit MCMC Butterworth Pulau Pinang - To discuss and to get related information to the study - Date : 1 Apr 2016
	Apr	Visit MCMC Butterworth Pulau Pinang - To collect related information to the study - Date : 4 Apr 2016
	Jun	Meeting with ARC from ASTRA, JKM and MKN - To present the research finding - Date : 11 Jun 2016 - Venue : Dewan Syarahan APAM
	Aug	Visit MCMC Butterworth Pulau Pinang - To present and discuss related to the study finding - Date : 15 Aug 2016 - Venue : Meeting Room
	Aug	Knowledge Management International Conference 2016 (KMICe2016) - Paper presentation - Date : 29 - 30 Aug 2016 - Venue : Shangri La Hotel, Chiang Mai, Thailand
	Sep	The International Conference on Communication and Media 2016 (i-COME'16), an ICA Regional Conference - Paper presentation - Discussions and to get advice from Assoc. Prof. Dr. Kirk Kee, Chapman University, USA for validate the model and data finding. - Date : 18 – 20 Sep 2016

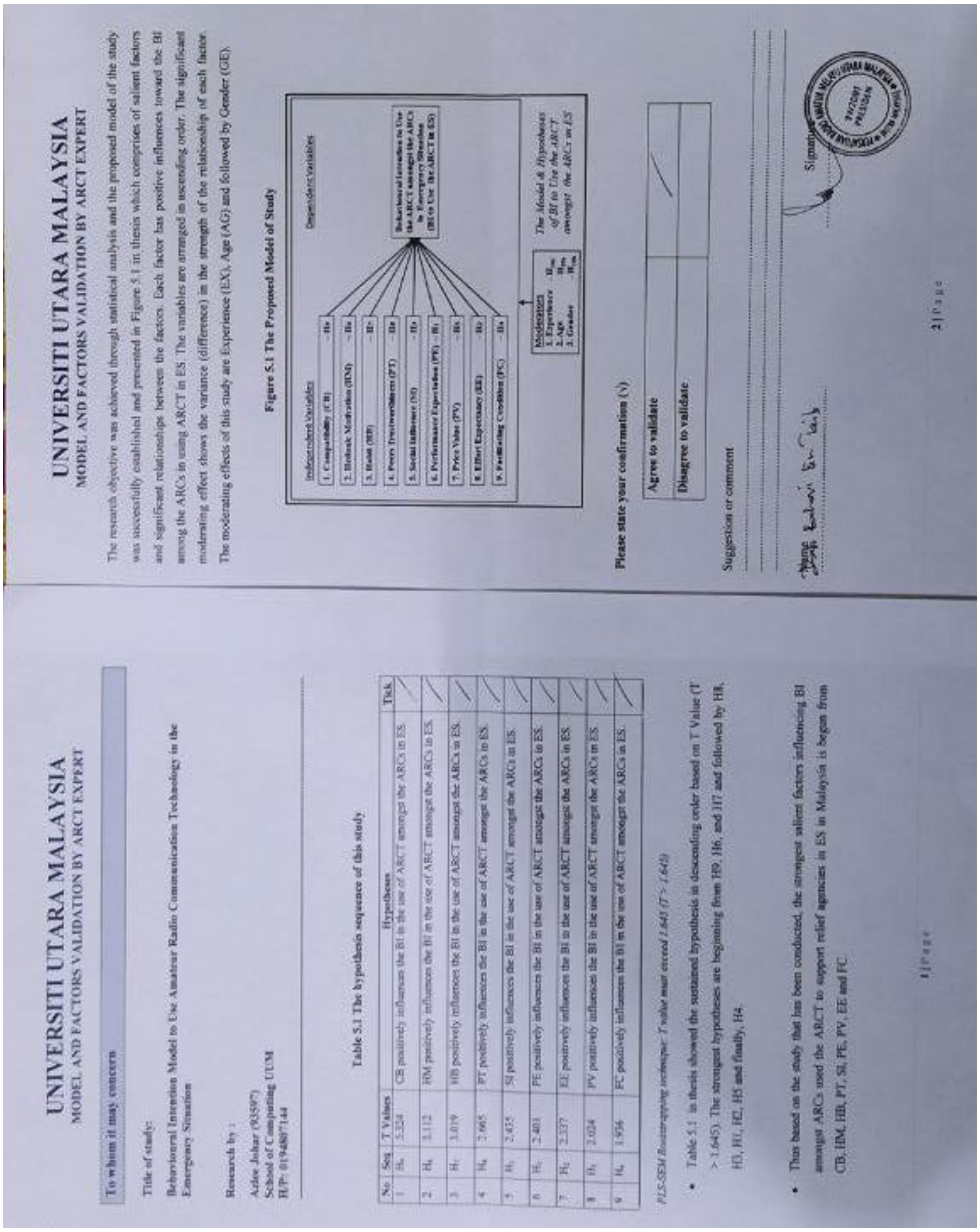
- Venue : Istana Hotel, Kuala Lumpur, Malaysia.

	Oct	International Symposium on Sustainable Development & Management (ISSDM) 2016 - Paper presentation - Date : 8 – 9 Oct 2016 - Venue : International Business School (IBS), Universiti Teknologi Malaysia UTM, Kuala Lumpur, Malaysia.
2018	May	Emergency simulation for volunteers of the Jabatan Kebajikan Masyarakat Negeri Perlis - Incharge contingency communication via ARCT - Date 07- 09 Sep 2018 - Venue : Pulau Tuba, Langkawi
2019	Apr	First aid training for volunteers of the Jabatan Kebajikan Masyarakat Negeri Perlis - Presentation - the importance of ACRT in emergencies - Date 19-21 Apr 2019 - Venue : Myangkasa Akademik & Resort, Langkawi
	Jul	With ASTRA visited MCMC Butterworth Pulau Pinang - To share information about the research findings - Date : 15 Jul 2019
	Aug	Received the notification letter from MCMC about receiving the research information. - Date : 08 Aug 2019

Appendix I
The process to be legally ARCT practitioner

Year	Month	Progression
2014	Apr	Registered to MCMC - To obtain official license through RAE
	May to Jun	Attended RAE 1/2014 class organized by ASTRA Perlis - RAE preparation class to get Call Sign from MCMC - JPAM Perlis Lecture Hall
	Jun	Obtained membership card ASTRA SWAL: 2988-071-14 - Formally can use repeater ASTRA to communicate via ARCT
	Jun	Attended the Examination of RAE 1/2014 organized by MCMC - RAE to get Callsign B Class (9W2) from MCMC - Grand Arora Hotel Alor Star Kedah
	Aug	Obtained Official RAE result from MCMC - 19/47 pass RAE (ASTRA Perlis new member)
	Aug	Submit AA form to MCMC - To register Callsign –9W2XAA – Azlee Johar
	Oct	Received an official letter from MCMC - Amateur Radio Operator License dan Callsign –9W2XAA – Azlee Johar - (valid until 31 Dec 2018)
	Oct to Dec	RAE 2/2014 - class organized by ASTRA Perlis - RAE preparation class to get Call Sign from MCMC - Contribute and conduction electrical calculation class in JKM Meeting Room
2018	Dec	Renew License dan Callsign - (Valid until 31 Dec 2020)

Appendix J
Final validation by ARCT professional practitioner



UNIVERSITI UTARA MALAYSIA
MODEL AND FACTORS VALIDATION BY ARCT EXPERT

To whom it may concern

Title of study:

Behavioural Intention Model to Use Amateur Radio Communication Technology in the Emergency Situation

Research by :

Azlee Johar (93597)
School of Computing UUM
H/P: 0194807144

Table 5.1 The hypothesis sequence of this study

No	Seq	T Values	Hypotheses	Tick
1	H_9	5.324	CB positively influences the BI in the use of ARCT amongst the ARCs in ES.	✓
2	H_6	3.112	HM positively influences the BI in the use of ARCT amongst the ARCs in ES.	✓
3	H_7	3.019	HB positively influences the BI in the use of ARCT amongst the ARCs in ES.	✓
4	H_8	2.665	PT positively influences the BI in the use of ARCT amongst the ARCs in ES.	✓
5	H_3	2.435	SI positively influences the BI in the use of ARCT amongst the ARCs in ES.	✓
6	H_1	2.401	PE positively influences the BI in the use of ARCT amongst the ARCs in ES.	✓
7	H_2	2.337	EE positively influences the BI in the use of ARCT amongst the ARCs in ES.	✓
8	H_5	2.024	PV positively influences the BI in the use of ARCT amongst the ARCs in ES.	✓
9	H_4	1.936	FC positively influences the BI in the use of ARCT amongst the ARCs in ES.	✓

PLS-SEM Bootstrapping technique: T value must exceed 1.645 (T > 1.645)

- Table 5.1 in thesis showed the sustained hypothesis in descending order based on T Value (T > 1.645). The strongest hypotheses are beginning from H9, H6, and H7 and followed by H8, H3, H1, H2, H5 and finally, H4.

- Thus based on the study that has been conducted, the strongest salient factors influencing BI amongst ARCs used the ARCT to support relief agencies in ES in Malaysia is begun from CB, HM, HB, PT, SI, PE, PV, EE and FC.

1 | Page

UNIVERSITI UTARA MALAYSIA
MODEL AND FACTORS VALIDATION BY ARCT EXPERT

The research objective was achieved through statistical analysis and the proposed model of the study was successfully established and presented in Figure 5.1 in thesis which comprises of salient factors and significant relationships between the factors. Each factor has positive influences toward the BI among the ARCs in using ARCT in ES. The variables are arranged in ascending order. The significant moderating effect shows the variance (difference) in the strength of the relationship of each factor. The moderating effects of this study are Experience (EX), Age (AG) and followed by Gender (GE).

Figure 5.1 The Proposed Model of Study

Please state your confirmation (√)

Agree to validate	✓
Disagree to validate	

Suggestion or comment

Name: [handwritten name]

Signature

2 | Page

Appendix K
Radio Amateur Disaster Information Centre Portal

http://radicmalaysia.blogspot.my

Appendix L
Proofreading consultancy and services

AISHAH ROSE MARIE ABDULLAH
English proofreading services
Email : proofreading2011@gmail.com
Phone: +60194255509

CIMB – 7606022103 8 March 2019
(under the name Rose Marie Siyun)

To:
Mr. Azlee Johar (azleejohar@gmail.com)

No	Item	Amount
1.	Chapter 1	RM 150.00
2.	Questionnaire	RM 50.00

Total RM200.00

Thank you

Ezna Syaqira binti Zakaria
B-T.11-U.06, Blok B, Apartment SR4, No. 1, Jalan P5A/5, Presint 5, 62200 Putrajaya. Tel: 012-3142847

Date: September 14th, 2019

En. Azlee Johar
Universiti Utara Malaysia
azleejohar@gmail.com

Sir,

PROOFREADING VERIFICATION

This is to verify that the following document has been proofread by the proofreader.

No.	Item	Details
1.	Student's Name	Azlee Johar
2.	Thesis	Chapter 2, 3 and 4
3.	Institution	Universiti Utara Malaysia

Thank you.

Ezna Syaqira binti Zakaria
eznasyaqira@gmail.com

Translator/ Proofreader.

Ref. no.: HH-A-2019-0009

HH ACADEMIC (002672130-K)

PT. 321, TINGKAT 1, JALAN BANDAR,
71000 PORT DICKSON, NEGERI SEMBILAN
012-3590809
www.hh-publisher.com

Date: 27th August 2019

Mr. Azlee Johar
Universiti Utara Malaysia
azleejohar@gmail.com

Sir,

PROOFREADING VERIFICATION

It is to verify that the following document has been proofread by our in-house proofreaders.

No.	Item	Details
1	Student's name	Azlee Johar
2	Thesis	Abstract (English) and Chapter 5
3	Institution	Universiti Utara Malaysia

Thank you and kind regards,

Nor Hidayah Binti Mustafa
Manager

Appendix M
Snapshot gallery

Meeting with ARC from ASTRA Malaysia, PDRM, JKM & MKN
at JKM Office Kangar Perlis

En. Ahmad Razif Ramli
The Director of Strategic Information
Communication Technology and
System in MCMC

Visit MCMC in Cyberjaya, Selangor and MCMC
Northern Territory to obtain the related
information and to present finding

fi

En. Zainol Hamid
Assistant Director
MCMC Northern Territory

En. Muhamad Tarmizi Abdul Wahab
ARCT Officer
MCMC Northern Territory

Visit MCMC in Cyberjaya, Selangor and MCMC
Northern Territory to obtain the related
information and to present finding

Assoc. Prof. Dr. Mohd Sobhi Ishak
School of Multimedia Technology and Communication
(SMMTC UUM)

Assoc. Prof. Dr. Kerk Kee
School of Communication Chapman University, USA

To be a team leader of the Bravo team in emergency communications via ARCT in emergency situation simulation in ASEAN Regional Forum Disaster Relief Exercise (ARFDiREx) 2015

International relief agencies in emergency situation simulation in ASEAN Regional Forum Disaster Relief Exercise (ARFDiREx) 2015

Sharing and disseminating information via ARCT in emergency situation simulation in ASEAN Regional Forum Disaster Relief Exercise (ARFDiREx) 2015

The International Conference on
Communication and Media 2016
(i-COME'16), an ICA
Regional Conference
September 18-20, 2016
Istana Hotel, Kuala Lumpur

International Symposium on Sustainable
Development and Management
(ISSDM) 2016
October 8-9, 2016
International Business School (IBS),
Universiti Teknologi Malaysia UTM,
Kuala Lumpur

ARC throughout Malaysia
Memorable of the PhD Journey

Support international relief agencies in emergency situation simulation in ASEAN Regional Forum Disaster Relief Exercise (ARFDiREx) 2015

My ARCT equipments , ARCT license from MCMC , ASTRA member card and DXers callsign for international communication

Dedicated to my wife, Afiza Muhammad and my children's, Amyra Husna, Adryana Husna, Ammar Hadeef and Adleena Husna for their support throughout my pursuance of the course in MSc.(ICT) to PhD.(IT)
from 2008 to 2021
Universiti Utara Malaysia