THE FACTORS THAT CONTRIBUTE TO THE CONTINUOUS USAGE OF BROADBAND TECHNOLOGIES AMONG YOUTH IN RURAL AREAS: A CASE OF NORTHERN REGION OF MALAYSIA

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Abstrak

Walaupun banyak faedah yang di perolehi daripada teknologi jalur lebar dalam perkhidmatan pendidikan dan kesihatan, penggunaannya di kawasan pedalaman masih rendah termasuk di Malaysia. Hal ini menimbulkan persoalan mengenai penggunaan jangka masa panjang teknologi ini. Pada masa kini, kurang kajian empirikal berkenaan penggunaan jalur lebar yang berterusan dalam kalangan belia terutamanya melibatkan pelajar sekolah di kawasan pedalaman Malaysia. Objektif utama kajian ini adalah untuk mengenal pasti faktor yang menyumbang kepada penggunaan secara berterusan teknologi jalur lebar dalam kalangan belia di kawasan pedalaman Malaysia. Oleh itu, satu model kajian yang mengandungi lapan faktor yang menyumbang kepada penggunaan teknologi jalur lebar secara berterusan telah dicadangkan. Kajian ini menggunakan pendekatan kuantitatif. Sebanyak 450 set borang soal selidik telah diedarkan kepada responden di wilayah utara Malaysia. Namun, hanya 393 set borang soal selidik telah dikembalikan dan ini mewakili 87.33% kadar maklum balas. Data yang dikutip kemudiannya dianalisa menggunakan Model Persamaan Berstruktur bagi mengkaji hubungan antara faktor yang menyumbang. Hasil kajian menunjukkan jangkaan prestasi, jangkaan usaha, pengaruh sosial, kesesuaian, keadaan kemudahan, kualiti perkhidmatan, kemahuan sikap pengguna dan kepuasan pengguna adalah faktor signifikan yang menyumbang serta memastikan penggunaan jalur lebar yang berterusan dalam kalangan belia di kawasan pedalaman. Maka kajian ini menyumbang kepada bidang pengetahuan dalam Informatik Komuniti dengan memberikan satu rangka kerja untuk mencapai penggunaan jangka masa panjang teknologi jalur lebar dalam kalangan belia di kawasan luar bandar, melalui integrasi dua model sistem maklumat iaitu *Information System Continuance Post Acceptance* dan *Unified Theory of Acceptance and Use of Technology*. Faktor yang dikenal pasti dapat menyumbang sebagai input kepada penyediaan polisi kerajaan dan pembekal perkhidmatan supaya terdapatnya permintaan yang berterusan terhadap perkhidmatan jalur lebar dari bukti yang diperolehi dari kajian ini. Penggunaan berterusan jalur lebar di kawasan pedalaman akan memberikan sumbangan positif kepada pencapaian akademik, literasi dalam kalangan belia, merapatkan jurang digital dalam penggunaan jalur lebar, menyumbang kepada peningkatan perniagaan dari rumah dan produktiviti negara.

Kata kunci: Informatik Komuniti, Penggunaan jalur lebar berterusan, *Information System Continuance Post Acceptance*, *Unified Theory of Acceptance and Use of Technology*, Jurang digital.

Abstract

Despite the benefits of broadband technology in education and healthcare services, its usage in the rural areas is still low and Malaysia is not excluded. This situation leads to raising the question of long-term usage of the technology. Presently, there are less empirical study on the continuous usage of broadband technology among the youths particularly school children in the rural areas of Malaysia. The objective of this study is to determine the contributing factors for continuous usage of broadband technology among youths in the rural areas. Therefore, a research model was proposed consisting of eight contributing factors for continuous usage of broadband technology. Moreover, the study used quantitative approach by distributing 450 questionnaires to respondents in the northern region of Malaysia. However, only 393 questionnaires were returned which represent 87.33% response rate. The data collected were analyzed using a Structural Equation Model to investigate the relationship between contributing factors. The results showed that performance expectancy, effort expectancy, social influence, compatibility, facilitating condition, service quality, user behavioural intention and user satisfaction are the significant contributing factors that must be in place to ensure the continuous usage of broadband among youth in the rural areas. Hence, this study contributes to the body of knowledge in Community Informatics by providing a framework for achieving long-term use of broadband technology among youths in the rural areas, through the integration of Information System Continuance Post Acceptance and Unified Theory of Acceptance and Use of Technology models. The factors identified may contribute as input to the government policy formulations and service providers to ensure continuous demand for broadband from the evidence extracted from this study. Continuous usage of broadband technology in the rural areas would have positive contributions on the academic performance, literacy among youths, bridging the digital divide in broadband usage, increase home business and national productivity.

Keywords: Community Informatics, Continuous Broadband usage, Information System Continuance Post Acceptance, Unified Theory of Acceptance and Use of Technology, Digital divide.

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In the name of Allah, Most Gracious, Most Merciful. Praise and peace be upon His beloved our Prophet Muhammad (SAW), his family and his companions from whom, and by the will of God. We escape darkness into enlightenment. It was in this spirit that I set out to undertake the current study, and the quest for self-actualization provided the additional push that kept me going and finally sees this thesis come to its expected conclusion, Alhamdulillah.

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List of Abbreviations

PE	Performance Expectancy
EE	Effort Expectancy
SI	Social Influence
CP	Compatibility
FC	Facilitating Condition
SQ	Service Quality
UBI	User Behavioural Intention
US	User Satisfaction
BCUI	Broadband Continuous Usage Intention
VIF	Variance Inflation Factor
AVE	Average Variance Extracted
f^2	Effect size
$R^2_{included}$	R^2 when all the exogenous variables are existed
$R^2_{excluded}$	R^2 when a particular exogenous variable is omitted from the model
Q^2	Predictive Relevance
$Q^2_{included}$	Q^2 when all the exogenous variables are existed
$Q^2_{excluded}$	Q^2 when a particular exogenous variable is omitted from the model
R^2	Coefficient of Determination
CI	Community Informatics
SEM	Structural Equation Modeling
PLS-SEM	Partial Least Square- Structural Equation Modeling
CB-SEM	Covariance Based Structural Equation Modeling
GDP	Gross Domestic Product
TAM	Technology Acceptable Mode
TRA	Theory of Reasoned Action
TPB	Theory of Planned Behaviour
MPCU	Model of PC Utilization
MD	Motivational Model
C-TAM-TPB	Combined TAM and TPB
DOI	Diffusion of Innovation
SCT	Social Cognitive Theory
UTAUT	Unified Theory of Acceptance and Use of Technology
ECT	Expectation-Confirmation Theory
ECM	Expectation-Confirmation Model
EDT	Expectancy Disconfirmation Theory
ICT	Information and Communication Technology
IT	Information Technology
MDGs	Millennium Development Goals
UN-MDGs	United Nation-Millennium Development Goals
UN-ICT	United Nation-Information and Communication Technology
UN-ICT	United Nation Information and Communication Technology
GeSCI	Global e-School and Communities Initiative
WSIS	World Summit on Information Society
ITU	International Telecommunication Union
UNESCO	United Nations Educational Scientific and Cultural Organization
WTISD	World Telecommunication and Information Society Day
ISDN	Integrated Services Digital Network

DSL	Digital Subscriber Line
MMDS	Multichannel Multipoint Distribution Service
LMDS	Local Multipoint Distribution Service
FSO	Free Space Optics
WiFi	Wireless Fidelity
WiMAX	Microwave Access
3G	Third Generation Mobile Network
IS	Information System
SMEs	Small and Medium Enterprises
U.S.A	United State of America
NITC	National Information Technology Council
MOSTI	Ministry of Science, Technology and Innovation
ND	Narrowband Dial-Up
ISDN	Integrated Services Digital Network
VOIP	Voice over Internet Protocol
DSL	Digital Subscriber Line
OECD	Organisation of Economic Cooperation Development
ADSL	Asymmetrical Digital Subscriber Line
ISP	Internet Service Provider
IPTV	Internet Protocol Television
HSPA	High Speed Packet
4G	Fourth-Generations
LTE	Long Term Evolution
2G	Second Generation Broadband Technology
VDSL	Very High Bit-Rate DSL
DOCSIS	Data over Cable Services Interface Specification
FTTH	Fiber-To-The-Home
R&D	Research and Development
GPTs	General Purpose Technologies
USP	Universal Service Provision
CMA	Communications and Multimedia Act
CBL	Community Broadband Library
CBC	Community Broadband Centre
P1	Packet One
WCDMA	Wideband Code Division Multiple Access
PU	Perceived Usefulness
PEOU	Perceived Ease of Use
SPSS	Statistical Package for Social Science
KPKK	Ministry of Information, Communication and Culture

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter provides brief idea of what this thesis is all about. It covers the background of the study that focuses on the information and communication technology, broadband and its technologies and brief description of northern region of Malaysia which is the location of this study. Besides, the problem statement as the justification for this study is stated while the research questions that go in line with research objectives are provided as well. Moreover, the significant of the research to both academics and practitioners are provided in this study while the scope of the research which delimits the study is explained in detail. Finally, the research plan and the chapterization of the thesis are provided.

1.1 Background of the Study

1.1.1 Global Effect of Information and Communication Technology

The last segment of 20^{th} century experiences evolvement of information age, which is a period that information is viewed to influence social, cultural and economic behaviour as machinery did in an earlier century during industrial age (Polykalas, Prezerakos, & Nikolinakos, 2012; Harvard Law School, 2007). The acquisition of knowledge and skills through efficient access and use of Information and

Communication Technology (ICT) is the key way to literacy (Gholami, Higon, Hanafizadeh, & Emrouznejad, 2010; Hilberg & Gabriele, 2008). Moreover, the use of the internet such as emails, blogs and forums, and Short Message Service (SMS) has become important in all organizations as a means to communicate knowledge and information (Gholami et al., 2010; Adekunle, Omoba, & Tella, 2007). This leads to the proposition of some researchers that ICT is the skills that allow individual to use computers, software applications, databases and other technologies in order to obtain a wide variety of academics, work-related and personal goals (Polykalas et al., 2012; Hanadi, Mark, & Lan, 2011) leading to a computerized telecommunication in producing daily work procedures and communication.

Researchers have stressed that ICT has been found to be a key player in making Information Technology (IT) enabled export services of some countries tradable which add value to their country's economy (Houghton, 2009; Houghton & Welsh, 2009). In the hope of that, many of developing and developed countries, such as India, Ireland, Hungary, the Russian Federation, Switzerland, Poland, Denmark, China, Singapore, Finland, Sweden, Malaysia, Korea Republic, South Africa and Spain have achieved annual growth of 15% or more from the exportation of Information Technology (IT) and IT-enabled services which include communication and information services from the year 2009 as shown in Figure 1 (World Bank, 2013; Houghton & Welsh, 2009).

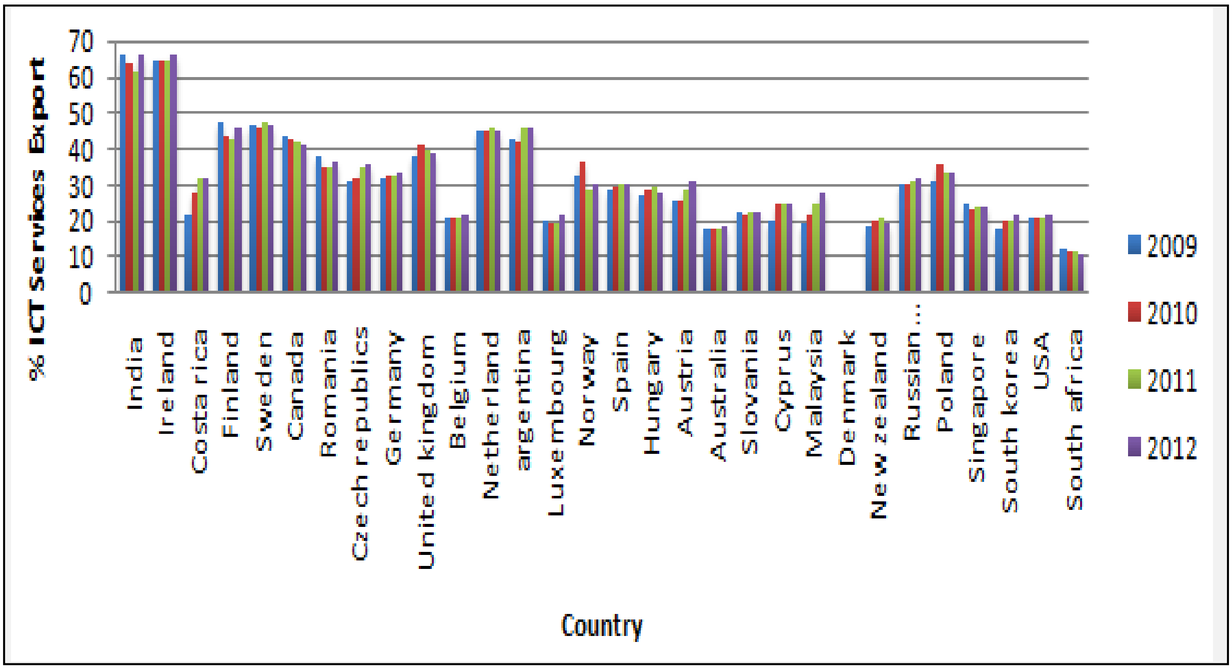


Figure 1.1: % ICT Services Export by Countries from 2009 to 2012 (Source: World Bank Data, 2013)

Furthermore, the UN World Summit on Information Society (WSIS) held in Geneva 2003 aims to bridge the global digital divide that separates rich countries from poor countries by spreading and increasing access to the internet in the developing world (WSIS, 2003; GeSCI, 2003; UN-ICT, 2001). Besides, the World Bank report in the year 2009 on Information and Communication Technology for Development (ICT4D) emphasised that correlation between the connectivity of broadband technology and economy of a region is a link to their development (Qiang & Carlo, 2009). Meanwhile, the International Telecommunication Union (ITU) and United Nations Educational Scientific and Cultural Organization (UNESCO) in 2010 established the broadband Commission, with a mission to promote the use of broadband-friendly practice and policies in order to introduce the world's inhabitants, mostly the rural dwellers to the benefits of broadband technology (Broadband Challenge, 2011). The fact that over three-quarters of the world's poor live in rural areas of the developing regions (World Bank Report, 2010), the use of broadband technology is needed to be embraced so as to contribute to their socio-economic development (World Telecommunication and Information Society Day (WTISD), 2011).

1.1.2 Broadband and the Related Issues

Broadband has been defined in different ways based on the objectives and context of issues at hands (Brian & Jennifer, 2008; Ofcom, 2005). Table 1.1 depicts the variation in opinions of some researchers on the definition of broadband.

Table 1.1: Definitions of Broadband

Authors	**Definitions**
Antun et al. (2011)	Broadband is any technology that has ability of two-ways high-speed internet transfer by receiving and sending data and allow users to be "always on".
ITU (2011)	Broadband is a transmission capacity that is faster than primary rate Integrated Services Digital Network (ISDN) at 1.5 or 2.0 megabits per second.
Brian and Jennifer (2008)	Broadband is a technology that transmits data across internet at high speed and always on when compared with dial-up system that needs to be connected whenever internet is needed.
Broadband Stakeholder Group (2008)	Broadband is defined as always on access, at work, at home or on the move provided by a range of fixed line, wireless and satellite technologies to progressively higher bandwidths capable of supporting genuinely new and innovative interactive content, applications and services and the delivery of enhanced public services.

Table 1.1 Continued

MCMC (2005)	Broadband is defined as a transmission medium of wide band frequencies used to transmit information that can be multiplexed and sent throughout many different frequencies or channels within a certain bandwidth (from audio up to video frequencies) and allowing more information to be transmitted than usual within a given period of time.
Burton and Hicks (2005)	Broadband is a telecommunication technology for transmitting large volume of digital information a high level.
Ofcom (2005)	Broadband is defined as higher bandwidths and always-on service that provides data rate of 128kbps and above.

In this situation of variation in the definitions of broadband, this study admits the definition of broadband from the ITU recommendation 1.113 of standardization sector due to its ability to download and upload large files and transmit services to a long distance (ITU, 2011; ICTlogy, 2007). Hence, a related perspective by Federal Trade Commission (2008) described broadband as the high-speed internet access which can be obtained through a variety of services; Digital Subscriber Line (DSL), cable, fiber optic, wireless, or satellite. This means that broadband panaceas can be grouped into two; fixed line technologies and wireless technologies.

A fixed line broadband technology depends on the direct physical connection to the subscribers' household and business which may be cable modem, digital subscriber line (DSL) and broadband power line that have synthesized to use the existing form of subscriber connection as a channel for communication (Corning, 2005). Figure 1.2 shows the DSL architecture as an example of fixed line broadband technology.

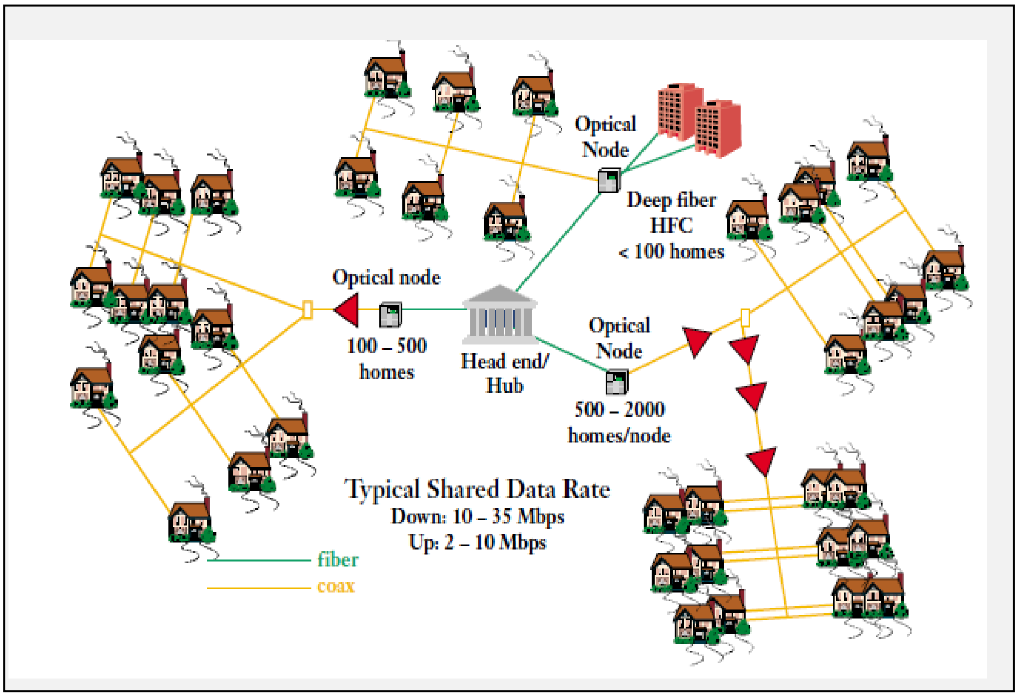


Figure 1.2: Fixed Line Broadband Technology "DSL Architecture" (Source: Corning, 2005)

Moreover, wireless broadband or wireless broadband access is a technology that uses point-to-point or point-to-multipoint microwave in the frequencies that range 2.5 and 43 GHz to transmit signals between hub sites and end-users' receivers. This is sometimes regarded as suitable for both access and backbone infrastructure (Corning, 2005). Examples of wireless broadband technology are microwave links, Multichannel Multipoint Distribution Service (MMDS), Local Multipoint Distribution Service (LMDS), Free Space Optics (FSO), Wireless Fidelity (WiFi), worldwide interoperability for Microwave Access (WiMAX), satellite, and Third Generation Mobile Network (3G). Figure 1.3 depicts the MMDS architecture as an example of wireless broadband technology.

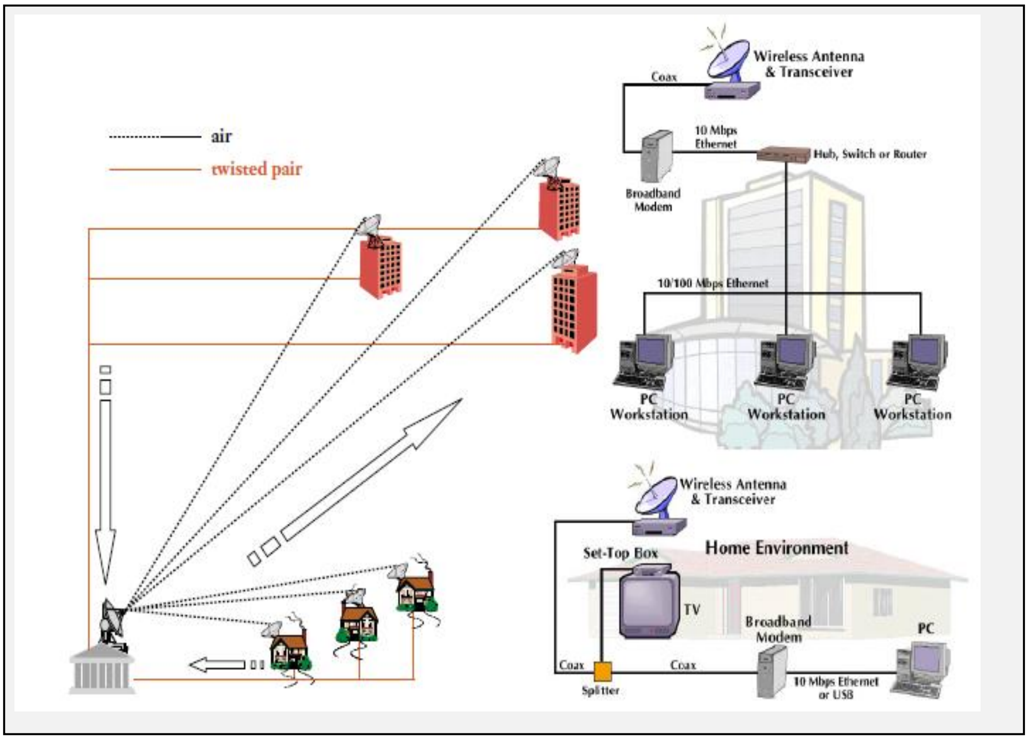


Figure 1.3: Wireless Broadband Technology "MMDS Architecture" (Source: Corning, 2005)

In addition, researchers have emphasised that society that adopts and absorbs the benefits of broadband enabled ICT, services and applications through the frequent usage would possess unique attributes in terms of productivity, innovation, growth and quality of life as well as significant competitive advantage over society that do not (Adria & Brown, 2012; BSG Briefing Paper, 2004). Meanwhile, researchers of broadband technology on social context have argued that broadband is domiciled in two different categories; community and municipal broadband (Andrea, Alison, & Julio, 2009; Ortiz & Tapia, 2008; Bar & Park, 2006). Indeed, community broadband originates and resides in the domain of interested, concerned and technological oriented people and community groups (Andrea et al., 2009; Bar & Park, 2006; Meinrath, 2005). In order words, municipal broadband is owned, sponsored and designed by city (Andrea et al., 2009; Ortiz & Tapia, 2008; Tapia & Ortiz, 2007; Gillett, 2006).

Furthermore, present research has continued to show that broadband technology is not luxury but an essential component that enhances communities and nations to develop through its application in generating employment, proficiency in education and social participation (Andrea et al., 2009; OECD, 2008). Previously, broadband was commonly referred to as an internet connection download speeds that are faster than traditional dial-up connections of 256 kbps, which is consequently regarded as the incomplete conceptualization of broadband (OECD Report, 2008). However, Yangsoo, Tim, and Siddhartha (2010) described broadband beyond the network, but as an ecosystem that comprises of elements that based on high-speed connectivity in order to interact in different ways which are high-capacity communications networks, services, applications and users as shown in Figure 1.4.

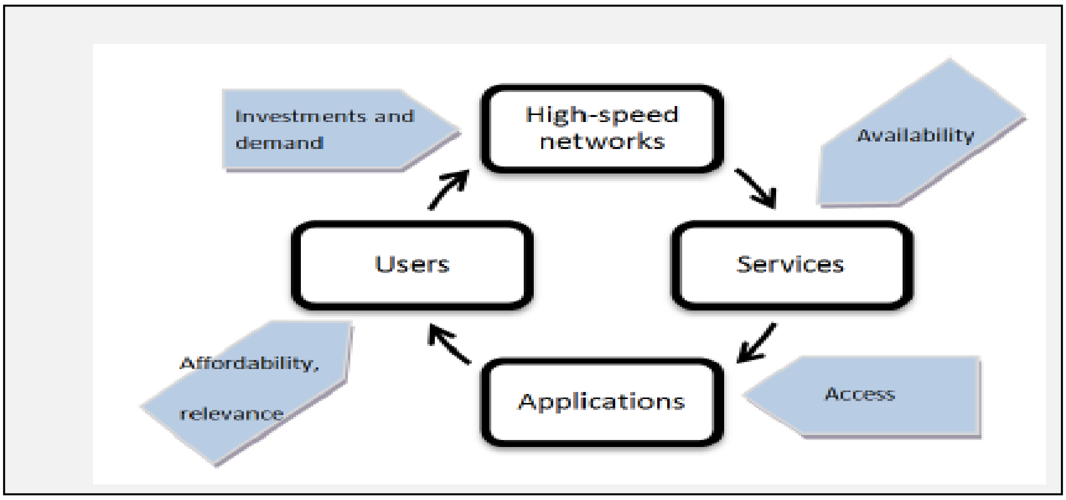


Figure 1.4: A Broadband Ecosystem (Source: Yongsoo et al., 2010)

Broadband ecosystem helps individual to acquire skills which make them to be more enterprising as workers and turn up to be innovative by developing social networks through broadband-enabled web applications that facilitate peer-to-peer communities and integration with economy (Christine & Carlo, 2009). Besides that, achieving a broadband ecosystem in the rural communities serves as catalyst for fast and reliable internet and ensures continuous penetration in the user's population (OIAC, 2013; Antun, Danijel, & Josip, 2011). Further belief reveals that continuous usage of broadband technology in the communities which is the focus of this study brings about creation of class of knowledge workers that attract human capital within an intensifying global competition for talented workers (Christine & Carlo, 2009).

1.1.3 Continuous Usage of Technology and Its Issues

Continuation of usage of a device has to do with retention of value by the users that intend to stay and actively utilize the device for exchanging knowledge and information with others (Juyeon, Jihun, Jae-Nam, & Jae, 2012; Bauer & Grether, 2005). Researchers have emphasised that the continuation of usage of device or system is a way of measuring success in the implementation of information system (Ramayah, Noor-Hazlina, & May-Chiun, 2010; McKnight, Lockwood, Hoffman, West, & Sheets, 2002). Limayem and Cheung (2008) argued that adoption of technology is not the yardstick for its success but believes to use the technology on a continued basis. Therefore, there is need to perform frequent check in order to uphold the usage of technology on the continuous basis, especially in the rural area (Roland & Rajiv, 2008; Zhang, Janakiraman, Sim, & Kumar, 2006). Hence, inculcating continuous usage of technology by the users determines the success of the technological devices.

Furthermore, researchers have emphasised that studies in Information System (IS) research have previously focused on the initial usage of technology which is known as acceptance but seen as incomplete conclusion path (Cho, Cheng, & Hung, 2009; Venkatesh, Morris, Davis, & Davis, 2003; Davis, Bagozzi, & Warshaw, 1989). However, continuous usage of technology is regarded as driver to achieve long-term and viable result towards technological innovation in a community, revealing that that only initial usage cannot produce total liberation for the community (Premkumar & Bhattacherjee, 2008; Bhattacherjee & Premkumar, 2004; Pollard, 2003; Devaraj & Kohli, 2003). Indeed, the lapses created in concentrating on the initial usage of technology have led to failures in today's businesses and social activities especially in the rural areas (Bell, 2004; Lyytinen & Hirschheim, 1987).

1.1.4 Description of Rural Area

In the meantime, rural area is regarded as the area that its population density is below 100 inhabitants per kilometre square (Krizanovic, Zagar, & Grgic, 2011). Croatia Government (2007) argues that areas with population density below 150 inhabitants per kilometre square could be regarded as rural areas. Moreover, rural area in the context of Malaysia is defined as an area outside urban settlement with its population less than 10,000 people and consists of agricultural features, forest and water bodies (Malaysia Rural Definition, 2010). This shows that there is variation in layouts, sizes and the number of inhabitants in defining the rural areas. Therefore, the Malaysia definition is accepted for defining rural areas in this study because of its distinctive capturing of size of inhabitant and the environmental features.

Moreover, the significant number of inhabitant in the rural areas together with their geographical location and terrain has led to the reduction in ICTs facilities in their domain (Santosh & Maziar, 2012; Markendahl & Casey, 2012). Thus, application and use of ICTs is a tool in developing rural areas which can be applied in direction of developmental projects towards provision of a sustainable rural livelihood to alleviate poverty (Adria & Brown, 2012; Caroline, Brenda, & David, 2006). However, rural communities have found to be facing many challenges that prevented them from using the ICT devices which includes infrastructure, limited to education, insufficient training and capacity building, social and cultural challenges and political constraints (Pade, Mallinson, & Sewry, 2006). These constrains have caused failure or struggling of some ICTs projects in the rural areas from becoming a sustainable type and caused reduction in the usage of broadband internet (Salman & Hasim, 2011; Rob, Susan, Richard, Brian, & Brian, 2011).

1.1.5 Overview of Northern Region of Malaysia

In the first place, the effort to ensure regional development in Malaysia came up in the third Malaysia plan of 1976-1980 which categorizes the states in Malaysia into six different regions (Muzafar, Dayang-Affizzah, & Chin-Hong, 2012; Government of Malaysia, 1976). The six regions in Malaysia as shown in Figure 1.5 are (1) the northern region which comprises of Perlis, Kedah, Penang and Perak states; (2) Central region comprises of Selangor, Kuala Lumpur (Federal Territory), Negeri Sembilan and Melaka; (3) Eastern region which comprises of Kelantan, Terengganu and Pahang; (4) Southern region consists of the state of Johor; (5) Sabah; and (6) Sarawak (Muzafar et al., 2012; Koridor Utara, 2007; Government of Malaysia, 1976).

Figure 1.5: Regional Locations in Malaysia (Source: MAL Group of Companies, 2014)

In addition, Muzafar et al. (2012) stress that the rate of development among the states in the northern region of Malaysia is the least when compare with the rest of the regions in Malaysia. Besides, the northern region of Malaysia which is also known as Northern Corridor Economic Region comprises of four northernmost states that fall on the west coast of Peninsular Malaysia: Perlis, Kedah, Penang and North of Perak as shown Figure 1.6. (Koridor Utara, 2007). The four states encompass mixture of islands, historic town centres and national parks that entice many tourists (Northern Peninsular Malaysia, 2012; Things Asian, 2008).

Figure 1.6: States Locations in Northern Region of Malaysia (Source: Travelpack Malaysia, 2012)

Kedah state is a state in the northwest corner of Peninsular Malaysia located in northern region and embedded a resort island, Langkawi which has been attracting many tourists (Travelpack Malaysia, 2012; Koridor Utara, 2007). The state is fairly small and covering an area of 9,425 sq km that consists mostly of a large rice fields and gently rolling hills. Kedah’s terrain features abundant cropland of about 52% land use and 37% forestry with a very low level of urbanization (2%). Off its coast are the island of Langkawi and rising to meet the western shoreline is the mountain of Gunung Jerai (1,200 meters above sea level).

The population of Kedah state is of about one million and primarily Malay with significant Chinese and Indian minorities (Kedah Location, 2012; Northern Peninsular Malaysia, 2012; Abby, 2005). Moreover, Penang is one of the states located in the northern peninsular of Malaysia and is the second smallest. Besides, it is 8th most populous in Malaysia and regarded as best of northern Malaysia. Penang shares border with Kedah state in the north and east while Perak is found in its south. The state is highly developed and economically pertinent through its tourist features (Northern Peninsular Malaysia, 2012; Penang, 2011).

Furthermore, the northernmost state of peninsular in Malaysia is Perlis and known to be the smallest state in Malaysia, located in the northern part of the west coast and bordered in the south with Kedah state. The state is predominantly agricultural without island and has population of 227,025. Perlis has port and ferry terminal located at the Kuala Perlis village (Northern Peninsular Malaysia, 2012; My Perak, 2012). Indeed, Perak is another state in the northern region of Malaysia, covering an area of 21,000 square kilometres which makes it the second largest state in Peninsular Malaysia. Perak state is adjacent to the states of Kedah and Penang in the north and also found at the north of Selangor. The population of Perak is approximately 2.3 million, comprises of 52% of Malay, 30% Chinese, 12% Indian while others (Semai, Temiar and Jahai) are 2.4%. The larger portion of Perak is covered with forest and lowland areas that have left fallowed for the mining purposes but presently supported for agricultural activities, such as vegetable and fruit farming. Besides, Perak’s land fits for fish and poultry farming and oil palm plantations (Northern Peninsular Malaysia, 2012; My Perak, 2012).

1.2 Problem Statement

The use of high speed broadband technology is believed to produce significant positive effect on the business activities, social and economy of communities and nation as a whole (Czernich, Falck, Kretschmer, & Woessmann, 2011; Qiang, Rossotto, & Kimura, 2009). The importance of broadband to the rural economy is a notable issue which can be used as an enabler for developing the rural economy by facilitating e-business, smoothened the interaction between farms and national together with international markets (European Commission, 2006). This explains that merits of broadband technology is not limited to urban areas but also rural areas as it has positive impacts on the rural education, business activities and employment generation (LaRose, et al., 2011; Katz & Suter, 2009; Breitband, 2008), calling for its continuous usage.

Previous studies on the broadband technology in the rural areas such as those conducted by Townsend et al. (2013); LaRose et al. (2011); Antun et al. (2011); Kok-Lim et al. (2011); have completely focused adoption and ignore its continuous usage that would reveal its prosperity. Meanwhile, the researches on the adoption and diffusion of broadband technology have led to the proposition that there is need to further work on the continuous use of broadband and the related technologies in order to improve community and economic dividend (Ibrahim & Erik, 2011). Moreover, many studies have argued that usage of broadband technology is gradually low among the teenagers or youths who are supposed to be the movers of technology usage in the rural areas (Salman & Hasim, 2011; Lenhart et al., 2010). Therefore, current literatures on broadband technology in the rural areas are found to be widespread with lack of empirical evidences on its continuous usage among youth in the rural areas. Hence, there is a need to determine the contributing factors that may contribute to continuous usage of broadband technology among the youth in the rural areas (Ashok et al., 2007).

In the context of Malaysia, statistics have shown that the communication and multimedia industries in Malaysia has contributed 6.1% of the country's revenue in the year 2008, however, the broadband's user's rate in Malaysia is still below expectation level as compared to many countries in the world (Internet World Stats, 2010; SKMM, 2007). The related study by Ooi et al. (2011) stressed that the rate of broadband usage in the recent years in Malaysia is believed to be lagging as compared with its population growth especially in the rural areas. Ooi et al. (2011) argued that the backwardness in the usage of broadband is always caused by low services being experienced by the consumers and some unknown factors.

Although, the broadband penetration rate in Malaysia has attained 66% but evidence from NITC-MOSTI (2013) shows that the use of broadband technology in their rural areas is still low. Besides, SKMM (2009) stresses that disparity between rural and urban usage of broadband in Malaysia is wide as shown in Figure 1.7.

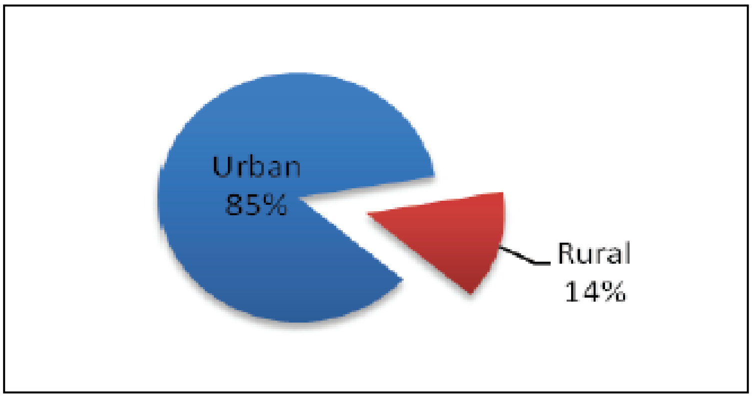


Figure 1.7: Urban-Rural broadband usage in Malaysia (Source: SKMM, 2009)

The Figure 1.7 shows that 14.7% and 85.3% of broadband were used in rural and urban areas respectively. Therefore, the low usage of broadband technology in the rural area is suggested to have caused by the delayed in rollout of broadband services, slower infrastructure growth and neglecting of continuous usage (Ooi, Jia-Jia, King-Tak, & Binshan, 2011; Dwivedi, Khan, & Papazafeiropoulou, 2007). Hence, there is need to venture into the study of continuous usage of broadband technology in the rural areas and its determinant factors so as to mitigate the disparity between urban-rural broadband usage for actualisation of social and economical development.

Using IS continuance post acceptance model; the model stresses that only perceived usefulness or performance expectancy and user satisfaction are the determinants of continuous usage of technological devices (Bhattacherjee et al., 2001). However, several studies in the context of IS research have emphasised that continuous usage of technology especially in the smaller domain which is similar to the rural areas are not limited but more than perceived usefulness and user satisfactions (Chen, 2010; John & Khaled, 2010; Lin & Ong, 2010). Indeed, the empirical study of Venkatesh et al. (2011b) argued that integration of predictors of UTAUT model with IS continuance post acceptance model has additional value to continuous usage of technology in terms of model fitness and prediction. This implies that existing literatures on IS continuance lies on insufficient research in determining its predictors and requires further studies.

In addition, researchers have previously used both service quality and compatibility as direct or indirect contributing factors towards continuous usage of technology in a large organisation and produced a satisfactory outcome (Park et al., 2010; Ramayah et al., 2010; Slyke et al., 2008, Limayem & Cheung, 2008; Karahanna, 2006; Wu & Wang, 2005; DeLone & Mclean, 2003). However, their effectiveness are yet to be tested in the small domain like rural areas, whereas, Ramayah et al. (2010); Limayem and Cheung (2008); Damiani et al. (2008) stressed that a factor should be used in both large and small domains in order to be fully regarded as a contributing factor to an issue at hand. Hence, there is need to understand the effect of compatibility and service quality of broadband technology towards the continuous usage in the rural areas.

Furthermore, it has been emphasised that both gender and experience of users of broadband or technological devices determine the strength of usage by the users but require further clarification while considering its continuous use in the rural areas (Castaneda, Francisco, & Teodoro, 2007; Porter & Donthu, 2006; Fox, 2004; Lenhart et al., 2003). This indicates that gender and experience of users of technology have been used as moderator and played important roles in determining the strength of the technological usage. However, their effects have been neglected among the youth in the rural domain (Chen, 2010; John & Khaled, 2010). In view of the presented research problems, specifically among the youth in the rural areas of Malaysia as none of the existing studies to the knowledge of researcher provides factors that contribute to the continuous usage of broadband technology, this study seeks to address the followed research questions.

1.3 Research Questions

Based on the alighted problems in section 1.2, this study attempts to provide answers to the following questions:

i. What are the effects of low usage of broadband technology in the rural areas of Malaysia?

ii. How can continuous usage of broadband technology be achieved among the youth in the rural areas of Malaysia?

iii. What are the significant factors that influence continuous usage of broadband technology among the youth in the rural areas of Malaysia?

iv. To what extent do gender and experience of users of broadband technology moderate the relationship between the influential factors and continuous usage of broadband technology among the youth in the rural areas of Malaysia?

1.4 Research Objectives

The main objective of this study is to develop and validate a model for continuous usage of broadband technology among youth in the rural areas of Malaysia. Therefore, the sub objectives are:

i. To determine the effect of low usage of broadband technology in the rural areas of Malaysia.

ii. To determine the approach for achieving continuous usage of broadband technology among youth in the rural areas of Malaysia.

iii. To determine the significant factors that influences the continuous usage of broadband technology among youth in the rural areas of Malaysia.

iv. To examine the moderating effect of gender and experience of users of broadband technology on the relationship between the influential factors and continuous usage of broadband technology in the rural areas of Malaysia.

1.5 Significance of the Research

The usage of broadband technology provides substantial important cost advantage in the rural networks and services of the demands of rural low-income populations (Dwivedi et al., 2007; Proenza, 2006). This implies that the benefit of using broadband technology appears to be higher once there is adequate and affordable access in the rural areas which can guarantee its continuous usage. However, ITU (2010) stressed that while broadband technology is gradually moving out of reach of many people in low income countries which enormous with rural communities, it becomes clearer to the people in the developed countries with influx of mobile technology. This shows that lack of continuous usage of broadband technology in the rural areas could jeopardise their development economically and educationally.

Moreover, the World Bank (2009) emphasised that if there could be increase of 10% in the broadband penetration and usage in a community, the Gross Domestic Product (GDP) is bound to be boosted by at least 1.38% which would enhance the productivity level and good governance through a remote monitoring. Although, there are few literatures that established the factors for achieving continuous usage of technology (Bhattacherjee et al., 2001; Park et al., 2010; Ramayah et al., 2010; Slyke et al., 2008, Limayem & Cheung, 2008; Karahanna, 2006), yet this study does not find an academic literatures on the contributing factors for continuous usage of broadband technology among youth in the rural areas. Hence, this study has filled the gaps of the existing literatures on continuous usage of broadband technology among youth in the rural areas towards academics and practitioners.

1.5.1 Significance of the Research to the Academics

The study has contributed to the body of knowledge by integrating the concepts of IS continuous post acceptance model and UTAUT model in one study. These two concepts which are IS continuous post acceptance model and UTAUT model with the inclusion of compatibility and service quality represent the independent research streams. However, some of previous studies that have investigated the contributing factors of continuous usage by taking predictors of IS post acceptance model into consideration (Park et al., 2009; Chen et al., 2011; Ham et al., 2012; Eriksson & Nilsson, 2007; Cheng-Hsun, 2010) did not establish its impact on the continuous usage among the youth in the rural areas.

Moreover, UTAUT model has widely been used in IS research and identified as model that recognises individual in the communities while using the technology (Curtis et al., 2010; Sumac et al., 2010; Loo et al., 2009; Wang et al., 2009; Suha & Anne, 2008) but are yet to be tested in the rural areas. Thus, this study helps in providing the contributing factors for continuous usage of broadband technology among the youth in the rural areas to the researcher on the rural informatics field. Moreover, this study is theoretically contributed to the body of knowledge by developing and validating an instrument for collecting data towards continuous usage of broadband technology among youth in the rural areas. This is necessary and is in line with argument of Straub, Boudreau, and Gefen (2004) that it is essential to develop and validate new instruments in a situation where theory is advancing.

1.5.2 Significance of the Research to the Practitioners

The contribution of this study to the providers of broadband technology is that it establishes the importance of providing more infrastructures that would help the rural dwellers in continuously using the broadband technology in their domain. The input from the determinants of continuous usage of broadband technology among the youth in the rural areas as established in this study have equally served as positive insight for the providers of broadband technology in knowing the needs of rural dwellers. This is necessary as some of the companies and government agencies derived some revenues from the provision of broadband technology for the use of households (Preston & Cawley, 2008; Cawley & Preston, 2007; Ng & Wiemer-Hastings, 2005).

Furthermore, provision of access to advanced communications services is considered crucial for economic and social development and a higher quality life (Ayres & Williams, 2004). However, many of the users of broadband technology in the rural areas do not get motivation for continuously use the broadband technology from their providers. Hence, this study has recommended that there are needs for the policy maker such as regulatory body on communication to ensure that providers of broadband services abide to the rules and regulations while dealing with the users. This is because there would be no benefits for both users and suppliers of broadband technology if consumer stops using the technology soon after adoption (Eriksson & Nilsson, 2007; Park & Yoon, 2005; Beilock & Dimitrova, 2003).

1.6 Scope of the Research

This study is concerned with the users of broadband technology towards its continuous usage among youth in the rural areas of Malaysia. Northern region of Malaysia is found to be prevalent in cultural and agricultural in nature, rainforest, historical and archaeological features which are attributes of rural area (Northern Region of Malaysia, 2005). Therefore, the rural areas in the northern region of Malaysia were chosen as locations for this study. Moreover, the data for this study was collected from the secondary school students' users of broadband technology that reside in the rural areas of northern region of Malaysia with the supervision of their parents or guardians. This is as a result of their extensive level of literacy development which could help in administering the instrument for data collection (Heidi & Susan, 2009). Besides that, secondary school students have been described as major source of information while dealing with internet related issues (Socorro, Elizabeth, Aniceto, & Prudenciano, 2010).

In addition, Pusat Info Desa (PID) which is known as rural internet centre was used as distribution and collating centres for the instruments because of the effects it brings to the social life and empowering the rural dwellers through the usage of internet in their communities (Alias, Jamaludin, Hashim, Ismail, & Suhaili, 2010; Amichai, Katelyn, McKenna, & Samuel-Azran, 2008). Besides that, the study employed the use of Structural Equation Modeling (SEM) due to its ability to determine the fitness of model under study faster than other analytical tools and useful in testing the theories (Hayes, 2009; Henseler, Ringle, & Sinkovics, 2009). Hence, the study used the Partial Least Square technique of SEM (PLS-SEM) which is quantitative research approach in nature while analysing the collected data as it helps the researcher to maximise the variance explained of dependent variable (Hair, Ringle, & Sarstedt, 2011a; Henseler et al., 2009, Suha & Anne, 2008).

1.7 Research Plan

According to Kothari (2009), Jan and Colin (2009), a research plan is the orderly arrangement of ideas in an experimental way that serves as inventory of what researcher intends to do. Thus, the research plan in this study is pictorially shown in Figure 1.8 with the techniques to be used in order to achieve the set objectives. This study was planned in an orderly ways as shown in Figure 1.8 with three major steps; literature review, research model with hypothesis formulation and the report writing. The study was planned by commencing with literature review which led to the identification of factors for continuous usage of broadband technology among youth in the rural areas. Thereafter, development of research model with hypothesis formulation brought about questionnaire design, while the report writing embedded analysis of the collected data.

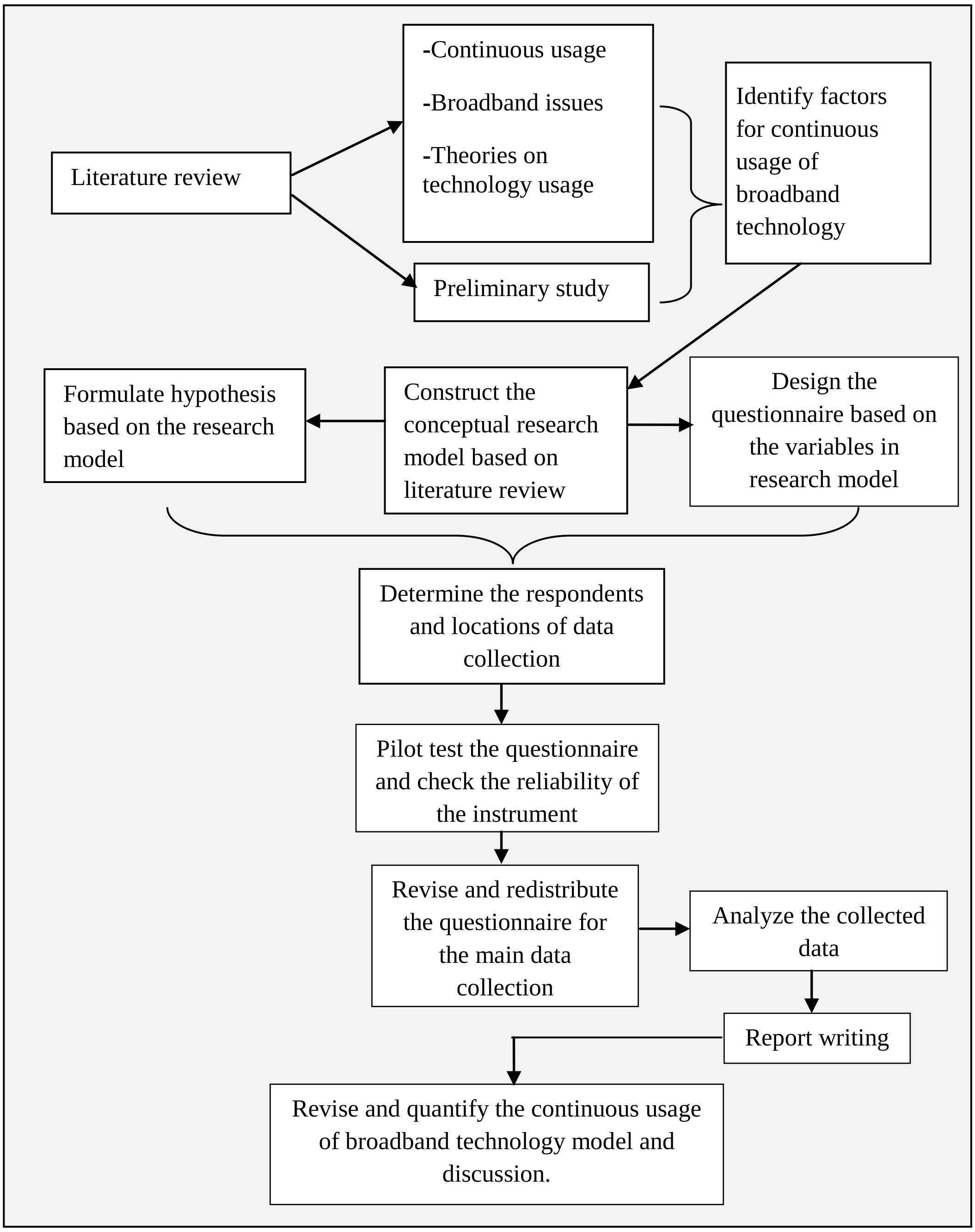


Figure 1.8: The Research Plan

1.8 Thesis Chapterization

Chapter One of this thesis is the introduction part that gives clue to what the study is all about. It embedded background of the study, problem statement, research questions, research objectives, significance of the research, scope of the research and an annotated research plan. **Chapter Two** represents review of related literature on the continuous usage, broadband technology and usage, rural broadband technology and its evolvement in Malaysia rural areas and the related IS theories. **Chapter Three** discusses the theoretical framework, formulation of conceptual research model and the research hypothesis. Moreover, **Chapter Four** depicts the quantitative research methodology for achieving objectives of this study, while **Chapter Five** presents the data analysis and results. Consequently, **Chapter Six** gives the discussion of results, while **Chapter Seven** presents recommendation of study, research contribution, future research and conclusion of the thesis.

1.9 Summary

This chapter presents the background of the study by giving the highlight on ICT, broadband and some related issues. The chapter gives description of northern region of Malaysia which is the domain of this study. Moreover, the problem statement as the justification for this study was clearly presented. Besides that, the research questions together with objectives of the research were stated. Indeed, the significance of the research to both academics and practitioners were described in concise, while the scope of the research to delimit the study was explained.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter contains review of previous works and is sectioned into three main parts; part one the discussion of previous work on continuous usage of technology and the related issues in IS research. Besides that, part two provides review of studies on the broadband technology, which covers the state of the internet before the introduction of broadband and the current forms of broadband technology. Indeed, part two does not leave out the rural broadband with the benefits it provides for the rural people. Lastly, third part covers the review of related theories on the use of technology which lead to the clue for discovering base models for this study.

2.1 Continuous Usage of Technology

Continuous usage of technology has been addressed differently based on the variation in the perspectives of the people. Limayem and Cheung (2008) and Bhattacherjee (2001) argued that continuance use of a device or technology has to be determined by the intention made by the users. On the other hand, consistency in performing a specific behaviour turn to intrinsic habit within people which bounds to turn to continuous usage of technology (Limayem, Hirt, & Cheung, 2007; Ouelette & Wood, 1998). As agreed by Thorngate (1976), continuous usage of device is not preceded by the intention of the users but by the formed habit. A related studies of

Mohammad and Samar (2012), Lee and Kwon (2011) gave support to the stance of Thorngate (1976) that continuous usage proofs an adaptive behaviour of users which possesses regularly sequence of action and conformation of ongoing activities. Therefore, continuous usage either on devices or technology is built on the intended behaviour of users of technology.

Many researchers have emphasised that intention itself is the psychological situation that precedes usage intention of devices on a frequent basis (Shin, Ahn, & Kim, 2009; Davis et al., 1989). Nevertheless, attaining continuous usage of technology is attributed to cognitive and affective factors (Mohammad & Samar, 2012; Lee & Kwon, 2011). The cognitive factors are those that relates to the knowledge processes, such as perceived usefulness, ease of use, security and satisfaction (Mohammad & Samar, 2012). On the contrary, effective factors portray emotions and feelings which are perceived playfulness, enjoyment and pleasure. In a related study, Wang, Meister, and Gray (2013) argued that perceived usefulness, perceived ease of use and perceived playfulness are the factors which may be directly or indirectly cause continuous usage of systems or technology.

2.1.1 Roles of Continuous Usage in IS Research

Previous studies have shown that many of the existing research in Information System (IS) have concentrated on the intention to use which is known as adoption of IS, while less focus has been given to the post-adoption usage, called continuous usage or long-term use (Santhanamery & Ramayah, 2012; Thong et al., 2006). Santhanamery and Ramayah (2012); Teo, Srivastava, and Jiang (2008) argued that most of times, the initial usage of technology by some users is followed by reverting to the traditional ways due to the failure to get expected satisfaction and service quality. Therefore, researchers have stressed that IS continuous is paramount in research due to its viability and the benefits of frequent usage it brings in the IS domain rather than first-time use (Bhattacherjee, 2001b; Karahanna et al., 1999). Hence, IS success is synonymously referred to as continuous usage and ignited by intended behaviour of users of technology (Liang & Yeh, 2010; Fang, Chan, Brzezinski, & Xu, 2006).

The continuous usage of technology becomes an important issue since it is the determinant of IS success (Lu & Hsiao, 2007; Anderson, 2006). Thus, success of information technology is mainly dependent on its content value that users' belief would derive more benefit for the future purposes (Lu & Hsiao, 2007; Du & Wagner, 2006). Meanwhile, researchers have emphasised that factors that brings about continuous usage or success of technology is revealed by social cognitive theory as users' expectations, social factors and belief (Wasko & Faraj, 2005; Bock, Zmud, & Kim, 2005; Kankanhalli, Tan, & Wei, 2005). However, studies have stressed that the success of IT cannot be guaranteed until the confirmation of its continuous usage by the users is established (Liang & Yeh, 2010; Lu & Hsiao, 2007; Wasko & Faraj, 2005). This explains that there is need to address the factors that see to the continuous usage of technology among the users in different domains.

Moreover, researchers have previously argued that process of continuous usage of technology could be deeply understood by understanding both Expectation-Confirmation Theory (ECT) and IS continuance post-acceptance model (Ham, 2012; Hwang et al., 2011; Chiu & Wang, 2008). Bhattacherjee (2001a) emphasised that consumer’s intention to repurchase is synonymous to IS user’s behaviour to proceed to continuous usage intention by considering the ECT. The consumers or users possess initial expectation prior to assessment of a service. Thereafter, consumers or users of services bound to compare the perceived performance vis-a-vis original expectation which leads to continue or discontinue as shown in Figure 2.1.

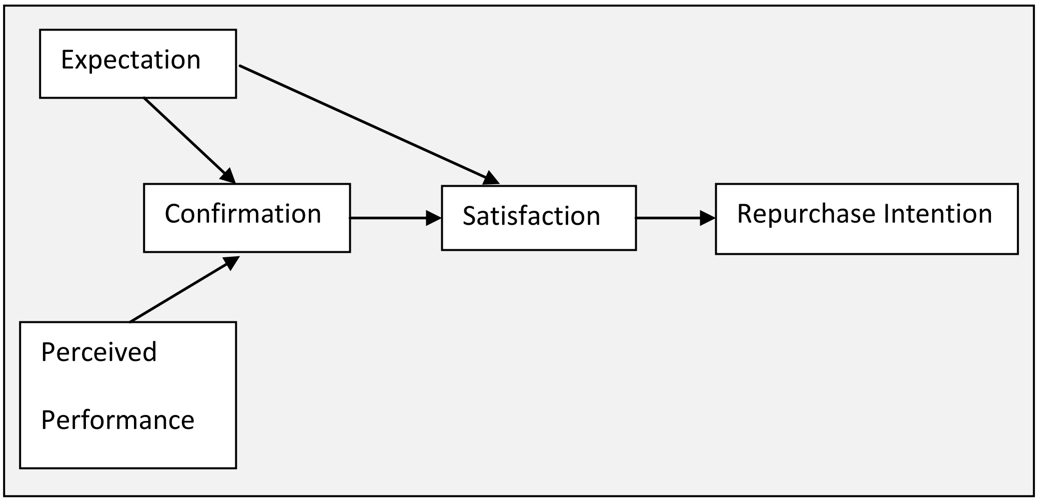


Figure 2.1: Expectation-Confirmation Model

The continuous use of a technology means that users have heard deep experiences of the technology in use (Ham et al., 2012; Bhattacherjee, 2001a). Thus, continuance model in IS research fuses perceived usefulness into its model in order to have better understanding and explanation towards continuous usage of technology. Besides that, IS user’s continuance follows the initial acceptance intention which could lead to ex-post retrieval of previous intention (Cheung & Lee, 2009; Bhattacherjee, 2001a). Hence, post acceptance model of IS continuance is proposed and comprises of perceived usefulness, confirmation and satisfaction as shown in Figure 2.2.

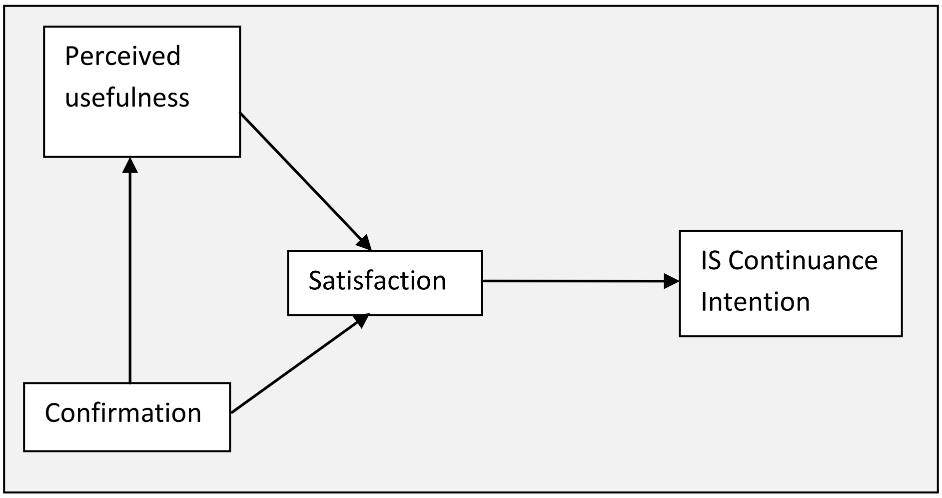


Figure 2.2: IS Continuance Post-Acceptance Model

Furthermore, IS researches have been conducted with integration of two or more theories or models in establishing users' continuous usage on different technology (Lin et al. 2013; Lee & Kwon, 2009). The study of Vatanasombut et al. (2008) blends Commitment-Trust Theory, ECM and TAM leading to the development of a research model for continuous usage intention of mobile devices and validated empirically. Besides that, TAM was decomposed based on the Expectancy Disconfirmation Theory (EDT), with perceived performance forming perceived quality and perceived usability towards continuous usage intention (Roca et al., 2006). This explains the important role of merging two or more models while establishing continuous usage of technological devices.

Indeed, the study of Liao et al. (2007) argued that fusion of two or more theories ease avenue of creating model for continuous usage in IS. Therefore, they integrate the Theory of Planning Behavior (TPB) and concept of EDT which led to the suggestion that user's behavioural intention which determines online user's continuous usage intention is affected by perceived usefulness and subjective norm.

However, researchers have established the use of Unified Theory of Acceptance and Use of Technology (UTAUT) model in studying users IS continuous usage and suggested that it should be integrated with another theory in order to obtain viable results (Chiu & Wang, 2008; Kim et al., 2006; He & Wei, 2006).

2.1.2 Application of Continuous Usage

The application of IS continuance have been implemented in different domains with exclusion or less invention of broadband usage among the youth in the rural areas. The study of Lin et al. (2013) proposed a model for continuous usage intention of video conferencing among the student of higher learning institution, while the model was empirically validated. The summary of studies on IS continuance or continuous usage intention by previous researchers is presented in Table 2.1.

Table 2.1: Summary of Studies on Continuous Usage Intention of IT/ IS with their Applications and Domain

Sources	Applications	Domains
Lean et al. (2009),	E-government	Industrial workers in town.
Liao et al. (2009).	Cyber university system	University students.
Djamasbi and Strong (2008).	Computerised decision making aid	University students.
Mohammad and Samar (2012).	Online booking services	University undergraduate students.
Cho et al. (2009),	E-learning tools	University students.
Lu and Hsiao (2007).	WRETCH album and blog	Bloggers.
Yun et al. (2013), Soud and Fisal (2011),	E-learning system	University students.

Table 2.1 Continued

Hong et al. (2006).	Mobile internet	Government workers.
	Location-based service applications	Smart-phones users in city.
Park et al. (2010)	Web analytics services	Ace counter software users.
Chiu and Wang (2008)	Web based learning system	Registered University part-time students.
Shin et al. (2009),	Internet-based	Users of IPTV in the city,
Limayem and Cheung (2008).	learning technology	University students.

Table 2.1 shows that there have been studies on the IS continuance usage covering some areas of studies like; e-government, e-learning, web analytic services, decision supporting system, booking system in the domains of university student, government and industrial workers. However, Table 2.1 reveals that there are loops in extending IS continuance usage to the broadband technology among youth in the rural domain.

In other words, many studies in IS continuance have considered continuous usage intention as dependent variable rather than actual continuous use behaviour (Lankton & McKnight, 2012; Agarwal & Karahanna, 2000). On the other hand, few of the studies in IS/IT domain have used actual use behaviour as dependent variable (Limayem et al., 2007; Compeau et al., 1999) while both philosophies considered their measurement through self administered questionnaires. In summary, Table 2.2 depicts some of the previous studies on the continuous usage intention of IT/ IS with their dependent and independent variables.

Table 2.2: Summary of Studies on Continuous Usage Intention in IT/ IS with their Variables

Sources	Dependent variables	Independent Variables
Zhou (2013)	Continuance intention	Trust. Flow. Satisfaction.
Wang et al. (2013)	Current Knowledge Management System (KMS) use	Prior KMS use by superiors. Prior KMS use by peers. Prior KMS use by subordinates. Prior KMS use by extended Professional population. Prior KMS use.
Zhou et al. (2012)	Continuance intention	Satisfaction. Affective commitment. Calculative commitment.
Polites and Karahanna (2012)	Intention to use new system Perceived	Perceived ease of use. Relative advantage. Subjective norm. Inertia.
Lankton and McKnight (2012)	Continuance Intention	Satisfaction.
Kim (2012)	Continuance intention	Perceived usefulness. User satisfaction. Perceived enjoyment. Perceived monetary value.
Hoehle et al. (2012)	Intention to continue using internet banking	Perceived usefulness. Satisfaction.
Barnes (2011)	Continuance intention	Perceived usefulness. Habit. Enjoyment. System Experience.
Deng et al. (2010)	Continuance intention	Satisfaction.

Table 2.2 Continued

Limayem and Cheung (2008)	IS continuance intention IS continued use	IS continuance intention. Habit. Satisfaction. Prior behaviour. Perceived usefulness. Satisfaction.
Wang et al. (2008)	Facebook continuance Intention	Perceived usefulness. Perceived ease of use. Pleasure. Arousal.
Limayem et al. (2007)	IS continuance intention IS continuance usage	Perceived usefulness. Satisfaction. IS continuance intention. Habit.
Tulu et al. (2006)	Behavioural intent for continued use of medical IT	Perceived usefulness. Perceived ease of use. Work practice compatibility.
Sánchez-Franco (2006)	Intention Usage	Usefulness. Flow. Attitude. Intention.
Limayem et al (2003a)	Continuance intention IS Continuance	Perceived usefulness. Satisfaction. Continuance intention. Habit. Initial Usage.
Limayem and Hirt (2003b)	Intentions Actual usage behaviour	Perceived consequences. Social factors. Facilitating conditions. Intentions. Habit.
Bhattacherjee (2001b)	IS continuance intention	Perceived usefulness. Satisfaction.

Table 2.2 Continued

Agarwal and Karahanna (2000)	Behaviour intention	Perceived usefulness. Perceived ease of use. Cognitive Absorption.
Karahanna et al. (1999)	Behavioural intention to continuous use	Attitude towards continuing to use. Subjective norm towards Continuing to use. Perceived voluntariness.

2.2 Overview of Broadband Technology

The statistical figure by the ITU revealed that over 590 million users of internet were found to be subscribers of fixed broadband, while more than 1 billion subscribers rely on mobile broadband globally as at the end of the year 2011 (International Telecommunication Union, 2012a). However, research by International Telecommunication Union (2012a) showed that only 40% increment was recorded for mobile broadband while half of this is from South America, Asia and African regions. This implies that mobile broadband is commonly accessible among the developing countries due to the alternative purposes it serves for having computers at exorbitant rate. Hence, the International Telecommunication Union (2012b) argued that outweigh of mobile broadband subscription over fixed broadband does not represents higher number of mobile broadband users in the future. This would be gradually reduced as the cost of infrastructure to acquire personal computer (PC) at home gets reducing.

Furthermore, the inception of broadband services came from 1990s while the broadband penetration was first discovered in 1997 by organisation of economic cooperation development (Organisation of Economic Cooperation Development, 2010). Moreover, many definitions have been given to the broadband as most of them focus what can be achieved on the choosing networks (California Broadband Task Force, 2008; Sawyer et al., 2003; National Broadband Task Force, 2001). Thus, the communication agent in USA defined broadband as the communication devices that are capable of downloading and uploading at minimum speed of 200 Kbps (Federal Communications Commission, 1999).

Despite the proposition of USA in 1999 on the definition of broadband, the organisation of economic cooperation development classified minimum download speed of 256 Kbps and upload speed of 64 Kbps for the broadband device (OECD Directorate for Science, Technology and Industry, 2001). On the other hand, the ITU and OECD agreed on a unified definition of broadband with download speed of 256 Kbps for both fixed and wireless broadband service (Broadband Commission for Digital Development, 2010). In summary, broadband service is defined as being faster than dial-up (Choudrie & Middleton, 2014; Choudrie & Lee, 2004). Hence, broadband devices give more convenient gained to the users as it is always-on services.

2.2.1 Initial Internet Access Prior to Broadband

Before the advent of broadband, people access the internet through Narrowband Dial-Up (ND) or Integrated Services Digital Network (ISDN) by making use of telephone lines. However, Eriksson and Nilsson (2007) argued that the use of narrowband is slow while considering the activities for video and music streaming comparing to the present day services. Besides, downloading and uploading of heavy files are always slow and take longer time to access some websites while using the narrowband technology (Choudrie & Middleton, 2014).

2.2.1.1 Narrowband Dial-Up

The ND was the prime technique of moving online with the use of modem modulating-modulator technology, connected to the computer. Therefore, the digital data from computer is converted by modem over an ordinary copper telephone line which connects to a remote computer as shown in Figure 2.3. Besides, the dial-up calls attracts charges which are different based on the dialled number. However, the dial-up connection does not allow simultaneous phone calls while connecting to the computer (Choudrie & Middleton, 2014). Meanwhile, the maximum speed of dial-up service is placed at 56 Kbps. On the other hand, narrowband dial-up service is commonly available, cheap and use whenever broadband services in some places.

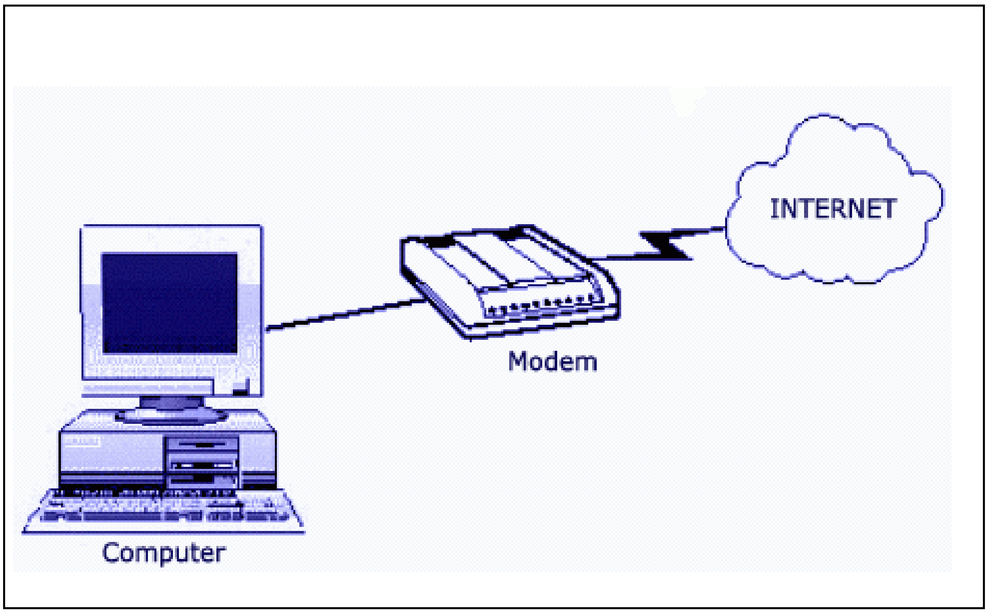


Figure 2.3: Narrowband Dial-Up Connection (Source: DeepSearcher Inc., 2012)

2.2.1.2 Narrowband Integrated Services Digital Network

The integrated Digital Narrowband Digital Network (ISDN) is another pre-broadband internet services which is similar to dial-up, using a standard copper telephone line for connection to computer. On the contrary to dial-up, ISDN employs digital signals and capable of transmitting up to 64 Kbps data speed for upstream and downstream connection. Yet, ISDN as revealed in Figure 2.4 supports voice call on the same line while on connection. Besides that, Choudrie and Middleton (2014) argued that ISDN speed can be boosted to 128 Kbps at an additional cost, providing higher stability and reliability over dial-up connection. This shows that ISDN is expensive which may serve as hindrance for general acceptance.

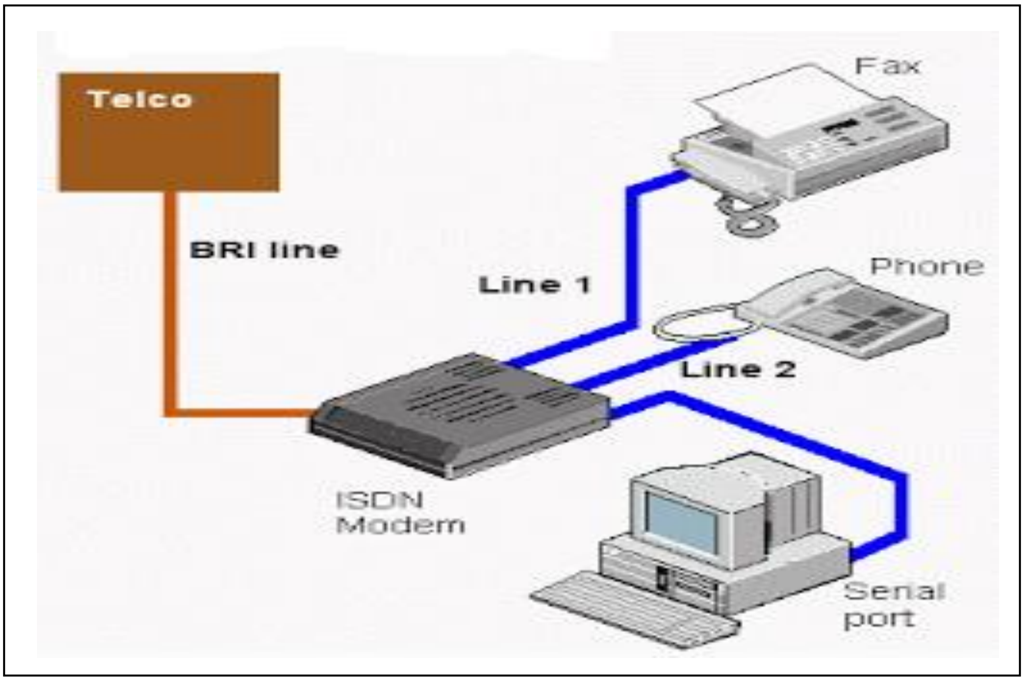


Figure 2.4: The ISDN Connection (Source: Click to Tech, 2011)

2.2.2 First Generation Broadband Technology

The popularly used modem broadband networks employ digital subscriber line or cable modem technologies (Choudrie & Middleton, 2014; Junhee, Kwangil, Donghwan, & Kyeongdeok, 2007). The first generation network supports many services, such as email, web browsing, Voice over Internet Protocol (VOIP), music and video streaming (California Broadband Task Force, 2008). Therefore, there varieties of first generation broadband technologies which are digital subscriber line, asymmetric digital subscriber line, fixed wireless, satellite and mobile broadband.

2.2.2.1 Digital Subscriber Line

The Digital Subscriber Line (DSL) is known to be the most common technology in the early era of broadband and got some influential in the mist of organisation of economic cooperation development countries (Organisation of Economic Cooperation Development, 2013). On the contrary, Choudrie and Middleton (2014) argue that DSL technology provides high broadband of information to homes and small firms through a standard copper telephone lines. Therefore, researcher proves that DSL technology gives up to 8 Mbps speed and support voice calls services while surfing the internet at the same time (Choudrie & Middleton, 2014). This allows the users of DSL to enjoy high speed of accessibility downloading and uploading large files than the ISDN.

2.2.2.2 Asymmetrical Digital Subscriber Line

The connection and installation of Asymmetrical Digital Subscriber Line (ADSL) can be achieved quickly and cheaply as users perform the operation through ADSL modems. However, users are shifting from the ADSL due to the need of higher speeds, electrical devices interference and ISP congestion. Besides, the speed of ADSL as shown in Figure 2.5 ensures that more of the users' locations are away from the local exchange (Choudrie & Middleton, 2014). Hence, ADSL is found of low service quality which is one of the factors that users need before choosing a technology for the internet surfing.

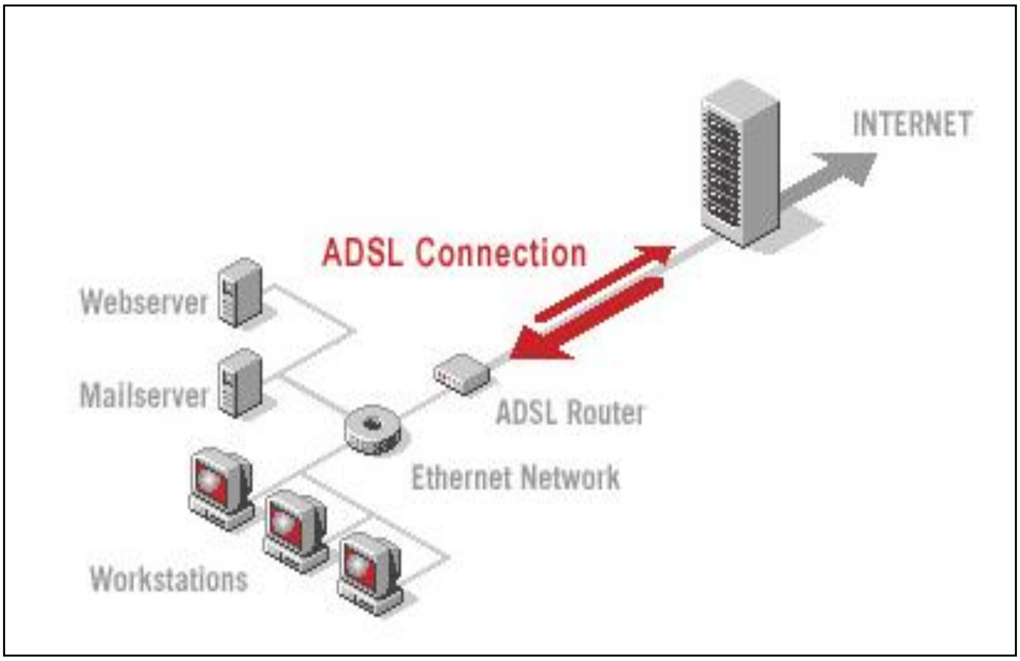


Figure 2.5: ADSL Broadband Technology (Source: Freezone (2014)

2.2.2.3 Fixed Wireless

Fixed wireless technology is popularly use in both rural and remote areas due to the lack of fixed line infrastructure. The research has shown that the fixed wireless providers give speeds that ranges between 10-13 Mbps. This makes fixed wireless services to be more expensive than the DSL, but gives higher and quality connectivity to dial-up. Moreover, fixed wireless needs to connect subscribers in a way it frees from unforeseen communication obstructions. However, some of the premises in the rural areas cannot be connected with fixed wireless providers due to the lack of infrastructures (Choudrie & Middleton, 2014; Susuki, Horiuchi, Hayashi, & Otani, 2007). Many of the providers of fixed wireless services find it difficult to acquire the infrastructure for their operation in the rural areas and hinder their services. Therefore, most of the rural areas are lack of availability of fixed wireless broadband technology as depicted in Figure 2.6.

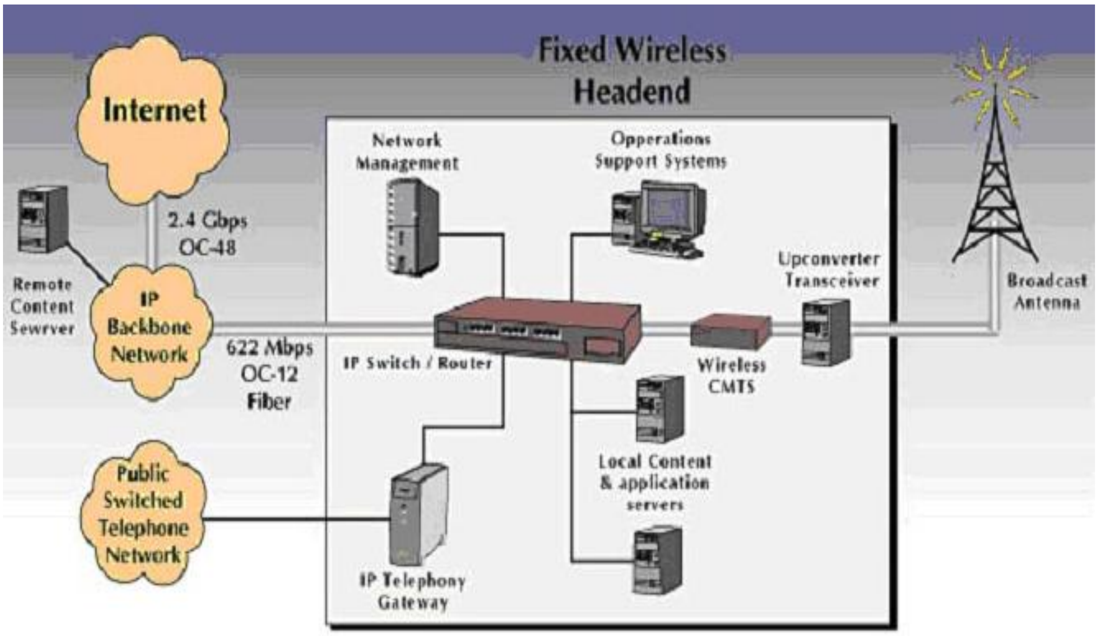


Figure 2.6: The Fixed Wireless Broadband Services (Source: State of Michigan, 2013)

2.2.2.4 Satellite Broadband

Evidences have shown that satellite broadband is the choice for the inhabitants that fail to connect to the DSL and that away from the fixed wireless providers (Choudrie & Lee, 2004). This is because satellite broadband provides up to 10 Mbps transmitting speeds, however, there are some restrictions while uploading a file that needs bandwidth of more than 1 Mbps. Therefore, there is need to get additional antenna to ease receiving of satellite broadband connection which means that it is more expensive that fixed line services. Moreover, satellite broadband does not give full support to VOIP services Internet Protocol Television (IPTV) due to the low latency connectivity (Choudrie & Middleton, 2014). This may be difficult to be used among the youths that rely on their computers as means of communication.

2.2.2.5 Mobile Broadband/ Third Generation

The popularity of mobile broadband services became known globally due to the internet access it gives. Mobile services are delivered using different radio frequency spectrum bands which are different on the countries basis. The commonly bands used in mobile services are 850 MHz, 900 MHz, 1800 MHz and 2.6 GHz. Moreover, 3G mobile broadband provides download speed ranges from 384 Kbps to 14 Mbps by using High Speed Packet (HSPA) technology. Indeed, Fourth-Generation (4G) is another visible broadband technology which provides speeds of up to 100 Mbps and known as Long Term Evolution (LTE). The advantages of mobile broadband service explain that it provides alternative services to fixed line service. However, Choudrie and Middleton (2014) stressed that 3G mobile broadband does not have a wider coverage like satellite broadband and has an expensive price packages. This shows that 3G mobile broadband may not serve purpose for the people living in the remote areas.

2.2.3 Second Generation of Broadband

The numbers of limitations in first generation broadband networks bring about more researchers leading to the Second Generation Broadband Technology (2G). There are varieties of 2G broadband which are very high bit-rate DSL, enhanced DSL and data over cable service interface specification (Choudrie & Middleton, 2014). On the other hand, a Very High Bit-Rate DSL (VDSL) which is a 2G broadband gives a high speed over short distance by using copper plane network. Meanwhile, the download speed of VDSL is 50 Mbps with upload speeds of 12 Mbps. Moreover, an enhanced VDSL which is known as VDSL2 is another form of 2G broadband and provides a speed beyond 100 Mbps. Besides that, Data over Cable Services Interface Specification (DOCSIS) with 3.0 cable modem is classified as 2G broadband technology and provides high-speed data transfer to the cable TV systems (Choudrie & Middleton, 2014; Sung, Chang, Chen, & Hsieh, 2010). Hence, DOCSIS supplies a speed that is over 400 Mbps by using 8-channel bonding (Sung et al., 2010).

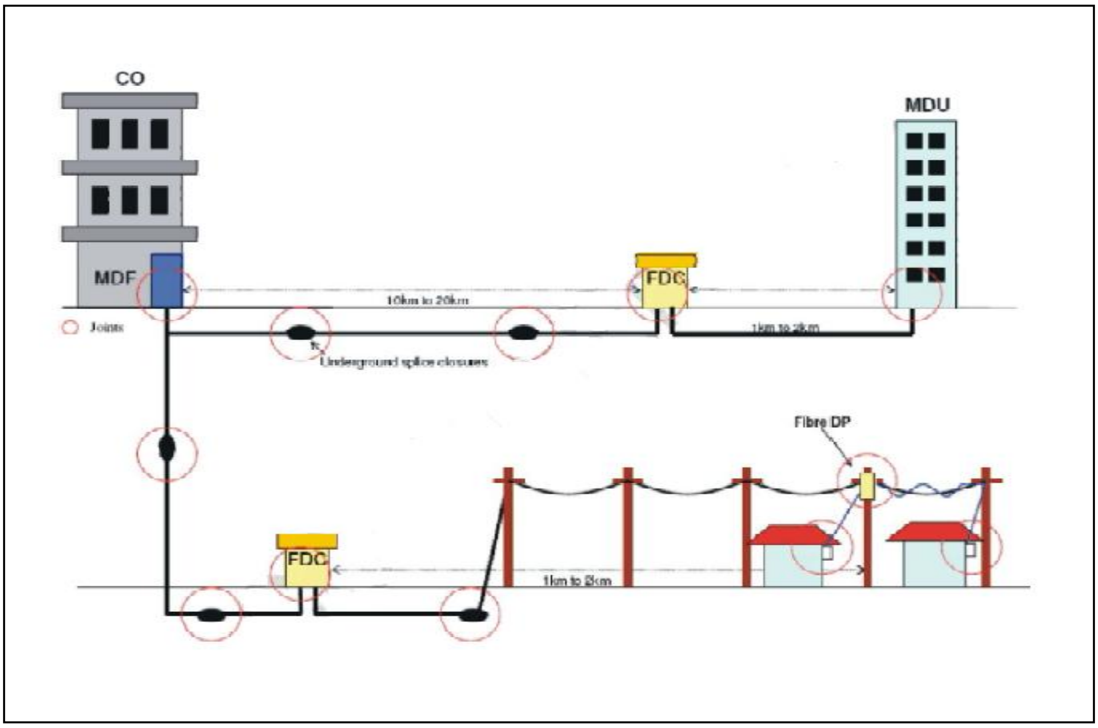


Figure 2.7: The FTTH Network

2.2.4 Third Generation: Next Generation Networks

The Third Generation (3G) network is a faster broadband network over the copper and coaxial cable networks. One of the 3G network is Fiber-To-The-Home (FTTH) which brings higher speeds than copper and cable, shown in Figure 2.7. This type of broadband network provides services that are up to 1 Gbps and above to commercial users. Indeed, the FTTH has good attributes, such as flexibility, reliability and less expensive. Based on the features of FTTH, the FTTH technology has been launched and introduced for assisting achieving high speed broadband in Malaysia (Telecom Malaysia, 2010). However, 3G network may not be the best of broadband technology with the intervention of 5G wireless which is the next generation network that capable for mobile world (Choudrie et al., 2012; Sung et al., 2010). On the other hand, the actualization of standard for the 5G network would likely to be achieved by the year 2020 (Choudrie & Middleton, 2014; Choudrie et al., 2012). This shows that the 5G wireless technologies is not yet readily available but would be needed for the future challenges.

2.3 Outcome of Broadband Technology

The development of broadband is viewed as a step towards essential gain in productivity, education and economic development of a community as a whole (Trkman et al., 2008; Dutta & Roy, 2005). Incorporation of innovation to business, education, health care and day-to-day activities are now based on the capability to frequently disperse information. Thus, the factors for broadband development are given to the availability of internet irrespective of location, amount of time spent online and the spectrum of services that are ready for use (Savage & Waldman, 2005; Kellerman, 2004). Hence, the study of Lee and Chan-Olmsted (2004) resulted to the statement that any country that gives priority to the usage of broadband will definitely achieve competitive advantage among the membership countries.

According to Marcus (2005), despite the fact that Europe is one of the leading regions in the usage of broadband technology, it has the consequences of increasing growth rate and lack of evenly distribution among the member countries. On the other hand, the stakeholders in the broadband connectivity, such as national and regional governments, education and research institutions and the service providers are yet to provide the lasting solution to the causes of inconsistent in the usage of broadband in the society (Irani, Dwivedi, & Williams, 2009; Chanclou et al., 2006). Hence, Chanclou et al. (2006) stressed that there is need for a new structure that fosters broadband development (Chanclou et al., 2006).

2.3.1 Broadband as Indicator of Research and Development

Many studies have shown that the impact of broadband is viewed through innovation of ICTs and innovation brought by ICTs which are collaborative Research and Development (R&D) networks, such as virtual simulations, artificial intelligence, and grid computing initiatives (Liebenau et al., 2009; Okamoto & Reynolds, 2006). Therefore, both innovations are enabled by broadband through invention and propagation of new applications together with the development of existing innovations (Choudrie & Middleton, 2013; Katz, 2010).

The study of Carlaw et al., (2007) argued that broadband enabled which are combinations of ICTs and other technologies, such as biotechnology and nanotechnology are liable to bring up more inventions and innovations in the future. Besides that, the initial study by Koellinger (2006) emphasised that organizations that prioritize the usage of ICTs in their practice innovate more and produce larger benefits to their users and enjoy productivity gains. Thus, this impact of broadband technology can be extended to the academics and felt by the use of broadband as it enables more intensive use of ICTs and use of innovative enhancement.

In addition, ICTs and broadband have a transformative effect on the way innovative activity is carried out while new forms of ICT-related innovation processes which fast-track knowledge, ideas and fostering relations based on tacit knowledge have emerged (Choudrie & Middleton, 2013; Katz, 2010. However, previous studies have shown that ICT-related R&D has changed from the perspective of computer hardware towards software, computer and related IT services, web services and digital content (Liu et al. 2009; Ghosh et al., 2005). Indeed, the initial study of Von-

Hippel (2005) stressed that there have been increase in the practicing of ICT-related R&D in some sectors through the broadband usage. Hence, broadband is the stimulus to successful R&D and thus, chosen as an enabler of innovation in the areas that are expected to produce more innovations in future.

2.3.2 Broadband as General Purpose Technology

An economic growth is believed to be controlled by factors like product, process and organizational innovations that rely on technological change which is always include technological improvement (Carlaw et al., 2007). The current studies have shown that many of technological improvement basically change how and where economic activity is organized and called General Purpose Technologies, GPTs (Czernich et al., 2011; Majumdar et al., 2010). However, ICTs that include computers and the broadband technology are regarded as GPT and appear over time with several phases of efficiency, applications and diffusion (Choudrie & Middleton, 2013; Liu et al. 2009; Carlaw et al., 2007; Ghosh et al., 2005). This appears not only in the sectors that produces GPT but also throughout the economy which leads to drastic changes in the production process of those using the new invention and creates further inventions and innovations.

Furthermore, GPTs are technologies that capable of spreading over to some sectors, get improved over time, lowering the costs of its users and ease invention and production of new products and processes (Majumdar et al., 2010; Jovanovic & Rousseau, 2005). The GPT enables changes as in the case of ICTs, while broadband technology is acting as the prime infrastructure which serves as basis that support an endless variety of applications. Moreover, Czernich, Falck, Kretschmer, and

Woessmann (2011) argued that output of GPT leads to increase productivity, rise in network economies and the effects on network expansion. Besides, many of new products, both goods and services have been created as a result of ICTs and fully integrated into everyday life which includes working life (Carlaw et al., 2007). Hence, the effect of broadband cannot be separated from GPT because of its function as a GPT which is ICTs enabler.

2.4 Consumer and Usage of Broadband

The deployment of broadband has cut across many governments globally due to the common view that its usage brings about international competitiveness and economic development (Oh et al., 2003; Sawyer et al., 2003). Therefore, the current growth and development of internet, e-commerce and the information economy are the outcome of a high usage of broadband in any society (Lee et al., 2003; Sawyer et al., 2003). Consequently, the advantages of using the broadband have lured government of both developed and developing countries, such as South Korea, Japan, Hong Kong, Sweden, Canada and the United State of America (USA) to invest more on the development of broadband infrastructures which brings high-speed internet access to the end users (Oh et al., 2003; Sawyer et al., 2003).

2.4.1 Factors Influencing Usage of Broadband

Many researchers have focused digging on the factors that aid consumer’s perpetual usage of broadband due to its associated infinite benefits. In the views of Dwivedi et al. (2007), Venkatesh and Brown (2001), Attitudinal, Normative and Control factors propel the broadband usage before consumers in any society. Attitudinal factors are referred to as Relative Advantage, Utilitarian Outcomes and Hedonic Outcomes which represent favourable or unfavourable behaviour in question. Besides that, normative factors are primary and secondary influence that is in form of perceived social pressure in performing the behaviour in question. On the other hand, control factors are regarded as knowledge, skills and facilitating conditions that suite perceived control on the external factors which may facilitate individual behavioural performance.

On the contrary, Khoumbati, Dwivedi, Lal, and Chen (2007) argued that usage of broadband could be encouraged before the consumers by giving focus to some factors that are best needed by the users and empirically validated as shown in Table 2.3.

Table 2.3: Factors that Influence consumer's Usage of Broadband: (Sources: Adapted from Khoumbati et al., 2007)

Authors	**Constructs**	**Definition/Description**
Brown and Venkatesh (2005), Venkatesh and Brown (2001).	Behavioural intention	This is the consumer's intention to subscribe to and make use of broadband internet in the future.
Rogers (1995)	Relative advantage	This is the degree to which broadband internet is perceived as being better than its predecessor.
Brown and Venkatesh (2005), Venkatesh and Brown (2001).	Utilitarian outcomes	The extent to which broadband internet usage enhances the effectiveness of household activities.

Table 2.3 Continued

Brown and Venkatesh (2005), Venkatesh and Brown (2001).	Hedonic outcome	It is the pleasure derived from the consumption or use of broadband internet for entertainment purpose (online radio, streaming audio and video, electronic greetings, online games).
Venkatesh and Brown (2001).	Social outcomes	These are increment in prestige that coincides with the subscription of broadband for home use.
DeLone and McLean (2003), Parasuraman et al. (1991), Parasuraman et al. (1988).	Service quality	This is defined as the perceived quality of service a consumer is obtaining from the current Internet Service Providers (ISP).
Brown and Venkatesh (2005), Venkatesh and Brown (2001).	Primary influence	This is the perceived influence from friends and family to subscribe to and use broadband internet services.
Brown and Venkatesh (2005).	Workplace referents' influence	This is the extent to which co-workers influence behaviour.
Brown and Venkatesh (2005), Venkatesh and Brown (2001).	Secondary sources' influence	The perceived influence of information from secondary sources such as advert and news on TV and newspapers to subscribe to and using broadband internet services.
Venkatesh and Brown (2001).	Perceived knowledge	This is the perceived level of knowledge about broadband internet, its risks and benefits.
Dwivedi (2005).	Self-efficacy	This is the perceived ability or skill to operate computers and the internet without the assistance of others.
Venkatesh and Brown (2001).	Perceived ease of use	This is the degree to which using the PC is free from effort.

Table 2.3 Continued

Venkatesh and Brown (2001).	Facilitating conditions	This is the perceived level of resources when subscribing to broadband.
Venkatesh and Brown (2001).	Declining cost	This is the extent to which the cost of broadband subscription is decreasing in such a way that it inhibits adoption.

The usage of broadband are found to be influenced by some factors as shown in Table 2.3. Meanwhile, there are variations in the opinions of some researchers on the factors that influence usage of broadband which could be addressed by further empirical validation.

2.4.2 Broadband Usage in Household

Previous studies have stressed that the increase in the usage of broadband in some households could be traced to its benefits for educational and entertainment purposes (Choudrie & Lee, 2004; Lee et al., 2003). Therefore, internet users are found of behaving differently especially when there is accessibility to the broadband technology and stay online four-times than the traditional narrowband (Carriere et al., 2000). The related study by Horrigan and Rainie (2002) argued that the average internet users with high-speed broadband at home should be expected to access up to seven online activities daily, such as news, healthcare information, undertaking an online course, listening to music, or downloading files on a daily basis.

Although, the general believe of multitasking attribute of broadband which allows users to perform many activities at the same time should be cause of attracting high broadband usage in the household. However, lack of scepticism that using the broadband may not provide solution and support to benefit their activities in some households (Choudrie & Dwivedi, 2004; Choudrie & Lee, 2004). Thus, the study of Dwivedi et al. (2006) argued that variety of use and rate of use of broadband are the major constructs that determine the broadband usage in the household perspective. Hence, the benefits derived from the use of broadband technology do encourage the users to utilise the broadband judiciously especially in the context of household in the developed countries.

Furthermore, the introduction of e-government in some countries has made broadband to be taken as a factor for growth and propagation of emerging e-services through the accessibility giving to the many households (Choudrie & Dwivedi, 2006; Choudrie & Dwivedi, 2005). However, the use of broadband technology vis-a-vis e-government service in the households of many countries are different as a result of existence of some hindrance factors, such as cultural, social, economical, skills, service quality, resources and technological factors (Dwivedi & Weerakkody, 2007; Choudrie & Dwivedi, 2006; Choudrie & Dwivedi, 2005; Oh et al., 2003).

In the case of Malaysia, government has recognised the important of ICT which brings about acceptability of broadband to some level in different households (Kasim, Malek, & Hambali, 2011). This is due to the location of Malaysia among the highly economic region, which is comprises of Singapore, Indonesia, Thailand, India and China. The study of Kasim et al. (2011) emphasised that factors that encourage usage of broadband technology in the society or households in Malaysia could be traced to Utilitarian Outcome, Hedonic Outcome, Social Influence, Self-Efficacy and Resources. However, previous study has shown that Malaysia has face slow in adoption and usage of broadband in some of their states, caused by constant changing in policy and the target growth of the users (Selamat et al., 2008). Moreover, statistics from Table 2.4 shows that there is inconsistence in the broadband penetration rate in some state in the northern region of Malaysia while compare with other regions which may cause by some hidden factors.

Table 2.4: Broadband Penetration Rate by States in Malaysia from 2007 to 2012 (%) (Source: NITC-MOSTI, 2013)

States	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Johor	13.3	19.4	29.3	51.5	60.7	64.1
Kedah	7.6	11.2	17.6	44.7	**56.5**	**56.0**
Kelantan	4.6	7.1	11.7	38.9	45.3	43.8
Melaka	15.0	21.4	30.0	58.3	66.4	68.8
Negeri Sembilan	11.1	17.4	26.4	66.4	76.0	73.7
Pahang	6.4	10.0	17.4	44.5	49.0	50.7
Perak	10.1	15.2	22.1	43.2	**52.2**	**53.6**
Perlis	6.1	10.9	17.4	61.5	**84.9**	**81.9**
Pulau Pinang	25.5	33.2	43.1	75.5	**82.8**	**83.8**
Selangor	25.1	33.2	49.1	67.3	74.8	77.6
Terengganu	6.6	10.6	17.6	49.8	58.6	57.5
Sabah	6.7	9.5	14.5	25.6	32.7	47.3
Sarawak	9.7	13.6	19.3	40.2	47.5	48.2
W.P Kuala Lumpur	40.1	54.2	88.9	123	107.4	119.4
W.P Labuan	14.9	21.2	28.7	70.1	73.1	65.2
Malaysia	**15.2**	**21.1**	**31.7**	**55.6**	**62.3**	**66**

The statistics of Malaysia National Information Technology Council (NITC) and Ministry of Science, Technology and Innovation (MOSTI) on the broadband penetration rate by states from year 2007 to 2012 reveals that there are decreases or slight difference in the usage of broadband internet, especially in Northern Region of Malaysia (NITC-MOSTI, 2013) as shown in Table 2.4. Perlis state experiences reduction of 3% in broadband penetration rate from 2011 to 2012, while Kedah state drops with 0.5%. Besides, Perak state increases with 1.4% broadband penetration rate from 2011 to 2012 and Pulau Pinang state got slight increment of 1%. Hence, there is need to conduct study on the factors for achieving a continuous usage of broadband technology in some state of Malaysia.

On the other hand, many countries around the globe have experienced low demand rate of broadband despite the provision of broadband access at affordable prices by their governments (Irani et al., 2009). In other words, researchers have argued that broadband issue is more concerned with demand constrained than supply constrained (Stanton, 2004; Oh et al., 2003). This means that it is paramount to establish the factors that influence the usage of broadband within consumers in households (Howick & Whalley, 2008; Stanton, 2004; Oh et al., 2003). Summarily, the contributions of different researchers on the driving factors for broadband usage in the households as argued by the study of Irani et al. (2009) are shown in Table 2.5.

Table 2.5: Factors Influencing Usage of Broadband among Consumers in the Household

Authors	Constructs	Descriptions
McFarland and Hamilton (2006), Luarn and Lin (2005), Wang (2003), Wang et al. (2003).	Self-Efficacy	This is the possession of the required personal computer (PC) and internet skills.
Pavlou and Fygenson (2006), Lu et al. (2005), Yu et al. (2005), Hsu and Lu (2004).	Social Influences	This is the belief that important other people would induce someone to use technology.
Wu and Wang (2005), Luarn and Lin (2005), Oh et al. (2003).	Perceived Resources	The cost of acquiring broadband for household usage.
Irani et al. (2009), Choudrie and Lee (2004), Sawyer et al. (2003), Oh et al. (2003), Venkatesh and Brown (2001).	Utilitarian Outcomes	This is the extent to which using a technology enhances the effectiveness of daily household activities, including online shopping and information seeking.

2.4.3 Broadband Technology and Its Impact among Youth

The increase in the use of ICT has led to the usage of broadband in many of public and private enterprises to a climax level (Luan et al., 2008; Luan et al., 2005). This is as a result of the infinite benefits that broadband technology provides, such as connection to the outside world. On the contrary, researchers have stressed that the benefits of broadband technology is not limited to the government or private offices but also the youths who are part of the constituents of the society (Kandasamy & Shah, 2013; Yusop & Sumari, 2013; Luan et al., 2008). Luan et al. (2008) argued that integration of broadband usage to the activities of youth and teenagers in the context of education provides avenue to active learning and genuine environment. This shows that broadband technology is not self-dependent but a network which requires efficient utilization from the people.

However, studies have shown that the domain of secondary education which enjoys patronage of youth or teenagers have been affected by the broadband access (Christopher & Maria-Gorretti, 2012; Wee, 1999). Many of the youths that have computers do not have internet connectivity either dial-up or broadband. Thus, this serves as deterrent to the student's academic performance and their future ambition (Lee et al., 2012; Wee, 1999). On the contrary, the present advancement in ICT and reduction in the price of computer make the sources of information to become affordable to the youth through the acquisition and use of broadband technology (Lee et al., 2012; Wee, 1999).

In the context of Malaysia, the joint proposal of the Ministry of Education (MOE) and the Malaysian Institute of Microelectronics System (MIMIOS) formulate policy called, Computer-In-Education (CIE) so as to introduce computer literacy into the teaching curriculum (Wee, 1999). Thus, computer has become a subordinate to the life of students in their daily activities (Ramayah & Jaafar, 2008). Despite the fact that there are great efforts to add ICT application into the activities of students, the level of usage of technology is considering low (Raman, 2011; Ramayah & Jaafar, 2008). This is as a result of lack of access to the broadband technology, cost of PC, low motivation of students and lack of availability of computer laboratory in the students' schools (Christopher & Maria-Gorretti, 2012; Raman, 2011; Ramayah & Jaafar, 2008; Wee, 1999). On the contrary, the factors that influence the use of technology among youth are presented in Table 2.6

Table 2.6: Factors that Influence Usage of Broadband Technology among Youth

Authors	**Constructs**	**Descriptions**
Raman (2011), Ramayah and Jaafar (2008), Davies (1989).	Perceived usefulness	This is the belief that using technology improves my work performance.
Raman (2011), Ramayah and Jaafar (2008), Davies (1989).	Perceived ease of use	I found it easy to use technology to do my work.
Raman (2011), Fishbein and Ajzen (1975).	Subjective norm	Many people who are important to me think it is good idea to use PC.

Table 2.6 depicts the factors that influence the usage of broadband technology among youth. In other words, they are referred to as performance expectancy, effort expectancy and social influence by Venkatesh et al. (2003).

Though, the factors that influence the use of broadband technology or ICT among the youth especially in their education career have been suggested by the previous researchers (Raman, 2011; Ramayah & Jaafar, 2008; Davies, 1989; Ajzen, 1975).

However, previous studies have stressed that accessibility and usage rate among the youth or teenagers are not equal due to the existence of digital divide in the level of education, income disparity, gender, race and geographical location (Luan et al., 2008; Papastergiou & Solomonidou, 2005; Norris, 2001; Matheson & Zanna, 1990). Meanwhile, researchers have given highest attention to the issue of gender over the others factors that hinder the equality of usage of technology among teenagers (Ramayah & Jaafar, 2008; Papastergiou & Solomonidou, 2005; Matheson & Zanna, 1990).

Many studies that investigate the gender differences in the accessibility and usage of internet technology among teenagers argued that higher usage is found in male group specifically in the urban areas (Wang et al., 2009; Luan et al., 2008). The studies of Nachmias et al. (2000), Madell and Muncer (2004) indicated that there are differences in the accessibility and usage of the contents of internet among teenage students with the higher users found in males than females. Madell and Muncer (2004), Sherman et al. (2000) stressed that higher usage of the technological or internet contents are common in males than females because, male's teenagers spend more time on the net irrespective of their locations.

However, studies have argued that dominance of usage of technological between male and female depends on the attitudinal changes of the youth (Luan et al., 2008; Madell & Muncer, 2004). The study of Venkatesh et al. (2003) emphasised that effort expectancy and social influence of users of technology poses higher strength on females than male users. Therefore, gender is required to be taken into consideration while studying continuous usage of broadband technology among youth. Hence, there is need to conduct further studies on the gender disparity in the continuous usage of broadband technology among youth in the rural areas.

2.5 Rural Broadband

Broadband telecommunication services are growing towards usage of higher rate of data due to the increase demand for the interactive games, downloading of videos clips and music (Ellershaw et al., 2008). However, most of these applications require minimum of access speed of 50Mbit/s, which is usually common in urban areas while the broadband services in rural areas are struggling with lower speed because of high cost of provision (Vetter, 2006; Yoshimoto, 2005). In other words, researchers have emphasised that the infrastructure that provide high speed broadband services in urban centres are lacking in the rural areas (Adria & Brown, 2012; Zang & Wolff, 2004). Thus, this has affected the behavioural intention of users in the rural areas and resulted in continuously using the low-speed dial up access in lieu of demanding for higher services.

Establishment of fast speed broadband services in the rural areas is believed to bring and increase the quality of life of rural dwellers in the areas of education, healthcare, job creation, entertainment and life of aged population (LaRose et al., 2011; NTIA, 2009; Federal Communications Commission, 2009). Although, many government agencies especially in the developing countries have ensured that the usage of broadband in the rural areas receives more focus. However, studies of Horrigan (2009), Horrigan and Murray (2006) argued that the starting cost of broadband is still exorbitant to the rural dwellers. On the other hand, researchers have stressed that frequent usage of broadband in the rural areas could have been actualised provided the consideration is given to the simplicity of the broadband devices, demographic features of users which would provide total panacea to the intermittent connection of rural broadband (LaRose, Strover, Gregg, & Straubhaar, 2011; GAO, 2006). For instance, the gender as demography of users of broadband technology could affect its continuous usage if the factors that influence each group of gender are adequately catered for.

2.5.1 Reasons for Low Patronage of Broadband in the Rural Areas

The weakness in the usage of rural broadband or its absence is believed to be caused by lack of relevant applications for connectivity which could be used for accessing the internet (Horrigan, 2009). Considering the future effect of broadband technology in the rural areas, many of rural dwellers find it difficult to believe that broadband could help in solving their contemporary issues, either socially or economically (LaRose et al., 2011; LaRose et al., 2007). However, the studies of LaRose et al. (2007), Rogers (2003) argued that the state of diffusion of innovation reveals that factors like relative advantage, trialability, observability, complexity and compatibility of broadband technology affect its usage among the rural dwellers. If the people residing in the rural areas are assured that the services derived from the use of broadband technology would be supporting their activities, either towards the education or business, there would be more usage towards continuity.

2.5.2 Benefits of Rural Broadband

2.5.2.1 Economic Benefits

Previous studies have argued that investment on broadband infrastructure in some rural areas have created employment opportunities for the rural dwellers (Katz & Suter, 2009; Gillett et al., 2006). Thus, Katz and Suter (2009) echoed that the relationship between economic development and broadband development has relative terms in the economic growth of rural areas. Besides that, the different perceptions of Horigan (2008) and LaRose et al. (2006) stressed that provision of broadband in the rural areas would aid home businesses, telecommuting, exposure to modern education and training among the rural dwellers. In order words, availability of broadband in the rural areas serves as means of job creation for rural dwellers and allows some inhabitant in the rural areas to work from their respective homes.

2.5.2.2 Social Benefits

Many dimensions of lives in the rural areas can be affected with the usage of broadband technology. Therefore, researchers have argued that deployment of broadband in the rural areas could have great effect in the areas of education, healthcare, social linkages, employment opportunity, intra-rural communication and government services (LaRose, et al., 2011; Herman & Ettema, 2007). Horrigan (2009) echoed support that rural broadband is useful in the healthcare, access to community news and communication among the rural dwellers. On the other hand, LaRose et al. (2011) stressed that social benefit of broadband to the rural communities if embraced is not only limited to the healthcare and education, but also entertainment and public services. The entertainment benefit of having broadband in the rural areas could be seen among the youth group by watching and listening to the online movies and music respectively.

2.5.3 Broadband and Rural Development

Aside the economic and social benefits of broadband technology to the rural communities, researchers have argued that there are many benefits that could be brought to the rural communities that are in form of development (Dickes et al., 2010; Prieger & Heil, 2010b). However, the usage of broadband technology in the urban areas has been identified with the development it brings to them, but this can also be applicable to the rural areas (Prieger & Heil, 2010a; Dicke et al., 2010). Based on this, Prieger and Heil (2012), Barkley et al. (2007) argued that deployment of broadband to the rural areas would assist small scale firms in terms of business efficiency by engaging in electronic commerce (e-commerce). On the contrary, the major challenge for the small scale businesses in the rural areas is the accomplishment of wired and wireless internet which could be simplified through rural broadband (Prieger & Heil, 2012; Barkley et al., 2007).

Furthermore, Stenberg et al. (2009) emphasised that rural broadband increases community involvement, avenue for income expansion and human capital development through distance learning. Moreover, availability of broadband technology in the rural areas promotes interaction among the rural dwellers through the cost reduction on civic engagement and community participation. Therefore, the use of high speed internet in the rural areas solves the stress of visiting the municipal records by the rural dwellers that are sourcing for the information regarding the participation at grassroot level (Stern et al., 2011; Stern & Adams, 2010).

Accessibility of broadband in the rural areas serves as mechanism for upgrading the rural health centres into telemedicine which allows rural dwellers to enjoy the same healthcare infrastructure with urban settlers (Prieger, 2013; Whitacre et al., 2009). Thus, telemedicine in the rural areas benefited the communities through the transportation savings, increased laboratories and cost savings from telemedicine outsourcing procedures (Prieger, 2013; Stern & Adams, 2010). Indeed, medical services like laboratory work through the telemedicine saves the societal cost as the test would have been performed in urban centres. Hence, it is paramount to encourage the frequent usage of broadband in the rural communities so as to achieve the potential development which could have brought by the broadband in the rural areas.

2.6 Evolution of Broadband in the Rural Areas of Malaysia

The Universal Service Provision (USP) was established under the provision of the Communications and Multimedia Act (CMA) in 1998 is to ensure there is broadband accessibility in rural Malaysia (SKMM, 2009). Meanwhile, USP project in Malaysia involves establishment of broadband services in the rural communities in the forms of Community Broadband Library (CBL) and Community Broadband Centre (CBC). Moreover, Malaysia government allocated RM2.4 billion to the USP so as to achieve their target in financing the community broadband projects from 2009 to 2010 by covering 135 selected districts across the country. Hence, the total amount of RM883 million from the USP fund was allocated for community broadband project located in the rural areas. To actualise the objective of USP in Malaysia, their target was divided into underserved areas and underserved groups shown in Table 2.7.

Table 2.7: The USP Target

USP Focus (Vis-a-Vis)	Descriptions
1. Underserved Areas	
a. Broadband Access Service.	Areas where broadband subscribers are below national broadband penetration rate.
b. Public Cellular Services.	Areas with population density of less or 80 inhabitants per square kilometres.
c. Public Switch Telephone Network (PSTN) Services.	Areas where PSTN subscribers penetration rate is 20% below the national PSTN penetration.
2. Underserved Group within the Community	A group of people with similar characteristics and do not have individual or collective access.

Furthermore, there was addition of Time 3 programme in 2008 in order to support the activities of CBL and CBC project which aimed to increase the coverage in Malaysia to 97% before the end of 2011 (SKMM, 2009). Besides, SKMM and some private industries offer to give basic telephony, some services and monitoring the underserved group in the communities for effective and affordable broadband connectivity. Indeed, SKMM (2009) shows that there are varieties of introduction of new technologies in Malaysia with the view to extend the usage to the rural and underserved communities.

In addition, the statistics by SKMM (2009) revealed that 75% of broadband subscriptions are relied on ADSL technology in Malaysia in 2008, while 22.5% use mobile broadband. Indeed, 0.5% and 0.3% of subscribers used SDSL and satellite broadband, while 1.5% and 0.2% utilised wireless technologies and fixed technologies respectively. Moreover, WiMAX technology was introduced in Malaysia giving services like any other mobile broadband technologies to both rural and urban areas at affordable price and high speeds. The connectivity of WiMAX is achieved through different companies such as, Packet One (P1), REDtone-CNX Broadband, Asiaspace and Y-Max Networks.

Furthermore, 3G cellular network has been used by 75% of population as at the second-quarter of the year 2009 provided by Maxis and Celcom. Thus, the target of Maxis and Celcom was to extend the 3G coverage to the rural areas through the use of Wideband Code Division Multiple Access (WCDMA) 900MHz. In the same way, the use of 3G network in the rural areas is capable of providing high speed data applications to the rural dwellers such as, mobile-banking, location-based and video calls. Besides that, the difficulties of ADSL and terrestrial coverage in some remote locations in Malaysia have been connected by using VSAT such as Sabah and Sarawak. Over 304 libraries and clinics are currently using VSAT services for the internet connectivity due to its C-band satellite frequency as shown in Figure 2.8 which is weather tolerance (SKMM, 2009).

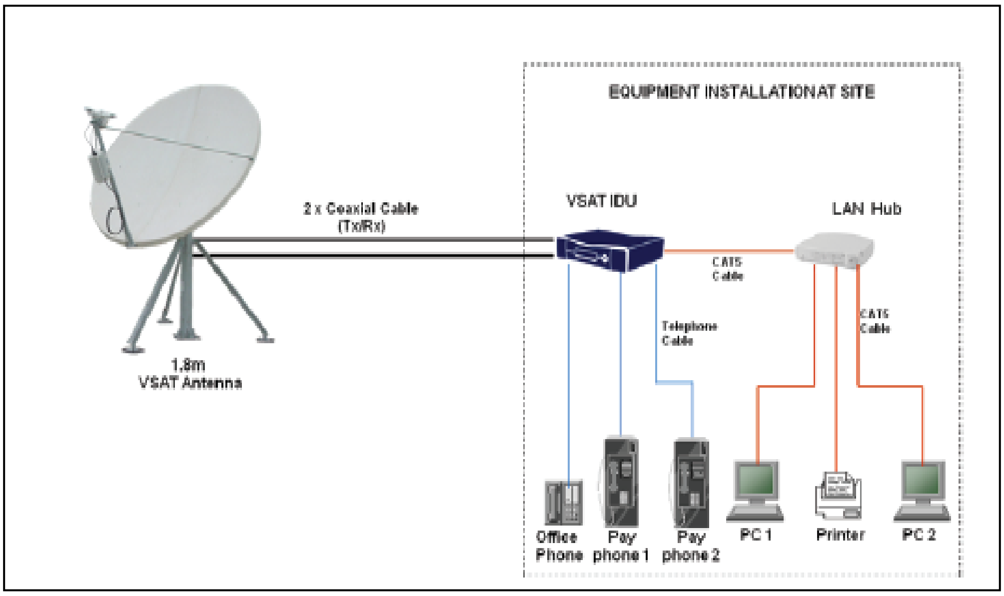


Figure 2.8: VSAT Deployment (Source: SKMM, 2009)

2.7 Overview of IS Theories and their Relations to the Study

Previous studies have stressed that many of the IS theories have been used and addressed in different perspectives and produce solutions to the issues at hand (Ho, 2010; Park et al., 2009; Eriksson & Nilsson, 2007). These theories are Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), Motivational Model (MD), Combined TAM and TPB (C-TAM-TPB), Diffusion of Innovation Theory (DOI), Model of PC Utilization (MPCU) and Social Cognitive Theory (SCT). Meanwhile, researchers have argued that many of IS theories are capable of discovering factors or drivers for achieving a particular issues in the societies (Ho, 2010; Premkumar & Bhattacherjee, 2008; Damiani et al., 2008; Venkatesh et al., 2003). Therefore, this study examine the prominent IS theories in finding the factors towards continuous usage of broadband technology among youth in the rural areas of Malaysia.

2.7.1 Theory of Reasoned Action (TRA)

The Theory of Reasoned Action focuses on attitudes toward behaviour and subjective norm (Fishbein & Ajzen 1975). The theory assumes that individuals are rational and will make systematic use of information available to them. The major determinants of this model are; individuals' perceptions, attitudes towards the behaviour and social influence, while the model serves as the foundation for explaining and predicting human behaviours. Moreover, Davis et al. (1989) applied TRA to the study on individual's acceptance of technology. Meanwhile, the study of Shepppard et al. (1988) stressed that in order for a theory to predict specific behaviour, attitude and intentions, there must be agreed action, target, context, timeframe and specificity. However, TRA is specifically useful for determining behaviour that is consciously thought out beforehand (Hansen et al., 2004; Jae-Nam & Young-Gul, 2005) and show weakness for the thought for the long-term usage of technology.

2.7.2 Technology Acceptance Model (TAM)

Davis (1989) predicts information technology acceptance and usage. TAM used the TRA by Fishbein and Ajzen (1975) to represent the theoretical base. Thus, Davis (1989) stresses that user's behavioural intention to use a technology is affected by their perceived usefulness and perceived ease of use of the technology. The model was extended to TAM2 by including subjective norm as an additional predictor of intention in a mandatory environment. Moreover, Davis (1989) argued further that both Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) affect people's intention to use a system as shown in Figure 2.9.

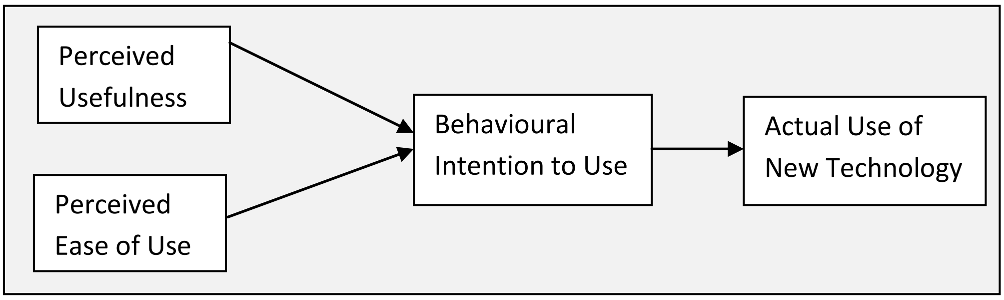


Figure 2.9: Technology Acceptance Model (Source: Davis et al., 1989)

Hence, the basis of TAM are PU (degree to which a person believes that using a particular system would enhance his/her job performance) and PEOU (the degree to which a person believes that using a particular system would be free of effort) (Davis et al. 1989). On the contrary, TAM does not consider the satisfaction of users of technology towards the long-term usage for future purposes (Ho, 2010; Park et al., 2009; Venkatesh et al., 2011b). Therefore, TAM could not be unilaterally used for predicting the frequent usage of technology since it lacks consideration of satisfaction of the users of technology.

2.7.3 Decomposed Theory of Planned Behaviour (DTPB)

The DTPB theory begins with constructs from the Diffusions of Innovation Theory (DOI) perspective (Taylor & Todd 1995). The DTPB is an improvement of the Theory of Reasoned Action (TRA). Clearly, DTPB model shows that it contains constructs like perceived usefulness, complexity, compatibility, subjective norms, self-efficacy and facilitating conditions. Moreover, the study of Taylor and Todd (1995) examined the appropriateness of TRA, TPB and DTPB as models to predict consumer behaviour. Therefore, the results showed that TRA and TPB were capable to predict behaviour, while the decomposed version was better at explaining the behaviour. Hence, empirical analysis reveals that the theory explains up to 21% and 25% variance in technology acceptance and use behaviour.

2.7.4 Theory of Planned Behaviour (TPB)

Ajzen and Fishbein (1985) proposed the theory of planned behaviour due to the limitations found in TRA. However, the addition of construct of Perceived Behavioural Control to TRA brings about Theory of Planned Behaviour (TPB). Therefore, this projects TPB to be widely used and validated by many studies in prediction of individual intentions and behaviour of technology adoption. On the contrary, Taylor and Todd (1995) criticized TPB and TRA that the models required individuals to be motivated to perform certain behaviour. Therefore, the assumption is vulnerable to many problems while studying consumer behavioural related research (Taylor & Todd, 1995). The findings show that TPB explains between twenty 1% and 37% variance in technology acceptance and user behaviour.

2.7.5 Combined TAM and TPB (C-TAM-TPB)

The C-TAM-TPB is an integrated model that combines the constructs of TPB with Perceived Usefulness from TAM. Therefore, Taylor and Todd (1995) added two factors to TAM which are Subjective Norm and Behavioural Perceived Control in order to develop a more comprehensive and important determinants use of information technology. Taylor and Todd (1995) suggest further that the C-TAM-TPB model provides enough usage for experienced and non-experienced accounting for some amount of the variance in intentions and usage behaviour. In other words, C-TAM-TPB can be used to predict future usage behaviour even when the individual has no experience. Hence, the C-TAM-TPB model can be used to predict future usage behaviour for those with or without experience of the technology being studied. However, the theory lacks factors to predict long-term usage of technology which determine the success of technology.

2.7.6 Model of PC utilization (MPCU)

Thompson et al. (1991) argued that utilization of a personal computer (PC) would be influenced by individuals' Feelings towards Using PCs, Social Norms, Habits, Expected Consequences and Facilitating Conditions. It was concluded that the core constructs in MPCU model are Feelings towards Use, Complexity, Facilitating Conditions, Job-Fit, Long-Term Consequences and Social Factor. However, the Behavioural Intention was excluded in the MPCU due to the dominance power of Actual Use on Predictive Use, while habits were excluded from the model because of measurement issues. Hence, the model testing took place at one organization, making the dimensions of perceived consequences for utilizing personal computers at the work place to include two near-term consequences (Complexity and Job Fit) and long-term consequences.

2.7.7 Diffusion of Innovation Theory (DOI)

Diffusion of Innovation (DOI) Theory is heavily used in many disciplines. The DOI was designed by Rogers (1983) with five constructs which influence adoption of technology, such as Compatibility, Complexity, Observability, Relative Advantage and Trainability. The study of Moore and Benbasat (1991) adapted DOI determinants and come-up with seven constructs for individual technology acceptance. The constructs consist of Compatibility, Ease of Use, Image, Relative Advantage, Results Demonstrability, Visibility and Voluntariness of Use. DOI theory has been used in many fields of studies with its prediction level of about 37%, such sociology, public health, communication, geography, education and many other disciplines, making it to surpass several other models in terms of usage in research perspective. However, researchers like Ndubisi (2008), Gregor and Jones (1999), Rogers and Shoemaker (1971) argued that retention of values of innovation of technology or technological devices which is referred to as compatibility can instigate continuous usage by the users. Therefore, some variables in DOI fit predicting usage of technology for long-term purposes.

2.7.8 Social Cognitive Theory (SCT)

Bandura (1986) came up with SCT with intension of studying human behaviour. Compeau and Higgins (1999) used the theory to study computer usage by using the constructs like Affect, Anxiety, Outcome Expectations-Performance, Outcome Expectations-Personal and Self-Efficacy. In other word, SCT expresses that cooperation between the users and the behaviour induces thinking and action (Venkatesh et al., 2003). On the other hand, the study of Jones (1989) argued that behaviours of users of technology varies from users to users and cannot unilaterally predict the action but users himself. Indeed, the beauty of SCT is that it helps understanding the individual and group behaviour and domain in which behaviour can be changed (Liaw et al., 2006; Hasan & Ali, 2004). Hence, SCT has shown that it mainly taken the behaviour of users into consideration which is not synonymous to the success of the technology.

Conclusively, the related IS theories such as, TRA, TAM, DTPB, TPB, C-TAM-TPB, MPCU, DOI and SCT have been stressed that they truly focus on the first-time use of technology (Venkatesh et al., 2003; Bandura, 1986; Rogers, 1983; Ajzen & Fishbein, 1985), thus, cannot be used for determining the success of technology, known as long-term usage. On the contrary, previous studies have argued that IS continuance post acceptance model fits determining the success of technology, even though, researchers have made some modifications on it towards achieving their research's objectives (Hwang et al., 2011; Lee & Kwon, 2009; Chiu & Wang, 2008). Recently, researchers have stressed that some variables in UTAUT model can be used while investigating continuous usage of technology (Chiu & Wang, 2008; Liao et al., 2007), but, a viable result would be obtained with integration with related theories (Chiu & Wang, 2008; Kim et al., 2006; He & Wei, 2006). Hence, this study adapts IS continuance post acceptance and UTAUT as base models towards achieving contributing factors for continuous usage of broadband among youth in the rural areas of Malaysia.

2.8 Summary

This chapter has provided detailed discussion about the previous works on continuous usage of technology, roles played by the continuous usage in IS research and its limited coverage. Moreover, the chapter provided review on the evolvement of broadband technology which covers the state of internet before the advent of broadband technology. Indeed, the chapter covers broadband usage among the consumers and households together with influential factors. The rural broadband was discussed together with benefits and development it brings to the rural communities.

However, the chapter shows that the review of previous works lack studies on the continuous usage of broadband technology among youth. Furthermore, the evolution of broadband in the rural areas of Malaysia and the government involvement were discussed in the chapter, but, study on continuous usage of broadband technology has not been extended to the rural areas. Lastly, the chapter discusses the related IS theories as they have been widely used by the IS researchers, however, they lack focus on the long-term usage of technology. This leads the researcher to see IS continuance post acceptance model and UTAUT model to be useful in determining the contributing factors for continuous usage of broadband technology among youth in the rural areas. The next chapter presents the conceptual framework which comprises of the base models and their contribution in the study.

CHAPTER THREE

CONCEPTUAL FRAMEWORK

3.0 Introduction

This chapter provides the framework for the study in accordance with the background for the research discussion in the literature review chapter. The main purpose of this study is to model and validate the contributing factors for continuous usage of broadband technology in the rural areas. Therefore, this chapter proposed a research model for continuous usage of broadband technology in the rural areas and formulated hypotheses based on the foundation of related theory as discussed in the literature review chapter. Moreover, the chapter is divided into three sections such as the theoretical framework together with the research model, overall relationships between independent variables, dependent variable, mediating variables and moderating variables. Lastly, the chapter contains research proposition which is the hypotheses development for the study.

3.1 Theoretical Framework

Many theories that relate to the ICT usage have been postulated such as Technology Acceptable Model (TAM), Diffusion of Innovation (DOI) model, Theory of Planned Behaviour (TPB) and other models are mainly focus on the first-time use (Ajzen, 1991; Davis, 1989; Rogers, 2003). However, researchers have argued that the success of IS and the technology rely on their ongoing and long-term use, rather than the initial use or first-time use (Bischoff et al., 2014; Bhattacherjee, 2001). This implies that accepting only first-time use of technology cannot be used as measure for determining it success, and thus calling for continuous usage of technology as the research stream.

Meanwhile, previous studies on IS continuous post acceptance model and UTAUT model have shown that some of their embedded constructs fit measuring continuous usage of technology (Venkatesh et al., 2011b; Sumac et al., 2010; Loo et al., 2009; Wang et al., 2009; Peter & McLean, 2009; Suha & Anne, 2008; Bernroider, 2008; Wu & Wang, 2006; Bhattacherjee, 2001b; Karahanna et al., 1999). On the other hand, Chiu and Wang (2008); Kim et al. (2006); Straub (2004) argued that there is need to search for more factors so as to ensure the validity of the new model that would be used in another context. Hence, this study uses IS continuous post acceptance model and UTAUT model as the based models with inclusion of service quality and compatibility of technology for determining the contributing factors for continuous usage of broadband among youth in the rural areas.

3.1.1 IS Continuance Post Acceptance Model

IS continuance post acceptance model was proposed by Bhattacherjee (2001) through the refinement of the Expectation Confirmation Model (ECM) by Oliver (1980) and commonly used for modelling IS continuance. Indeed, the IS continuance post acceptance model was proposed to evaluate individual stand in continuously using a system, while Bhattacherjee (2001) recommended that the main constructs are perceived usefulness and satisfaction of the users of the systems which is antecedented by the confirmation, shown in Figure 3.1. However, many modification or refinement have been made on the model, but still remains the base model while researching on IS continuance domain (Vahid & Khaled, 2010; Bhattacherjee, 2001a). Therefore, IS continuance post acceptance model is useful in this study while determining the contributing factors for continuous usage of broadband technology among youth in the rural areas.

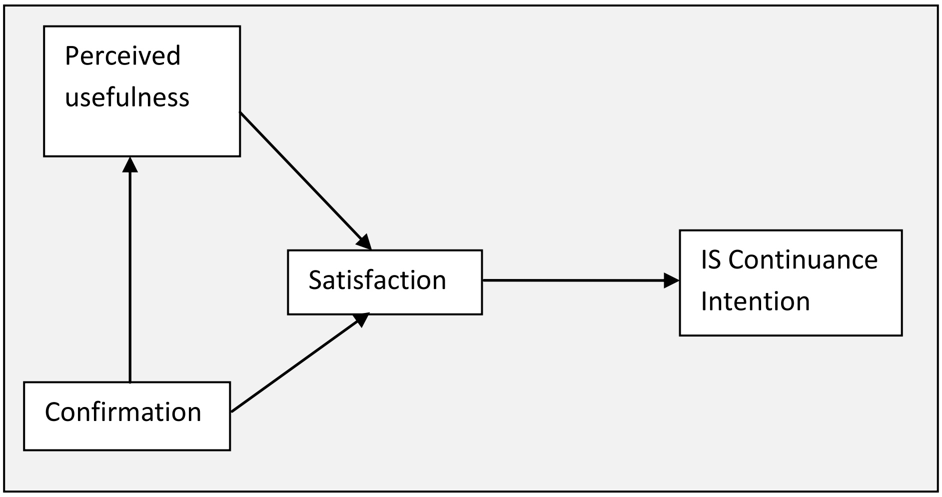


Figure 3.1: IS Continuance Post-Acceptance Model

Furthermore, IS continuous post acceptance model has been widely used in IS research while studying post acceptance issues of technology and its long-term success (Venkatesh et al., 2011b; Vahid & Khaled, 2010; Bhattacherjee, 2001a). The construct like satisfaction in the IS continuance post acceptance model is useful for this study due to its positive attribute it describes towards the feelings of the users of technology (Bhattacherjee, 2001a; Inteco, 1998). However, the antecedent of satisfaction which is confirmation construct has been argued as construct towards pre-acceptance issue (Park et al., 2009; Eriksson & Nilsson, 2007; Bhattacherjee, 2001a, 2001b). Since this study focuses on the long-term use of broadband technology and not the first-time use, confirmation construct from IS continuance model found not useful as contributing factor for continuous usage of broadband technology among youth in the rural areas.

Moreover, researchers have stressed that perceive usefulness construct in the IS continuance model ensures understanding of long-term use of technology (Ham et al., 2012; Bhattacherjee, 2001a). On the other hand, understanding of long-term success of technology could be achieved through the performance expectancy which is similar to perceive usefulness and expresses that users of technology have already acquired experience about it (Bischoff et al., 2014; Ham et al., 2012). Thus, performance expectancy is used in lieu of perceived usefulness construct in this study, because users of broadband technology in the focused rural areas have had knowledge about the technology. Hence, performance expectancy, satisfaction and IS continuance intention are adapted for the completion of this study.

3.1.2 Definitions of Components of IS Continuance Post Acceptance Model

The constructs for achieving continuous usage of broadband technology among youth in the rural areas are captured in IS continuance model (Ham et al., 2012; Park et al., 2009; Eriksson & Nilsson, 2007; Bhattacherjee, 2001a), but require clearer definition and shown in Table 3.1.

Table 3.1: Definitions of Components of IS Continuance Model

Variables	**Definitions**	**Authors**
Perceived Usefulness	The degree of believe that using a system enhances job performance.	Bischoff et al. (2014), Ham et al. (2012), Eriksson and Nilsson (2007), Bhattacherjee (2001a).
Confirmation	The perception of agreement between expectation of use and its actual performance.	Ham et al. (2012), Premkumar and Bhattacherjee (2008), Bhattacherjee (2001a).
Satisfaction	The user's positive feelings about prior use of technology.	Ham et al. (2012), Park et al. (2010), Park et al. (2009), Premkumar and Bhattacherjee (2008).
IS Continuance Intention	The likelihood that a user will continue to use a technology.	Ham et al. (2012), Park et al. (2010), Cho et al. (2009), Park et al. (2009), Eriksson and Nilsson (2007), Bhattacherjee (2001a).

Table 3.1 describes the definitions of components of IS continuance model with the views of different researchers and provides further clarification of the components of the model of IS continuance.

3.1.3 Unified Theory of Acceptance and Use of Technology

The Unified Theory of Acceptance and Use of Technology (UTAUT) model was proposed by Venkatesh et al. (2003). The UTAUT model has been argued has model that capture first-time use of technology (acceptance) with the look on the next issue after acceptance (Venkatesh et al., 2003). However, researchers have stressed that some construct in UTAUT model can be fussed with some constructs towards studying of long-term use (continuous use) of technology (Venkatesh et al., 2011b; Chen et al., 2011; Ho, 2010). This shows that components of UTAUT model are useful for modelling the continuous usage of broadband technology among youth in the rural areas.

Furthermore, the UTAUT model as shown in Figure 3.2 has been chosen as another base model in this study since it covers more internal factors and most widely use in the studies of technology usage when compared to TAM, TRA, TPB and MPCU. The UTAUT theory has Use Behaviour as dependent variable, while the independent variables are Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions (Venkatesh et al., 2003).

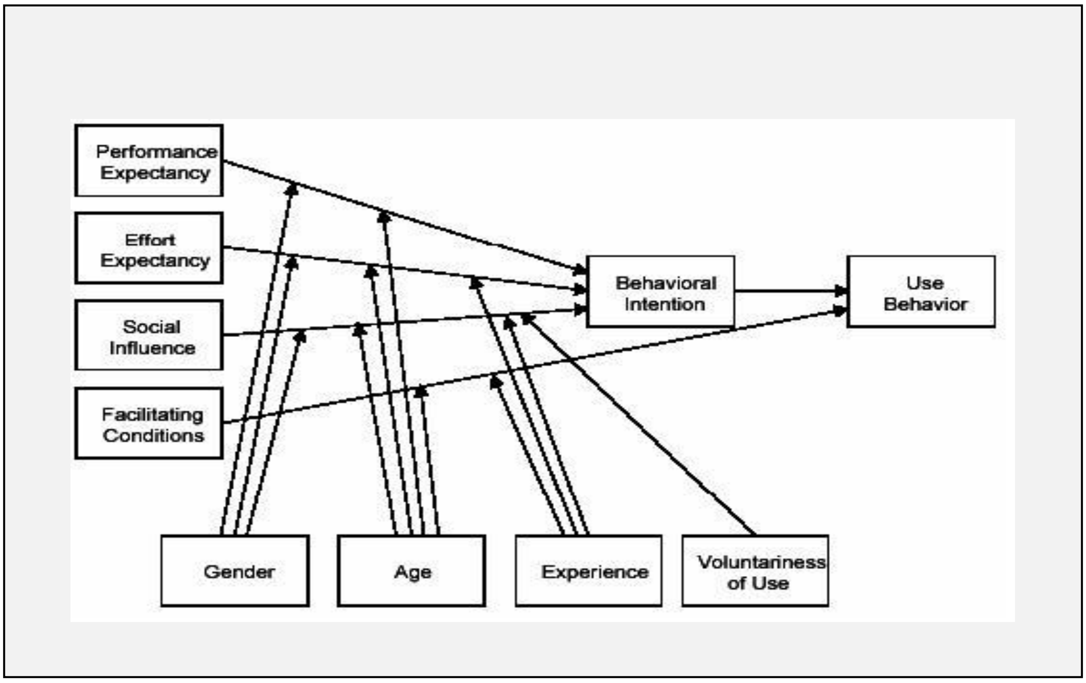


Figure 3.2: The Unified Theory of Acceptance and Use of Technology Model (Source: Venkatesh et al., 2003)

In addition, UTAUT model fits for this study because of its ability to merge the constructs of the existing eight theories in forming a unified theoretical basis (Williams, Rana, Dwivedi, & Lal, 2011; Vankatesh et al., 2003) which helps in understanding the existing problem. Moreover, UTAUT theory has got many supports for the existence of performance expectancy and effort expectancy constructs (Williams et al., 2011; Chang, Hwang, Hung, & Li, 2007) which could be used to measure the anticipation of long-term usage of broadband technology among youth in the rural areas. Besides, the social influence and the facilitating condition constructs assist in identifying the requirements for continuous usage of broadband technology in the rural areas. Indeed, UTAUT model fits objectives of this study because of its provision of the 70% variance in usage intention and 50% usage than TAM and other IS theories. In fact, UTAUT model has been emphasised as theory that fits using in both small and large organizations (Abdulwahab & Zulkhairi, 2012; Venkatesh, Sykes, & Zhang, 2011; MarChewka, Chang, & Kostiwa, 2007) and thus calling for its usage as base model for this study.

3.1.4 Definitions of Components of UTAUT Model

Precisely, elements related to ICT infrastructure within effort expectancy constructs are captured by the UTAUT construct of facilitating conditions (Abdulwahab & Zulkhairi, 2012; Venkatesh et al., 2011; Venkatesh et al., 2003). On the other hand, UTAUT model shows that when both performance expectancy and effort expectancy constructs are present, facilitating conditions become insignificant in the prediction of intention. Thus, the components of the UTAUT model require clearer definition for better understanding and presented in Table 3.2.

Table 3.2: Definition of Components of UTAUT Model

Variables	**Definition**	**Authors**
Performance Expectancy	This is the degree to which individual believes that usage of systems brings a better output.	Abdulwahab and Zulkhairi (2012), Venkatesh et al. (2011), Wang and Shih (2008), Venkatesh et al. (2003).
Effort Expectancy	This is the degree of ease that surrounds the use of information system.	Abdulwahab and Zulkhairi (2012), Venkatesh et al. (2011), Al-Gahtani et al. (2007), Park et al. (2007), Wang et al. (2006), Venkatesh et al. (2003).
Social Influence	It is the degree to which individual perceives that important others people believe that one should use the technology.	Abdulwahab and Zulkhairi (2012), Venkatesh et al. (2003), Venkatesh and Davis (2000).
Facilitating Condition	The degree to which individual believes that there is technical infrastructure to support the use of new information system.	Abdulwahab and Zulkhairi (2012), Venkatesh et al. (2011), Al-Gahtani et al. (2007), Wang et a. (2006), Venkatesh et al. (2003).
Behavioural Intention	This is the measured of the strength of one's intention to perform a specified behaviour.	Abdulwahab and Zulkhairi (2012), Venkatesh et al. (2011), Venkatesh et al. (2003), Igbara et al. (1997).

Table 3.2 depicts the definitions of components of UTAUT model by different researchers and brings about clarification about the content of UTAUT model. The components are performance expectancy, effort expectancy, social influence, facilitating condition and behavioural intention.

3.2 Reasons for Inclusion of Service Quality and Compatibility Constructs

Both service quality and compatibility as constructs were found useful in this study towards determining the contributing factors for continuous usage of broadband technology among youth in the rural areas. Sections 3.2.1 and 3.2.2 provide detailed explanation for their usefulness in this study.

3.2.1 Needs for Inclusion of Service Quality

Researchers have emphasised that service quality is attributed to the feelings of users of technology towards provision of outcome after the initial use (Junaida et al., 2010; Park et al., 2009). This is as a result of its dimensions that were identified by Parasuraman et al. (1985, 1988) as positive action of technology in use towards its success, such as reliability, responsiveness, assurance, tangible and empathy. On the other hand, the study of Kettinger and Lee (1997) argued that service quality in the context of IS research should be measured with reliability, responsiveness, assurance and empathy, with exclusion of tangible while studying the success of technology. This is because of services derived from IS do not sometimes require physical contact but rather feelings of promptness and reliability, which is similar to the likelihood of user to continuous using a technology.

Moreover, service quality is useful in this study due to the argument of some researchers that it influences attitudes of users of technology towards long-term use (Lin, 2007; Wang et al., 2002; Preece, 2000). Besides that, the studies of Elliot (2012) and Nelson (2005) stressed that service quality of technology should be measured in terms of its accuracy, completeness, reliability, accessibility, flexibility and promptness, which are dimensions of IS success (DeLone & McLean, 2003).

This shows that using service quality as one of the factors for achieving continuous usage of broadband among youth in the rural areas would help objectives of this study, as it has been emphasised as a construct that adds value to the success of technology on the long-term use (Parasuraman et al., 1985).

Furthermore, service quality is suggested to be one of the contributing factors for continuous usage of broadband among the youth in the rural areas as it forms significant dimension towards IS success in electronic commerce domain where customer service is important (DeLone & McLean, 2003). Since the users of broadband technology lacks face-to-face contact with the recipients of information being sent, its service quality must be guaranteed for its success (Elliot et al., 2012; Ramayah et al., 2010). Thus, broadband technology is a communication device used to ensure successful transaction of electronic commerce; hence, its success must be achieved to ensure satisfaction of the users for the long-term usage (Elliot et al., 2012; Ramayah et al., 2010; Park, 2009).

In addition, service quality has been used by many researchers while studying the perceive performance of technology in different contexts towards IS success, such as library, e-learning, e-commerce, mobile application and virtual community, and yield good results (Elliot et al., 2012; Ramayah et al., 2010; Sanchez-Franco et al., 2009; Landrum & Prybutok, 2004). This implies that service quality affect the success of technology or IS in different perspectives on the continuous usage basis (Landrum & Prybutok, 2004). On the other hand, the empirical studies of many researchers showed that reliability and accessibility of technology should be traced to the embedded service quality that guarantees its continuous usage (Lee & Chung, 2009; Wang & Liao, 2008; Wu & Wang, 2006). Hence, service quality fits the construct to determine the success of broadband technology usage among the youth in the rural areas towards long-term use.

3.2.2 Needs for Inclusion of Compatibility

The innovation of technology has been viewed as new idea and practice to shape the functionality of the organisation but with the relative of its compatibility towards the success of the organisation (Ndubisi, 2008; Kotler, 2003). Meanwhile, Ndubusi and Chukwunonso (2005) argued that success of any business in an organisation could be achieved by inculcating the habit of long-term use through the compatibility of the introduced innovation. Therefore, consistent of value and needs which are embedded in an innovation used in the organisation could serve as retention of users for frequent use in future. Moreover, studies have shown that innovation that is more compatible with values and ways of transacting businesses in an organisation would be chosen for future and continuous usage in lieu of non-compatibility innovation (Ndubisi, 2008; Gregor & Jones, 1999; Rogers & Shoemaker, 1971). Thus, compatibility plays important role in determining the success of technology (broadband) for long-term use.

Furthermore, broadband technology may be viewed as dimension of innovation to the people in the rural areas; however, the behaviour of the users towards its future usage needs to be taken into consideration (Krieglmeyer et al., 2010; Sang et al., 2009). The study of Hussein (2010) argued that achieving continuous usage of technology or the long-term use should not be limited to the factors like performance expectancy, ease of use and service quality, but also the compatibility of the technology. Moreover, researchers have stressed that users of technology would continuously using it once they have confident that it would be consistent with their lifestyle and the way they work (Hussein, 2010; Krieglmeyer et al., 2010; Ojha et al., 2008). Hence, the use of compatibility helps in determining the contributing factors for continuous usage of broadband technology among youth in the rural areas.

3.3 Research Model

A conceptual research theorizes or makes logical sense of the relationships among several factors that have been identified as important to the problems (Sekaran, 2003). Thus, Sekaran (2003) emphasised that a research model is the basic foundation upon which other research structures extend the frontier of knowledge. Considering the discussions in the literature review together with this chapter, researcher came-up with a research model for the contributing factors for continuous usage of broadband technology among youth in the rural areas. Hence, Figure 3.3 shows the research model for this study.

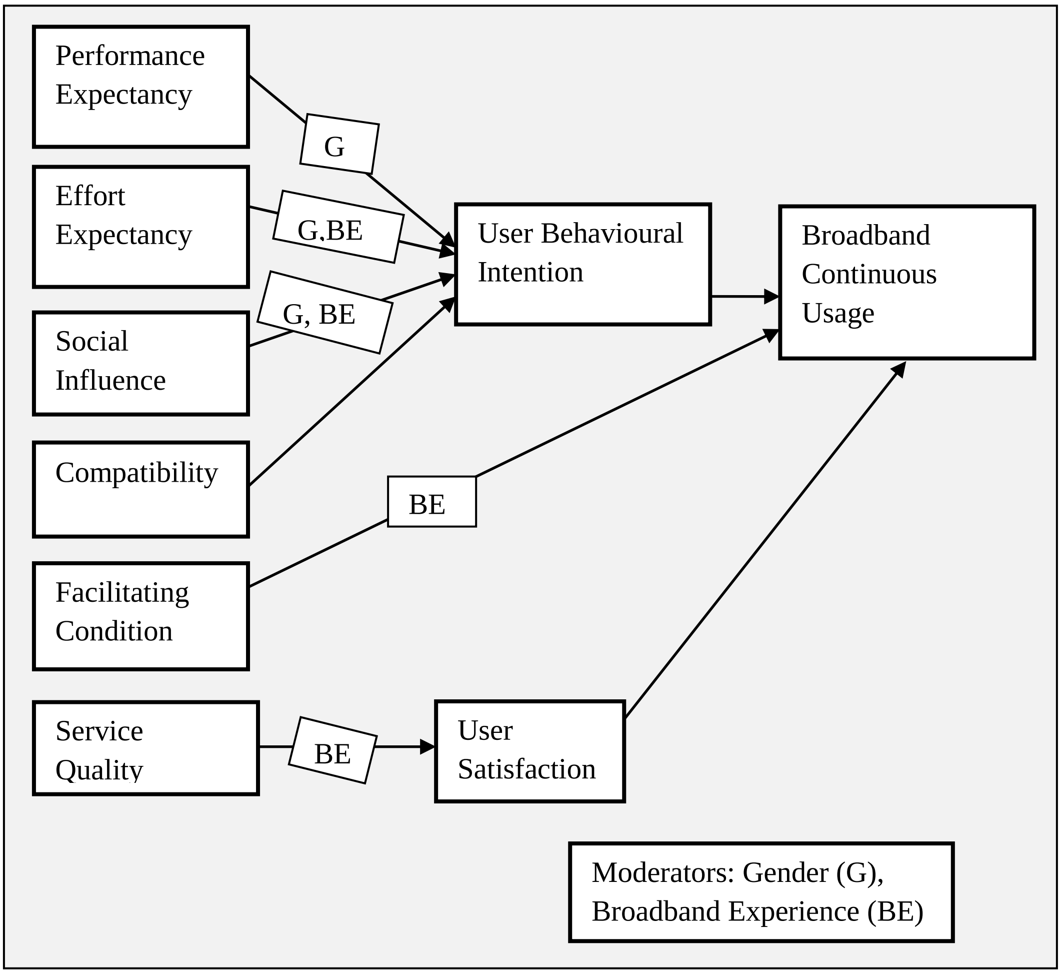


Figure 3.3: Research Model

Furthermore, the dependent variable in this study is the broadband continuous usage which is referred to as intended retention of values derived from the use of broadband perpetually (Juyeon, Jihun, Jae-Nam, & Jae, 2012; Ham et al., 2010; Eriksson & Nilsson, 2007; Bauer & Grether, 2005). Moreover, the study considers a thorough approach in measuring broadband continuous usage adapted from previous studies by various scholars (Juyeon et al., 2012; Ham et al., 2010; Park et al., 2010; Cho et al., 2009; Eriksson & Nilsson, 2007). Besides that, the independent variables are performance expectancy, effort expectancy, social influence, compatibility, facilitating condition and service quality.

In addition, all the independent variables were measured by adapting from previous literatures by various authorities (Venkatesh et al., 2003, 2011, 2012; Abdulwahab & Zulkhairi, 2011, 2012; Suha & Anne, 2008; Dwivedi & Weerakkody, 2007; Rogers, 2003; Park et al., 2010; Dwivedi et al., 2010; Dwivedi et al., 2006; Moore & Benbasat, 1991; Parasuraman et al., 1985). Besides, the mediating variables are User Behavioural Intention and User Satisfaction. Each of the mediating variables was measured by adapting the measurement items used by the previous researchers (Venkatesh et al., 2003, 2011, 2012; Abdulwahab & Zulkhairi, 2011, 2012; Suha & Anne, 2008; Park et al., 2010; Ham et al., 2010; Park et al., 2009).

3.4 Operationalization of Constructs

The operational definition of variables presents the useful terms to describe the relationship between the variables that were used in this study. Therefore, this study used eleven variables in modelling the contributing for continuous usage of broadband technology among youth in the rural areas of Malaysia. The variables are performance expectancy, effort expectancy, social influence, compatibility and facilitating condition. Others are service quality, user behavioural intention, user satisfaction, broadband continuous usage, gender and broadband experience. However, this study does not use age as was used as the moderator in the UTAUT model since our participants are of the same age group which is relevant to the study of Suha and Anne (2008). Besides that, voluntariness is also discarded in the study's research model as our participants are users of broadband technology in the rural areas and in line with the previous study (Suha & Anne, 2008).

3.4.1 Independent Variables

3.4.1.1 Performance Expectancy

Performance expectancy is the degree to which individual believes that using a technology gives benefits to consumers in performing some activities (Venkatesh et al., 2012). Venkatesh et al. (2003) has emphasised that performance expectancy has it theoretical foundation on the basis of five different theories or models. Thus, performance expectancy was derived from the Perceived Usefulness (PU) construct which was proposed by TAM (Keong et al., 2012; Davis, 1989). On the other hand, researchers have argued that PU which is synonymous to performance expectancy was emerged to be a strong and highly significant determinant of technology usage (Keong et al., 2012; Schaupp et al., 2010; Lee, 2009; Riemenschneider et al., 2002).

Moreover, performance expectancy was stressed as the most influential construct among the four independent variables of UTAUT in predicting behavioural intention of user of technology (Venkatesh et al., 2003). Besides, the use research domain establishes that performance expectancy is the main driver of technology use intention and behaviour (Venkatesh et al., 2012). However, previous studies stressed that performance expectancy have been tested and confirmed in many research domains as the determinant of behavioural intention of users towards a technology usage for the long-term use (Venkatesh et al., 2012; Ting & Yanhong, 2012; Keong et al., 2012; Wang & Shih, 2008; Tao, 2008; Al-Gahtani et al., 2007; Wu et al., 2007; Wang & Yang, 2005). Hence, performance expectancy helps in adding value to the model of continuous usage of broadband technology among youth in the rural areas of Malaysia.

Many studies have emphasised that performance expectancy is gender bias towards determining behavioural intention, which determines success of technology towards the long-term use (Wang & Shih, 2008; Al-Gahtani et al., 2007). Thus, Venkatesh et al. (2003) argued that effect of male is stronger than female on the relationship between performance expectancy and behavioural intention of users of technology. The study of Marchewka et al. (2007) added that male users of computers or technological devices feel more easily than female users which lead to the positive behavioural intentions.

Indeed, the argument of stronger effect of male users of technology than the female users on the relationship between performance expectancy and behavioural intention is supported by many researchers (Niexi & and Guifeng, 2011; Suha & Anne, 2008; Dong et al., 2008). Besides that, experience in Venkatesh model was changed to broadband experience in this study so as to be in line with the study's objectives. Hence, previous studies uphold the fact that high experience users of technology have stronger effect than low experience user on the relationship between performance expectancy and behavioural intention (Venkatesh et al., 2011; Suha & Anne, 2008; Castaneda et al., 2007).

Lastly, the measurement of performance expectancy in this study was modified in order to conform to some studies that have used the construct. Thus, performance expectancy was measured with five questions that focus on academic fulfilment that were adapted from Venkatesh et al. (2003). (1) Using broadband enhances my academic performance, (2) Using broadband internet services helps achieving academic activities more quickly, (3) Using broadband facilitates academic efficiency, (4) Usage of broadband would make it easier to do my work, (5) My frequent use of broadband would earn me competency in my work.

3.4.1.2 Effort Expectancy

Effort expectancy is the degree of ease associated with consumers' use of technology (Venkatesh et al., 2012). Effort expectancy has its theoretical basis from three different constructs in different models, which are Perceived Ease of Use (TAM1/ TAM2), Complexity (MPCU) and Ease of Use (DOI) (Venkatesh et al., 2003). Thus, many researchers that have argued that effort expectancy construct some models has direct relationship with behavioural intention of users of technology especially for the long-term usage (Lm et al., 2011; Niexi & Guifeng, 2011; Wang et al., 2009; Suha & Anne, 2008; Park, et al., 2007; Wang et al., 2006). Moreover, previous studies have emphasised that the relationship between effort expectancy and behavioural intention of users of technology is moderated by gender, such that the effect is stronger in female than male (Rajapakse, 2011; Suha & Anne, 2008; Venkatesh et al., 2003; Venkatesh et al., 2000).

In fact, the experienced users of technology are found to be moderated the relationship between effort expectancy and behavioural intention, such that the effect is stronger in highly experienced users than the low experienced users of technology (Venkatesh et al., 2011; Suha & Anne, 2008). However, Marchewka et al. (2007) argued that there is relationship between effort expectancy and behavioural intention, such that the effect decreases as the users gain more experiences of using the software. In the context of this research, effort expectancy was measured by five questions which were adapted from previous studies. (1) My interaction with the broadband device would be clear and understandable, (2) I found that broadband devices are easy to operate, (3) I found broadband internet services easy to use, (4) I found using facilities in broadband to be flexible, (5) It would be easier for me to become skilful at using broadband internet services.

3.4.1.3 Social Influence

Social influence is the extent to which a user or technology perceives that important people believes that he or she should use a particular technology (Venkatesh et al., 2012). Venkatesh et al. (2003) argued that social influence is postulated from three constructs that have their theoretical basis from six different models. Thus, the models are Social Factors (MPCU), Subjective Norm (TRA, TAM2, TPB and C-TAM-TPB) and Image (DOI). Moreover, researchers have emphasised that social influence serves as basis for individual intention to use new technology, such as broadband technology in the rural areas (Keong et al., 2012; Schaupp et al., 2010; Lee, 2009; Venkatesh et al., 2003). On the other hand, a highly experienced user of technology has more effect on the relationship between social influence and behavioural intention of users of technology (Keong et al., 2012; Schaupp et al., 2010).

Besides that, previous studies have revealed that effect of female is stronger than male on the relationship between social influence and the behavioural intention of users of technology (Keong et al., 2012; Suha & Anne, 2008; Venkatesh & Morris, 2000). Thus, social influenced was measured in this study with five questions adapted from previous studies. (1) Important people in my village think I should use broadband, (2) People who are important to me would want me to use broadband, (3) People that use broadband in my village are more prestige, (4) I would use the broadband internet if my friends use it (5) My village has supported the use of broadband.

3.4.1.4 Compatibility

Moore and Benbasat (1991) described compatibility as the extent to which an innovation is viewed as being consistent with existing values, needs and experiences of future users. Moreover, Rogers (1995) defined compatibility as the degree to which an innovation is perceived to be consistent with the current values, past experiences and needs of the potential adopters. Based on the mobile commerce perspective, Rogers (2003) defined compatibility as the degree by which individual that participated in online transactions via mobile commerce is perceived as being consistent with the potential user's existing values, beliefs, initial knowledge and current needs. Therefore, compatibility of new technology or innovation is bound to affect user's behavioural intention due to the retention of content of the technology (Wu & Wang, 2005; Rogers, 1995), which is not different from the usage of broadband technology among the rural dwellers.

In addition, Karahanna et al. (2006) present compatibility as perceived process of acquiring knowledge between an innovation and antecedent techniques for accomplishing tasks. Thus, compatibility scale items does focuses on work style on the believe having on the past experiences (Moore & Benbasat, 1991). Researchers have progressively focused on the dimension of compatibility that similar to current work style (Slyke et al., 2008, Karahanna, 2006). Besides, contribution by Karahanna et al. (2006) shows that compatibility scales comprises of multiple dimensions which are compatibility with work processes, compatibility with work style, compatibility with values and compatibility with prior experiences.

In other words, Wu and Wang (2005) argue that compatibility is the most important determinant of the behavioural intention to use a technology after the initial use. Hence, previous studies have empirically revealed that there is relationship between the compatibility and behavioural intention to use a technology (Amitabh et al., 2009; Suha & Anne, 2008; Lin, 2007; Hung et al., 2006; Hsu et al., 2006; Chen et al., 2002; Agarwal & Prasad, 2000). Thus, compatibility of broadband technology would enhance behavioural intention of user towards the long-term use in the rual areas. Moreover, compatibility was measured with four question in this study: (1) Using broadband is compatible with my work and life, (2) Using broadband fits with the way I like to work, (3) Using the broadband fits into my work style, (4) Using a broadband is completely compatible with my current situation.

3.4.1.5 Facilitating Condition

Facilitating condition is defined as the degree at which a user believes that an organisational and technical infrastructure exist to support the use of technology (Venkatesh et al., 2011). In fact, facilitating condition construct is derived from the integration of four different theories or models by Venkatesh et al. (2003). The models and theories are Perceived Behavioural Control from TPB/ DTPB, C-TAM-TPB and the initial facilitating condition from MPCU by Thompson et al. (1991). Hence, facilitating condition has been established by previous studies to affect the frequent use of technology (Bostjan et al., 2010; Suha & Anne, 2008; Wang et al., 2006).

Besides that, the relationship between the facilitating condition and frequent use of technology is found moderated by the experience of users, such that the effect is stronger in highly experienced users of technology than low experienced users (Lily et al., 2011). Conclusively, facilitating condition was measured by five questions adapted from the previous researcher; (1) I have the resources to use broadband at my village, (2) I have the knowledge to use broadband, (3) Given the specific instruction, it would be easier for me to use broadband, (4) A technical person is available to support in case of difficulty in using broadband service in my village, (5) Adequate ICT facilities are available at my village to access broadband internet services.

3.4.1.6 Service Quality

Service quality was initially incorporated into the IS success model of Delone and McLean to measure perceptions of users towards acceptance and adoption of technology (DeLone & McLean, 2003; Parasuraman et al. 1991; Parasuraman et al. 1988). Thus, service quality has been argued to be helpful in developing the system and evaluate the roles of technology in order to facilitate end users (Rosemann & Vessey, 2005; McCalla & Ezingeard, 2005). Previous researchers have described service quality of technology as the user’s judgement on the overall experience or knowledge shared on the used technology which could lead to their continuation or discontinuation (Hishamuddin, 2008; Yang et al., 2005; Parasuraman et al., 2005; Zammuto et al. 1996).

Furthermore, service quality has been viewed as the differences between the user's expectation and performance of actual service delivered by the technology (Usha et al., 2010). Meanwhile, Parasuraman et al. (1988) emphasised that there are five main dimension of service quality that need to be mastered by the users of a technological devices; reliability, responsiveness, assurance, empathy and tangibility. Reliability of technology is the ability to provide the service to the users accurately, while responsiveness of the technology is the willingness to produce prompt services to the users. Indeed, assurance is the ability of user to have trust and confidence in the available technology based on the derived perceived knowledge. Besides, empathy is described as care and attention derived from the use of technology and tangibility is the physical presence and evidence of the technology. Hence, reliability, responsiveness together with assurance of technological devices show dimensional attributes towards user satisfaction (Usha et al., 2010).

In addition, the investigation of service quality in IS research is becoming increasing as a result of the constant reaction of quality of service that could be derived by the users from the technology in use (McKnight & Leida, 1998). Meanwhile, service quality has been the contemporary issue in the technological based broadband networks while using internet protocol (IP) telephony (Foo & Cheung Hiu, 1998). Therefore, Dwivedi et al. (2010) argued that service quality plays a paramount role in determining consumer readiness or satisfaction to remain with the technology under use. Pursuing this further, researchers have revealed that there is positive relationship between service quality and satisfaction of users of technological devices (Park et al., 2010; Limayem & Cheung, 2008; DeLone & Mclean, 1992, 2003).

Conclusively, information relating to experience derived by the users of product or technology impacts the outcome after usage (Burnham et al., 2003). Therefore, researchers have established that there is relationship between service quality and the user satisfaction, such that the effect is stronger in highly experienced users than the low experience users (Park et al., 2010; Hoffman & Novak, 1996). Consequently, service quality was measured by using seven questions which were adapted from the previous studies; (1) Broadband is readily available in my village, (2) The broadband technical support is very efficient, (3) I enjoy customer satisfaction from the provider of my broadband, (4) I am satisfied with the speed of internet access obtained from my broadband, (5) The security measures are provided with internet services obtained from my broadband, (6) The broadband service is very reliable, and (7) The overall service quality of the internet connection of my broadband is satisfactory.

3.4.2 Dependent Variables

3.4.2.1 User Behavioural Intention

Behavioural intention is the strength of user's intention to perform a specified behaviour (Davis et al., 1989). Previous studies have revealed that behavioural intention construct was derived from the Theory of Reasoned Action (TRA) by Fishbein and Ajzen (1975). Behavioural intention construct have found introduced into IS research in both acceptance and use of technology (Rajapakse, 2011; Lm et al., 2011; Wang et al., 2009; Wang et al., 2006; Davis, 1986). Thus, behavioural intention construct was revealed as an important construct among IS researchers due to the roles it plays in post adoption and acceptance of technology (Abdulwahab & Zulkhairi, 2011; Rajapakse, 2011; Lm et al., 2011, Suha & Anne, 2008; Jackson & Leitch, 1997). The related argument buttresses that behavioural intention has direct relationship on the individual level of technology usage (Lm et al., 2011). This shows that user behavioural intention mediates the relationships between the independent variables and the broadband continuous usage in the context of this study.

Conclusively, many researchers have established that behavioural intention of users of technology influences the use behaviour which could be synonymous to continuous usage (Shin et al., 2009; Limayem & Cheung, 2008; Wang & Shih, 2008; Al-Gahtani et al., 2007; Davis & Venkatesh, 2004). Hence, the user behavioural intention was measured in this study through the adaption of four questions from previous study by Venkatesh et al. (2003). The questions are (1) I believe that everyone in my village should use ICT facilities in broadband in the future; (2) I perceive using broadband as voluntary, (3) I intend to continue my current subscription of my broadband and (4) I intend to continue the usage of broadband internet service in the future.

3.4.2.2 User Satisfaction

The users are viewed as the central part of information system, thus they are the determinant of both satisfaction and dissatisfaction of technology which could suggest the onward usage (Usha, et al., 2010; Lee et al., 2006). Researchers have cleared the distinction between use and satisfaction that use is voluntary in the case of enforcing policy or rules, but satisfaction is the substitute of efficiency and success (Kari et al., 2006; Igbaria & Tan, 1997; Ives et al., 1983). Thus, user satisfaction can be described as means of measuring information system success (Kari et al., 2006). Moreover, previous studies have emphasised that service quality is a determinant factor of user satisfaction which thereafter affect continuous usage of technology or devices (Cho et al., 2009; McKinney et al., 2002).

In the light of this, Liao et al. (2009) stressed that user satisfaction is the prime motivator that determines individual intention to continue usage of technology. Hence, user satisfaction construct was measured with five questions adapted for the benefit of this study from the previous studies by (Park et al. (2010), Ham et al. (2010) and Park et al. (2009). The questions are (1) I feel happy about my experience with the broadband usage, (2) I feel fulfilled about my overall experience with broadband usage, (3) I feel pleased about the usage of broadband internet services, (4) I feel contended with the usage of broadband internet services, and (5) I feel satisfied about my overall experience with broadband services.

3.4.2.3 Broadband Continuous Usage

The continuous usage of technology is defined as the long-term usage of innovation on a regular or ad hoc basis (Cho et al., 2009; Premkumar & Bhattacherjee, 2008; Bhattacherjee, 2001). In order word, continuation of usage of technology by consumers creates survival for the service technology and revenue for the firms (Bhattacherjee, 2001a). Eriksson and Nilsson (2007) argued that continuous usage of technology may be triggered by the acceptance and user satisfaction towards service delivery. Moreover, the TRA identifies a link with emergence of behavioural intention and behavioural expectation as intermediaries between attitude and behaviour of users (Warshaw & Davis, 2001; Leone et al., 1990; Ajzen & Fishbein, 1980). Besides that, satisfaction of buyers from the already used device is seen as determinant of continuation of using a technology (Pare et al., 2005; Gianni & Franceschini, 2003).

The study of Cho and Park (2001) added that buyer's level of satisfaction is believed to affect their purchasing behaviour. Indeed, Bhattacherjee (2001b) stressed that the success of online community relies on its continuous usage rather than the initial adoption. However, a related study revealed that many online communities fails due to the behaviour of the users towards its continuous usage and that knowledge sharing continuous usage is still at the infancy stage, causing dissatisfaction (He & Wei, 2009; Cheung & Lee, 2007; Sangwan, 2005). Hence, broadband continuous usage was measured by using seven adapted questions , such as (1) I access e-government services by using broadband, (2) Using broadband assists in accessing entertainment activities, (3) Using broadband enhances my social and personal activities in online and (4) Using broadband enhances my information seeking. Others are (5) Broadband usage increases my level of information producing, (6) Using broadband helps my communication with people in a distance location, and (7) My usage of broadband will be perpetual.

Finally, Tables 3.3 summarises the factors used in the research model with their corresponding operational definitions. Besides, the variables used in the research model in Figure 3.3 are categorised into independent variable, dependent variable and moderating variable. Thus, Table 3.3 depicts the codes and description of all the factors used in this study as the determinant factors for continuous usage of broadband technology among youth in the rural areas. Indeed, Table 3.4 contains measurement items used to measure all the variables.

Table 3.3: Summary of Factors Used in the Research Model

Sources	Variables	Definitions
Venkatesh et al. (2012).	Performance Expectancy	The degree in which individual in the rural areas believes that using a broadband will give benefits in performing some activities.
Venkatesh et al. (2012).	Effort Expectancy	The degree of ease associated with consumers' use of broadband in the rural areas.
Venkatesh et al. (2012).	Social Influence	The extent to which a user believes that important people believe that he or she should use a broadband in their rural areas.
Rogers (1995), Moore and Benbasat (1991).	Compatibility	The extent to which a broadband is viewed as being consistent with existing values, needs and experiences of future users.
Venkatesh et al. (2011).	Facilitating Condition	The degree at which a user believes that there are technical and infrastructure supports to use broadband in the rural areas.
Parasuraman et al. (2005), Yang et al. (2005), Hishamuddin (2008).	Service Quality	The user's judgement on the overall experience or knowledge shared on the broadband used in the rural areas.
Davis et al. (1989).	User Behavioural Intention	The measure of strength of user's intention to perform a specific behaviour.
Park et al. (2009), Kari et al. (2006).	User Satisfaction	User satisfaction is the means of measuring success of broadband in the rural areas.
Cho et al. (2009), Premkumar and Bhattacherjee (2008), Bhattacherjee (2001).	Broadband Continuous Usage	The long-term usage of broadband on a regular basis in the rural areas.

Table 3.4: Codes and Description of All the Variables

Factors and Sources	Codes	Variables Description
Broadband Continuous Usage (Eriksson & Nilsson, 2007; Chiu & Wang, 2008)	BCU-1	I access e-government services by using broadband
	BCU-2	Using broadband assists in accessing entertainment activities
	BCU-3	Using broadband enhances my social and personal activities in online
	BCU-4	Using broadband enhances my information seeking
	BCU-5	Broadband usage increases my level of information producing
	BCU-6	Using broadband helps my communication with people in a distance location
	BCU-7	My usage of broadband will be perpetual
Performance Expectancy (Venkatesh et al., 2003)	PE-1	Using broadband enhances my academic performance
	PE-2	Using broadband internet services helps achieving academic activities more quickly
	PE-3	Using broadband facilitates academic efficiency
	PE-4	Usage of broadband would make it easier to do my work
	PE-5	My frequent use of broadband would earn me competency in my work
Effort Expectancy (Venkatesh et al., 2003)	EE-1	My interaction with the broadband device would be clear and understandable
	EE-2	I found that broadband devices are easy to operate
	EE-3	I found broadband internet services easy to use
	EE-4	I found using facilities in broadband to be flexible
	EE-5	It would be easier for me to become skilful at using broadband internet services
Social Influence (Venkatesh et al., 2003)	SI-1	Important people in my village think I should use broadband
	SI-2	People who are important to me would want me to use broadband
	SI-3	People that use broadband in my village are more prestige
	SI-4	I would use the broadband internet if my friends use it
	SI-5	My village has supported the use of broadband

Table 3.4 Continued

Compatibility (Rogers, 2003; Moore & Benbasat, 1991)	CP-1	Using broadband is compatible with my work and life
	CP-2	Using broadband fits with the way I like to work
	CP-3	Using the broadband fits into my work style
	CP-4	Using a broadband is completely compatible with my current situation
Facilitating Condition (Venkatesh et al., 2003)	FC-1	I have the resources to use broadband at my village
	FC-2	I have the knowledge to use broadband
	FC-3	Given the specific instruction, it would be easier for me to use broadband
	FC-4	A technical person is available to support in case of difficulty in using broadband service in my village
	FC-5	Adequate ICT facilities are available at my village to access broadband internet services
Service Quality (Park et al., 2010; Dwivedi et al., 2010; Dwivedi et al., 2006)	SQ-1	Broadband is readily available in my village
	SQ-2	The broadband technical support is very efficient
	SQ-3	I enjoy customer satisfaction from the provider of my broadband
	SQ-4	I am satisfied with the speed of internet access obtained from my broadband
	SQ-5	The security measures are provided with internet services obtained from my broadband
	SQ-6	The broadband service is very reliable
	SQ-7	The overall service quality of the internet connection of my broadband is satisfactory
User Behavioural Intention (Venkatesh et al., 2003)	UBI-1	I believe that everyone in my village should use ICT facilities in broadband in the future
	UBI-2	I perceive using broadband as voluntary
	UBI-3	I intend to continue my current subscription of my broadband
	UBI-4	I intend to continue the usage of broadband internet service in the future

Table 3.4 Continued

User Satisfaction (Park et al., 2009; Kari et al., 2006)	US-1	I feel happy about my experience with the broadband usage
	US-2	I feel fulfilled about my overall experience with broadband usage
	US-3	I feel pleased about the usage of broadband internet services
	US-4	I feel contended with the usage of broadband internet services
	US-5	I feel satisfied about my overall experience with broadband services

3.5 Research Hypothesis

From the research model in Figure 3.3, the User Behavioural Intention (UBI), Facilitating Condition (FC) and User Satisfaction (US) are the determinants of Broadband Continuous Usage (BCU). Thus, the relationship between Facilitating Condition (FC) and Broadband Continuous Usage is established to be moderated by the broadband experience as suggested by the researcher Lily et al. (2011). Moreover, the independent variables Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI) and Compatibility (CP) are the determinants of User Behavioural Intention (UBI). Besides that, Service Quality (SQ) as one of the independent variables determines User Satisfaction (US).

Additionally, this study hypothesised that the relationships between the determinants of user behavioural intention (performance expectancy, effort expectancy and social influence) are moderated by gender and broadband experience as suggested by some researchers (Keong et al., 2012; Schaupp et al., 2010; Wang & Shih, 2008; Suha & Anne, 2008; Al-Gahtani et al., 2007; Castaneda et al., 2007). On the other hand, the determinant of user satisfaction (service quality) is moderated by the broadband experience (Park et al., 2010; Hoffman & Novak, 1996). Therefore, this study proposed hypotheses $\mathbf{H_1}$-$\mathbf{H_8}$ as the main hypotheses and the $\mathbf{H_9}$-$\mathbf{H_{13}}$ as the mediating variable hypotheses. Consequently, $\mathbf{H_{14}}$-$\mathbf{H_{20}}$ was proposed as the moderating variable hypotheses. The null hypothesis $\mathbf{H_0}$ is returned when there is no significant relationship between the hypotheses; otherwise, the hypotheses remain valid.

3.5.1 Main Hypotheses

The main hypotheses in this study are formulated based on the suggestions of previous researchers as discussed in section 3.4 as follows and summarised in Table 3.5:

H_1: Performance Expectancy has a significance influence on User Behavioural Intention among youth in the rural areas.

H_2: Effort Expectancy has a significance influence on User Behavioural Intention among youth in the rural areas.

H_3: Social Influence has a significance influence on User Behavioural Intention among youth in the rural areas.

H_4: Compatibility has a significance influence on User Behavioural Intention among youth in the rural areas.

H_5: Facilitating Condition has a significance influence on Broadband Continuous Usage among youth in the rural areas.

H_6: Service Quality has a significance influence on User Satisfaction among youth in the rural areas.

H_7: User Satisfaction has a significance influence on Broadband Continuous Usage among youth in the rural areas.

H_8: User Behavioural Intention has a significance influence on Broadband Continuous Usage among youth in the rural areas.

Table 3.5: Research Hypotheses between Independent and Dependent Variables

Codes	**Description of Hypotheses**	**Independent Variables**	**Dependent Variables**
H_1	PE significantly influence UBI in the rural areas	PE	UBI
H_2	EE significantly influence UBI in the rural areas	EE	UBI
H_3	SI significantly influence UBI in the rural areas	SI	UBI
H_4	CP significantly influence UBI in the rural areas	CP	UBI
H_5	FC significantly influence BCU in the rural areas	FC	BCU
H_6	SQ significantly influence US in the rural areas	SQ	US
H_7	US significantly influence BCU in the rural areas	US	BCU
H_8	UBI significantly influence BCU in the rural areas	UBI	BCU

3.5.2 Hypotheses for Mediating Variables

The hypotheses for mediating variables are formulated based on the recommendations of some researchers as discussed in section 3.4 as follows and summarised in Table 3.6:

H_9: User Behavioural Intention mediates the relationship between Performance Expectancy and Broadband Continuous Usage among youth in the rural areas.

H_{10}: User Behavioural Intention mediates the relationship between Effort Expectancy and Broadband Continuous Usage among youth in the rural areas.

H_{11}: User Behavioural Intention mediates the relationship between Social Influence and Broadband Continuous Usage among youth in the rural areas.

H_{12}: User Behavioural Intention mediates the relationship between Compatibility and Broadband Continuous Usage among youth in the rural areas.

H_{13}: User Satisfaction mediates the relationship between Service Quality and Broadband Continuous Usage among youth in the rural areas.

Table 3.6: Research Hypotheses among the Mediating Variables

Codes	**Description of Hypotheses**	**Independent Variables**	**Dependent Variables**
H_9	UBI mediates the relationship between PE and BCU	PE	BCU
H_{10}	UBI mediates the relationship between EE and BCU	EE	BCU
H_{11}	UBI mediates the relationship between SI and BCU	SI	BCU
H_{12}	UBI mediates the relationship between CP and BCU	CP	BCU
H_{13}	US mediates the relationship between SQ and BCU	SQ	BCU

3.5.3 Hypotheses for Moderating Variables

The hypotheses for moderating variables are formulated based on the suggestions of previous studies as discussed in section 3.4 as follows and summarised in Table 3.7:

H_{14}: Performance Expectancy influences User Behavioural Intention in the rural areas, such that the effect is stronger in male than female.

H_{15}: Effort Expectancy influences User Behavioural Intention in the rural areas, such that the effect is stronger in female than male.

H_{16}: Social Influence influences User Behavioural Intention in the rural areas, such that the effect is stronger in female than male.

H_{17}: Effort Expectancy influences User Behavioural Intention in the rural areas, such that the effect is stronger in high experienced user than low experienced user.

H_{18}: Social Influence influences User Behavioural Intention in the rural areas, such that the effect is stronger in high experienced user than low experienced user.

H_{19}: Facilitating Condition influences Broadband Continuous Usage in the rural areas, such that the effect is stronger in high experienced user than low experience user.

H_{20}: Service Quality influences User Satisfaction in the rural areas, such that the effect is stronger in high experienced user than low experienced user.

Table 3.7: Research Hypotheses among the Moderating Variables

		Gender		**Broadband Experience**	
Codes	**Hypotheses**	**M**	**F**	**H**	**L**
H_{14}	PE influences UBI towards BCU in the rural areas	√			
H_{15}	EE influences UBI towards BCU in the rural areas		√		
H_{16}	SI influences UBI towards BCU in the rural areas		√		
H_{17}	EE influences UBI towards BCU in the rural areas			√	
H_{18}	SI influences UBI towards BCU in the rural areas			√	
H_{19}	FC influences BCU in the rural areas			√	
H_{20}	SQ influences US towards BCU in the rural areas			√	

3.6 Summary

This chapter argued the need for using IS continuance post acceptance and UTAUT models as theoretical framework in this study. Besides, the chapter further argued reasons for inclusion of service quality and compatibility constructs in the research model, towards continuous usage of broadband technology among youth in the rural areas. Moreover, each of the eleven components in the research model was discussed to ascertain their relation upon which 20 direct and indirect relationships were hypotheses. The hypotheses established the relationship between the contributing factors for continuous usage of broadband technology among youth in the rural areas of Malaysia. Indeed, the effect of age and experience of broadband technology users were tested among the 20 hypotheses. Hence, next to this chapter is chapter four which extensively discussed the methodology that was adapted to answer the research questions.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.0 Introduction

This chapter discuses detailed research methods used in this study which include research process, research design, research approach and sampling methods that deals with sampling frame, population and sample size. It also involves questionnaire design and validation with pilot test. The chapter discusses sample of study and data collection technique together with process of data analysis using Statistical Package for Social Science (SPSS) version 20 and Partial Least Square of Structural Equation Modelling (PLS-SEM) version 2.0.

4.1 Research Process

The research process is the number of phases that represent the entire activities in the research (Sekaran & Roger, 2011; Sekaran, 2000). In this study, there are three phases of the major activities as shown in Figure 4.1. Phase one of the study involves analysis of literatures and preliminary data gathering that were used to formulate research problem which was done through analysis of literature review. Besides that, the Malaysia Ministry of Information, Communication and Culture (KPKK) which is the authority in charge of PID in Malaysia was contacted for approval to use the Pusat Info Desa in Kedah, Perlis, Pulau Penang and Northern Perak states as the distribution and collation of the instrument for data collection from the respondents (Secondary School Students). Indeed, the PIDs locations and managers were visited for proper notification about using their centres.

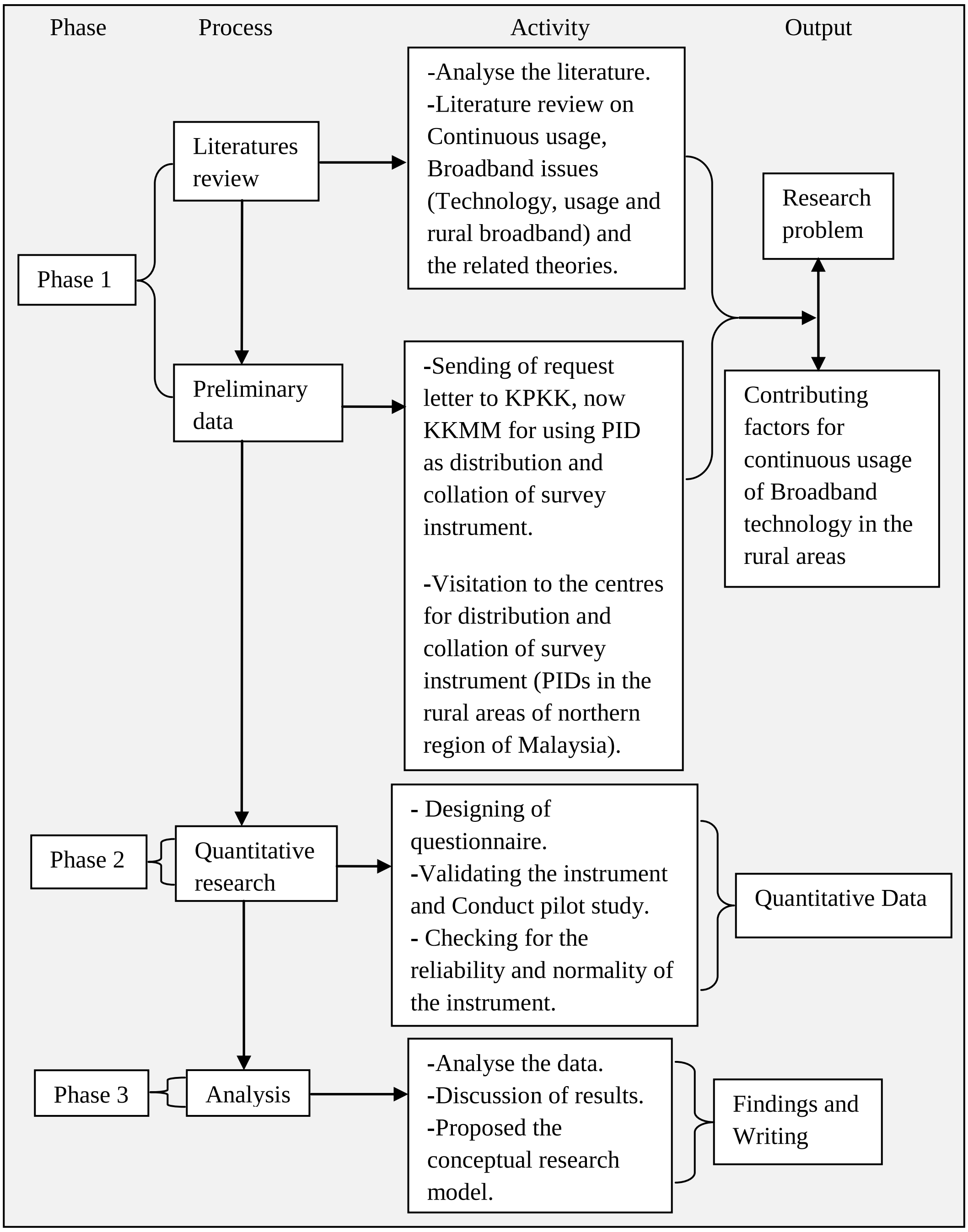


Figure 4.1: Overall Research Process

Furthermore, phase two of the study contains quantitative research activities with the aim to determine the contributing factors for continuous usage of broadband technology in the rural areas of Malaysia. It involves some activities like designing and development of survey instrument, validation of instrument, pilot study and field study. Moreover, Phase three is the analysis stage that produces findings and results. This was achieved by analyzing the gathered data from the respondents, discussion of results and presentation of final revised research model.

4.1.1 Research Approach

Research approach or research strategy presents the pattern of assumptions, ideas and techniques that characterize quantitative and qualitative research (Bryman & Bell, 2007). The deductive reasoning is a set of techniques for applying testable theories in the real world in order to assess their validity, however, inductive reasoning is a process of reasoning in which the premises of an argument are believed to support the conclusion but do not ensure it (Lancaster, 2005). In other words, inductive reasoning tends researchers to observe certain phenomena and arrive at conclusions by logically establish a general proposition based on observed phenomena (Sekaran, 2003).

According to Sekaran and Roger (2011), deductive reasoning starts with a general theory and applied to a specific case under study. Thus, this study is deductive in nature because it is hypothesis testing that intends to use and test both IS continuance post acceptance and UTAUT models in determining the contributing factors for continuous usage of broadband technology among youth in the rural areas of Malaysia and the relationship between the determinants constructs.

4.1.2 Research Design

Bryman and Bell (2007) stressed that research design guides and provides a framework for the collection and analysis of data through the reflection of decisions about the priority being given to a range of dimensions of the research process. This is supported by the argument of Churchill et al. (2010) that research design should be viewed as the framework or study plan that can be used as a guide in collecting and analyzing data. Therefore, the research design is considered as the techniques for collecting data which involves specific instruments, such as self-completed questionnaires or structured interviews.

On the other hand, De Vaus (2001) argued that the prime function of a research design is to ensure that the obtained evidences enable the researcher to answer the initial or research question clearly. Indeed, Sekaran and Roger (2011) and Sekaran (2003) emphasised that research design involves a series of rational decision-making choices on the purpose of the study (exploratory, descriptive, hypothesis testing), its location (the study setting), the type of investigation, the extent of researcher interference, time horizon and the level to which the data would be analyzed (unit of analysis). Moreover, the decisions have to be made regarding the sampling design, how data is to be collected (data collection methods), how variables would be measured and analyzed to test the hypotheses (data analysis). Besides that, Sekaran (2003) argued that methods are part of the design which is in accordance with stand of Bryman and Bell (2007) that methods are responsible to describe data collection. Therefore, this study is conducted to test the derived hypotheses from the conceptual research model towards determining the contributing factors for continuous usage of broadband technology among youth in the rural areas of Malaysia.

Admittedly, hypotheses testing tend to explain the nature of certain relationships or establish the differences among groups of two or more factors in a situation and add more focus to the understudying research (Ranjit, 2011). This implies that hypotheses testing offer an enhanced understanding of the relationships that exist among variables (Sekaran, 2003). Base on that, the researcher uses correlation study to depict the contributing factors that are associated with the research objectives continuous usage of broadband technology among youth in the rural areas of Malaysia. In other words, correlation study is described as the study that has to do with identification of the important factors that are related to the existing problems and objectives (Sekaran & Roger, 2011) and discovery of relationship between two or more aspects of a situation (Rangit, 2011). Hence, this study was conducted in a non-constrained setting by using minimal interference of researcher in the field study while considering the terms of settings.

Furthermore, the study's horizon refers to conducting a longitudinal or cross-sectional study (Sekaran & Roger, 2011). A cross-sectional which is also called one-shot study is done when data is gathered just once over a period of time such as days, weeks, or months in order to answer a research question. However, collection of data at more than one point in time is considered as longitudinal study (Sekaran & Roger, 2011; Rangit, 2011; Creswell, 2003). Longitudinal study is found of taking more time, effort driven and cost more than cross-sectional study (Sekaran & Roger, 2011) which can serve as constraints in achieving the set objectives and thus cannot be adopted in this study. In fact, longitudinal study possesses attribute of suffering from conditioning effect as the respondents may lose interest in the data collection exercise since they have been met in the past (Ranjit, 2011). Conclusively, the researcher found cross-sectional study useful for this study because it contains only one contact with the study population and comparatively cheap to undertake and easy to analyse (Ranjit, 2011; Creswell, 2009).

4.2 Sampling Method

Ranjit (2011) described sampling in research method as the process of selecting a few (a sample) from a bigger group (sampling population) to become the basis for estimating or predicting the prevalence of an unknown piece of information, situation or outcome regarding the bigger group. In other words, sampling in research is argued as the selection of units from the total population to be studied (Sherill, 2011; Lynn & Ronald, 2010) and pictorially shown in Figure 4.2. Moreover, Christine (2010) categorised sampling method into probability and non-probability. Probability sampling method gives equal chances of being selected to every member of the population understudy, while non-probability allows the researcher to hand-pick the suitable respondents based on the nature of problem understudy. Thus, this study uses probability sampling method approach in selecting the sample while collecting the data due to the non-biased of the approach.

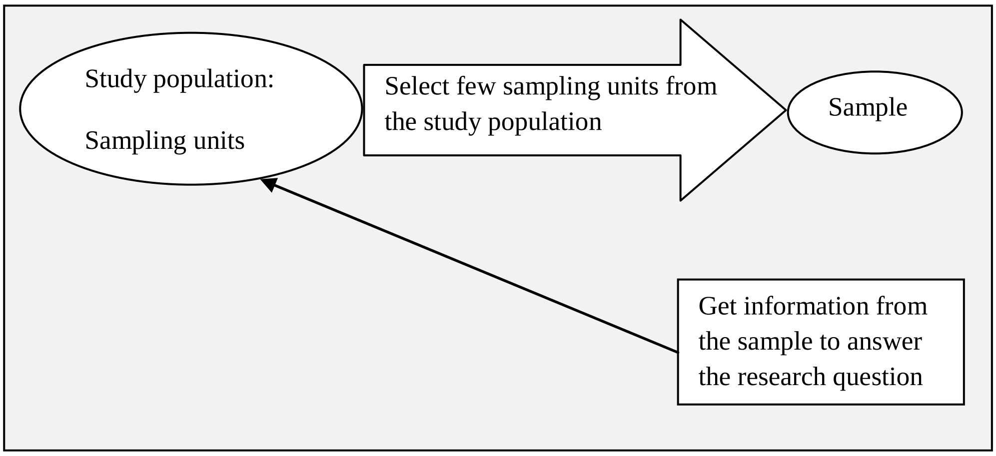


Figure 4.2: The Concept of Sampling (Source: Ranjit, 2011)

4.2.1 Sampling Technique

Previous researchers have emphasised that sampling technique in quantitative research could be categorised into random sampling and non-random sampling (Ranjit, 2011; Creswel, 2009). Random sampling is referred to as probability sampling where every element of the population has equal and independent chances of being selected for the study (Sekaran & Roger, 2011; Ranjit, 2011; Jeff, 2007). Many studies have argued that random sampling is useful while conducting an investigation about theory testing as well as formulation due to the non-inductive of result of a unit on the other (Wicander et al., 2010; Wilson, 2010; Whitacre et al., 2009). This implies that selection or rejection of an element of the population does not affect other elements in the same population. However, non-random sampling is used in the population where the exact number of population is unknown and the selection of one element depends on the consideration of others (Ranjit, 2011; Zoltan & Tatsuya, 2010). Therefore, random sampling technique is appropriate in this study as the total number of the population is known.

Furthermore, random sampling comprises of simple random sampling, stratified sampling and cluster sampling, where they all provide independent of selection to every member of the population (Cox et al., 2011; Sekaran & Roger, 2011; Cooper & Schindler, 2003). However, there some difference between the techniques of sampling in the random sampling base on their logic, accuracy, cost and time (Sekaran & Roger, 2011; Cooper & Schindler, 2003). Both stratified and cluster samplings are tantamount to the accuracy of strong correlation of characteristics of the population and large volume of population (Sekaran & Roger, 2011; Cooper & Schindler, 2003). Indeed, stratified and cluster samplings have been argued to be attributed with geographical proximity, time consuming and non-cost effective and thus, do not fit for this study (Ranjit, 2011; Zoltan & Tatsuya, 2010; Cooper & Schindler, 2003). Therefore, this study uses simple random sampling in choosing the participants (secondary school students) due to its simplicity and cost effective (Ranjit, 2011; Creswell, 2009) for the data collection in the rural areas of Malaysia.

The simple random sampling is best chosen in this study because it gives every element of the population equal and independent chances of selection (Sekaran & Roger, 2011; Ranjit, 2011). This allows the respondents of the study who are youth with the same age group to provide their stand on the continuous usage of broadband technology in their village. Besides that, simple random sampling is chosen in this study since it allows the population sample to represent their entire population (Ranjit, 2011; Creswell, 2009) as youth (secondary school student) are found in all the rural areas of Malaysia. Moreover, it is commonly found of simple random sampling to be freed from classification error, easy to obtain a representative group and does not require detail knowledge of the population (Emily & Roger, 2011;

Roger & Joseph, 2011). Therefore, the respondents in this study are free of classification error that may have occurred if other sampling techniques have been adopted, such as stratified sampling and cluster sampling.

In addition, simple random sampling is used in this study due to its capability to be used for collecting data simultaneously for both training and assessment (Rusell & Gree, 2008; Ellison et al., 2009). Unlike the stratified and cluster samplings of random sampling that deals data collection from the small portion of the population for the sampling representation. Thus, due to the large number of broadband technology users in some rural areas of Malaysia, simple random sampling fits data collection technique in this study. Indeed, the studies of LaRose et al. (2011), Kok-Lim (2011), Chen (2011) stressed that the use of simple random sampling supersede cluster and stratified sampling approaches as its efficient for gathering data concurrently from samples within the populations in a separate ways.

4.2.2 Sampling Design

This study uses fishbowl draw as the sampling process in selecting the samples from the population for appropriate data collection. Ranjit (2011), Ellison (2009), Jeff (2007) argued that the fishbowl draw is the appropriate process in choosing the random sample, because it gives total freedom of selecting the participants especially when the total population is small. In choosing the samples in this study, some papers which are the exact number of target sample size were tagged “YES” while the remaining were tagged “NO” and then put in a bucket in order to allow the invited participants to the PIDs (secondary school students) to make a choice from the bucket. Hence, the participants that choose already tagged papers with "YES" were given the questionnaires to administer.

4.2.3 Sampling Frame

A sampling frame is argued as the lists of elements of population from which a sample is drawn which could be geographical areas, institutions, individual or other units (Michael & Earl, 2012; Earl, 2011; Churchill et al., 2010). The study of Martyn (2007), Herman et al. (2008), Pierre (2007) stressed that survey that deals with people or individual should be the various register of elements of the population, such as admission register of students, students' attendance list in the school and telephone directories. However, researchers have emphasised that a sampling frame may create bias in the research once it is not up-to-date and contain foreign elements that are not common to every member of the population (Herman et al., 2008; Pierre, 2007; Carl-Erik, 2003). This implies that a sampling frame must contain lists of elements that are unique to every members of the population.

In the context of this study, the secondary school students found useful for achieving the objectives of this study as they are the most common element found in the rural areas. Therefore, the list of the secondary schools in the rural areas of northern region of Malaysia was obtained from the office of the Northern Corridor Economic Region Research Unit (NCERRU) at Universiti Utara Malaysia. The NCERRU has the up-to-date lists and details of secondary schools in the northern region of Malaysia. Besides that, the sample frame was also obtained from the offices of the Jabatan Pendidikan Negeri Kedah, Perlis, Pulau Penang and Perak (Education Department in Kedah, Perlis, Pulau Penang and Perak States). This helped the researcher to identify the secondary schools and students in the respective rural areas.

4.2.4 Location of Sample

The respondents in this study (secondary school students) were invited to the 9 PIDs in northern region of Malaysia for data collection. The permission of Malaysian Ministry of Information, Communication and Culture (KPKK), now KKMM was sought and granted (shown in Appendix D) to use 9 PIDs in the northern region of Malaysia as distribution and collation of survey questionnaires. The PIDs were used in this study as the distribution and collation centre for the survey questionnaires due to the provision of public access it provides to the rural dwellers. The PIDs allow the rural dwellers to use computers and internet and relatively brings economic benefits and build social capital for the rural settlers in Malaysia (Marhaini, 2010; Wicander et al., 2010). Moreover, the research has shown that Malaysian government intends to set up 240 PIDs by the year 2010 for about 2.8 million members of the rural communities (Nor Iadah, Zahurin, Huda, Rafidah, & Wan, 2007). However, there are 42 PIDs throughout the 13 states in Malaysia, while only 9 PIDs are located in the northern region of Malaysia (Portal PID, 2012).

Furthermore, PID was first established in March 2000 with two centres: Ayer Tawar in Selangor and Kanowit in Sarawak (Nor Alias et al., 2010) and is one of the government's initiatives to bridge the rural-urban digital divide through free community-shared ICT facilities and internet access. Its creation is to provide IT skills training and knowledge acquisition programs to women, the elderly and youth and to produce entrepreneur in the rural communities (Nor Iadah et al., 2007).

Indeed, the creation of PID in Malaysia is expected to provide opportunity and empower the rural communities (KTAK, 2006). Hence, the use of PIDs as distribution and collation centre for the survey questionnaires assisted the researcher to meet the respondents that are truly residing in the rural areas.

4.2.5 Population and Sample Size

The population is defined as the individuals or objects that meet certain requirements for membership in the overall group (Churchill et al., 2010). Keller and Joseph (2009) emphasised that population is regarded as the entire set of observations under study. In other word, population can be described as the group of people or events in a geographical boundary and time that are interested to researcher for investigation (Sekaran & Rogger, 2011; Sekaran, 2000). A related description of population points that it is the set of units to be studied (Robert et al., 2011). Thus, this study uses secondary school students who are users of broadband and residing in the rural areas of northern region of Malaysia population and served as the unit of analysis.

Furthermore, secondary school students at the rural areas in the northern region of Malaysia are chosen as the population for this study because they are easily found at the grassroots level unlike other students (College and University) that are seasonal in the rural areas. In addition, Yang (2005) and Lightner et al. (2002) stressed that choosing of secondary school students as target group is suitable as they are reliable in the network or internet usage and exposed to the latest ICT. Therefore, it is emphasise that since fast internet (broadband) serves as learning tool and encourages academic activities, students are suitable to be used as target groups for data collection (Komerik, 2005).

Secondary school students in the rural areas are chosen as respondents in this study due to the availability of internet infrastructure that are available in their respective schools. Researchers have argued that whenever the rural folks especially students and youth have opportunity to the broadband facilities, they always maximise its usage (Nor Alias et al., 2010; Nor Iadah et al., 2007; Wee, 1999). In addition, Noce and McKeown (2008) argued further that provision of internet's infrastructure for youth would not only affect the usage but also ensure their performance in academics activities. Thus, all the secondary schools in the rural areas of northern region of Malaysia have ICT laboratory which allow students to have access to the information (Nor Alias et al., 2010; Nor Iadah et al., 2007). Hence, using secondary school students as the unit of analysis enhances achievement of the objectives of this study.

Additionally, previous studies have shown the use of internet services such as social media, online movies and accessing the solution for their academics tasks are common amongst the youth and secondary school students in both rural and urban areas over the other sects in the societies (Noce & McKeown, 2008; Ngcobo & Herselman, 2007; Wee, 1999). Though, the study of Wang et al. (2009) found disparity between the rate of using services from broadband between youth in urban and rural areas, however, the usage of the services derived from the broadband is higher while compare the youth with the industrial workers in the rural areas. Therefore, using secondary school students as respondents in this study helped the researcher towards achieving contributing factors for continuous usage of broadband among youth in the rural areas of Malaysia.

Moreover, the total number of 50 survey questionnaires was distributed to the invited secondary school students who are broadband users at each PID in the rural areas of northern region of Malaysia. In the long run, 450 participants as shown in Table 4.1 were given questionnaire throughout the 9 PIDs in the northern region of Malaysia which is in line with recommendation of Krejcie and Morgan (1970). The study of Krejcie and Morgan (1970) argued that a population size that is more than 1,000,000 should choose the sample size that is above 384. Therefore, from the statistics received from the NCERRU and the state educational departments showed that the population of secondary school students in the rural areas of northern region of Malaysia is above 1,000,000.

According Ooi et al. (2011), only 175 questionnaires were return from 350 participants that were employed in their study. On the other hand, Ensley et al. (2006) distributed 1,142 questionnaires to top officers of 164 firms in United State of America for measuring the factors that influence entrepreneur leadership's behaviour but only 258 responses were returned. Moreover, researchers have argued that there is need to obtain a minimum of 300 sample size if the rigorous analysis like factor analysis and multivariate analysis are to be performed (Dwivedi et al., 2010; Fowler, 2002; Stevens, 1996). In other words, researchers have argued further that the minimum sample size for the multivariate data analysis should be ten times of the largest number of structural paths directed to a particular latent construct (Hair et al., 2011a; Dwivedi et al., 2010; Fowler, 2002). Therefore, the sample size of 450 as chosen in this study satisfies the suggestions of previous researchers and not too voluminous.

Table 4.1: Research Survey Sample and Sample Size

Northern States of Malaysia	Location of Distribution & Collation of Questionnaires	Number of Distributed Questionnaire
Kedah	PID Bukit Kayu Hitam	50
	PID Yan (KETUA ZON)	50
	PID Kupang	50
	PID Kuala Nerang	50
Pulau Penang	PID Tasik Gelugor	50
	PID Balik Pulau	50
Perlis	PID Simpang Empat	50
Perak	PID Selama	50
	PID Kuala Kurau	50
	Total	**450**

4.3 Designing of Research Instrument

Researchers have stressed that designing of research instrument requires understanding of some underlying assumptions which help to formulate good questions that need to be answered by the participants (Daniel, 2012; David & Robert, 2007). Redesigning of research instrument for data collection is necessary in some cases that the previous and existing instruments are to be used in a scope that different from previous research (Leiyu, 2008). Besides that, Leiyu (2008) argued that the object of study, research concept and dimensions required proper understanding before designing of the research instrument. Therefore, the researcher bears the objectives of research together with their dimensions and the participants in mind while designing the research instrument for this study.

4.3.1 Survey Technique

The study uses survey technique for gathering data due to its ability to produce useful facts and figures answers to the research questions and serve as a research approach to collect, explore and give detail description of an existing phenomena (Jelke, 2009; Sekaran, 2000). Garson (2002) argued that survey is a method of gathering efficient data from respondents that represents a broad population by using certain instrument that composed of closed or open-ended items. According to Pricillia (2005), survey method is capable of obtaining information from both large and small sample of population as used in this study.

Moreover, Choudrie and Dwivedi (2005) emphasised that survey is the most appropriate research approach in quantitative research in order to achieve the research objectives in a social setting, such as household and community. Dwivedi et al. (2010) support usage of survey approach because it is easy to conduct, saves cost and time, and has high accessibility. In fact, researchers have shown that survey mode of data collection ranges between the use of internet and non-Internet (Ranjit, 2011; Sekaran, 2003). The non-internet types of surveys can be administered in a number of ways which are door-to-door surveys, ad hoc mail surveys and self administered questionnaires (Sekaran 2003). Each of these ways has its merits and demerits as described in Table 4.2.

Table 4.2: Merits and Demerits of Survey Types of Data Collection (Source: Sekaran, 2003)

Mode of data Collection	Merits	Demerits
Self Administered Questionnaires	i. Ability to create a close relationship and motivate respondent. ii. Doubts can be clarified. iii. Less expensive when administered to a group of respondents. iv. High response rate is assured with high anonymity.	i. Organizations may be reluctant to give researcher time for the survey with groups of employees assembled for the purpose.
Mail Questionnaires	i. Anonymity is high. ii. Wide geographical regions can be reached. iii. Respondents can take more time to respond based on their convenience. iv. Can be administered electronically if desired.	i. Response rate is almost always low. ii. A 30% rate is acceptable. It cannot clarify questions. iii. Follow-up procedures for non-response are necessary.
Electronic Questionnaires	i. Easy to administer. ii. It can move globally. iii. It is inexpensive and fast delivery. iv. Respondents can answer at their convenience time.	i. Computer literacy is a must. ii. Respondents must have access to the facility. iii. Respondents must be willing to complete the survey.

Based on the argument of Sekaran (2003), the researcher found self administered questionnaires appropriate for collecting data in this study due to its ability to motivate respondents and achieve high response rate. However, electronic questionnaires and mail questionnaires mode of survey were not used because of their low response rate attribute and they required availability of infrastructure in their domain.

4.3.2 Questionnaire Design

Venkatesh et al. (2003) stressed that the major data collection instrument is structured questionnaire. Thus, Sharma (2007) and Rajendra (2003) described a structured questionnaire as the list of questions to be presented to the respondents in a predetermined order which adds value to the reliability of the study by ensuring that every respondent is asked the same question. Moreover, Amin (2005) and Mugenda (2008) argued that structured questionnaire can be administered simultaneously by a large number of individual respondents and less expensive, less time consuming and required lesser skills. Therefore, the structured questionnaires used in this study comprised of adapted pre-formulated written set of statements.

In addition, the study uses a designed questionnaire that meets the set research objectives and guided by the adopted information system (IS) theories, the conceptual research model and the proposed hypotheses. The sources of the items to measure the constructs of the conceptual research model are shown in Table 4.3. Bhattacherjee (2001), Venkatesh et al. (2003), Parasuraman et al. (1985, 1988), Krieglmeyer et al. (2010) were used as the major sources of items for measuring some constructs in the research model of this study. Besides, some other sources that their items found useful for measuring the constructs were used in designing the questionnaires and shown in Table 4.3. Indeed, the designed questionnaire was used to measure the constructs in the research model. Consequently, the designed questionnaire contains introductive statement about the constructs of the conceptual research model which was revised and put in an appropriate way by the two academic supervisors and some experts in the field of study before the pilot study.

Table 4.3: Source of Items for Measuring the Constructs

s/n	Constructs	Sources of Measuring Items
i.	**Performance Expectancy**	Venkatesh et al. (2003, 2011, 2012), Abdulwahab and Zulkhairi (2011, 2012), Suha and Anne (2008).
ii.	**Effort Expectancy**	Venkatesh et al. (2003, 2011, 2012), Abdulwahab and Zulkhairi (2011, 2012), Suha and Anne (2008).
iii.	**Social Influence**	Venkatesh et al. (2003, 2011, 2012), Abdulwahab and Zulkhairi (2011, 2012), Suha and Anne (2008).
iv.	**Compatibility**	Dwivedi and Weerakkody (2007), Rogers (2003), Moore and Benbasat (1991).
v.	**Facilitating Condition**	Venkatesh et al. (2003, 2011, 2012), Abdulwahab and Zulkhairi (2011, 2012), Suha and Anne (2008).
vi.	**Service Quality**	Park et al. (2010), Dwivedi et al. (2010), Dwivedi et al. (2006).
vii.	**User Behavioural Intention**	Venkatesh et al. (2003, 2011, 2012), Abdulwahab and Zulkhairi (2011, 2012), Suha and Anne (2008), Dwivedi et al. (2006), Venkatesh et al. (2003).
viii.	**User satisfaction**	Park et al. (2010), Ham et al. (2010), Park et al. (2009).
ix.	**Broadband Continuous Usage**	Ham et al. (2010), Park et al. (2010), Cho et al. (2009), Park et al. (2009), Eriksson and Nilsson (2007), Bhattacherjee (2001a).

Furthermore, the designed questionnaire as shown in Appendix A comprises of four sections for respondents to answer and instructed them to administer section one to section three with the supervision of their parents or guardians. The first section includes questions about the background of the respondents who are secondary school students and are broadband users in the rural areas of northern region of Malaysia. Moreover, section two contains questions about the village of respondents in order to know how rural their locations are. Besides, section three embedded questions on the internet knowledge and experience of the respondents, while section four contains adapted questions from the previous studies on the measurement of the constructs of conceptual research model.

Section four of the designed questionnaire measures constructs like performance expectancy, effort expectancy, social influence, compatibility, facilitating condition, service quality, user behavioural intention, user satisfaction, and broadband continuous usage. Moreover, the measurements of all the constructs in this study are addressed by using a five-point likert scale that ranges from strongly disagree (1) to strongly agree (5). Dwivedi et al. (2007) stressed that five-point likert scale is the most acceptable likert points due to the convenience it creates for the respondent in making choice. This is supported by Woodcock et al. (2012) that respondents of questionnaires on the usage intention of technology face no difficulty while administering questionnaires designed in five-point likert scale. Therefore, the sample of this study's survey questionnaire is shown in Appendix A of this thesis.

4.3.3 Translation of Instrument to Bahasa Melayu

The research instrument used in this study was translated to Bahasa Melayu from English language through bilingual translation method and checked for correction by the competent translators and checkers from the Language Centre, University Utara Malaysia. Thus, evidence of translation of research instrument by the language centre, University Utara Malaysia is shown in Appendix B. Besides, the final copy of the research instrument was compared to the original instrument in order to ensure consistent of the translation process before embarking on the validation process. Indeed, many researchers have stressed that bilingual translation method in survey is the method where by the instrument is translated from source language to the language believed that the respondents understand most (Carolyn et al., 2010; Betty & Oded, 2007). Hence, the final research instrument contains both Bahasa Melayu and English Language for ease understanding of content of questionnaires by the respondents.

4.3.4 Validation of Questionnaire

Weiner (2003) emphasised that the instrument designed for collecting data needs to be validated to ensure high quality of data. Thus, validity refers to how well the instrument measures what it designs for. There are several types of validity which include face validity, content validity and construct validity. Hence, the researcher ensures that all the types of validity were fulfilled while validating the contents of the questionnaire. Kenneth (2005) referred to the face validity as a method of testing whether the instrument appears to measure what it designs for. Thus, the research instrument was discussed with the two supervisors, Assoc. Prof. Dr. Wan Rozaini Bt Sheik Osman and Dr. Azizah Ahmad. Their opinions were taken into consideration in designing and arranging the questionnaire that designed in Bahasa Melayu and English language.

Moreover, a content validity concerns the extent to which an instrument is adequately represents all elements of a concept and reviewed by the group of experts or key persons on the field. Sekaran (2000) stressed that an instrument is considered validated if it is evaluated by a group of expert judges in the field of research. Thus, the research instrument for collecting data was presented to the four experts; Prof. Dr. Abdul Razak Yaakub, Prof. Dr. Zulkhairi Md. Dahalin, Assoc. Prof. Dr. Huda Haji Ibrahim and Dr. Mohd Khairudin Kasiran, who are experienced in quantitative research and instrument development for evaluation and validation. Their observations and suggestions were taken into consideration and shown in Appendix C.

4.4 Data Collection Approach

According to Manohar (2004), the approach of collecting data does affect the quality, quantity, adequacy and appropriateness of data. This implies that some precautions need to be taken before embarking on the collection of final data to be used for the analysis. Indeed, data collection has been required to be subjected to thorough study in order to obtain adequate and enough scientific evidences which would produce solutions to the existing problem (Wendy, 2012). Researchers have argued that there should be conduction of pilot test as the investigation on the standardisation of the research instrument before embarking on the main data collection (Jan, 2013; Hair et al., 2011c; Sekaran, 2003). Thus, this study considers conduction of pilot study as prerequisite to the main data collection from the secondary school students that are residing in the rural areas of northern region of Malaysia which helped to obtain quality data for the analysis.

4.4.1 Pilot Study

Jan (2013) and Sekaran (2003) described pilot study as the administration of survey to a small and convenient sample that possesses close characteristics with the target sample in the final survey. In a related development, Ranjit (2011) argued that the pilot study is purposely carried out in order to determine the feasibility of the instrument designed for data collection. Indeed, pilot study is necessary to perform because it serves as measure to discover inadequacies which reduce biases and access reliability of measurement factors before the distribution of questionnaires to the final respondents (Jan, 2013; Pallant, 2011). Hence, 40 questionnaires were distributed to the invited secondary school students for administration at the Kampung Oran Telecentre, Mata Ayer, Perlis state Malaysia on January 5th, 2013.

4.4.1.1 Process of Gathering Data during Pilot Study

Kampung Oran Telecenter is located at Masjid As-Syakirin, Mata Ayer in Perlis state Malaysia which is 46 km from Arau city. The telecentre is surrounded by many dispersed villages; Pekan Sayur, Batu 15, Lubuk Sireh, Padan Basar and Kampung Aman to mention a few with forest and mountain. Initially, a notice was sent to the manager of telecentre, Mr. Mohd Asril bin Mat Isa on December 27th, 2012 about the researcher to invite secondary school students in Mata-Ayer and its environs to the telecentre for data collection, while the appoint was fixed for January 5th, 2013.

Furthermore, about 57 secondary school students were present at the Telecentre on January 5th, 2013 at Kampong Oran Telecentre, Mata-Ayer, Perlis state Malaysia. The respondents were given brief introduction about objectives of the pilot study and the meaning of broadband. This was done with the help of the telecenters manager Mr. Mohd Asril bin Mat Isa and the Telecenter's attendant, Mr. Syed Mohd Helmi. Moreover, the fishbowl draw was used to choose 40 respondents which were randomly selected from the 57 invited secondary school students at the telecentre, while the appointment was fixed for returning of the questionnaires on January 11th, 2013. This is because of sections 1 to 3 of the questionnaires requires the supervision of the respondents' parents or guardians. A token of souvenir was given to each of the respondents as appreciation after returning the questionnaire. Finally, only 38 (95%) questionnaires were returned to the telecentre from January 7th to 11th, 2013.

4.4.1.2 Data Preparation during Pilot Study

Checking for errors and correction of errors is important before the analysis of data set in order to ensure achievement of data quality after the analysis (Cox & Christl, 2011; Pallant, 2011). Therefore, the data view of the SPSS software was thoroughly checked while entering the collected data from the respondents of questionnaires during the pilot study and ensured that no entries were above the possible values of the scale.

4.4.1.3 Checking the Reliability of Scale

The reliability of a scale indicates how free it is from random error and brings about the magnitude of the correlation found between any two scales (Pallant, 2011; Bob, 2008). Pallant (2011) emphasises that internal consistency needs to be measured while checking for the reliability of the scale. Thus, internal consistency is the degree to which the items that make up the scale are all measuring the same underlying attribute which can be done by calculating Cronbach's Coefficient Alpha (Pallan, 2011; Zoltan & Tatsuya, 2010). Besides, Cronbach's coefficient alpha is a statistic that provides indication of the average correlation among all the items that make up the scale which ranges from 0 to 1 (Pallant, 2011). Indeed, Cronbach's alpha is expected to be of high value when the correlation between the respective questionnaire's items is high, while the minimum level of 0.7 is recommended (Damon et al., 2011; Ruth, 2011; DeVellis, 2003; Nunnally, 1978).

In addition, 47 items were used to measure the entire 9 constructs of the conceptual research model during the pilot study of the instrument and their distribution is shown in Table 4.4. Indeed, the results of the pilot test which is represented by the internal consistency of the scale have high values of Cronbach's alpha. Besides that, the entire 9 constructs (exogenous variables, endogenous variable and mediating variables) have their Cronbach's alpha greater than 0.7 and shown in Table 4.5. Hence, the results of reliability test are acceptable for further analysis based on the recommendation of some researchers (Damon et al., 2011; Ruth, 2011; DeVellis, 2003; Nunnally, 1978).

Table 4.4: Distribution of the Measurement Items with Their Construct

s/n	Construct	Number of Items used
i.	Performance Expectancy	5
ii.	Effort Expectancy	5
iii.	Social Influence	5
iv.	Compatibility	4
v.	Facilitating Condition	5
vi.	Service Quality	7
vii.	User Behavioural Intention	4
viii.	User Satisfaction	5
ix.	Broadband Continuous Usage	7

Table 4.5: Reliability Test for the Pilot Study

Variable Types	Variables	Cronbach's Alpha
Exogenous Variables	Performance Expectancy	0.764
	Effort Expectancy	0.814
	Social Influence	0.717
	Compatibility	0.768
	Facilitating Condition	0.734
	Service Quality	0.794
Mediating Variables	User Behavioural Intention	0.710
	User satisfaction	0.756
Endogenous Variable	Broadband Continuous Usage	0.726

4.4.2 Final Validation of the Instrument

The final validation of the instrument for collecting data was done by Dr. Mohd Khairudin Kasiran, Assoc. Prof. Dr. Wan Rozaini Sheik Osman and Dr. Azizah Ahmad. All of them are expert in their research fields of interest and they are experienced at validating the appropriateness of the process and instrument for data collection. Hence, the instrument for data collection was presented to them after the pilot study while they all agreed with the methods, phases and the applied activities for collecting data from the respondents during the pilot study.

4.4.3 Main Data Collection

The main data collection for this study was conducted from January 20th, 2013 to June 15th, 2013. The arrangements were made with the managers and deputy managers of PIDs in the northern region of Malaysia on the days to fix for data collection exercise, shown in Table 4.6. The invitations were sent to the head of the secondary schools that surround all the PIDs of the researcher's intention to collect data from the students. Meanwhile the training on "Google Docs" was given to the participants and some tokens as appreciation after returning the questionnaires at the PIDs in the northern region of Malaysia. Giving training to the participants serves as an incentive which is recommended by some researchers as driver to obtain quality and viable data for analysis (Earl, 2011; Baker et al., 2011; Sekaran & Roger, 2010). Moreover, the researcher ensured that more than 50 participants as the target sample size were invited to each PID in order to achieve random selection of participant and give every participant equal chances of being selected.

In addition, simple random sampling was used to select the participants from the invited secondary school students to the PIDs through fish bowl draw or style. Fish bowl style assisted the researcher to avoid being bias while selecting the participants for data collection. The number of invited students to each of PIDs and the selected participants are shown in Table 4.6. Besides that, the distribution date together with returned date of questionnaires and quantity of retuned questionnaires are shown in Table 4.6. In order to ensure that the participants return the distributed questionnaires to the PIDs at the stipulated time, respondents were informed and promised of the free training on “Google Docs” after they return the questionnaires.

Table 4.6: Summary of the Main Data Collection Process

States	Locations of instrument distribution (PIDs)	Instrument Distribution Date	Instrument Collection Date	No of Invited Participants	No of Selected Participants	No of Returned Questionnaires
Kedah	Bukit Kayu Hitam	07/05/2013	23/05/2013	63	50	39
	Yan	13/02/2013	28/02/2013	71	50	50
	Kupang	08/04/2013	30/04/2013	60	50	47
	Kuala Nerang	20/01/2013	07/02/2013	84	50	48
Pulau Penang	Tasik Gelugor	22/03/2013	10/04/2013	76	50	43
	Balik Pulau	29/03/2013	10/04/2013	75	50	43
Perlis	Simpang Empat	03/06/2013	15/06/2013	89	50	35
Perak	Selama	17/04/2013	15/05/2013	68	50	41
	Kuala Kurau	26/04/2013	15/05/2013	81	50	47

4.5 Data Analysis Method

The data analysis method was performed to analyse the collected data from the respondents of our questionnaires which was categorised in three different stages. The first stage of data analysis method dealt with analysis of respondent's response to the questionnaires. This contains response rate, test of non response bias and the descriptive statistics of respondents. All these are to check level of enthusiastic of participants towards the research instrument. Besides that, the second stage focuses on the data screening and data preparation in order to identifying the potential non compliance of the data set before embarking on the multivariate analysis as recommended by Hair et al. (2007). The data screening and preparation involves assessment of missing data, outlier treatment, tests of normality and multicollinearity through the use of SPSS version 20.

Furthermore, stage three of the analysis uses partial least square form of structural equation modelling (PLS-SEM). The PLS-SEM involves measurement model which was used to assess reliability, convergent validity and discriminant validity so as to eliminate casual relationships in the gathered dataset as recommended by many researchers (Gefen & Straub, 2005; Fornell & Larcker, 1981). Thus, the measurement model is a sub-model in Structural Equation Modeling (SEM) that specifies the indicators for each construct and assesses the reliability of each construct. In addition, the third stage of analysis assesses path analysis of hypothesised model in the research hypotheses through the use of the statistic package SPSS version 20 and SmartPLS 2.0 software package.

4.6 Summary

This chapter discusses the methodologies that were used in the study. The methods include research process, research design, research approach, sampling method and instrument for collecting and analysing the data. Besides, it discusses processes of validating the instruments and piloting, data collection and data analysis techniques. The chapter shows that the research instrument was piloted by using engaging 40 secondary school students that are residing in Kampung Oran village's Telecentre, Mata Ayer Perlis state, Malaysia while 38 (95%) questionnaires were returned. Moreover, the chapter shows that that the main data collection was conducted by using 450 questionnaires while 393 (87.33%) were returned. Indeed, the data analysis techniques were discussed through the use of SPSS and PLS-SEM.

CHAPTER FIVE

DATA ANALYSIS AND RESULTS

5.0 Introduction

This chapter represents the results of the analysis of data that was collected from the respondents of the questionnaires at the rural areas in the northern region of Malaysia, through the application of International Business Management (IBM) Statistical Package for Social Sciences (SPSS) version 20 and SmartPLS 2.0 software. The chapter begins with the description of the analysis that has to do with profile of respondents and test of Non-Response bias. Besides, the chapter takes care of data screening and cleaning which embedded treatment of detection and treatment of missing data and outliers; test of normality of data and multicollinearity in order to obtain a reliable data. Moreover, the analysis of measurement model and structural model is presented in the chapter, together with analysis of mediating and moderating constructs in the model. Finally, the chapter discusses the findings of the formulated hypotheses of the research.

5.1 Analysis of Survey Response

Performing the analysis on the collected surveyed response helps the researcher to discover and apply necessary measures on the returned questionnaires. Besides, previous researchers have stressed that identification of the main themes of the study becomes easier while analysing the gathered response from the field (Ranjit, 2011;

Mamdouh, 2010; David and Dursun, 2008). Therefore, this study analysed the returned questionnaires through the use of IBM SPSS version 20 which takes care of response rate, test of non-response bias and descriptive statistics of respondents.

5.1.1 Response Rate

The data collection in this research was conducted for about 23 weeks in the rural areas of northern region of Malaysia which started from January 20th, 2013 to June 15th, 2013. The total number of 450 questionnaires was distributed to the respondents while the follow-up was through telephone calls, sending of short message services (SMS) and self-visits to the collating centres in order to increase the response rate. The adaption of follow-up to increase the response rate in this research is in compliance with recommendations of some researchers that using of follow-up during the data collection and giving of incentives to the participant after returning the instruments are is stimuli to achieve a viable data for the analysis (Earl, 2011; Baker et al., 2011; Sekaran and Roger, 2010; Park et al., 2010; Michael and Earl, 2009).

Furthermore, 393 questionnaires were returned out of 450 questionnaires that were distributed to the participants which make the response rate to be 87.33%. Besides that, only 373 questionnaires were useful for further analysis out of 393 returned questionnaires, making the valid response rate to be 82.89%. Researchers like Hair et al. (2010) and Sekaran (2003) have recommended the response rate of 30% for survey as fits for analysis. Thus, the valid response rate of 82.89% is good and acceptable to achieve the objective of this study, as shown in Table 5.1. Indeed, Pallant (2001, 2010) stresses that for the analysis that has to do with interrelationship of variables; the sample size should be ten times of the independent variables of the model under study. Therefore, the gathered questionnaires are adequate for conducting further analysis in this study.

Considering the overall variables in this research which are nine, showing that the sample size must not below 90 respondents. In fact, the 373 usable questionnaires fulfil the requirements of finding the relationship between the constructs in the research model. In conclusion, the 450 distributed samples and 373 usable samples appeared to be adequate for further analysis when compared to many studies in the domain of technology usage and continuous use of technology (Venkatesh et al., 2011; Liang and Yei, 2011; Park et al., 2009; Wang and Shi, 2008; Marchewka et al., 2007).

Table 5.1: Response Rate of the Questionnaires

Response	**Kedah**				**Pulau Penang**		**Perak**		**Perlis**	**Freq/Rate**
	BKH	**KNR**	**YN**	**KPG**	**BLP**	**TSG**	**KKR**	**SLM**	**SMT**	
No. of distributed questionnaires	50	50	50	50	50	50	50	50	50	450
Returned questionnaires	39	48	50	47	43	43	47	41	35	393
Returned and usable questionnaires	39	48	50	45	40	43	32	41	35	373

Table 5.1 Continued

Returned and excluded questionnaires	0	0	0	2	3	0	15	0	0	20
Questionnaires not returned	11	2	0	3	7	7	3	9	15	57
Response rate	78%	96%	100%	94%	86%	86%	94%	82%	70%	87.33%
Usable response rate	78%	96%	100%	90%	80%	86%	64%	82%	70%	82.89%

BKH: Bukit Kayu Hitam
KNR: Kuala Nerang
YN: Yan
KPG: Kupang
BLP: Balik Pulau
TSG: Taseg Gelugor
KKR: Kuala Kurau
SLM: Selama
SMT: Simpat Empat

5.1.2 Test of Non Response Bias

Researchers have described the non response bias as a major limitation that is associated with the paper-based questionnaire research irrespective of the high response rate obtained, and needs to be addressed in order to achieve representativeness of the samples (Baker et al., 2011; Roger, 2007). Indeed, occurrence of non response bias is due to the failure of large number of respondents to the questionnaires or some items of the questionnaires (Baker et al., 2011). However, Roger (2007) stresses that befalling of non-response bias is due to the disparity of characteristics between the respondents and non respondents of the population. Hence, this research believes that conducting test of non-response bias ensure that the collected data represents the non respondents.

Furthermore, Malhotra, Hall, Shaw and Oppenheim (2006) emphasised that non respondents are consistently different from respondents in personalities, attitudes, behaviour, motivations and demographic, which might affect the results of the study. Moreover, researchers have established that there are many methods of testing non-response bias in the quantitative research while the efficient technique is to compare the responses of the earlier returned survey and the late returned survey (Baker et al., 2011). In fact, researchers like Baker et al. (2011), Malhortra et al. (2006) and Churchill and Brown (2004) argued that late respondents should be viewed as non respondents, as they would not have responded to the questionnaires if the follow-up approach is not applied in collecting the data from them. Therefore, this study uses the t-test to compare the similitude between the mean, standard deviation and standard error mean of early responses and late responses.

In addition, the comparison of early and late responses is done on the demographic and continuous variables such as, gender, age group, current level of education, living location during academic session, monthly parent income and where do you always use broadband. Therefore, this study divides the sample into two groups (early response and late response) which is consistent with Venkatesh et al. (2011), Roger (2007) and Malhortra et al. (2006) that demographic variables are appropriate while analysing the test of response bias. Specifically, respondents that return the questionnaires within two weeks of distribution are regarded as early respondents while respondents that return the questionnaires after two weeks from the date of distribution are tagged late respondents. Besides that, this study conducts descriptive test and Levene’s test for equality of variance in testing for non-response bias and the classified 352 early respondents and 41 late respondents as shown in Table 5.2.

Table 5.2: Test of Non-Response Bias

	Response	No.	Mean	Std. Deviation	Std. Error Mean
Gender	Early response	352	1.58	.495	.026
	Late response	41	1.66	.480	.075
Age group	Early response	352	1.76	.692	.037
	Late response	41	1.78	.725	.113
Current level of education	Early response	352	1.81	.824	.044
	Late response	41	1.76	.734	.115
Living location during academic session	Early response	352	2.06	.574	.031
	Late response	41	2.10	.625	.098
Monthly parent income	Early response	352	2.82	1.046	.056
	Late response	41	2.68	1.035	.162
Where do you always use broadband	Early response	352	2.05	1.074	.057
	Late response	41	2.56	.976	.152

Table 5.2 shows the results of the descriptive statistics of the test of non-response bias, indicating that there was no much significant statistical difference between early and late respondents in the demographic variables, except for the early respondent that exhibits location of using the broadband (Home versus Other places). This shows that respondents that have broadband at home respond to the questionnaires than those who use broadband at other places. Moreover, the results of Levene's test of equality variance in the independent sample test while

considering the continuous variable show that there is no significance difference. The good examples are comparison between the current level of education and living location of respondents during academic session ($t = .398$, $p = .724$) and ($t = -.396$, $p = .629$). In conclusion, the detailed result of independent sample test for equality of variance and means can be found in Appendix E.

5.1.3 Descriptive Statistics of Respondent

The statistical frequency distribution of variables in the questionnaires was classified and presented in a way to reflect the originality of this study. The desired analytical tables were extracted for proper data analysis and hypothesis testing. Therefore, the original data sets in the form of frequency tables and analytical tables can be found in appendix F.

Considering the gender of respondents to the questionnaires, 163 are male while 230 are female out of 393 returned questionnaires which represent 41.5% and 58.5% of the distribution respectively and shown in Figure 5.1. In terms of the age group of the respondents as represented in Figure 5.2, 152 (38.7%) respondents are between the ages of 13 - 15years, 182 (46.3%) respondents are between the age group of 16 - 17years and 59 (15%) respondents are of 18 - 19years.

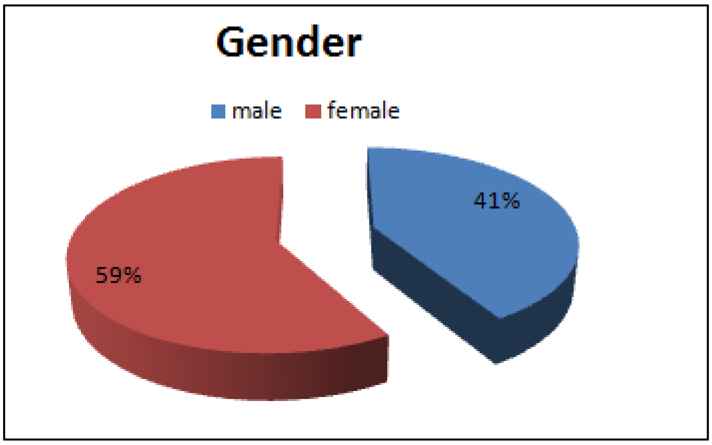


Figure 5.1: Gender of the Respondents

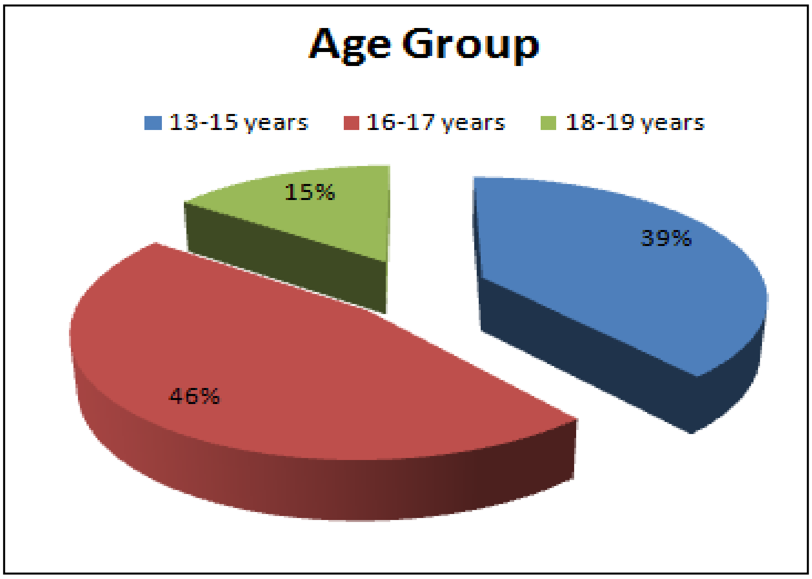


Figure 5.2: Age Group of the Respondents

Besides that, Table 5.3 shows that 151 (38.4%) respondents to our questionnaires are in form 1-3, 193 (49.1%) respondents are in form 4-5, 24 (6.1%) respondents are in lower 6 and 25 (6.4%) respondents are in upper 6 class during the data collection. Indeed, the study inquired the living location of respondents during the academic session and found that 43 (10.9%) respondents live at boarding school, 293 (74.6%)

respondents live with their parents, and 46 (11.7%) respondents live with the legal guardian, while 11 (2.8%) respondents live alone as shown in Table 5.3.

Table 5.3: Respondents' Education Level, Living Location and Family Size

Education level	**%**	**Location during academic session**	**%**	**Family size**	**%**
Form 1-3	38.4	At boarding school	10.9	3-4 members	28.8
Form 4-5	49.1	With my parent	74.6	5-6 members	48.9
Lower 6	6.1	With legal guardian	11.7	7-8 members	16.5
Upper 6	6.4	Alone	2.8	9 members and above	5.9

Moreover, Table 5.3 shows that 113 (28.8%) respondents have family size of 3-4 members, 192 (48.9%) respondents have family size of 5-6 members, and 65 (16.5%) respondents have their family size in the range of 7-8 members, while 23 (5.9%) respondents have the family size of 9 members and above. Indeed, the respondents were inquired of the highest educational attainment of their parents and found that 67 (17%) respondents' parents do not have educational background out of 393 returned questionnaires. Similarly, 231 (58.8%) respondents' parents have secondary school education as highest educational attainment, 46 (11.7%) respondents' parents possess diploma educational background while 31 (7.9%) respondents' parents have bachelor degree education as highest educational attainment. So also, 15 (3.8%) respondents' parents have maters degree as highest educational attainment and 3 (0.8%) respondents' parents possess Ph.D as the highest educational attainment, shown in Table 5.4.

Table 5.4: Respondent's Parent Education, Job and Monthly Income

Parent's education	**%**	**Parent's job**	**%**	**Parent monthly income**	**%**
None	17.0	Rubber tapping	12.5	Less than RM416	15.5
Secondary school	58.8	Palm oil keeping	13.5	RM417 - RM676	19.6
Diploma	11.7	Fishery	6.9	RM677 - RM1,500	33.8
Bachelor degree	7.9	Live stock farming	9.4	More than RM1,501	31.0
Masters degree	3.8	Business	19.6		
Ph.D	.8	Industrial worker	10.7		
		Others	27.5		

In terms of type of job of parents' of respondents, the study as shown in Table 5.4 reveals that 49 (12.5%) respondents' parents engage in rubber tapping, 53 (13.5%) respondents' parents take palm oil keeping as their job, while 27 (6.9%) respondents' parents engage in fishery activities. Besides that, 37 (9.4%) respondents' parents operate livestock farming, 77 (19.6%) have small scale businesses and 42 (10.7%) take industrial work as their job, while 108 (27.5%) parents' respondents engage in other works. On the other hand, Table 5.4 also presents variation in monthly income of the respondents' parents and found 61 (15.5%) earning less than RM416, 77 (19.6%) respondents' parents collecting between RM417 – RM676 and 133 (33.8%) respondents' parents earn between RM677 – RM1,500. Lastly, 122 (31.0%) respondents' parents have their monthly earning from RM1, 501 and above out of 393 returned questionnaires.

Furthermore, considering the availability of some basic facilities at respondents' homes with believes that they are living in the rural areas, the study found as shown in Figure 5.3 that 385 (98.0%) have television set at home while only 8 (2.0%) out of 393 returned questionnaires confess that they do not have television set at home. In the same way, 256 (65.1%) respondents reveal that their homes have Astro decoder at home, while 137 (34.9%) do not have satellite decoder at home. In terms of availability of radio at home of the respondents, 307 (78.1%) respondents have radio set at home and 86 (21.9%) reported non availability of radio in their home. 183 (46.6%) respondents have video recorders at home and 210 (53.4%) respondents out of 393 returned questionnaires do not have video tape recorder at home, while 362 (92.1%) respondents have washing machine in respective homes and 31 (7.9%) have no washing machine at their homes as depicted in Figure 5.3.

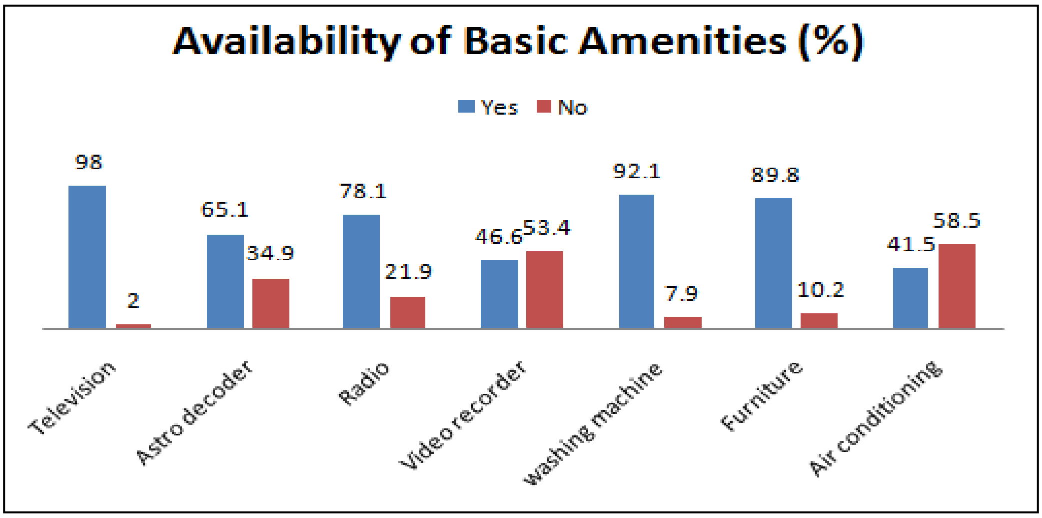


Figure 5.3: Availability of Basic Amenities in Respondents' Homes

From the Figure 5.3, the descriptive statistics of respondents shows that 353 (89.9%) respondents have furniture set at home, while only 40 (10.2%) respondents confess of non availability of furniture set in their homes. Indeed, out of 393 respondents that returned the questionnaires that were distributed to them, only 163 (41.5%) have air conditioning at home while 230 (58.5%) respondents do not have air conditioning at home. Besides, the study also reveals that 357 (90.8%) respondents' families have motorcycle and 36 (9.2%) do not, while 286 (72.8%) respondents' families possess motor cars and 107 (27.2%) do not have cars in their families, shown in Figure 5.4. In fact, 60 (15.3%) respondents indicated that they have boat as means of transportation in their family, while 333 (84.7%) do not have boat.

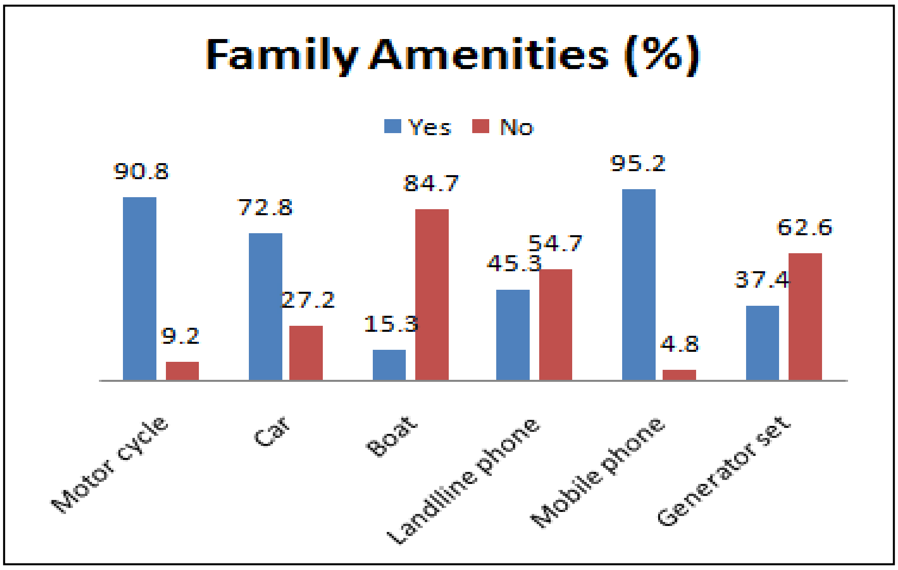


Figure 5.4: Availability of Amenities in Respondents' Families

In addition, Figure 5.4 shows the type of phones using at the respondents' homes and reveals that 178 (45.3%) have landline phones and 215 (54.7%) do not, while 374 (95.2%) have mobile phone and 19 (4.8%) respondents do not have mobile phones in their home out of 393 returned questionnaires. Moreover, 147 (37.4%)

respondents indicated that there are generator set in their home while 246 (62.6%) do not have generator set at home and shown in Figure 5.4.

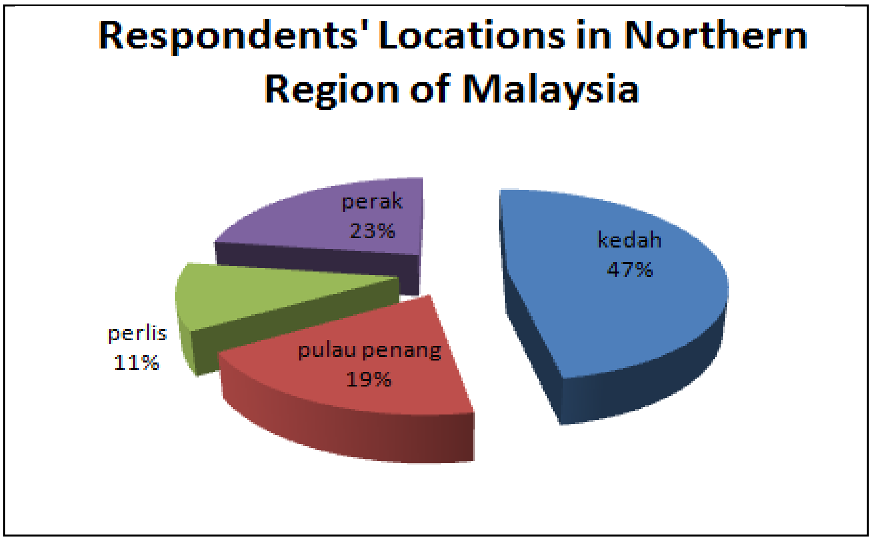


Figure 5.5: Respondents' Location in Northern Region of Malaysia

Considering the village location of respondents in the northern region of Malaysia, descriptive statistics as shown in Figure 5.5 reveals that 185 (47.1%) respondents' villages located in Kedah state, 75 (19.1%) in Pulau Penang state, 44 (11.2%) respondents' villages are located in Perlis state and 89 (22.6%) respondents' villages are located in Perak state.

Table 5.5: Respondent's Means of Transportation and Telecommunication

Transportation means	**%**	**Telecommunication means**	**%**
No vehicle	2.5	No means of communication	2.3
Own vehicle	79.6	Landline phone	13.7
Hired vehicle	7.1	Mobile phone	75.1
Government vehicle	10.2	Word of mouth	4.3
Others	.5	Computer	4.6

Moreover, Table 5.5 reveals the means of transportation and that 10 (2.5%) of the respondents reveals that there is no vehicle in their village while inquiring about the basic facilities in their villages and found that 313 (79.6%) respondents indicated that personal vehicle is their means of transportation. In the same way, 28 (7.1%) indicated that hired vehicles are the means of transportation, 40 (10.2%) respondents indicated that their villages depend on government vehicles as the only means of transportation while 2 (0.5%) respondents reveals that others apart from the stated are the means of transportation in their villages. Table 5.5 shows that 9 (2.3%) respondents indicated that there is no means of telecommunication in their villages, 54 (13.7%) indicated landline phones, 295 (75.1%) indicated mobile phones, 17 (4.3%) confirm word of mouth and 18 (4.6%) respondents indicated computer as the means of telecommunication in their villages.

The study further reveals that 388 (98.7%) respondents indicated that there is electric supply in their villages while 5 (1.3%) confirmed that their villages lack electric supply and presented in Figure 5.6. 391 (99.5%) respondents reveal that there is availability of water supply in their villages and 2 (.5%) respondents out of 393 returned questionnaires confirms lack of water supply in their villages. Moreover, 358 (91.1%) respondents confirmed that that there are government clinics in their villages while 35 (8.9%) indicated non availability of government clinics in their villages. Indeed, Figure 5.6 represents the descriptive statistics which shows that 332 (84.5%) respondents indicated that multipurpose halls are available in their villages and 61 (15.5%) confirms its absence, 333 (84.7%) respondents reveal that there are public phones in their villages but 60 (15.3%) respondents indicated lack of public telephone in their villages.

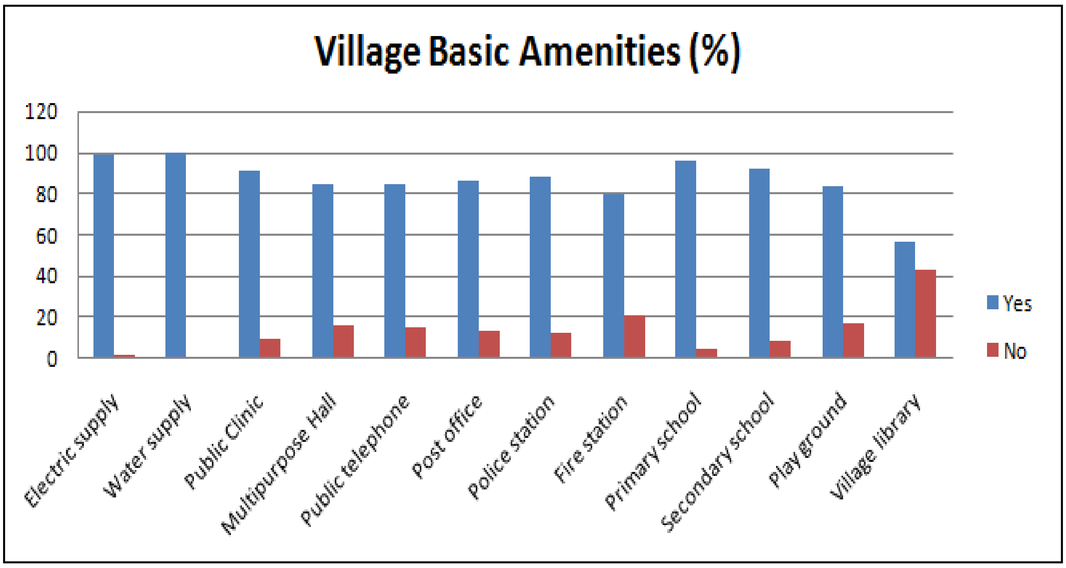


Figure 5.6: Availability of Basic Amenities in the Respondents' Villages

In fact, the study investigated further about the availability of basic facilities in the respondents' villages as presented in Figure 5.6, it shows that 341 (86.8%) respondents indicated that there are post office in their villages and 52 (13.2%) confirms absence of post office in their villages. Meanwhile, 346 (88.0%) respondents' villages have police station or post, while 47 (12.0%) respondents confirm the absence of police post in their respective villages out of 393 returned questionnaires. 312 (79.4%) agreed that there is availability of fire station in their villages, while 81 (20.6%) indicated to non-availability of fire station at their villages. So also, 377 (95.9%) out of the 393 returned questionnaires agreed to the presence of primary school in the domain and 16 (4.1%) respondents indicated lack of primary school in their villages. Hence, Figure 5.6 shows that 361 (91.9%) respondents confirm the presence of secondary school in their village, while 32 (8.1%) respondents reveal that they do not have secondary school in their villages. 327 (83.2%) respondents confirm the availability of playground in their villages and

66 (16.8%) indicated absence of playground in their villages, while 223 (56.7%) respondents confirm the presence of village library in their location and 170 (43.3%) respondents do not.

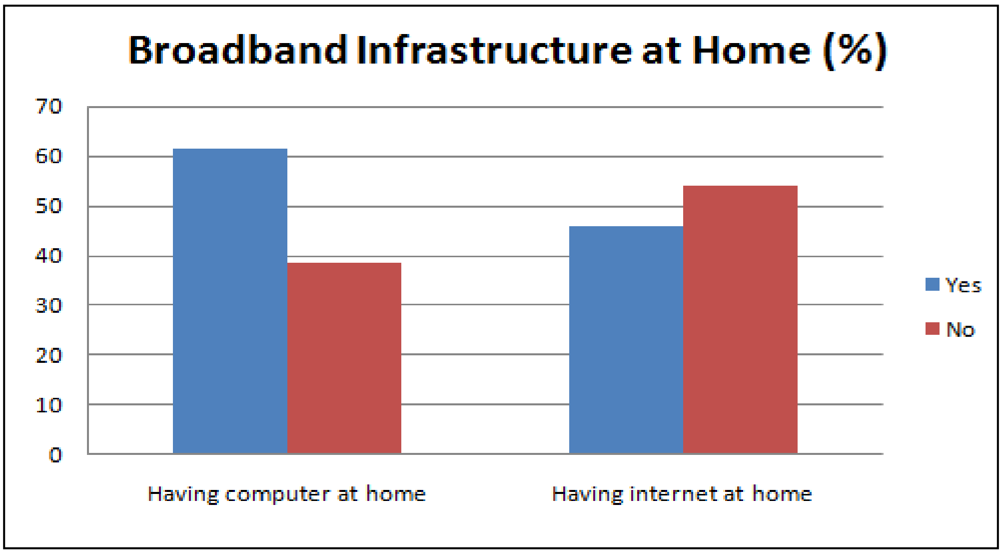


Figure 5.7: Availability of Computer and Internet in Respondents' Homes

Moreover, the study inquired the availability of computer in the houses of respondents and found that 241 (61.3%) respondents indicated having computer at home, while 152 (38.7%) respondent do not have computer at home. The study discovered that having computer at home does not necessitate flair for internet connectivity as indicated by the respondents in Figure 5.7 that 181 (46.1%) have internet at home and 212 (53.9%) do not have internet connectivity at home. In the light of this, the analysis shows that 74 (18.8%) respondents do not have internet at home due to high start-up cost, 103 (26.2%) respondents' homes lack internet because of high in current cost, 23 (5.9%) due to lack of equipment, 6 (1.5%) respondents due to the limited coverage, 3 (0.8%) respondents' homes lack internet due to the other reasons and 184 (46.8%) respondents were not in the scope of lacking internet connectivity at home.

Table 5.6: Type of Internet, Broadband Usage Location and Type

Type of internet connectivity	%	Location of using broadband	%	Type of broadband in use	%
Dial up	5.3	Home	41.2	Wired	58.3
Broadband	41.5	School	18.8	Wireless	41.7
Not applicable	53.2	Rural internet centre	28.2		
		Cybercafé	11.7		

In addition, the study investigated the type of internet connectivity in the home of respondents as shown in Table 5.6 and found that 21 (5.3%) respondents indicated that they have dial-up internet connectivity at home, 163 (41.5%) use broadband internet type and 209 (53.2%) respondents have no relationship to the type of internet connectivity at home. Considering the location of usage of broadband by the respondents, the study confirm that 162 (41.2%) respondents always use broadband at home, 74 (18.8%) always use broadband in their schools, 111 (28.2%) respondents indicated that they always use broadband at rural internet centres (PID), while 46 (11.7%) respondents confirm usage of broadband at cybercafé always. In the light of type of broadband the respondents always using as presented in Table 5.6, it shows that 229 (58.3%) depend on the wired broadband while 164 (41.7%) respondents indicated the usage of wireless broadband.

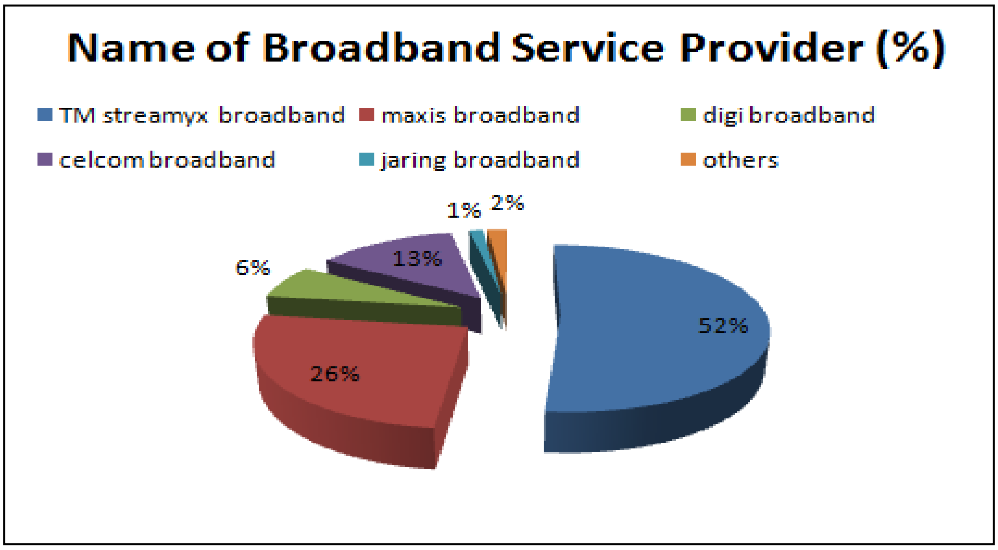


Figure 5.8: Respondents' Broadband Service Providers

In terms of chosen service provider of broadband using by the respondents, Figure 5.8 shows that 203 (51.7%) respondents are using TM Streamyx broadband, 101 (25.7%) are using maxis broadband, 26 (6.6%) respondents are using Digi broadband and 51 (13.0%) choose Celcom broadband, 5 (1.3%) respondents indicated that they choose Jaring broadband, while 7 (1.8%) choose other type of broadband.

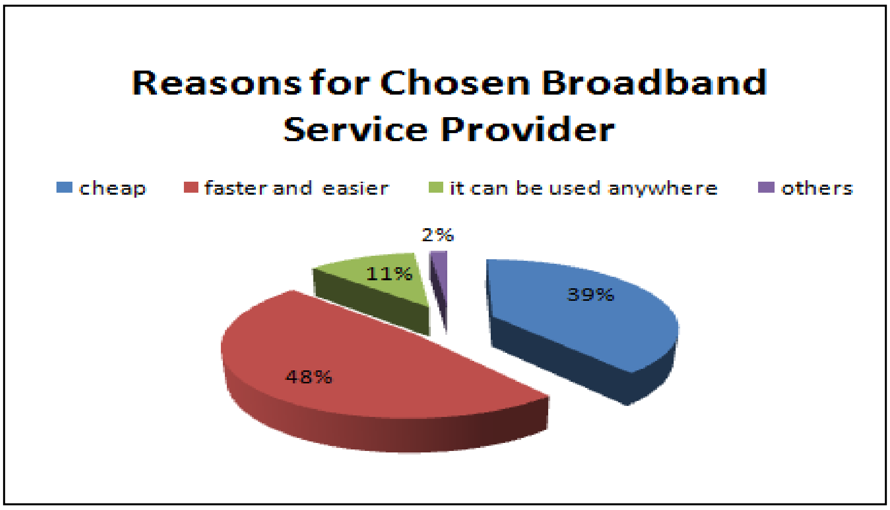


Figure 5.9: Respondents' Reasons for Chosen Broadband Service Providers

At this level, there is need to know the reasons of respondents choosing their preferred broadband service provider and represented in Figure 5.9. This shows that 153 (38.9%) respondents indicated that their choice of broadband service provider is because of cheapness and 189 (48.1%) based their choice on ease and fastness of the chosen broadband. Indeed, 144 (11.2%) choose the broadband service provider because it can be used anywhere, while 7 (1.8%) indicated their choice on other reasons.

Table 5.7: Broadband Payment Source, Daily Usage Duration and Awareness Source

Source of payment	**%**	**Monthly price**	**%**	**Daily usage duration**	**%**	**Awareness source**	**%**
Father	64.4	RM50 - RM70	75.1	Never	2.0	Friend	37.9
Mother	23.7	RM71 - RM90	8.4	1 - 2 hours	32.6	Newspaper	21.4
Siblings	6.1	RM91 - RM110	10.4	3 - 4 hours	16.5	Community notice board	15.8
Guardian	1.0	RM111 & above	6.1	More than 4 hours	48.9	Television	17.8
School	1.5					Radio	2.3
Others	3.3					Internet	4.1
						Others	.8

Considering the source of payment of broadband using by the respondents, the study shows that 253 (64.4%) respondents indicated that the payment of their broadband is being responsible for by their fathers as shown in Table 5.7, 93 (23.7%) of respondents' mothers are catered for their broadband payment and 24 (6.1%) respondents confirm that their cost of broadband is responsible by their siblings. So also, 4 (1.0%) respondents reveal that payment of their broadband is always settled by their guardians and 6 (1.5%) by their schools, while 13 (3.3%) respondents confirmed that the settlement of cost of their broadband is done by others. Table 5.7 reveals that 295 (75.1%) respondents indicated their cost between RM50 - RM70, 33 (8.4%) respondents confirm their bill between RM71 - RM90 in a month and 41 (10.4%) respondents pay RM91 - RM110 per month, while 24 (6.1%) respondents do pay RM111 and above to settle their broadband cost in a month.

The frequency of usage of broadband by the respondents was explained by the descriptive statistics which showed that 8 (2.0%) of respondents indicated using broadband for less than 1 hour in a day, 128 (32.6%) use broadband between 1 - 2 hours in a day and 65 (16.5%) respondents use broadband between 3 - 4 hours daily, while 192 (48.9%) respondents use broadband for more than 4 hours per day. Besides, it is pertinent to know about the source of awareness of broadband by the respondents and found 149 (37.9%) respondents got the awareness from friends, 84 (21.4%) received awareness of broadband through their friends and 62 (15.8%) from the community notice board. Indeed, 70 (17.8%) respondents got the knowledge about broadband through television, 9 (2.3%) from the radio and 16 (4.1%) respondents know about the existence of broadband through the internet, while 3 (0.8%) got awareness of broadband from other sources as shown in Table 5.7.

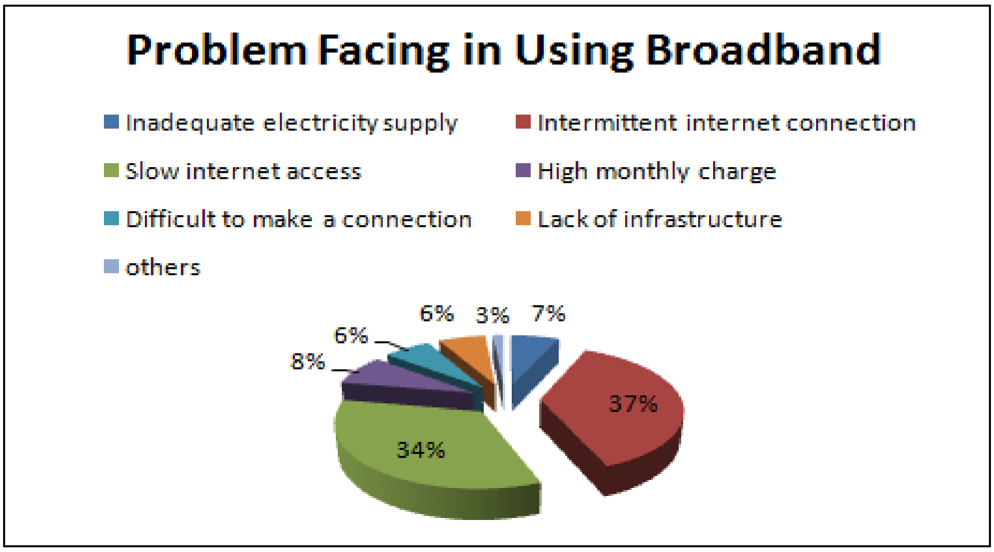


Figure 5.10: Problem Facing by Respondents in Using Broadband

Conclusively, the respondents were inquired for possible shortcomings during the usage of broadband as shown in Figure 5.10 and found 26 (6.6%) respondents indicated facing problem of inadequate electricity supply, 147 (37.4%) reported to have encountered intermittent internet connection and 133 (33.8%) respondents face problem of slow internet access. Moreover, Figure 5.10 reveals that 31 (7.9%) respondents confirm having problem of high monthly charge, 25 (6.4%) respondents indicate encountering difficulty to make a connection and 25 (6.4%) indicated having problem of internet streaming, while 6 (1.5%) respondents confirm having other problems.

5.2 Data Screening and Data Preparation

Data screening and data preparation are required steps that need to fulfil before conducting multivariate analysis and help to identify potential non compliance with underlying assumptions that are related to application of multivariate techniques (Hair et al., 2007; Robert, et al., 2009). Besides, data is screened and prepared in order to foster deep understanding of knowledge of researchers about the collected data. Screening and preparation of data in multivariate analysis should not be completed without taking care of missing data, analysis of outliers, test of normality of data and test of multicollinearity (Pallant, 2011; Tabachnick & Fidell, 2007). Hence, the study prepared the data for further multivariate analysis through the usage of IBM SPSS version 20 software package.

5.2.1 Missing Data

Researchers have emphasised that algorithm for data analysis is designed for data matrices with no missing data which calls for proper treatment of missing data in the returned survey if it exists (John, 2012; Craig, 2010). The general opinion on the occurrence of missing data in the returned questionnaires is to simply drop the case that contains missing values (Tabachnick & Fidell, 2007). Besides that, Hair et al. (2010) suggests that any case with not more than 15% missing data should be deleted provided that sample is adequate. The whole of 393 returned questionnaires in this study is free of missing data which is as a result of assistant giving in ensuring that respondents fill the questionnaires properly by the managers of Zone A and B of PIDs (distribution and collation centres) in the northern region of Malaysia. Wherever there is exception while returning the questionnaires, researcher and PIDs managers drawn attention of respondents to answer it appropriately. The evidence of non-missing data is shown in demographic statistics of respondents in appendix F.

5.2.2 Assessment and Treatment of Outliers

Assessment of outliers is a vital stage in data screening and data preparation for analysis and regarded as determinant of results and strength of predictive power of research model (Douglas et al., 2013; Aguinis et al., 2013). Evidences from the statistics have shown that outliers are any observation or measures that are numerically distance from other observations either smaller or larger (Bryne, 2010; Denis & Sylvain, 2010). In order words, outliers should be regarded as the extreme case scores that may probably affect the result of the analysis, either too high, too low or having a unique combination of values across several variables (Hair et al., 2010). Moreover, researchers have stressed that there are many types of outliers that need to identify and handle if found in the data set; error outlier, interesting outlier and influential outlier (Aguinis et al., 2013; Brutus et al., 2013).

Error outliers are the data points that are found at a distance from other data points as a result of inaccuracy in the sampling procedure, wrong recording, coding, computation of data (Agunis et al., 2013; Kutner et al., 2004). On the other hand, interesting outliers are the data points that are accurate but not confirmed as actual error outliers due to its potential error outliers features (Aguinis et al., 2013; Mohrman & Lawler, 2012). Aguinis et al. (2013) argued that there is possibility of not finding the source of error outliers which could turn the treatment to be interesting outliers. Therefore, identification and handling of error and interesting outliers are similar in nature and completely different from influential outliers which are specifically on statistical techniques (Aguinis et al., 2013). Hence, influential outliers are the observations that their existences in data set affect the fitness of the model and prediction power of the model, which should be applied in regression, SEM and multilevel modeling (Aguinis et al., 2013).

However, this study passed error and interesting outliers as there were no inaccuracy in the coding and computation of data into the IBM SPSS software statistical package as shown in demographic statistics of variables in appendix F. It has become imperative to examine influential outlier since it determines the fitness of model while working with regression and SEM. Following this further, influential outliers are categorised into two: model fit influential outliers and prediction influential outlier (Agunis et al., 2013; Kutner et al., 2004). A model fit influence outlier is the observation whose existence affects the fitness of model, while prediction influential outlier is the observation whose presence changes the parameter estimates. Meanwhile, researchers have identified methods of detecting and handling influential outliers as re-specification and deletion approaches (Aguinis et al., 2013; Cohen et al., 2003). The re-specification approach is strictly for theory building, while deletion approach focuses theory testing. Hence, the study uses deletion approach in handling influential outliers in the dataset by examining the model fit R^2 and some parameter while including and excluding the identified outliers.

Furthermore, Hair et al. (2010) described parameter for identifying outliers according to the number of samples used for the analysis. A small sample is 80 samples or below and large sample corresponds to above 80 samples. A small sample should consider data point that is outside $\pm$ 2.5 as outlier, while large sample should consider observation that is outside $\pm$ 4.0. Therefore, this study has large sample for its analysis since 393 questionnaires were returned by the respondents and $\pm$ 3.0 is used as the standardised residual (Z-score) as merging for detecting outliers (Garcia, 2012; Pallant, 2011; Tabachnick & Fidell, 2007). Moreover, the fitness of the model was determined without treating the outlier in the dataset and found $R^2 = 0.359$. Considering the effect of influential outliers in the dataset by using analysis of standardised scores and regard any observation that is far from $\pm$ 3.0 as outliers, only 20 cases (51, 67, 72, 187, 189, 190, 192, 193, 194, 195, 197, 198, 199, 204, 205, 206, 207, 208, 212, 215) were identify as potential influential outlier as their $R^2 = 0.528$ in SEM analysis. The distribution of outliers with affected cases of standardise scores exceeding $\pm$ 3.0 in the dataset is shown in Table 5.8.

Table 5.8: Cases with Outliers Based on the Standardised Scores

Items	**Cases with Standardised Values Exceeding $\pm$ 3.0**
EE4	51, 67, 190.
EE5	72, 212.
SI 5	67, 189, 190, 192, 193,
FC3	206, 207, 208
FC4	204, 215,
CP3	51, 205.
CP4	187, 192, 193.
SQ3	194, 195, 197, 198,
US3	199, 197.
UBI3	215, 189, 190.
UBI4	193.
BCU7	67, 189, 204.

Previous study has stressed that identification and treatment of outliers in the dataset necessitate their deletion from the observations in multivariate analysis (Hair et al., 2010). Thus, researchers have recommended removal or deletion of identified outliers from the entire observation regardless of the discovery techniques (Aguinis et al., 2013; Garcia, 2012; Kruschke et al., 2012). In the context of this study, the whole of 20 cases that contain outliers were deleted from the entire dataset for further analysis which is in line with Aguinis et al. (2013), Garcia (2012), Kruschke et al. (2012) and Pallant (2011) that outliers should be deleted from the data set prior to the further analysis. The deletion of 20 cases that contain influential outliers increases the fitness of the conceptual research model to 0.528 when compare with R^2 when the outliers were not treated.

5.2.3 Test of Normality

Assumption of normal distribution is regarded as important for many of the statistical tests and structural equation modelling (Hair et al., 2010; Hair, Black, Babin, Anderson, & Tathamir, 2007). Hair et al. (2007) argued that normality enhance the shape of the data distribution for an individual metric variable and its correspondence to the normal distribution which is the benchmark for statistical methods. Moreover, Pallant (2011) emphasised that normality of the data to be used for the analysis can be determined through Skewness and Kurtosis' values, Kolmogorov-Smirnov statistic, viewing of Histogram chart, Normal Q-Q plot and Detrended Normal Q-Q plots. Indeed, Skewness value provides the indication about the symmetry of the distribution, while the Kurtosis provides the information about the peakedness of the distribution. Hence, for the data to be perfectly normal, both values of Skewness and Kurtosis must be zero (Pallant, 2011).

This study performs the normality test and found that both the values of Skewness and Kurtosis are either below or more than zero for all the variables as shown in the descriptive tables of Appendix G, meaning that the data is not normal. The results of significant column in the Kolmogorov-Smirnov statistic are below 0.05 which is the indication of violation of assumption of normality. Besides that, all the generated histograms in the normality test show that the charts are not symmetric while the points do not lie along 45^0 diagonal line from the bottom to the top right of the chart labelled Normal Q-Q Plot. Indeed, the Detrended Normal Q-Q Plots have the points clustering around zero line, which indicate the non-normality of the distribution. Hence, the non-normality of the collected data in this study calls for the usage of PLS-SEM for the data analysis as PLS-SEM takes care of the standard error that may cause the non-normality of the distribution (Hair et al., 2011a; Sosik, 2009).

5.2.4 Test of Multicollinearity

Multicollinearity has argued to be the relationship among independent variables with the threshold value of 0.9 and above (Pallant, 2011; Hair et al., 2010; Tabachnick & Fidell, 2007). The existence of multicollinearity can place a great effect on the predictive power of model together with the estimation coefficient and the statistical significance tests (Hair et al., 2007). Thus, assessment of individual contribution of the predictive variable becomes impossible or difficult due to the mix-up of predictive variables (Field, 2009; Hair et al., 2007). Moreover, researchers have shown that increases in the multicollinearity bring about increment in the standard error of regression coefficient and resulted in the scepticism of the statistical significance of the affected coefficients (Pallant, 2011; Field, 2009; Tabachnick & Fidell, 2007).

Based on the argument of previous researchers, this study tests the multicollinearity in the dataset through the Pearson's correlation and Variance Inflation Factor (VIF) together with Tolerance values as suggested by some researchers (Hair et al., 2007; Meyer et al., 2006). Copper and Schindler (2003) and Allison (1999) stressed that the correlation between the variables should not beyond 0.75, while correlation that above 0.8 is problematic. The correlations between all the variables in Table 5.9 are below 0.75 and highest Pearson's correlated value between independent variables is 0.611 and less than 0.7. Hence, the dataset for this study is freed from multicollinearity problem.

Table 5.9: Correlation among the Variables

	Constructs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Perform_Expect	1								
2	Effort_Expect	.529**	1							
3	Social_Influence	.256**	.362**	1						
4	Facilitating_Condition	.439**	.487**	.362**	1**					
5	Compatibility	.387**	.611**	.377**	.550**	1**				
6	Service_Quality	.368**	.458**	.406**	.632**	.573**	1**			
7	User_Satisfaction	.436**	.513**	.313**	.523**	.583**	.639**	1**		
8	User_Behavioural_Int	.392**	.497**	.345**	.624**	.571**	.647**	.668**	1**	
9	Broadband_Cont_Us	.458**	.534**	.403**	.560**	.526**	.545**	.650**	.717**	1**

**. Correlation is significant at the 0.05 level (2-tailed).

Furthermore, multicollinearity is further tested in this study by examining the values of Tolerance and VIF as shown in Table 5.10, while the associated results in testing for multicollinearity can be found in Appendix H. Hair et al. (2007) simply described tolerance values as the amount of variability of the selected independent variable that failed to explain by other independent variable, while variance inflation factor (VIF) is the inverse of tolerance value. Indeed, researchers have postulated that any VIF value that exceeds 10 and tolerance value that is below 0.10 indicate the problem of multicollinearity (Pallant, 2011; Hair et al., 2010; Hair et al., 2007). The values of tolerance and VIF in Table 5.10, all the values of Tolerance are more than 0.10 while VIF values are less than 10. Therefore, the result indicates that this study does not violate the multicollinearity problem.

Table 5.10: Values of Tolerance and VIF

Independent Variables	**Collinearity Statistics**	
	Tolerance	**VIF**
Performance Expectancy	.675	1.481
Effort Expectancy	.509	1.963
Social Influence	.783	1.278
Facilitating Condition	.511	1.959
Compatibility	.496	2.016
Service Quality	.508	1.968

5.3 Structural Equation Modeling

Structural equation modeling (SEM) has been stressed as a statistical methodology that considers a confirmatory approach of a structural theory that generates observation on multiple variables and bearing on some phenomenon (Barbara, 2010; Bentler, 1988). The studies of Reinartz et al. (2009), Barroso et al. (2010) argued that SEM was develop as an alternative analytical technique which performs the functions that are similar to multiple regression but outweigh in some instances. Besides that, SEM is useful to examine a set of relationships among one or more dependent variables either continuous or discrete, stressed by Hair et al. (2010). Thus, the choosing of SEM as analytical package in this study helped the researcher in analysing multiple relationships between independent and dependent variables compare to other previously generation model, such as linear regression, ANOVA and MANOVA.

Previous studies have emphasised that there are two types of SEM which are characterised with different objectives as Covariance-Based SEM (CB-SEM) and Partial Least Square SEM (PLS-SEM) (Hair et al., 2014; Armin & Friedrich, 2012; Hair et al., 2011a; Barroso et al., 2010). The CB-SEM is purposely for estimation of the parameters of the model (loadings and path values) so as to reduce the disparity between the sample covariance and those predicted by the theoretical model (Hair et al., 2011a; Barroso et al., 2010). This implies that CB-SEM put more emphasis on the model fit, which is oriented toward testing of a strong theory characterising it to suite for the confirmatory research (Barroso et al., 2010).

On the other hand, PLS-SEM takes care and eases the prediction of the dependent variables by maximising the variance explained (R^2) of the dependent variable (Ringle et al., 2012; Hair et al., 2011a; Barroso et al., 2010). Moreover, PLS-SEM has capacity and attribute of estimating normal and non-normal data distribution which requires further treatment in CB-SEM (Hair et al., 2014; Reinartz et al., 2009; Ringle et al., 2009). This study uses PLS-SEM as the statistical technique to determine the contributing factors for continuous usage of broadband technology among youth in the rural areas of Malaysia. Hence, CB-SEM is not chosen for this study due to the restriction it has on the construct measurement properties with one or two items, whereas PLS-SEM accepts minimum of one item on its construct (Hair et al., 2011a).

Furthermore, PLS-SEM is recognised as having many advantages than CB-SEM by recognising models that include elements produce limited theoretical foundation and more prediction-oriented in explaining the dependent variables (Henseler et al., 2009; Ringle et al., 2006). PLS-SEM is acceptable as analytical package in this study since it accepts the data that violates the assumption of normality which should be expected while dealing with data from the youth, unlike the CB-SEM that is very sensitive to the assumption of normality (Hair et al., 2011b; Ringle et al., 2006; Haenlein & Kaplan, 2004; Chin et al., 2003). Conclusively, PLS-SEM recognises both reflective and formative measurement models unlike CB-SEM that considers formative model for only complex model but limiting its specification rules (Hair et al., 2011a).

In addition, Hair et al. (2014), Barroso et al. (2010), Haenlein and Kaplan (2004) and Fornell (1982) stressed that SEM is useful for easing the analysis of complex model and can be used in the following context which makes it to be choosing in this study:

i. Clearly modeling of measurement errors for observed variables.

ii. Simultaneously model the relationships among multiple independent or exogenous variables and dependent or endogenous variables.

iii. Include unobservable variables that are indirectly measured by indicators.

iv. Combine and test a priori knowledge and hypotheses with empirical data.

v. Evaluate loading of observed items on their constructs.

5.3.1 Assessment of Measurement Model

The assessment of PLS-SEM obeys the two steps approaches that involve measurement model (outer model) and structural model assessments (inner model) (Hair et al., 2011a; Wilson, 2010; Henseler et al., 2009; Ringle et al., 2006). The first step in the evaluation of model in PLS-SEM is the assessment of measurement model which pays attention to the reliability and validity of measures that form each of the constructs (Hair et al., 2014; Wilson, 2010; Chin, 2010). Researchers have stressed that the main activities in the assessment of measurement model deals with internal consistency reliability, indicator reliability, convergent validity and discriminant validity (Hair et al., 2014; Hair et al., 2011a; Chin, 2010; Hair et al., 2010).

Moreover, the internal consistency reliability of the measurement can be verified by using composite reliability which should be higher than the threshold of 0.7 as the acceptable value. Therefore, the reliability of the indicators which is known as the indicator loadings become acceptable with the loading of 0.7 and above (Hair et al., 2014; Hair et al., 2011a; Chin, 2010). Hence, composite reliability (*ρc)* is mathematically calculated as represented in equation 5.1.

$$\rho c = \frac{(\sum \lambda i)^2 \text{ var } F}{(\sum \lambda i)^2 \text{ var } F + \sum \Theta\, ii} \qquad (5.1)$$

Where

λi denotes factor loading

F denotes factor variance

Θii denotes unique/ error variance.

In addition, the validity phase of measurement assessment of PLS-SEM model focuses on the convergent validity and the discriminant validity (Hair et al., 2014; Hair et al., 2011a; Chin, 2010). Convergent validity is the evidence of showing that interested measure is related to the rest of the shared measures in the constructs (Peter, 2009). In other words, Peter (2009), Alex et al. (2007) argued that convergent validity is the evidence of establishing efficient relationship between scales that are under review and the validated scales believed to measure the constructs). Meanwhile, Hair et al. (2011a), Chin (2010) and Fornell and Larcker (1981) stressed that Average Variance Extracted (AVE) should be used for measuring convergent validity of the constructs with its standard threshold value which should be higher than 0.50. Indeed, an AVE value of 0.50 represents that 50% or more variance of the indicators should be accounted for (Chin, 2010; Henseler et al., 2009).

Furthermore, Chin (2010), Fornell and Larcker (1981) emphasised that AVE is applicable for the latent variable with reflective indicators which can be calculated as in equation 5.2:

$$\text{AVE} = \frac{(\sum \lambda i^2)\ \text{var}\ F}{(\sum \lambda i^2)\ \text{var}\ F + \sum \Theta\ ii} \qquad (5.2)$$

Where

λi denotes factor loading

F denotes factor variance

Θii denotes unique/ error variance.

The importance of AVE in the validity phase of measurement model in PLS-SEM helps in determining the construct's indicator that could be used for the model fitness. Therefore, there is need to set the PLS windows parameters before deleting the items/ factors that are not feet for the model's variance explanation (Hair et al., 2014; Chin, 2010).

Lastly, the discriminant validity as the second phase of validating the measurement model examines how each item relates to each construct and how strongly is the measured construct relate to the construct it intends to reflect (Hair et al., 2014; Hair et al., 2011a). However, previous studies have argued that the measured construct must not have a strong connection with another construct in the model in order to commit the discriminant validity problem (Chin, 2010; Wilson, 2010). Therefore, the discriminant validity can be verified by comparing the square of AVE to the rest of loadings in the each construct with expectation of square of AVE to be higher (Hair et al., 2014; Chin, 2010). Besides that, researchers like Hair et al. (2014), Hair et al. (2011a), Chin (2010), Wilson (2010) have argued that discriminant validity can be further verified by ensuring that the indicator or item loadings are higher than all of its cross loadings. Hence, the threshold values for assessing the measurement model (outer model) (Chin, 2010; Hair et al., 2010; Henseler et al., 2009; Bagozzi and Yi, 1988) are duly followed in this study as shown in the Table 5.11.

Table 5.11: Measures and Threshold Values for Assessment of Measurement Model

Assessment Subjects	**Measures**	**Threshold Values**
Internal Consistency Reliability	Composite Reliability	> 0.7
Indicator Reliability	Factor Loadings	> 0.7
Convergent Validity	Average Variance Extracted (AVE)	> 0.5
Discriminant Validity	Fornell-Larcker Criterion	-
Discriminant Validity	Cross-loadings criterion Comparison	-

5.3.1.1 Deletion Process of Items in the Measurement Model

In order to achieve the standardised values for reliability and validity of the measures, the parameters on the windows option of SmartPLS version 2.0 was set by ensuring that Cronbachs Alpha, AVE and Composite Reliability are enclosed in the display tooltip box. This allows the researcher to determine the value of the AVE of each construct in the model and to identify number of items that should be used for further analysis in the PLS-SEM. Moreover, the PLS algorithm was run and found the AVE of UBI, SQ and BCU below 0.50 while the rest of the constructs (PE, EE, SI, CP, FC and US) have their AVE above 0.50. This calls for further treatment on the UBI, SQ and BCU in order to obey the rules of assessing measurement models (Hair et al., 2014; Hair et al., 2011a; Chin, 2010; Wilson, 2010).

The UBI construct was checked after running the PLS algorithm and found that its AVE is 0.421 which is below the threshold value of 0.50. Besides that, UBI2 was found having its indicator loading of 0.422 which is the least among the four items in the UBI construct. Hence, there was deletion of item UBI2 while the PLS algorithm was run for the second time and AVE of 0.586 is achieved. Moreover, the SQ construct initially has AVE value of 0.323 with indicator loading 0.221 for SQ1 item. There was deletion of SQ1 item which increases the AVE to 0.414 and SQ3 item has its indicator loading of 0.382 which is the least among the remaining items. Indeed, item SQ3 was deleted and the PLS algorithm was run again increasing the new AVE of SQ construct to 0.481, but still below threshold value of 0.50. Therefore, item SQ5 was deleted since it has the least item loading factor of 0.462 when compare to the rest of items in the SQ construct and increases the AVE to 0.553 which is higher than standard value of 0.50 for acceptable AVE.

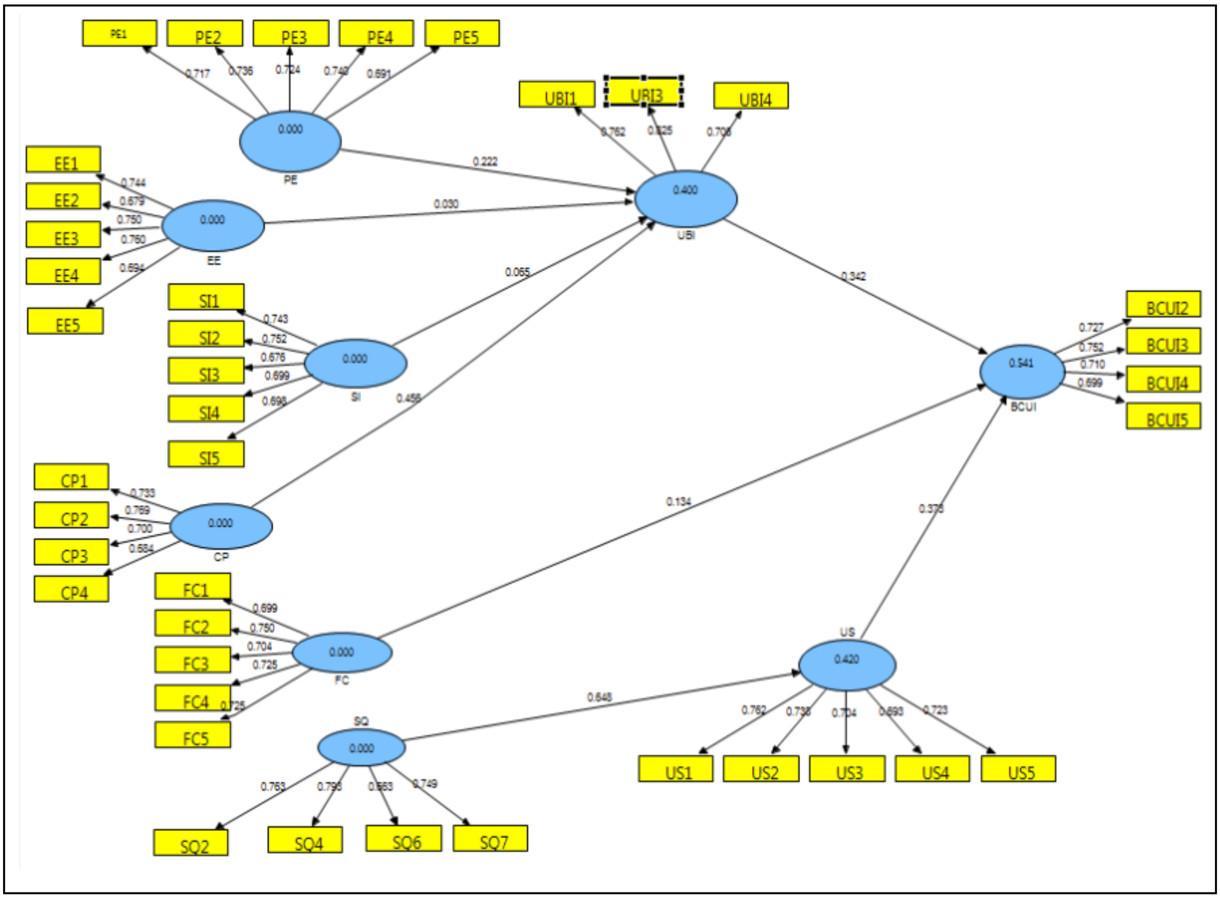


Figure 5.11: Constructs and the Remaining Items after Deletion

In addition, the BCU construct as shown in Figure 5.11 initially has 7 items with AVE value of 0.121 which is below the threshold value of 0.50 for AVE. The item BCUI6 has its indicator loading of 0.231 and was the least of the remaining indicator loadings. Therefore, item BCU6 was deleted and the AVE value was increased to 0.363 while BCU1 with indicator loading of 0.322 becomes the least of the remaining 6 items and called for deletion. The new AVE value was found to be 0.452 after the deletion of BCU1. The item BCU7 with the indicator loading of 0.435 becomes the smallest of the remaining 5 items. Indeed, BCU7 was deleted from the construct while the PLS algorithm was ran and AVE increased to 0.522 which is higher than 0.50 threshold value of AVE. Hence, all the 9 constructs as shown in Figure 5.11 and Table 5.14 have their AVE above 0.50 after the treatment of UBI, SQ and BCU constructs and fit for assessing reliability and validating of measures.

5.3.1.2 Results of Reliability and Validity of Measurement Model

The assessment of measurement model was conducted by using SmartPLS 2.0 software package while some results were obtained for both reliability and validity of the measurement model. Firstly, the composite reliability values of all the latent variables in the model were examined while the obtained results showed that all the correspondent composite reliability values of constructs in the model are above the recommended threshold value of 0.70 as shown in Table 5.12 (Hair et al., 2011a; Henseler et al., 2009; Ringle et al., 2006).

Table 5.12: Composite Reliability Values

Constructs	Composite Reliability
BCU	0.813456
CP	0.812879
EE	0.847633
FC	0.843729
PE	0.844647
SI	0.838706
SQ	0.831103
UBI	0.808903
US	0.846269

Additionally, the outer factor loadings were examined and the obtained results revealed that majority of factor loadings are above 0.70 as suggested by Hair et al. (2011a) and Henseler et al. (2009). However, some loading items are below 0.70, such as BCU5 (0.698949), CP3 (0.699663) and CP4 (0.683744). Others are EE2 (0.678803), EE5 (0.694162), FC1 (0.698753), PE5 (0.691492), SI3 (0.676228), SI4 (0.698924), SI5 (0.698346), SQ6 (0.662672) and US4 (0.692548). Indeed, all the outer factor loadings with their values below threshold value 0.70 are retained based on the argument of Hair et al. (2011a) that any factor loading that is below 0.70 should be used for further analysis if their composite reliability values are higher than 0.70. Thus, the outer factor loadings values below 0.70 have their correspondents' composite reliability values above 0.80 which make them to be useful in our study. The outer factor loadings with below and above 0.70 are shown in Table 5.13.

Table 5.13: Outer Factor Loading Values

	BCU	**CP**	**EE**	**FC**	**PE**	**SI**	**SQ**	**UBI**	**US**
BCU2	0.727193								
BCU3	0.752047								
BCU4	0.710021								
BCU5	0.698949								
CP1		0.732636							
CP2		0.768591							
CP3		0.699663							
CP4		0.683744							
EE1			0.743763						
EE2			0.678803						
EE3			0.749733						
EE4			0.760167						

Table 5.13 Continued

EE5	0.694162						
FC1		0.698753					
FC2		0.749722					
FC3		0.70371					
FC4		0.725118					
FC5		0.724846					
PE1			0.716691				
PE2			0.735776				
PE3			0.724391				
PE4			0.739904				
PE5			0.691492				
SI1				0.742564			
SI2				0.752445			
SI3				0.676228			
SI4				0.698924			
SI5				0.698346			
SQ2					0.763398		
SQ4					0.792554		
SQ6					0.662672		
SQ7					0.748712		
UBI1						0.761531	
UBI3						0.824546	
UBI4						0.706255	
US1							0.761654
US2							0.737638
US3							0.703852
US4							0.692548
US5							0.722719

Furthermore, the convergent validity was assessed by examining average variance extracted (AVE) values and the results showed that all the AVE values are above the threshold values of 0.50 as suggested by the researchers (Hair et al., 2011a; Henseler et al., 2009; Ringle et al., 2006). Hence, the convergent validity of the constructs are established and shown in Table 5.14.

Table 5.14: Average Variance Extracted (AVE)

Constructs	AVE Values
BCU	0.521761
CP	0.52113
EE	0.527154
FC	0.519349
PE	0.521075
SI	0.510208
SQ	0.552656
UBI	0.586201
US	0.524316

The validity process proceeded by examining the discriminant validity in two different phases. The first phase is through the use of Fornell-Larcker Criterion which says that square root of values of AVE must be higher than any other latent construct. Thus, the results showed that the square roots of values of AVE (Yellow Colour) are higher than the rest of the correspondent latent constructs, shown the establishment of discriminant validity and revealed in Table 5.15.

Table 5.15: Discriminant Validity Values (Fornell-Larcker Criterion)

	BCU	CP	EE	FC	PE	SI	SQ	UBI	US
BCU	**0.722330**								
CP	0.5764	**0.721893**							
EE	0.5567	0.606	**0.726054**						
FC	0.5385	0.5715	0.5059	**0.720659**					
PE	0.5011	0.3971	0.5446	0.4644	**0.721855**				
SI	0.2776	0.3957	0.367	0.3761	0.3005	**0.714288**			
SQ	0.4641	0.5314	0.4426	0.618	0.3868	0.4225	**0.743408**		
UBI	0.6522	0.5883	0.4511	0.5891	0.4392	0.323	0.606	**0.765638**	
US	0.6582	0.5926	0.5149	0.5447	0.4521	0.3424	0.6479	0.6203	**0.724097**

Conclusively, the second phase of validity process was conducted by examining discriminant validity through the cross loading criterion. The cross loading criterion suggests that all the indicator loadings should be higher than all the corresponding cross loading (Hair et al., 2014; Hair at al., 2011a) and revealed in Table 5.16. Hence, the obtained results in Table 5.16 show that all the values of latent constructs (Yellow Colour) are higher than the values of their cross loading variables which revealed establishment of discriminant validity.

Table 5.16: Discriminant Validity Values (Cross Loading Criterion)

	BCU	CP	EE	FC	PE	SI	SQ	UBI	US
BCU2	**0.7272**	0.3977	0.4455	0.3856	0.3447	0.1983	0.3414	0.4208	0.4222
BCU3	**0.752**	0.4158	0.4684	0.4955	0.4041	0.1998	0.3328	0.5111	0.5202
BCU4	**0.71**	0.4167	0.3528	0.3682	0.3403	0.1978	0.3334	0.4715	0.4772
BCU5	**0.6989**	0.4357	0.3376	0.2921	0.3533	0.2068	0.3353	0.4734	0.4737
CP1	0.3503	**0.7326**	0.5057	0.3109	0.2689	0.2573	0.3205	0.3777	0.3901
CP2	0.4702	**0.7686**	0.45	0.4096	0.295	0.2713	0.3987	0.4725	0.4654
CP3	0.3873	**0.6997**	0.3934	0.4024	0.2945	0.2842	0.3861	0.4176	0.4368

Table 5.16 Continued

CP4	0.4439	**0.6837**	0.4069	0.5183	0.2862	0.3294	0.4217	0.4213	0.4116
EE1	0.4772	0.4598	**0.7438**	0.4188	0.4309	0.3308	0.323	0.3403	0.3724
EE2	0.3975	0.4508	**0.6788**	0.2742	0.3258	0.3431	0.3399	0.2678	0.3616
EE3	0.4326	0.456	**0.7497**	0.4029	0.4031	0.2074	0.3507	0.3645	0.377
EE4	0.342	0.4263	**0.7602**	0.3757	0.4093	0.2312	0.3605	0.3692	0.3908
EE5	0.3782	0.4148	**0.6942**	0.3464	0.4022	0.2457	0.2189	0.2746	0.3716
FC1	0.3206	0.3898	0.3636	**0.6988**	0.2988	0.3285	0.3999	0.3172	0.3223
FC2	0.4733	0.4823	0.4324	**0.7497**	0.3827	0.207	0.4218	0.4344	0.4216
FC3	0.3876	0.4678	0.3716	**0.7037**	0.3621	0.2458	0.5628	0.5421	0.4782
FC4	0.3896	0.3543	0.3522	**0.7251**	0.2954	0.3279	0.4854	0.4587	0.4228
FC5	0.3364	0.3417	0.2811	**0.7248**	0.3195	0.2734	0.3463	0.3438	0.2901
PE1	0.2427	0.177	0.2728	0.1897	**0.7167**	0.1265	0.2206	0.2616	0.1909
PE2	0.3548	0.3207	0.4364	0.4147	**0.7358**	0.3584	0.3083	0.3723	0.2811
PE3	0.3203	0.249	0.3349	0.3252	**0.7244**	0.2396	0.2717	0.2906	0.3477
PE4	0.441	0.3164	0.4621	0.3788	**0.7399**	0.1942	0.3233	0.3607	0.3847
PE5	0.431	0.3513	0.4267	0.324	**0.6915**	0.1181	0.2492	0.2691	0.4241
SI1	0.1582	0.2393	0.3344	0.2003	0.16	**0.7426**	0.2478	0.2583	0.1965
SI2	0.2297	0.3013	0.3329	0.2566	0.202	**0.7524**	0.2919	0.2305	0.2588
SI3	0.1439	0.2393	0.1967	0.136	0.118	**0.6762**	0.2337	0.1112	0.1743
SI4	0.1606	0.267	0.2132	0.308	0.2046	**0.6989**	0.3207	0.1598	0.1791
SI5	0.254	0.3371	0.2008	0.3725	0.3188	**0.6983**	0.3788	0.2954	0.3429
SQ2	0.3007	0.4488	0.3614	0.4758	0.2139	0.3743	**0.7634**	0.4605	0.4773
SQ4	0.3353	0.4117	0.333	0.5758	0.331	0.3223	**0.7926**	0.4624	0.4683
SQ6	0.4075	0.3604	0.2971	0.3473	0.3685	0.247	**0.6627**	0.4086	0.4904
SQ7	0.3305	0.3561	0.3215	0.4386	0.2326	0.3108	**0.7487**	0.466	0.4841
UBI1	0.492	0.4482	0.4663	0.5732	0.4151	0.3006	0.5464	**0.7615**	0.5364
UBI3	0.4958	0.4773	0.3461	0.4544	0.2524	0.2383	0.5167	**0.8245**	0.471
UBI4	0.5078	0.4231	0.2155	0.3165	0.3358	0.1989	0.3215	**0.7063**	0.4114
US1	0.4992	0.4469	0.384	0.3657	0.3804	0.1834	0.4955	0.4442	**0.7617**
US2	0.5579	0.488	0.4134	0.5209	0.4021	0.2854	0.4836	0.5123	**0.7376**
US3	0.4684	0.4475	0.3431	0.3843	0.3488	0.2299	0.4226	0.3958	**0.7039**
US4	0.4306	0.3671	0.3509	0.3189	0.2263	0.3059	0.4774	0.4928	**0.6925**
US5	0.413	0.3867	0.3668	0.3672	0.2628	0.2365	0.4637	0.3914	**0.7227**

5.3.2 Assessment of Structural Model

5.3.2.1 Overview of Structural Model Assessment

Evaluation of structural model was investigated after establishing the appropriateness of the measures in the conceptual research model. The assessment of structural model aspect of PLS-SEM is basically on the establishment of variance explained (R^2) of the model and the significance of all the estimated path coefficients (Hair et al., 2014; Hair et al., 2011a; Ringle & Spreen, 2007; Ringle et al., 2006). Therefore, this study uses PLS algorithm style approach to obtain the R^2 for primary and secondary endogenous variables, while bootstrapping technique was used to obtain the significances of all the path coefficients between exogenous and endogenous variables. Bootstrapping technique is used to test for the significance of the path coefficient since the PLS assumes that used data are not normally distributed and thus, non parametric bootstrap procedure needs to be applied in order to obtain the significance of inner weights (Hair et al., 2014; Hair et al., 2011a; Chin, 2010; Davison & Hinkley, 1997).

Furthermore, structural model evaluation phase of PLS examines the effect size (f^2) of the endogenous variable which investigate whether the impact of a particular exogenous variable affect the endogenous variable (Hair et al., 2014; Hair et al., 2011a; Chin, 2010). Indeed, the f^2 of our model was evaluated by removing and replacing a particular endogenous variable in trying to see its impact on the endogenous variable. The f^2 is mathematically represented by equation 5.3:

$$f^2 = \frac{R^2_{included} - R^2_{excluded}}{1 - R^2_{included}} \quad (5.3)$$

Where,

f^2 is the effect size of R^2 when a particular exogenous variable is present and omitted in the model.

$R^2_{included}$ is the value of R^2 when all the exogenous variables are existed.

$R^2_{excluded}$ is the value of R^2 when a particular exogenous variable is omitted from the model.

In addition, Predictive Relevance (Q^2) of the model which is the evaluation of the magnitude of R^2 of endogenous variable is evaluated by using blindfolding technique through cross-validated redundancy (Hair et al., 2014; Hair et al., 2011a). Blindfolding technique is adequate for evaluating cross-validated redundancy while examining the predictive relevance of the model since it includes all the key element of the path model and structural model during the operation (Hair et al., 2014; Hair et al., 2011a). Moreover, the effect size (q^2) is recommended to evaluate in the structural model assessment in PLS-SEM (Hair et al., 2014). The q^2 explains the impact of a particular exogenous variable on the predictive relevance Q^2 of endogenous variable and mathematically represented by equation 5.4:

$$q^2 = \frac{Q^2_{included} - Q^2_{excluded}}{1 - Q^2_{included}} \quad (5.4)$$

Where,

q^2 is the effect size of Q^2 when a particular exogenous variable is omitted in the model.

$Q^2_{included}$ is the value of Q^2 when all the exogenous variables are existed.

$Q^2_{excluded}$ is the value of Q^2 when a particular exogenous variable is omitted from the model.

Table 5.17: Measures and Threshold Values for Assessment of Structural Model

Assessment Subjects	**Measures**	**Threshold Values**
Coefficient of Determination	R^2	0.19 (weak), 0.33 (moderate), 0.67 (substantial).
Path Coefficient	t-value	1.65 ($p < 0.10$), 1.96 ($p < 0.05$), 2.58 (0.01)
Effect Sizes	f^2 and q^2	0.02 (small), 0.15 (medium), 0.35 (large)
Predictive Relevance	Q^2	0.02 (small), 0.15 (medium), 0.35 (large)

Conclusively, Table 5.17 represents assessment of parameters of the structural model in PLS-SEM such as Coefficient of Determination (R^2), estimate of path coefficient, effect sizes (f^2 and q^2) and Predictive Relevance (Q^2) follow some criterion which is known as rules of thumb (Hair et al., 2014; Hair et al., 2011a; Henseler et al., 2009; Ringle & Spreen, 2007; Ringle et al., 2006; Chin, 1998). The Table 5.17 summarises the measures and threshold values which are applied in this study for testing the inner model in PLS-SEM.

5.3.2.2 Results of Assessment of Structural Model

The coefficient of determination R^2 were assessed in this study for the primary and secondary endogenous latent variables as recommended by some researchers (Hair et al., 2014; Hair et al., 2011a; Henseler et al., 2009). Based on the argument of Hair et al. (2014), Hair et al. (2011a) and Chin (1998), R^2 of 0.19, 0.33 and 0.67 indicate weak, moderate and substantial or good R^2 respectively. The R^2 value of 0.5407 was obtained for BCU which is the main endogenous latent variable and shows that the R^2 for BCU is almost substantial. Besides that, the R^2 value of 0.4004 was obtained for UBI, while R^2 value of 0.4198 was derived for US showing that both of the secondary endogenous latent variables are above moderate level. The results of coefficient of determination of endogenous latent variables are presented in Table 5.18.

Table 5.18: Values of Coefficient of Determination (R^2)

Construct Type	**Constructs**	**R^2**
Primary endogenous variable	BCU	0.5407
	UBI	0.4004
Secondary endogenous variable	US	0.4198

Furthermore, the confidential intervals of path coefficients were determined through the bootstrapping technique. The bootstrapping technique uses the repeated random sampling with replacement from original sample in order to create a bootstrap samples which eventually obtain standard errors for hypothesis testing (Hair et al., 2014; Hair et al., 2011a). Moreover, the number of cases of usable sample (n = 373) was set before running the bootstrapping in PLS 2.0 and the number of bootstrap samples was set to 5,000 based on the recommendation of some researchers (Hair et al., 2011a; Henseler et al., 2009; Ringle et al., 2006). Hence, five hypotheses out of the eight main hypotheses support the formulated hypotheses by using significant level of $p < 0.01$ as depicted in Table 5.19 and pictorially represented in Figure 5.12.

Table 5.19: Results of Path Coefficients (Direct Relationship)

Hypotheses	Path	Correlation Between Dimension	Original sample (O)	t-value	Test Results
H_1	β1	PE -> UBI	0.2223	3.3559*	Supported
H_2	β2	EE -> UBI	0.0298	0.3702	Not Supported
H_3	β3	SI -> UBI	0.0647	1.413	Not Supported
H_4	β4	CP -> UBI	0.4564	5.8132*	Supported
H_5	β5	FC -> BCU	0.1337	1.4325	Not Supported
H_6	β6	SQ -> US	0.6479	10.5867*	Supported
H_7	β7	US -> BCU	0.3733	4.0669*	Supported
H_8	β8	UBI -> BCU	0.3418	4.3483*	Supported

Note: degree of freedom: 5,000; * significant at $p < 0.05$ (2-tailed test)

The Figure 5.12 represents validated structural model which expresses the supported and non supported path coefficients from the formulated hypotheses. The sample size 5,000 was used for the bootstrap while testing for the significance level of the formulated hypotheses. Indeed, the values in the parentheses in Figure 5.12 indicate t-values while the values outside the parentheses denote path coefficients. Besides that, the solid lines represent significant relationships at ($p < 0.01$) and the dotted lines represent non-significant relationship at ($p < 0.01$).

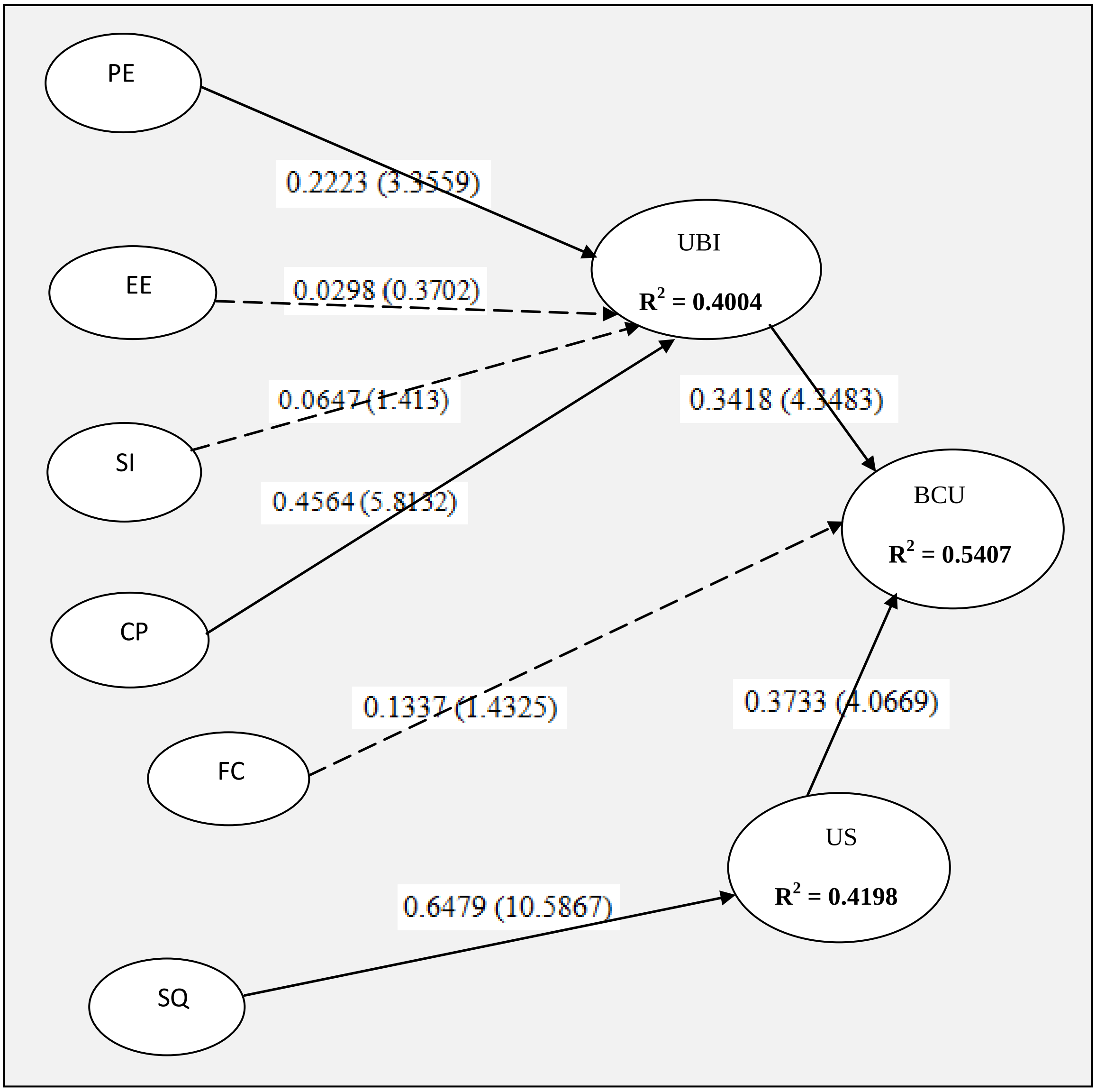


Figure 5.12: Validated Structure Model

In addition, the f^2 effect size which is a measure of the impact of a specific exogenous construct on the endogenous construct was examined and the effect sizes of FC -> BCU, PE -> UBI, UBI -> BCU and US -> BCU are found to be small. From the Table 5.20, it shows that there are no effect sizes on EE -> UBI and SI -> UBI, while the effect size of CP -> UBI is medium considering the recommendation of some researchers (Hair et al., 2014; Hair et al., 2011a; Henseler et al., 2009;

Ringle & Spreen, 2007; Ringle et al., 2006; Chin, 1998). Hence, the SQ -> US only produces large effect size.

Table 5.20: Values of Effect Size (f^2)

Correlation Between Dimension	Path Coefficients	Effect Size (f^2)	Remarks
CP -> UBI	0.4564	0.1967	medium
EE -> UBI	0.0298	0	no effect
FC -> BCU	0.1337	0.024	small
PE -> UBI	0.2223	0.0567	small
SI -> UBI	0.0647	0.005	no effect
SQ -> US	0.6479	0.7241	Large
UBI -> BCU	0.3418	0.1392	small
US -> BCU	0.3733	0.1721	small

The study further examined the predictive relevance (Q^2) by using blindfolding procedure through the cross-validated redundancy approach. Indeed, the Q^2 values for a particular endogenous latent construct that is larger than zero (0) indicates that the latent variable that explain the endogenous latent construct have the predictive relevance (Hair et al., 2011a; Henseler et al., 2009; Ringle & Spreen, 2007; Ringle et al., 2006). Moreover, the omission distance (D) must be between 5 and 10, while the number of cases must not be the multiple of D (Hair et al, 2011a; Ringle & Spreen, 2007). Therefore, the blindfolding procedure was performed in this study with an omission distance of 6 (with 63 cases). Hence, the results from Table 5.21 show that all Q^2 values are larger than zero which indicates the establishment of predictive relevance.

Table 5.21: Values of Predictive Relevance (Q^2)

Endogenous Constructs	SSO[a]	SSE[b]	Q^2 Values [c]
BCU	1492	1109.99	0.256
UBI	1119	852.2633	0.2384
US	1865	1452.8647	0.221

[a]Sum of Square of Observation
[b]Sum of Square of Prediction Errors
[c]Q^2 values is calculated as 1-SSE/SSO

Table 5.22: Values of Effect Size (q^2)

Correlation Between Dimensions	Path Coefficients	effect size (q2)	Remarks
CP -> UBI	0.4564	0.1329	Small
EE -> UBI	0.0298	0.0095	None
FC -> BCU	0.1337	0.0079	None
PE -> UBI	0.2223	0.0303	Small
SI -> UBI	0.0647	0.0121	None
SQ -> US	0.6479	0.1284	Small
UBI -> BCU	0.3418	0.6882	Large
US -> BCU	0.3733	0.6937	Large

The effect size (q^2) which test the impact of particular exogenous latent construct on the predictive relevant (Q^2) of endogenous latent construct was examine by using blindfolding procedure through the cross-validated redundancy approach. Based on the recommended threshold values of Hair et al. (2014), Hair et al. (2011a), Henseler et al. (2009), Ringle and Spreen (2007), Ringle et al. (2006) and Chin (1998), the results of q^2 effect size in Table 5.22 shows that there are no effect of Q^2 between EE -> UBI, FC -> BCU and SI -> UBI. Moreover, CP -> UBI, PE -> UBI and

SQ -> US has small effect size q^2 on each other. Conclusively, both UBI -> BCU and US -> BCU recorded large q^2 effect size on the predictive relevance Q^2.

5.4 Assessment of Mediation Effect

Preacher and Hayes (2008) argued that mediation acts as a process by which some variables exert their influences on another variable through the intervening of another variable called mediator. Thus, a mediator exhibits relationship between the predictor and criterion variables (Hair et al., 2014; Preacher & Hayes, 2008; Preacher and Hayes, 2004) and explain the extent of the relationship between the predictor and criterion variables. Indeed, the mediating process that contains only one mediator is considered as simple mediation (Preacher & Hayes, 2008; Preacher & Hayes, 2004), while the process that has more than one intervening variable between the predictor and criterion variables is regarded as multiple mediation (Preacher & Hayes, 2008; Cheung, 2007). Hence, the conceptual research model for this study falls into the class of simple mediation.

Furthermore, testing of simple mediation effect is best addressed by using Preacher and Hayes (2004) through the Sobel test approach. The Sobel test is assessed by configuring the SPSS macro in SPSS statistical package version 20 (Preacher & Hayes, 2008; Preacher & Hayes, 2004). A macro is a program that runs whenever a shortcut command is given for the execution. Besides that, the Sobel test procedure in the SPSS version 20 was set to first order (1st order), while the bootstrap sample was set to 5,000 as recommended by the researchers (Preacher & Hayes, 2008; Preacher & Hayes, 2004). Though, the simple mediation is recommended to be assessed by Baron and Kenny (1986) as follows in order to conclude that mediation occurs between exogenous and endogenous variables:

i. The total effect of independent variable (X) on the dependent variable (Y).
ii. The effect of independent variable (X) on the proposed mediator (M).
iii. The effect of mediator (M) on the dependent variable (Y), while controlling the independent variable (X).
iv. The direct independent variable (X) on the dependent variable (Y), while controlling the mediator (M).

However, many researchers have expressed their contradiction on the submission of the first recommendation of Baron and Kenny (1986) that the total effect should be the determinant of testing for mediation in the model and throw support for the Sobel test of Preacher and Hayes (2004). This led to the conclusion of many researchers that non-significant of total or direct test should not be taken as perquisite to indirect test while testing for mediating effect (Derek et al., 2011). The researchers stressed that the major condition for testing for mediation should best focus on the indirect effect which is Sobel test from Preacher and Hayes (Zhao et al., 2010; Hayes, 2009; MacKinnon et al., 2002; Shrout & Bolger, 2002). Besides that, the determinant of mediating effect should infer the consideration of values of normal distribution (z) and the two tailed *p*-value (Preacher & Hayes, 2004).

5.4.1 Results of Mediating Effect

The determination of significance of mediating effect for testing hypotheses H_9, H_{10}, H_{11}, H_{12} and H_{13} were conducted by following Sobel (1982)'s test as mostly suggested by some researchers using PLS (Helm et al., 2010; Bontis et al., 2007). Thus, this study uses the exact Sobel test as highlighted by Preacher and Hayes (2004) to investigate the simple mediation path which is mathematically represented in equation 5.5:

$$z = \frac{a \times b}{\sqrt{b^2 \times s_a^2 + a^2 \times s_b^2 + s_a^2 \times s_b^2}} \qquad (5.5)$$

Where:

a is the PLS estimate of the path coefficients between X->M

b is the PLS estimate of the path coefficients between M->Y, and

s_a^2 and s_b^2 are the bootstrap standard errors of a and b respectively.

Hence, the consequence of Hypotheses H_9, H_{10}, H_{11}, H_{12} and H_{13} are determined by considering *p*-value of ($p < 0.05$) and z to be ± 1.96 as recommended by Preacher and Hayes (2004). The raw outputs of mediating analysis can be found in Appendix I.

The Hypothesis H_9 which is the test of mediating effect of UBI on the relationship between PE and BCU as shown in phase A of mediation analysis in Figure 5.13 is significant while considering the results of indirect effect and significance using normal distribution, where z = 7.3821 and p = 0.0000 which is far below 0.05 as revealed in Table 5.24. Besides, all the phases of direct and total effect analytical paths have their *t* values significant statistically as they are above two tailed test of 1.96 and shown in Table 5.23. Hence, hypothesis H_9 is considered is supported as UBI mediate the relationship between PE and BCU.

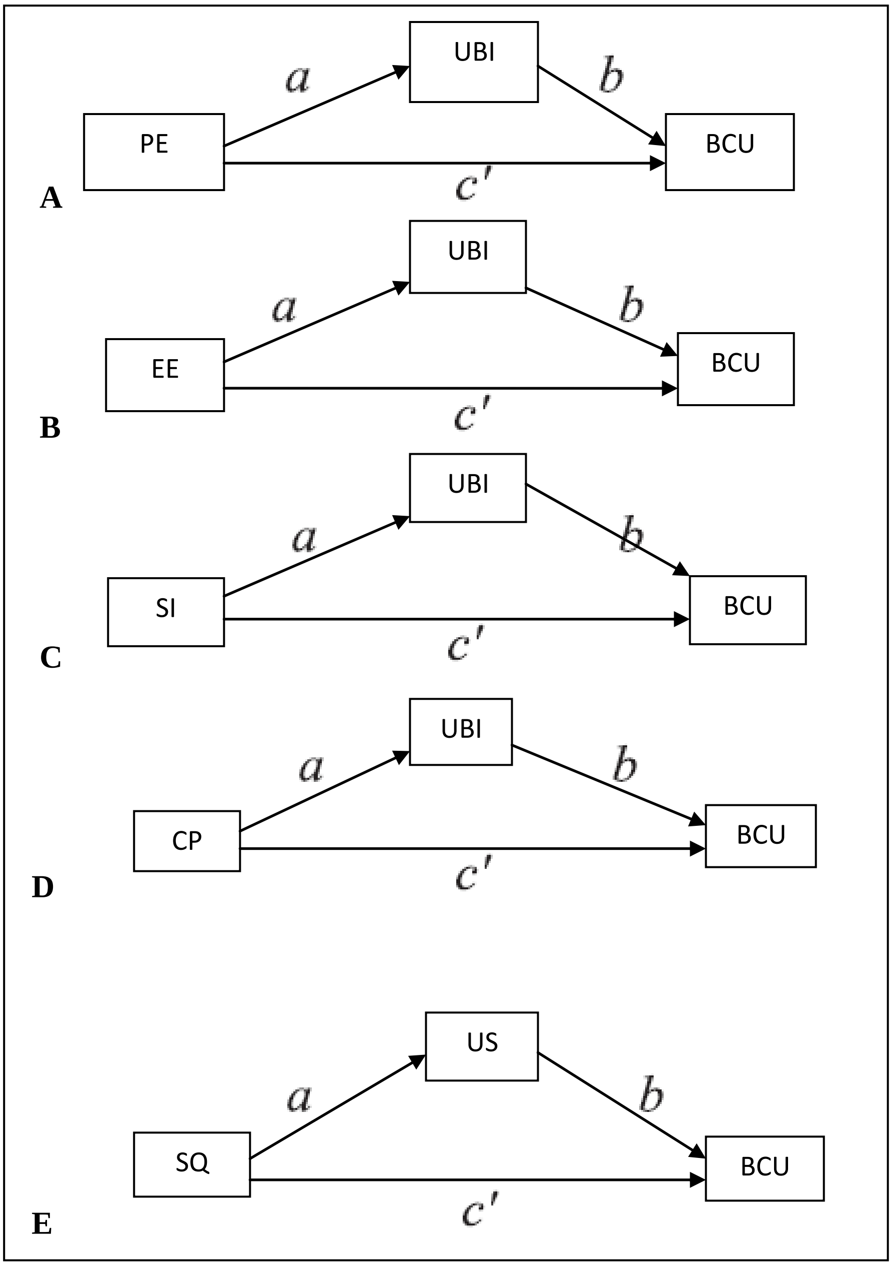


Figure 5.13: Phases of the Mediating Analysis

Table 5.23: Direct and Total Effect Results of Mediation Analysis

		Coeff	S.E.	t	Sig(two)
	b(YX)	.4981	.0457	10.9041	.0000
	b(MX)	.4897	.0543	9.0254	.0000
PE (X), BCU (Y) & UBI (M)	b(YM.X)	.4672	.0364	12.8315	.0000
	b(YX.M)	.2693	.0420	6.4087	.0000
	b(YX)	.5047	.0390	12.9442	.0000
	b(MX)	.4609	.0480	9.6062	.0000
EE (X), BCU (Y) & UBI (M)	b(YM.X)	.4348	.0357	12.1817	.0000
	b(YX.M)	.3043	.0369	8.2558	.0000
	b(YX)	.2005	.0380	5.2701	.0000
	b(MX)	.2546	.0430	5.9159	.0000
SI (X), BCU (Y) & UBI (M)	b(YM.X)	.5454	.0362	15.0788	.0000
	b(YX.M)	.0616	.0314	1.9654	.0501
	b(YX)	.5347	.0399	13.3990	.0000
	b(MX)	.6243	.0450	13.8630	.0000
CP (X), BCU (Y) & UBI (M)	b(YM.X)	.4159	.0407	10.2250	.0000
	b(YX.M)	.2750	.0435	6.3265	.0000
	b(YX)	.4028	.0406	9.9220	.0000
	b(MX)	.5667	.0351	16.1314	.0000
SQ (X), BCU (Y) & US (M)	b(YM.X)	.6073	.0511	11.8812	.0000
	b(YX.M)	.0587	.0451	1.3001	.1944

Table 5.24: Results of Indirect Effect and Significant Using Normal Distribution

Constructs	H	Value	S.E.	LL95CI	UL95CI	Z	Sig(two)	Remark
UBI on PE X BCU	H_9	.2288	.0310	.1680	.2895	7.3821	.0000	Supported
UBI on EE X BCU	H_{10}	.2004	.0266	.1483	.2525	7.5430	.0000	Supported
UBI on SI X BCU	H_{11}	.1389	.0252	.0894	.1883	5.5072	.0000	Supported
UBI on CP X BCU	H_{12}	.2597	.0316	.1978	.3215	8.2288	.0000	Supported
US on SQ X BCU	H_{13}	.3442	.0360	.2736	.4147	9.5664	.0000	Supported

From the mediating analysis of UBI on the relationship between EE and BCU as revealed in Table 5.23 and mediating analysis phase B in Figure 5.13, all the steps of direct and total effect are statistically significant while considering the t and sig (two) columns. Besides that, results of z and sig (two) columns from the indirect effect and significance using normal distribution in Table 5.24 ($z = 7.5430$ and $p = 0.000$) leads to the conclusion that UBI mediate the relationship between EE and BCU and confirmed the statistical significance of H_{10}. Moreover, the mediating analysis of UBI on the relationship between SI and BCU as shown in phase C of Figure 5.13 brings about the significance results of *t* and sig (two) columns of the direct and total effect. Indeed, the obtained results from the z and sig (two) columns in the indirect effect and significance using normal distribution in Table 5.24 ($z = 5.5072$ and $p = 0.0000$) confirms the significance of Hypothesis H_{11}.

Furthermore, the outcome of all the steps of phase D of mediating analysis of UBI on the relationship between CP and BCU as depicted in Figure 5.13 tested statistical significant while considering the direct and total effect results. The results of indirect effect and significance using normal distribution, the z = 8.2288 and p = 0.0000 proofed significant statistically as suggested by Preacher and Hayes (2004) which leads to the conclusion that Hypothesis H_{12} is significant. Moreover, Hypothesis H_{13} which is the mediating effect of US on the relationship between SQ and BCU was examined by first check the results of direct and total effect. Only the last step of the entire steps in the direct and total effect analysis showed insignificant which is not sufficient to fault the mediating process of US on relationship between SQ and BCU (Preacher & Hayes, 2004). The results of indirect effect and significance using normal distribution with z = 9.5664 and p = 0.0000 indicating the statistical significance of Hypothesis H_{13}.

5.5 Assessment of Moderation Effect

A moderating variable is the qualitative or quantitative variable that its existence affects the direction or strength of relationship between the exogenous variable and the endogenous variable (Baron and Kenny, 1986). Holmbeck (1997) stressed that moderator is a variable that reveals the variations of impact of nature of exogenous variable on the endogenous variable. In other words, a moderator exhibits differences in the strength of relationship between an exogenous variable and endogenous variable as shown Figure 5.14. Moreover, the usefulness of moderating variable cannot be overemphasised in the complex model as it simplifies variations in the stands of researchers (Chin et al., 2003; Homburg & Giering, 2001).

Therefore, moderator is worth of introducing whenever there are variations in the opinions of researchers regarding the relationship between exogenous and endogenous variables (Baron and Kenny, 1986).

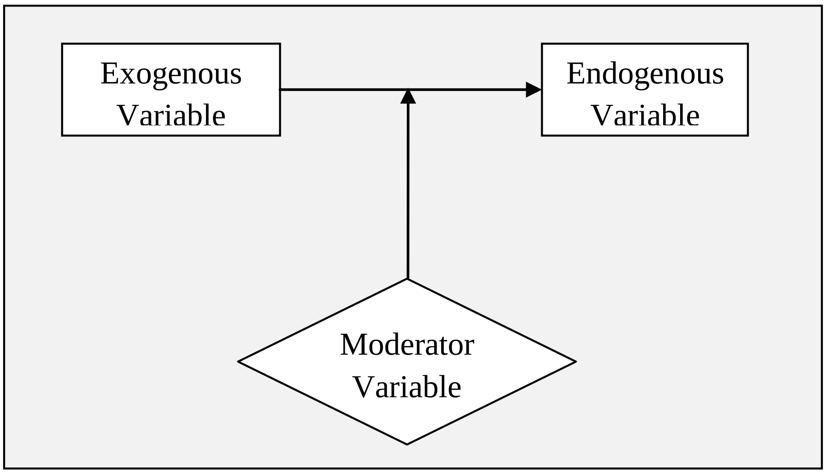


Figure 5.14: Illustration of Moderator Variable

Furthermore, testing of moderating effect in the reflective model can be addressed by using product term approach and the group comparisons approach (Henseler & Fassott, 2010). The product term approach could be built between the indicators of the latent exogenous variable and the indicators of the latent moderator variable (Henseler & Fassott, 2010; Chin et al., 1996, 2003). Thus, the usefulness of product term approach in testing for moderation comes into being when both of the interactive variables are continuous. Indeed, the assessment of moderating effect uses three fundamental steps (Henseler & Fassott, 2010) as depicted in Figure 5.15:

i. Estimation of the influence of exogenous variable on endogenous variable (path a).

ii. The direct impact of the moderating variable on the endogenous variable (path b).

iii. The confirmation of significance of interaction between exogenous and moderation variables on the endogenous variable (path c).

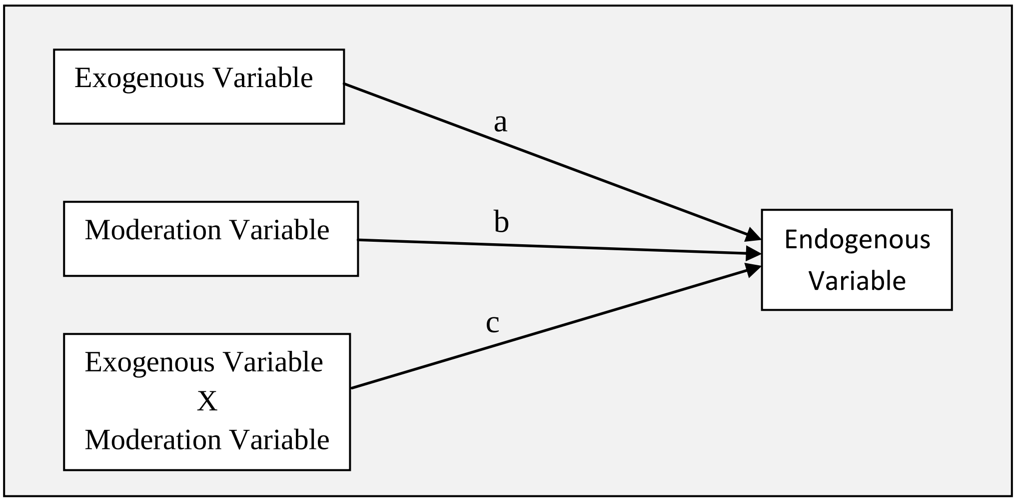


Figure 5.15: Steps in Moderation Assessment (Source: Baron and Kenny, 1986)

Testing of moderation effect resulted in the use of group comparisons approach when one of the interactive variables (exogenous and moderator) is not a continuous variable (Henseler & Fassott, 2010; Rigdon et al., 1998). Previous studies have argued that a moderator variable that is categorical in nature (gender, race, class) is used as a grouping variable without refinement while a metrically scaled variable that needs to be used as a grouping variable requires transformation through dichotomisation technique, "high" and "low" (Venkatesh et al., 2011; Henseler & Fassott, 2010). Therefore, this study classifies the gender as male and female as it is widely used by some researchers in solving the group comparison analysis

(Venkatesh et al., 2011; Bryne, 2010; Hair et al., 2010; Suha & Anne, 2008; Hsing & Heng, 2005; Venkatesh et al., 2003).

In addition, the study classified users of fast internet for 1-2 hours in a day as low internet experience while users of fast internet from 4 hours and above as high internet experience which is in line with stands of some researchers (Henseler & Fassott, 2010; Suha & Anne, 2008; Hsing & Heng, 2005). Moreover, the direct effect of the model is estimated separately for each group of observations and the differences in the model's parameters between the different data groups are regarded as moderating effects and shown in Figure 5.16. Therefore, the moderating effect is mathematically represented by d = $b^{(1)}$ - $b^{(2)}$. Besides, the interactive effect for the group moderation is achieved in this study by running the PLS algorithm for each of the subsamples and followed by bootstrapping that estimates the standard errors. Hence, the parameter estimates are compared using test statistic in equation 5.6 to check variations in the significant of the estimated parameters whenever the standard errors of the two groups are equal. However, the equation 5.7 should be used when the standard errors of the two groups are not equal.

$$t = \frac{\beta_{(1)} - \beta_{(2)}}{\sqrt{\frac{\left(n_{(1)} - 1\right)^2}{n_{(1)} + n_{(2)} - 2} \cdot se^2_{\beta_{(1)}} + \frac{\left(n_{(2)} - 1\right)^2}{n_{(1)} + n_{(2)} - 2} \cdot se^2_{\beta_{(2)}}} \cdot \sqrt{\frac{1}{n_{(1)}} + \frac{1}{n_{(2)}}}} \qquad (5.6)$$

$$t = \frac{\beta_{(1)} - \beta_{(2)}}{\sqrt{se^2_{\beta_{(1)}} + se^2_{\beta_{(2)}}}} \qquad (5.7)$$

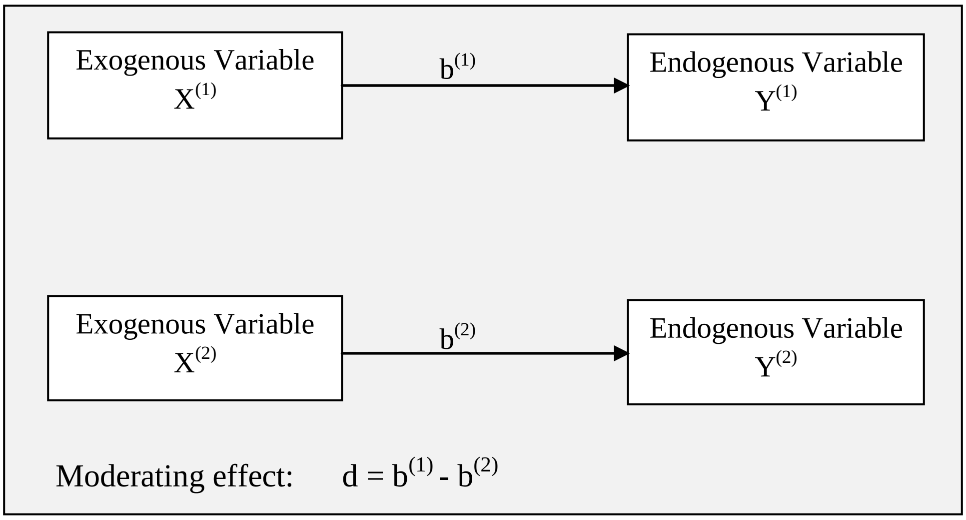


Figure 5.16: Group Comparisons for Detecting Moderating Effect

5.5.1 Results of Assessment of Moderation Effect

The assessment of moderation effect in this study is divided into two; assessments of gender as moderator between PE -> UBI, EE -> UBI and SI -> UBI. Besides, the study looks at the assessment of broadband experience as moderator between PE -> UBI, EE -> UBI, SI -> UBI, FC -> BCU and SQ -> US as shown in Figure 3.3.

5.5.1.1 Results of Assessment of Gender as Moderation

The assessment of gender as moderator was done in this study by splitting the original dataset that was used in this study into male data set and female data set based on the suggestion of Venkatesh et al. (2012), Venkatesh et al. (2011), Hair et al. (2010), Suha and Anne (2008), Hsing and Heng (2005), Venkatesh et al. (2003) creating male and female groups respectively. Besides, gender group was distributed into the total number of 153 male and 220 female. Moreover, the PLS algorithm was run on the male and female's data sets in order to evaluate the weight of effect of each of the groups on the concerned constructs and shown on the Figures 5.17 and 5.18 respectively. Besides, the bootstrapping which evaluates the standard errors was performed for both male and female groups. The raw outputs of the bootstrapping for both male and female groups are shown in Appendix J.

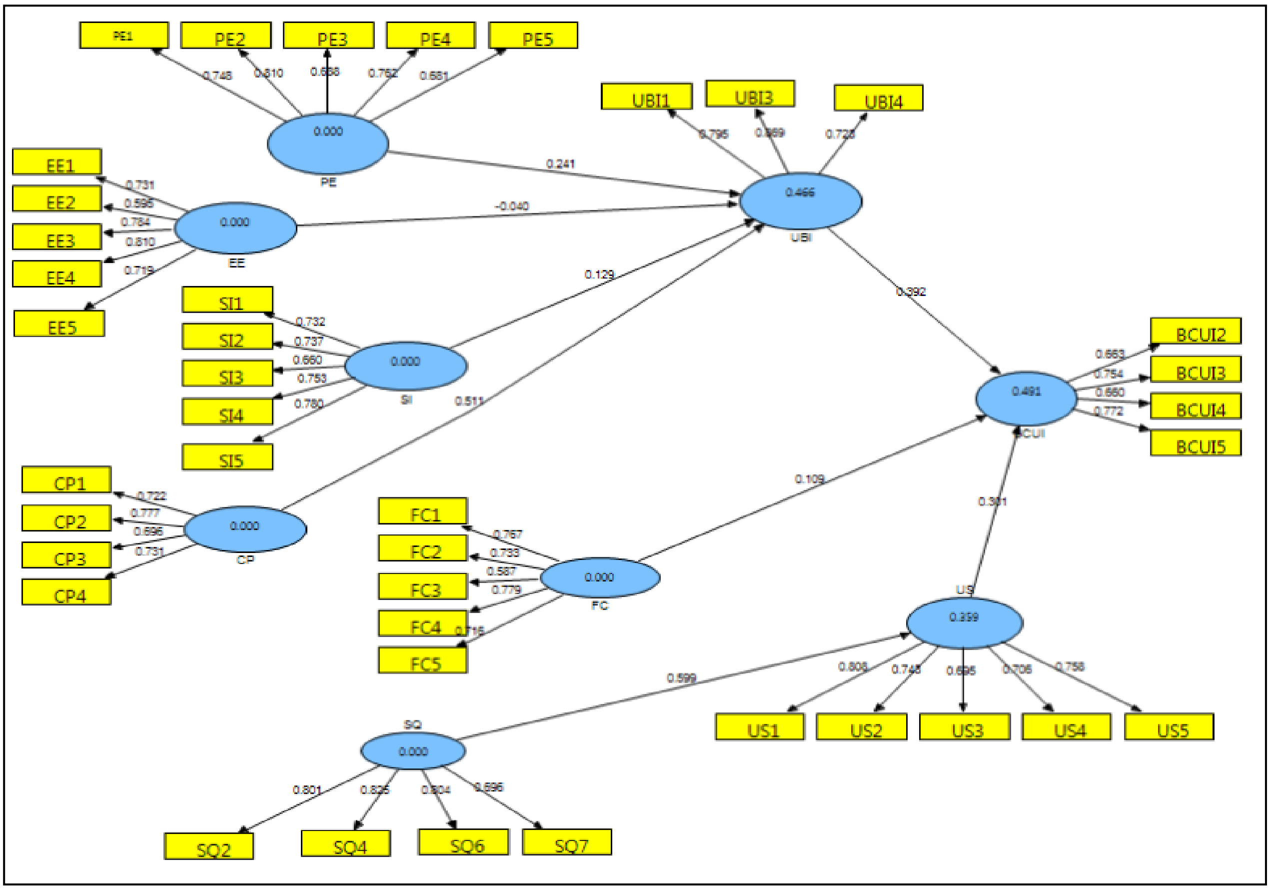


Figure 5.17: Path Model for Male Group

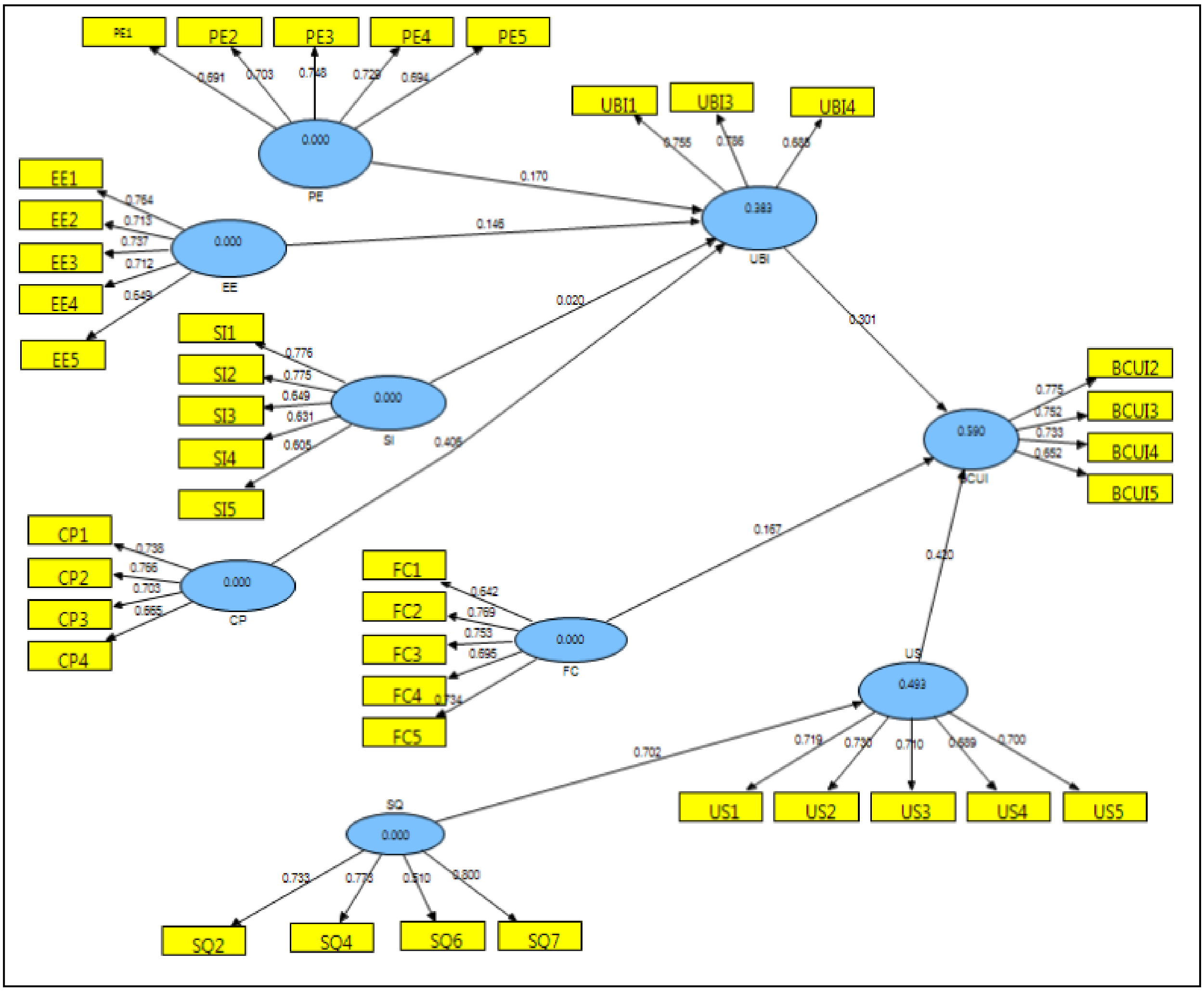
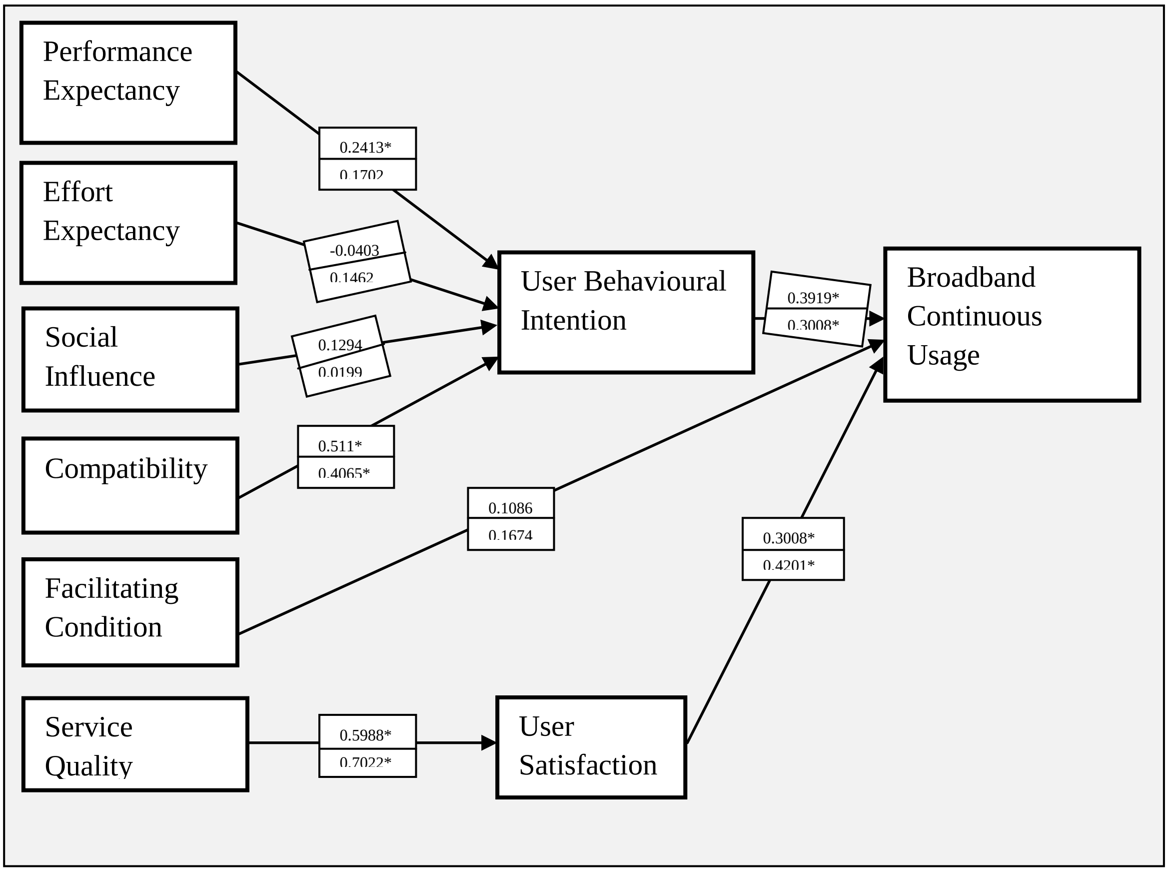


Figure 5.18: Path Model for Female Group

Comparing gender models for both male and female as shown in Figures 5.17 and 5.18 respectively, the study reveals that the gender model has variance explain for male; 46.6% for user behavioural intention, 35.9% for user satisfaction and 49.1% for broadband continuous usage. While female model has variances explain of 38.3% for user behavioural intention, 49.3% for user satisfaction and 59% for broadband continuous usage. Hence, female model has better variance explain than male model. Besides that, the path coefficient for male and female groups is shown in Figure 5.19.



* Significant at $P < 0.05$

Figure 5.19: Group Model with Path Coefficients (Male and Female)

In Table 5.25, the effect between performance expectance (PE) and user behavioural intention (UBI) is significantly different for both male and female ($t = 4.877$, $p = 0.012$), such that the effect in male (0.2435) is stronger than the female (0.1696). This confirms the attainment of Hypothesis H_{14}. Moreover, the result of analysis also shows that the effect between effort expectancy (EE) and the user behavioural intention (UBI) is significant for both male and female ($t = 13.707$, $p = 0.000$), such that the effect in female (0.1551) is stronger than the male (-0.0261). Therefore, Hypothesis H_{15} is achieved. Pursuing this further, it shows from the Table 5.25 that the effect between social influence (SI) and user behavioural intention (UBI) is significantly different for both male and female ($t = 3.743$, $p = 0.001$), such that the effect is stronger in male (0.1365) than the female (0.0343). Hence, hypothesis H_{16} is returned.

Table 5.25: Result of Gender as Moderator

Constructs	Hypotheses	t-statistics	p-value (2-tailed)	Remark
PE -> UBI	H_{14}	4.877	0.012	Supported
EE -> UBI	H_{15}	13.707	0	Supported
SI -> UBI	H_{16}	3.743	0.001	Not Supported

5.5.1.2 Results of Assessment of Broadband Experience as Moderation

The assessment of broadband experience as moderator was evaluated in this study by splitting the original data set into high broadband experience and low broadband experience as recommended by Venkatesh et al. (2012), Venkatesh et al. (2011), Henseler and Fassott (2010), Suha and Anne (2008), Castaneda (2007). Indeed, the broadband experience group was distributed into 191 high broadband experienced users and 117 low broadband experienced users. Besides, the PLS algorithm was run separately for the high broadband experience and the low broadband experience's data sets to evaluate the weight of effect of each of the groups on the concerned constructs and depicted in Figures 5.20 and 5.21 respectively. Conclusively, the bootstrapping that evaluates the embedded standard errors was performed for both high and low broadband experiences' groups. The raw outputs of the bootstrapping for both high and low broadband experiences' groups are shown in Appendix J.

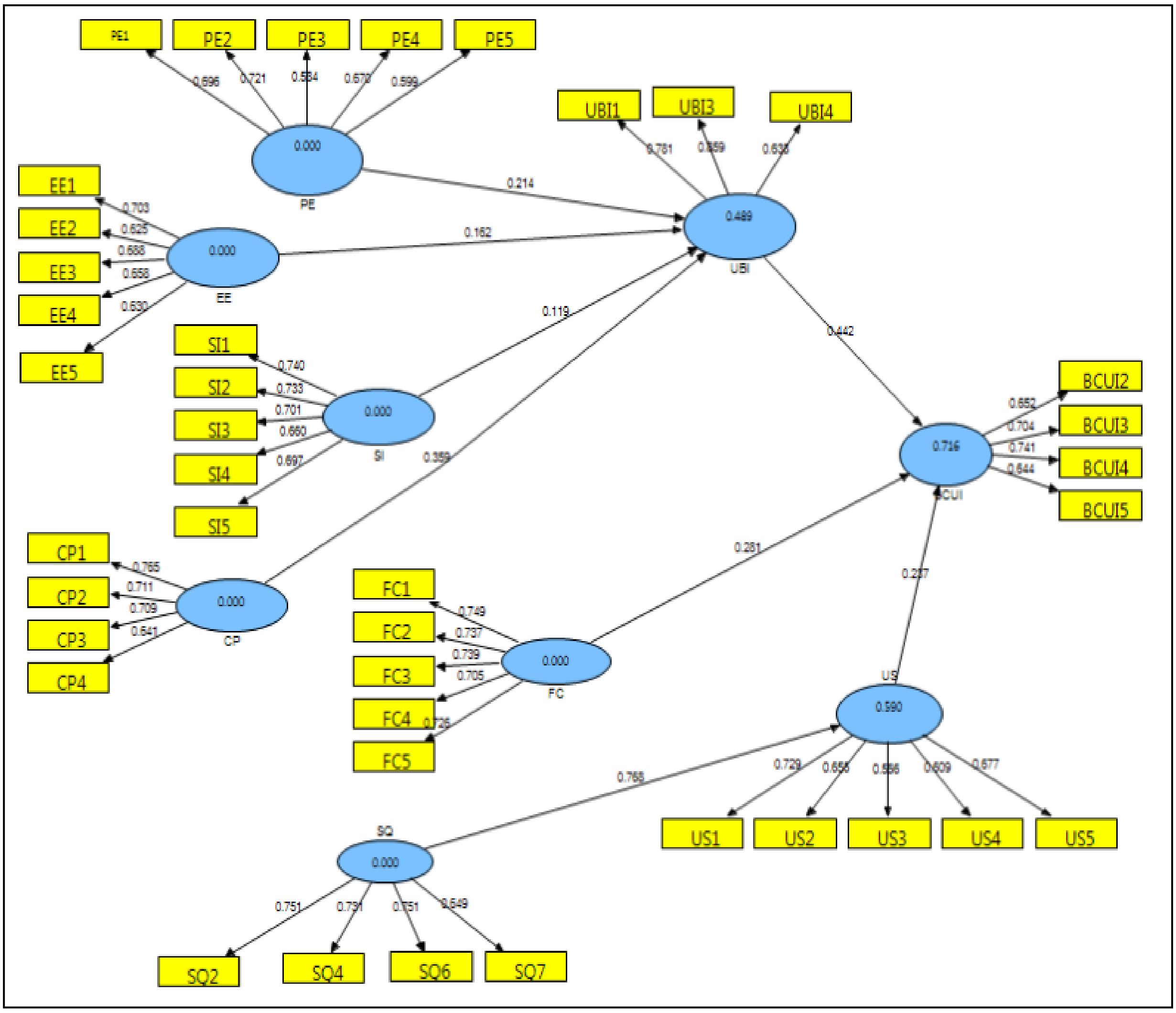


Figure 5.20: Path Model for High Broadband Experience

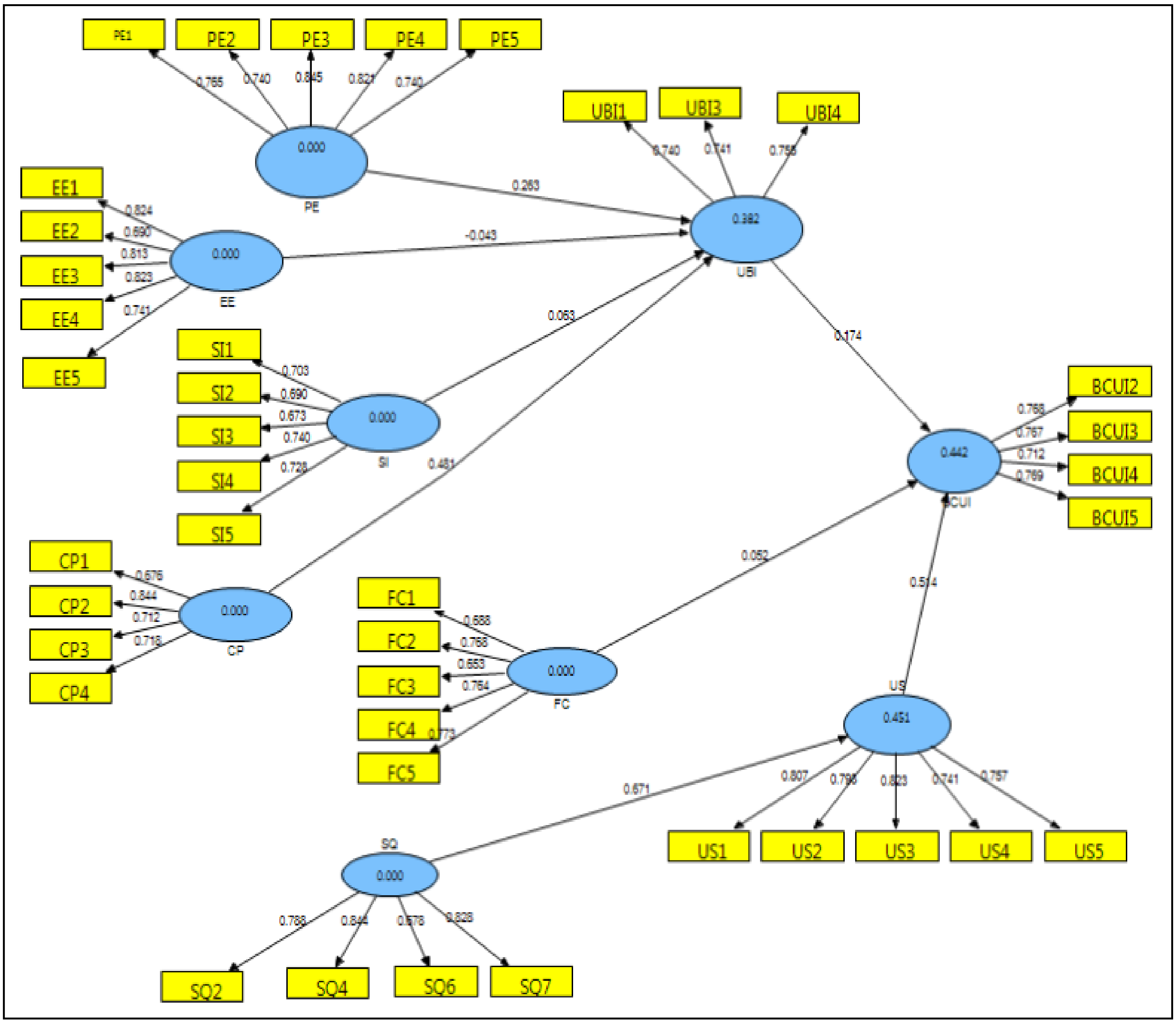
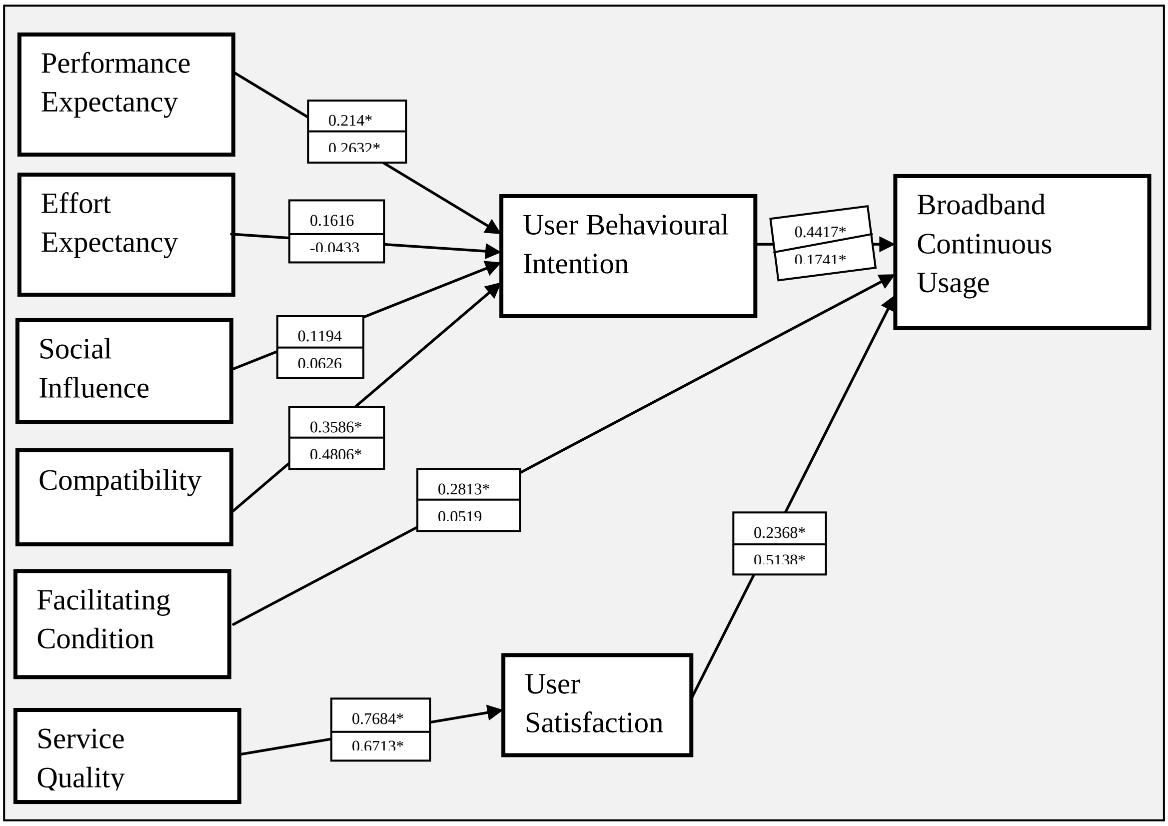


Figure 5.21: Path Model for Low Broadband Experience

Comparing the differences between the high and low broadband experience models, high broadband experience model has variance explain of 48.9% for user behavioural intention, 59% for user satisfaction and 71.6% for broadband continuous usage. While low broadband experience has variance explains of 38.2% for user behavioural intention, 45.1% for user satisfaction and 44.2% for broadband continuous usage. Therefore, high broadband experience model has better variance explain then the low broadband experience model. Hence, Figure 5.22 depicts the path coefficient for both high and low broadband experiences.



* Significant at $P < 0.05$

Figure 5.22: Broadband Experience Group Model with Path Coefficients (High Broadband Experience and Low Broadband Experience)

Table 5.26 presents the result of effect between effort expectancy (EE) and user behavioural intention (UBI) and found significant for both high and low broadband experiences ($t = 16.134$, $p = 0.000$). Indeed, the effect of moderation of broadband experience is stronger in high broadband experience user (0.1664) than low broadband experience user (-0.0323) showing attainment of hypothesis H_{17}. Hypothesis H_{18} which is the effect of broadband experience between the social influence (SI) and user behavioural intention (UBI) and the result is statistically significant with t = 21.616 and p = 0.000. Thus, the effect is found stronger in high broadband experience user (0.123) than the low broadband experience user (0.0713).

Table 5.26: Result of Broadband Experience as Moderator

Constructs	**Hypotheses**	**t-statistics**	**p-value (2-tailed)**	**Remark**
EE -> UBI	H_{17}	16.134	0	Supported
SI -> UBI	H_{18}	21.616	0	Supported
FC -> BCU	H_{19}	17.883	0	Supported
SQ -> US	H_{20}	2.891	0.005	Supported

Furthermore, the result of analysis of moderation effect shows that there is significant effect between facilitating condition (FC) and broadband continuous usage (BCU) at 2-tailed test since the t = 17.883 and p = 0.000 leading to the fulfilment of hypothesis H_{19}. Hence, the effect of high broadband experience user (0.2778) is stronger than the low broadband experience user (0.0553) while assessing the moderating effect on broadband experience between facilitating condition (FC) and broadband continuous usage (BCU). To complete the analysis, assessment of moderating effect reveals that the effect between service quality (SQ) and user satisfaction (US) is significantly different for both high broadband experience user and low broadband experience user (t = 2.891, p = 0.005). The analysis shows that the effect is stronger in high broadband user (0.7706) than the low broadband user (0.6713) which fulfils hypothesis H_{20}. In conclusion, Table 5.27 represents the results of hypotheses as conceptualised in chapter four of this study.

Table 5.27: Summary of Hypotheses Testing for Direct Relationship, Mediating and Moderating Effects

	Hypothesised Path	Proposition	Test Results
Main Effect			
H_1	PE -> UBI	Performance Expectancy X User Behavioural Intention	Supported
H_2	EE -> UBI	Effort Expectancy X User Behavioural Intention	Not Supported
H_3	SI -> UBI	Social Influence X User Behavioural Intention	Not Supported
H_4	CP -> UBI	Compatibility X User Behavioural Intention	Supported
H_5	FC -> BCU	Facilitating Condition X Broadband Continuous Usage	Not Supported
H_6	SQ -> US	Service Quality X User Satisfaction	Supported
H_7	US -> BCU	User Satisfaction X Broadband Continuous Usage	Supported
H_8	UBI -> BCU	User Behavioural Intention X Broadband Continuous Usage	Supported

Table 5.27 Continued

Mediating Effect			
H_9	PE -> BCU	UBI on PE X BCU	Supported
H_{10}	EE -> BCU	UBI on EE X BCU	Supported
H_{11}	SI -> BCU	UBI on SI X BCU	Supported
H_{12}	CP -> BCU	UBI on CP X BCU	Supported
H_{13}	SQ -> BCU	US on SQ X BCU	Supported
Moderating Effect (Gender Difference)			
H_{14}	PE -> UBI	Male > Female	Supported
H_{15}	EE -> UBI	Female > Male	Supported
H_{16}	SI -> UBI	Female > Male	Not Supported
Moderating Effect (Broadband Experience Difference)			
H_{17}	EE -> UBI	High > Low	Supported
H_{18}	SI -> UBI	High > Low	Supported
H_{19}	FC -> BCU	High > Low	Supported
H_{20}	SQ -> US	High > Low	Supported

5.6 Post-Hoc Test

Researchers have emphasised that conduction of additional test or analysis in research is necessary, especially when set hypotheses do not cover some interested aspect of the studies (Pallant, 2011; Tabachnick & Fidell, 2007). Tabachnick and Fidell (2007) argued further that post-hoc analysis does examine the variation in the particular group of elements in the study. Therefore, Pallant (2011, 2001) suggests the use of cross-tabulation analysis for comparing the observed frequencies or proportion of some cases in the study. On the other hand, Allen (2013), Pallant (2011), Pete (2008) argued that cross-tabulation analysis fits comparing the classified cases based on their categories in the variable and should be presented through the cross-tabulation table.

Previous studies have stressed that acquisition of technological infrastructure and its types determine development of communities and individual in the society (Frank et al., 2013; Wittwer & Senkbeil, 2008; Kuhlemeier & Hemker, 2007). Hence, this study explores the cross-tabulation analysis on group of respondents that have computer at home or not vis-a-vis their village location in the northern region of Malaysia and group with computer at home or not with respect to the type of internet connectivity they use at home towards continuous usage of broadband among youth in the rural areas. In addition, the study explored the cross-tabulation on the type of broadband the respondents used with respect to their village location in the northern region of Malaysia, while the cross-tabulation of gender with respect to the type of broadband they use was conducted.

Furthermore, correctness of cross-tabulation is based on the minimum expected cell frequency which should be 5 or greater than 5 (Allen, 2013; Pallant 2011). This rule has to be achieved in order to ensure that the cross-tabulation analysis has not violated the set rule and calculated in chi-square tests alongside with cross-tabulation. However, Frank et al. (2013), Pallant (2011), Wittwer and Senkbeil (2008), Tabachnick and Fidell (2007) argued that researcher must give consideration to the effect size of the categorical variables under comparison. This can be achieved through phi coefficient values which is for 2 by 2 categories of crosstab (0.1 = small effect; 0.3 = medium effect; 0.5 = large effect). On the other, Pallant (2011) recommends that crosstab that deals with categories of variables that are more than 2 by 2 should use Cramer's V values (0.06 =small; 0.17 = medium; 0.29 = large).

5.6.1 Cross-Tabulation Analysis of Having Computer at Home and Village Location in Northern Region of Malaysia

The percentage of respondents that have computer at home and those that do not have computer vis-a-vis their village location in the northern region of Malaysia was conducted using cross-tabulation analysis. This is because of the previous studies having argued that possessing of personal computer (PC) irrespective of destinations of users is one of the determinants of the developed countries (Nair et al., 2010; Huh, 2008; Batte, 2005). The study of Gnanial et al. (2006) stressed that lack of ICT infrastructure is one of the causes of low usage of technology at the remote areas in Malaysia. Therefore, the result of cross-tabulation between possessing of computer at home and location of villages are presented in Table 5.28 while the raw data of the cross-tabulation analysis are shown in Appendix K.

Table 5.28: Cross-tab for having Computer at home and Village Location in the Northern Region of Malaysia

			Village location in northern region of Malaysia				**Total**
			Kedah	**Pulau Penang**	**Perlis**	**Perak**	
Having computer at home	YES	Count	107	42	30	47	226
		% within having computer at home	47.3%	18.6%	13.3%	20.8%	100.0%
		% within village location in northern region of Malaysia	58.5%	58.3%	68.2%	63.5%	60.6%
		% of Total	28.7%	11.3%	8.0%	12.6%	60.6%
	No	Count	76	30	14	27	147
		% within having computer at home	51.7%	20.4%	9.5%	18.4%	100.0%
		% within village location in northern region of Malaysia	41.5%	41.7%	31.8%	36.5%	39.4%
		% of Total	20.4%	8.0%	3.8%	7.2%	39.4%
Total		Count	183	72	44	74	373
		% within having computer at home	49.1%	19.3%	11.8%	19.8%	100.0%
		% within village location in northern region of Malaysia	100.0%	100.0 %	100.0%	100.0%	100.0%
		% of Total	49.1%	19.3%	11.8%	19.8%	100.0%

Table 5.28 represents proportion of respondents that have computers and those that do not have with respect to their village location in the northern region of Malaysia. The result of the cross-tabulation analysis as shown in Table 5.28 indicates that

47.3% of the respondents that reside in the rural areas in Kedah state have computer at home, 18.6% of the respondents have computer at home in the rural areas of Pulau Penang state, 13.3% from rural areas in Perlis state have computer at home and the 20.8% of the respondents that live in rural areas of Perak state have computer in their respective homes. However, this study also reveals from the cross-tabulation analysis that 51.7% of the respondents that live in the rural areas of Kedah state do not have computer at home, 20.4% of respondents do not have computer at home in the rural areas of Pulau Penang state, while 9.5% do not have computer at home in Perlis state and 18.4% of the respondents do not have computer at home in the rural areas of Perak state.

Furthermore, Table 5.28 shows that the proportions of respondents that have computer at home in the rural areas of Kedah and Pulau Penang states are lower to the respondents that do not have computer at home. This implies that there is lack of motivation or demand for the usage of ICT in the rural areas of Kedah state and Pulau Penang state. On the other hand, the low in proportion of people with computer at home to the people without computer may be caused by the weak training in computer and lack of access to effective computers. This can serve as key factor for preventing youth in the rural areas to continuously use the technological innovation, such as broadband technology in their rural areas. Thereof, this coincides with the studies of Antun et al. (2011), Nair et al. (2010) and Gnanial et al. (2006) who argued that low possession of PC in the remote areas serves as deterrent for awareness of innovation about ICT and prevent the community from development.

Moreover, the result of cross tabulation analysis for the proportion of respondents that have computer at home vis-a-vis village location in the northern region of Malaysia has not violated assumption of minimum expected cell frequency, which is 17.34 and greater than the minimum assumption value of 5. This is shown in chi-square test table in Appendix K. Moreover, the effect size of 0.07 was obtained from the analysis as shown in the table of symmetry measures in Appendix K implies that the association between the categorical variables of having computer at home and village location is medium. The studies of Yusop and Sumari (2013), Salman and Hasim (2011), Ramayah and Jaafar (2008) argued that youth or secondary school students have opportunity of using the ICT infrastructure in many places other than their homes, such as rural internet centre, schools and cybercafé.

Thus, effect of the higher proportion of respondents that do not have computer at home over the respondent that have computer at home which is medium (0.07) may not have much significant effect on the economic activities in the rural areas of Kedah and Pulau Penang States. This is because youth in Kedah and Palau Penang have other to use the places to use the computers other than their homes, PID, cybercafé and schools. Therefore, the knowledge obtained from the use of computers or ICT facilities in other places could be transferred to their respective homes. Hence, continuous use of broadband among the youth in the rural areas of Malaysia can be assisted by providing computers at homes.

5.6.2 Cross-Tabulation Analysis of Having Computer at Home and Type of Internet Connectivity

The cross-tabulation analysis was conducted to examine the percentage of respondents that have computer at home and those that do not have computer with respect to the type of internet connectivity they use towards continuous use of broadband technology in the rural areas of Malaysia. This is presented in Table 5.29.

Table 5.29: *Cross-tab for having Computer at home and Type of Internet Connectivity*

			Type of internet connectivity at home			
			Dial up	**Broadband**	**Not applicable**	**Total**
Having computer at home	YES	Count	20	149	57	226
		% within having computer at home	8.8%	65.9%	25.2%	100.0%
		% within type of internet connectivity at home	100.0%	97.4%	28.5%	60.6%
		% of Total	5.4%	39.9%	15.3%	60.6%
	NO	Count	0	4	143	147
		% within having computer at home	0.0%	2.7%	97.3%	100.0%
		% within type of internet connectivity at home	0.0%	2.6%	71.5%	39.4%
		% of Total	0.0%	1.1%	38.3%	39.4%

Table 5.29 Continued

Total	Count	20	153	200	373
	% within having computer at home	5.4%	41.0%	53.6%	100.0%
	% within type of internet connectivity at home	100.0%	100.0%	100.0%	100.0%
	% of Total	5.4%	41.0%	53.6%	100.0%

The result of the cross-tabulation analysis as presented in Table 5.29 shows that 8.8% of the respondents that have computers at home use dial up internet connectivity, while 65.9% of respondents with computers at home use broadband connectivity and 25.2% of the respondents that have computers at home do not have any form of internet connectivity. On the other hand, the results of the cross-tabulation analysis reveal that respondents that do not have computer at home do not use dial up internet service (0.0%). Besides, 2.7% of respondents that do not have computers at home still use broadband technology and 97.3% of respondents that do not have computers at home do not use any form of internet connectivity.

The largest percentage (65.9%) of broadband as type of internet connectivity with respect to the respondents that have computers at home as shown in Table 5.29 indicates that there is tendency of increase in the social activities in the rural areas of northern region of Malaysia. This proportion has shown that availability of computer at home impact accessibility to broadband connectivity. Thus, having broadband accessibility on the computer at home in the rural areas would increase the modern way of communication (voice and video calls) among youth in the rural areas, through Skype, Yahoo Messenger, Viber Calls and Vonage Calls applications.

Moreover, access to broadband technology by the youth that have computers in their respective homes in the rural areas will have positive impact on their academic performance. The studies of Yusop and Sumari (2013), Chin and Yusop (2011) argued that communication between the youth becomes easier through the use of speed internet connectivity (broadband technology). Besides, the result of the cross-tabulation between respondents that have computer at home relative to the type or internet connectivity they use is supported by the studies of Chritopher and Maria-Gorretti (2012), Simond (2008) which stressed that possessing of the PC with the broadband technology among secondary school students will influence their performance academically and in terms of knowledge seeking. Therefore, continuous usage of broadband among the youth in the rural areas of northern region of Malaysia will be achieved since the possession of PC at home is at high rate.

In addition, the cross-tabulation analysis of respondents that have computers at home and the type of internet connectivity does not violate the assumption of minimum expected frequency which is 7.88 and greater than the minimum benchmark of 5. This is shown in chi-square test table in Appendix K. Indeed, the effect size of 0.706 (large effect) was obtained from the analysis as shown in the table of symmetry measures in Appendix K shows that there is strong association between the categorical variables of having computer at home and the type of internet connectivity the respondents used in their respective homes.

5.6.3 Cross-Tabulation Analysis of Type of Broadband Using and the Village Location in the Northern Region of Malaysia

The cross-tabulation analysis of respondents on the type of broadband using with respect to the location of the villages of the respondent in the northern region of Malaysia was conducted. The result shows that the analysis does not violate the assumption of minimum expected frequency which is 18.05 and higher than the minimum expected frequency of 5. This is shown in chi-square test table in Appendix K, while the effect size of 0.134 (medium effect) was obtained from the analysis as shown in the table of symmetry measures in Appendix K. This implies that there is little association between the categorical variables of type of broadband using and the village location in the northern region of Malaysia. Besides, the main cross-tabulation analysis that shows the proportion of type of broadband using and the village location in the northern region of Malaysia is presented in Table 5.30.

Table 5.30 presents the proportion of type of broadband use with respect to the village location in the rural areas of northern region of Malaysia. The table shows that 43.6% of respondents that reside in the rural areas of Kedah state use wired broadband technology, 21.8% in the rural areas of Pulau Penang, 12.3% in Perlis state and 23.3% of the respondent that reside in the rural areas of Perak state use wired broadband. However, 56.9% of the respondents that reside in rural areas of Kedah state use wireless broadband, 15.7% used wireless broadband in the rural areas of Pulau Penang state, 11.1% used wireless broadband in the rural areas of Perlis state and 16.3% used wireless broadband technology in the rural areas of Perak state.

Table 5.30: Cross-Tab for the Type of Broadband Using and the Village Location in the Northern Region of Malaysia

			Village location in northern region of Malaysia				
			Kedah	**Pulau Penang**	**Perlis**	**Perak**	**Total**
Type of broadband you use	WIRED	Count	96	48	27	49	220
		% within type of broadband you use	43.6%	21.8%	12.3%	22.3%	100.0%
		% within village location in northern region of Malaysia	52.5%	66.7%	61.4%	66.2%	59.0%
		% of Total	25.7%	12.9%	7.2%	13.1%	59.0%
	WIRELESS	Count	87	24	17	25	153
		% within type of broadband you use	56.9%	15.7%	11.1%	16.3%	100.0%
		% within village location in northern region of Malaysia	47.5%	33.3%	38.6%	33.8%	41.0%
		% of Total	23.3%	6.4%	4.6%	6.7%	41.0%
Total		Count	183	72	44	74	373
		% within type of broadband you use	49.1%	19.3%	11.8%	19.8%	100.0%
		% within village location in northern region of Malaysia	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	49.1%	19.3%	11.8%	19.8%	100.0%

The result shows that usage of wireless broadband technology is higher in the rural areas of Kedah state than wired broadband technology. On the other hand, the use of wired broadband technology among the users in the rural areas of Pulau Penang, Perlis and Perak states are higher than the users of wireless broadband technology. This implies that continuous usage of broadband among youth in the rural areas in Kedah state is visible while compare to the other states (Pulau Penang, Perlis and Perak). Besides, the result shows that the infrastructures that aid the use of mobile or wireless broadband technology (3G and satellite broadband technology) are available in the rural areas of Kedah state; thus, there is no need for additional cost for citing the infrastructure unlike the rural areas of Pulau Penang, Perlis and Perak state. This result is in line with the studies of some researchers which stressed that many of rural areas are found of lack of infrastructure to connect them to the wireless providers (Choudrie & Middleton, 2014; Susuki, Horiuchi, Hayashi, & Otani, 2007) and can jeopardise their long-term use of broadband technology.

5.6.4 Cross-Tabulation Analysis of Gender and Type of Broadband Using

The cross-tabulation analysis of respondents on gender with respect to the type of broadband using was conducted and does not violate the assumption of minimum expected frequency which is 62.76 and higher than the minimum expected frequency of 5. This is shown in chi-square test table in Appendix K, while the effect size of -0.102 (small effect) was obtained from the analysis as shown in the table of symmetry measures in Appendix K. This implies that there is little association between the gender and type of broadband using categories. The main cross-tabulation analysis that shows the proportion of gender with regards to the type of broadband using among the youth in the rural areas of Malaysia is presented in Table 5.31.

Table 5.31: Cross-Tab for the Gender and Type of Broadband Using

			Type of broadband you use		**Total**
			wired	**wireless**	
Gender	MALE	Count	81	72	153
		% within gender	52.9%	47.1%	100.0%
		% within type of broadband you use	36.8%	47.1%	41.0%
		% of Total	21.7%	19.3%	41.0%
	FEMALE	Count	139	81	220
		% within gender	63.2%	36.8%	100.0%
		% within type of broadband you use	63.2%	52.9%	59.0%
		% of Total	37.3%	21.7%	59.0%
Total		Count	220	153	373
		% within gender	59.0%	41.0%	100.0%
		% within type of broadband you use	100.0%	100.0%	100.0%
		% of Total	59.0%	41.0%	100.0%

Table 5.31 presents the result of cross-tabulation analysis of gender to the type of broadband they use in the rural areas of northern region of Malaysia and shows that 52.9% of male's respondents use wired broadband technology, 47.1% of the

respondents who are male relied on the use of wireless broadband technology. On the other hand, the result did show that 63.2% of female's respondents relied on the usage of wired broadband technology, while 36.8% of female's respondent strict to the use of wireless broadband technology for their social and academic activities.

Comparing the proportion of gender to the type of broadband they always use, the results from Table 5.31 reveals that female respondents who are youth in the rural areas of Malaysia use wired broadband technology than the male's respondents. This shows that female youth in the rural areas always use the broadband technology at home while trying to send email, communicating with their contemporaries (Facebook, Skype and Viber Calls Social Media), and solving their schools' assignments. Based on the previous studies, male and female teenagers use fast internet or broadband technology in different ways (Hargittai, 2008; Feller, 2006; Lenhart & Madeen, 2005). However, female teenagers create habit of using the broadband service at home than the male's counterparts while attempting to provide solution to the tasks given in their respective schools, through the use of fixed line internet service (Raman, 2011; Lenhart & Madeen, 2005). Hence, provision of fixed broadband technology at home can lure female youth in the rural areas towards continuous usage of broadband technology among youth in the rural areas.

In addition, the results from Table 5.31 show that male youth in the rural areas use wireless broadband than their female counterparts. This may be due to the privacy that they derive from the use of mobile broadband services. Using the wireless broadband technology by male youths in the rural areas will give security assurance to the users while exploring the web services. Previous researcher have stressed that male users of broadband technology are concerns of security issues while surfing the internet (Raman, 2011; Shashaani & Khalili, 2001). The related research by Dahlan et al. (2002) found that male employees in the banking industry in Malaysia preferred using wireless broadband technology to the wired type due to the assurance of security that attributed to the wireless broadband services. Thus, provision of wireless broadband technology infrastructure to the youth in the rural areas would give room for continuous usage of broadband technology among youth in the rural areas.

5.7 Summary

This chapter presented the data analysis and results of the study. Besides providing the data regarding the general characteristics of the sample and descriptive statistics of the respondents that were involved in the study, the chapter presented the results of the measurement model which are basically on the reliability and validity of the constructs. Indeed, the chapter has shown that the analysis is in line with the threshold values of composite reliability, factor loading, average variance expected and the discriminant validity (Fornell-Larcker criterion and Cross-Loading criterion). Moreover, five out of the eight main hypotheses (direct relationship) were supported to the study's hypotheses while all phases of mediating effect and moderating effect are supported as hypothesised, summarily shown in Table 5.27. In addition, the study explored the cross-tabulation analysis in order to investigate the effect of proportions of some categorical variables (Type of internet connectivity, Village location in the northern region of Malaysia, Type of broadband they use and Gender) towards continuous usage of broadband technology among youth in the rural areas of Malaysia.

CHAPTER SIX

DISCUSSION OF RESULTS

6.0 Introduction

This chapter presents the discussion on the obtained results in the previous chapters. The overview of the research is presented together with discussion of main, mediating and moderating hypotheses based on the output obtained from the SEM. Besides, the chapter contains the revised model for the contributing factors for continuous usage of broadband technology among youth in the rural areas of Malaysia.

6.1 Overview of the Research

This study was mainly conducted to determine the contributing factors for continuous usage of broadband technology among youth in the rural areas of Malaysia. Assessing the continuous usage of broadband technology in the rural areas of Malaysia becomes necessary since the success of present day activities are attributed to the use of technological innovation which requires high speed internet connectivity (Raman, 2011; Ramayah 2005). The review of previous studies showed that despite the government' effort to increase broadband penetration rate in Malaysia, many rural areas in Malaysia are still lacking behind. Indeed, failure to understand and identify the contributing factors for continuous usage of broadband technology in the rural areas will greatly cause government a significant lost in terms of human and capital investment. Therefore, a model is proposed in this study to present the contributing factors for continuous usage of broadband technology among youth in the rural areas.

Review of previous literatures show that the potentials influencing factors to achieve continuous usage of broadband technology are Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Compatibility (CP), Facilitating Condition (FC) and Service Quality (SQ). Others are User Behavioural Intention (UBI) and User Satisfaction (US). Based on the stated factors from the literatures, the researcher developed a model for broadband continuous usage among youth in the rural areas and shows the relationships among the significant factors. Indeed, the research model was tested in some rural areas among youth across the northern region of Malaysia. Finally, the moderating effect of gender and broadband experience of users on the relationship between the determinant factors were examined.

Furthermore, the path analysis with structural equation modeling using SmartPLS 2.0 software was used to test all the hypothesized relationships in the structural model. The summaries of results of the proposed hypotheses are shown in Table 5.27. Moreover, findings of the hypothesized results are discussed in this chapter while findings from the previous researches are used to support or disprove the significance of the current research findings. Hence, the subsequent sections present the discussions of the outcome of hypotheses testing.

6.2 Discussion of Hypotheses Testing

The discussion of hypotheses testing focuses on the main effect, mediating effect and moderating effect which show the interactions between all the contributing factors for continuous usage of broadband technology among youth in the rural areas of Malaysia.

6.2.1 Discussion of Main Effect Hypotheses

The main effect hypotheses take care of direct relationships between some factors towards the broadband technology continuous usage among youth in the rural areas; such as relationship between performance expectancy, effort expectancy, social influence, compatibility and user behavioural intention; facilitating condition and broadband continuous usage; service quality and user satisfaction; user behavioural intention and broadband continuous usage; user satisfaction and broadband continuous usage.

6.2.1.1 Relationship between Performance Expectancy and User Behavioural Intention (H_1)

Hypothesis testing H_1 supports the relationship between performance expectancy and use behavioural intention. In the context of this study, performance expectancy is defined as the degree in which youth in the rural areas believes that using a broadband technology will give benefits in performing some activities (Venkatesh et al., 2012; Venkatesh et al., 2003). Moreover, the measurement of performance expectancy towards user behavioural intention of broadband technology in the rural areas yielded three measures, such as job enhancement, promptness of task and competency. Therefore, the positive relationship between performance expectancy and the user behavioural intention in our finding shows that continuous usage of broadband technology in the rural areas of northern region of Malaysia would be actualised.

Furthermore, the study's result implies that believe of youth in the rural areas of northern region of Malaysia that are using broadband would fast track enhancement of their activities which would strengthen their behaviour towards broadband technology continuous usage. It means that secondary school students who are youths in the rural areas would have positive behaviour towards continuous usage of broadband technology once they believe that broadband technology brings about promptness of task and competency. The statistical significant result of hypothesis H_1 on the relationship between performance expectancy and the user behavioural intention in the rural areas of northern region of Malaysia is consistent with some studies; including (Adria & Brown, 2012; Alphonsus et al., 2011; Wang et al., 2009; Wang & Shih, 2008; Al-Gahtani et al., 2007), who found that believe of rural dwellers that usage of broadband technology bring success must be preceded by the behavioural intention of users.

On the other hand, the result of the hypothesis shows that youth in the rural areas will influence the use of ICT in their respective villages once they believe that acquiring the broadband technology will assists in their tasks. For example, the studies of Adria and Brown (2012), Abdulwahab and Zulkhairi (2011), Adekunle et al. (2007), they argued that teenagers in the rural areas and small communities serve as motivating factor towards the use of ICT through their believe that they its usage will benefit their activities. Thus, the youth in the rural areas as revealed from the result of H_1 that they would perform better in their academic activities while using the broadband technology, their behaviour towards buying more will increase and will finally affect their mind towards the continuous usage of broadband technology.

6.2.1.2 Relationship between Effort Expectancy and User Behavioural Intention (H_2)

Effort expectancy is defined as the degree of ease associated with consumers' use of broadband technology in the rural areas (Venkatesh et al., 2012; Venkatesh et al., 2003). Hypothesis testing H_2 does not support the relationship between effort expectancy and user behavioural intention. The result shows that effort expectancy does not influence user behavioural intention towards broadband continuous usage among youth in the rural areas of northern region of Malaysia. The implication of this result is that users of broadband technology in the rural areas, who are youth, do not build their behaviour to use technology on the simplicity of broadband. A related study argued that youths do adhere to the use of technology purposely to communicate to their colleagues through social media, irrespective of the attached difficulties that attributed to others (Yuspo & Sumari, 2013; Alphonsus, 2011). Therefore, youth in the rural areas of northern region of Malaysia are concerned about the benefits they will obtain from using the broadband technology.

Though, the respondents in this study are secondary school students who are residing in the rural areas, but they are exposed to the use of broadband devices in their respective schools and the rural internet centres, making its simplicity meaningless to them. Hence, this result is in line with previous work that suggested that effort expectancy does not influence user behavioural intention (Ayankunle et al., 2012;

Abdulwahab & Zulkhairi, 2011). However, the result is not different from other researchers that concluded that effort expectancy has significance influence on user behavioural intention (Venkatesh et al., 2012; Suha & Anne, 2008; Al-Gahtani et al., 2007), only that our respondents are exposed to the use of broadband technology at early stage of their life as a result of ICT facilities in their schools and communities.

6.2.1.3 Relationship between Social Influence and User Behavioural Intention (H_3)

The hypothesis testing H_3 does not support the relationship between social influence and user behavioural intention towards broadband technology continuous usage among youth in the rural areas of Malaysia. Social influence is defined in the context of this study as the extent to which a user believes that important people believe that he or she should use a broadband technology in their rural areas (Venkatesh et al., 2012; Venkatesh et al., 2003). However, the obtained result reveals that user behavioural intention of broadband technology in the rural areas does not influenced by the pair groups or specified personalities. This is an indication that behavioural intention grown towards the continuous usage of broadband technology among youth in the rural areas is personal to the users.

In order words, the possibility of using the broadband technology among youth in the rural areas is found common among the age group of the respondents in this study which makes hypothesis H_3 to be rejected. This result is supported by the previous researchers that social influence does not influence the user behavioural intention of technology (Yun et al., 2013; Hee et al., 2012; Alshehri et al., 2012). Research has shown that induction of others personality either from the parent, pair group or respected people in the rural areas to build behavioural intention towards broadband continuous usage replicating a risky phenomenon that may arise in the usage of technology (Yun et al., 2013). This implies that the users of broadband can decided to be using it for some tasks which may not be in line with objectives of providing the internet in their villages, since they want to impress other important people.

For instance, a particular user of broadband technology may decide to use it for providing solution to the assignment giving to them by their teachers in the schools, while others may decide to dedicate the use of their broadband technology as means of communication to their colleagues. A users of broadband technology that believes that usage of ICT add more values to their learning style (Chin & Yusop, 2011) and level of thinking and understanding of problem solving technique (Kandasamy & Shah, 2013) will not be influenced by others that dedicate it for social media platform. Hence, behaviour of individual towards usage of broadband technology among youth in the rural areas depends on the activities of the users.

6.2.1.4 Relationship between Compatibility and User Behavioural Intention (H_4)

This study defined compatibility towards the context of continuous usage of broadband technology in the rural areas as the extent to which a broadband is viewed as being consistent with existing values, needs and experiences of future users (Rogers, 1995; Moore & Benbasat, 1991). Therefore, the hypothesis testing H_4 supports the relationship between compatibility and user behavioural intention towards broadband technology continuous usage among youth in the rural areas.

This result suggests that the more the broadband technology that youth in the rural areas are using for their daily activities is capable of retaining the values and needs of future users; the behavioural intention of the users in the rural areas would increase.

In addition, if the use of broadband technology among the youth in the rural areas supports the downloading and uploading of videos, the youth will have mind-set to use it in future. Researchers have argued that many youth are fond of uploading huge amount of videos on the social media for the pleasure purposes, which is as a result of compatibility of their high speed internet to perform this operation (Luan et al., 2008; Suha & Anne, 2008). However, a technology with low bandwidth will find it difficult to transmit large data and cannot enjoy the patronage of the users due to its non compatible with their activities (Alphonsus et al., 2011; Bahaman et al., 2010). Hence, compatibility of broadband technology is necessary for the users to determine its long term usage.

Moreover, the consistency of experience shared by users from using the broadband technology while performing some tasks in the rural areas affects their behavioural intention. Besides that, the empirical result obtained in hypothesis H_4 on the relationship between compatibility and user behavioural intention of in the rural areas is in line with suggestion of some researchers, like (Islam et al., 2013; Lai & Chang, 2010; Suha & Anne, 2008) that behaviour of users of technology towards its long-term usage relies on the compatibility of that technology to retain the values and their needs. Hence, our result for H_4 is better than some previous works with $\beta = 0.4564$, comparing with Islam et al. (2013), Lai and Chang (2010) who have their $\beta = 0.24$ and 0.31 respectively. The path model value of 0.4564 for compatibility in this study shows that it has predictive relevance in the proposed model for contributing factors for continuous usage of broadband technology among youth in the rural areas.

6.2.1.5 Relationship between Facilitating Condition and Broadband Continuous Usage (H_5)

Facilitating condition is defined as the degree at which a user believes that there are technical and infrastructure supports to use broadband technology among youth in the rural areas (Venkatesh et al., 2012; Venkatesh et al., 2003). The hypothesis H_5 was empirically tested the relationship between facilitating condition and broadband technology continuous usage among youth in the rural areas and does not support statistically in the context of this study. At this level, the interpretation of this result is that the youth rural in the rural areas of northern region of Malaysia do not require any external support either technically or infrastructural before considering broadband continuous usage at their villages. Indeed, this could be resulted from the status of our respondents, who are secondary school students and their level of experience to the use of internet in their domain especially at their respective schools.

Furthermore, the result obtained in H_5 is in line with some researchers, such as Hee et al. (2012), Huang and Qin (2011), who confirmed that nowadays youth are so intelligent that they can provide solution to many of the difficulties they encounter while using their smart phones. Therefore, it shows that youths in the rural areas of Malaysia are expected to provide solution to some of the issues confronting them while using the broadband technology in their villages. Besides that, the path coefficient (β) from our hypothesis H_5 = 0.1337 outweighs previous studies from Hee et al. (2012), Huang and Qin (2011) with β = 0.062 and -0.673 respectively. Thus, our result in H_5 has been established that support of external or additional infrastructure in rural areas of northern region of Malaysia on the broadband technology continuous usage among youth is meaningless. This is because many of them can surf internet for the solutions if they encounter problems on the use of broadband technology (Hee et al., 2012; Huang & Qin, 2011). Hence, the result reveals that the present level of ICT development at their respective villages is satisfactory to youth in the rural areas.

Moreover, the Malaysia government has established 9 rural internet centres (PID) at the strategic locations in the rural areas of the 4 states at the northern states in Malaysia. This provides opportunities to the rural users in continuously using the broadband technology, presenting the facilitating condition as needless factor while forming the habit of broadband technology continuous usage in the rural areas. The previous studies that support the relationship cannot be discarded outrageously that there may not be need for external help once the provision has been made while using ICT in the rural domain (Lily et al., 2011; Bostjan et al., 2010; Suha & Anne, 2008; Wang et al., 2006). Hence, there is no significance of effect of facilitating condition on the continuous usage of broadband technology among the youth in the rural areas of Malaysia.

6.2.1.6 Relationship between Service Quality and User Satisfaction (H_6)

Hypothesis H_6 on the relationship between service quality and user satisfaction towards broadband technology continuous usage among youth in the rural areas is empirically supported based on the result obtained in this study. The service quality was defined in the context of this study as the user's judgement on the overall experience or knowledge shared on the broadband used in the rural areas (Hishamuddin, 2008; Parasuraman et al., 2005; Yang et al., 2005; Davis et al., 1989). Moreover, service quality was measured through the use of reliability, responsiveness and assurance measures as suggested by Usha et al. (2010) represented the stance of respondents in this study.

The result of hypothesis H_6 reveals that youth in the rural areas of Malaysia experienced good and reliable services from the use of broadband in their communities. This builds their satisfaction and gives assurance that broadband technology continuous usage will be achieved easily in their respective villages. On the other hand, the responsiveness of services they received whenever they intend to use the broadband technology on their devices for online activities adds more values to their satisfaction. Indeed, the result has shown that youth in the rural areas found their broadband useful and reliable while solving the academic works given in their schools and sometimes while watching online documentaries. Hence, this result in hypothesis H_6 which confirms the effect of service quality on the user satisfaction is in accordance with some previous researchers that existence of expected services in the ICT tools used by the teenagers strengthen the derived satisfaction (Mohammad & Samar, 2012; Park et al., 2010; Liao et al., 2009; Limayem & Cheung, 2008; Hong et al., 2006). Besides, the result of H_6 shows dominance over some of the previous studies with $\beta = 0.6479$ while compare with Limayem and Cheung (2008), Hong et al. (2006).

6.2.1.7 Relationship between User Satisfaction and Broadband Continuous Usage (H_7)

The relationship between user satisfaction and broadband continuous usage among youth in the rural areas of northern region of Malaysia which is hypothesis H_7 is statistically supported. Meanwhile, user satisfaction in the context of this study is defined as the means of measuring success of broadband technology in the rural areas (Park et al., 2009; Kari et al., 2006). This is an indication that users of broadband technology in the rural areas of northern region of Malaysia shared good experiences with the use of services either in their schools, homes or rural internet centres. Moreover, the respondents during the data collection showed enthusiasm in the usage of the broadband technology services as they have confident that the use of broadband technology would give them prompt output to their request. Besides, the result shows that user satisfaction in the context of this study is the most direct contributing factor for continuous usage of broadband technology among youth in the rural areas of Malaysia with $\beta = 0.3733$, $t = 4.0669$.

In fact, the use of broadband technology among youth in the rural areas of northern region of Malaysia has gained ground especially among the secondary school student folks. Most of our respondents use the broadband technology services on their smart phones in order to access free chat applications which allow them to reach out to their friends and relatives in the urban centres. However, many of secondary school students in the rural areas of northern region of Malaysia have positive experiences towards continuous usage of broadband technology as they engage the broadband for studying and tutorial purposes through "Youtube". This is confirmed by the study of Yusop and Sumari (2013) that many of Malaysian students engage the social media for leaning and sharing of skills purposes.

Moreover, the supported result in hypothesis H_7 is compatible with previous studies that user satisfaction influences the IS or technological devices continuous usage (Park et al., 2010; Liao et al., 2009; Limayem & Cheung, 2008; Hong et al., 2006; Bhattacherjee, 2001; Oliver & Burke, 1999; Churchill & Suprenant, 1982). Consequently, the result of H_7 outweighs some of the related study's results on the effect of user satisfaction on the broadband continuous usage, such as Mohammad and Samar (2012), Hong et al. (2006), Limayem et al. (2008) with 0.212, 0.234 and 0.311 respectively.

6.2.1.8 Relationship between User Behavioural Intention and Broadband Continuous Usage (H_8)

The user behavioural intention is defined in this study as the measure of strength of user's intention to perform a specific behaviour (Davis et al., 1989). The result of hypothesis testing H_8 supports the relationship between user behavioural intention and broadband continuous usage among youth in the rural area. Previous studies have either directly or indirectly support the relationship between behavioural intention towards the use of technology and continuous use (Shin et al., 2009; Limayem & Cheung, 2008; Wang & Shih, 2008; Al-Gahtani et al., 2007). This result implies that the more the users of broadband technology in the rural areas build good behaviour towards its usage, the more they will continuously use the broadband technology.

Furthermore, the youth in the rural areas of the northern region of Malaysia possess some strength of behaviour towards continuous usage of broadband technology in their respective villages; as a result of experienced they have shared with the use of broadband device. Hence, the obtained result in hypothesis H_8 which supported that there is relationship between user behavioural intention and broadband technology continuous usage among youth in the rural areas. The result is in line with outcomes of some previous studies that behaviour of users of ICT determines the perception of using it for the long-term purposes (Shin et al., 2009; Suha & Anne, 2008; Lu & Hsiao, 2007).

6.2.2 Discussion of Mediating Effect Hypotheses

A mediating effect is a situation where a variable exert influence on the relationship between independent and dependent variable (Preacher & Hayes, 2008). Researchers have argued that there is need to test the influence of some variables on the relation between the dependent and independent variables, especially when the theory is advancing (Derek et al., 2011; Ho, 2009; Preachers and Hayes, 2004). However, it has been stressed by the previous studies that lack of testing the mediating effect in some studies do result on incomplete sourcing for the contributing factors (Riemenscheider et al., 2009; Tan et al., 2009). Therefore, the influence of user behavioural intention was tested in this study ascertained the relationship between performance expectancy, effort expectancy, social influence, compatibility and broadband continuous usage. Besides, the exert influence of user satisfaction was tested on the relationship between service quality and broadband continuous usage.

6.2.2.1 Influence of User Behavioural Intention as Mediator

Hypothesis H_9 that proposed the mediating effect of user behavioural intention on the relationship between performance expectancy and broadband continuous usage among youth in the rural areas was empirically supported by the result of our analysis. This is statistically confirmed from the Table 5.23 showing that all the phases of analysis are significant with 2-tailed test. Besides, Table 5.24 which is the indirect effect and significant using normal distribution endorsed the support of Hypothesis H_9 with ($Z = 7.3821$; $p < 0.05$; 95% CI of 0.1680 to 0.2895). Moreover, the result of mediating effect of user behavioural intention proofs heavier than its individual relationship on performance expectancy and broadband continuous usage. This implies the fact that the specific behaviour is created by youth in the rural areas provides direction for the users that using broadband would allow them to achieve better results in their activities which may be academics in nature. Hence, there is indirect significant relationship between performance expectancy and continuous usage of broadband technology among youth in the rural areas and supported by previous studies (Yun, et al., 2013; Lin & Ong, 2010; Shin et al., 2009; Hong et al., 2006) that behaviour of users of technology induce the believe of users towards continuous usage.

Though, the hypothesis testing on the relationship between effort expectancy and user behavioural intention was not supported in the main hypothesis, however, the study found the relationship between the user behavioural intention and broadband technology continuous usage. This leaves the relationship between effort expectancy and broadband continuous usage in dilemma situation. Thus, Hypothesis H_{10} testing the influence of user behavioural intention on the relationship between effort expectancy and broadband continuous usage found supported ($Z = 7.5430$; $p < 0.05$; 95% CI of 0.1483 to 0.2525) shown in Table 5.24. The result is in line with some researchers, including (Yun et al., 2013; Hong et al., 2006). This is an indication that there is indirect significant relationship between effort expectancy and broadband continuous usage among youth in the rural areas. Moreover, the result of hypothesis H_{10} means that the higher the simplicity in terms of use of broadband technology, the more broadband continuous usage among youth in the rural areas. Hence, the effort expectancy is accepted as one of the contributing factors towards continuous usage of broadband among youth in the rural areas. This is shown by the indirect relationship which reveals the importance of the effort expectancy in this study.

Furthermore, the study shows that social influence does not relate to user behavioural intention which may due to some peculiar issues to the users of broadband technology. On the other hand, user behavioural intention found related to broadband continuous usage among youth in the rural areas. Therefore, Hypothesis H_{11} which investigates the influence of user behavioural intention on the relationship between social influence and broadband continuous usage intention is statistically supported ($Z = 5.5072$; $p < 0.05$; 95% CI of 0.0894 to 0.1883) as revealed in Table 5.24. Indeed, the result has shown that there is an indirect significant relationship between social influence and broadband continuous usage. The implication of this is that based on the regards that some of the youth in the rural areas have for important and influential people; their behaviour could easily be changed towards broadband continuous usage. This shows that the social influence variable cannot be removed as one of the contributing factors towards continuous usage of broadband among youth in the rural areas. Hence, this outcome has the back-up of some previous studies which argued that behaviour of users of technology or ICT has value towards people that users respect while using the technology for the long-term use (Yun et al., 2013; Tai et al., 2013; Hsiao, 2012).

In addition, the statistically result in this study reveals that user behavioural intention relates to both compatibility and broadband continuous usage among youth in the rural areas either as independent or dependent variable. Thus, Hypothesis H_{12} tested the influence of user behavioural intention on the relationship between compatibility and broadband continuous usage among youth in the rural areas and supported. This is empirically and statistically proved from Table 5.24 with ($Z = 8.2288$; $p < 0.05$; 95% CI of 0.1978 to 0.3215). This is interpreted as there is existence of indirect significant relationship between compatibility and broadband continuous usage in the rural areas. Based on this, the result shows that the higher the youth in the rural areas experience consistency in terms of values and needs in their broadband technology, the more they form behavioural towards continuous usage of broadband in their respective villages. Besides, the obtained result is support by some previous studies that behaviour of users of technology can motivate users to test the compatibility of ICT tools on their activities towards its continuous usage (Lee et al., 2013; Mallat et al., 2009; Shin et al., 2009; Suha & Anne, 2008).

6.2.2.2 Influence of User Satisfaction as Mediator

User satisfaction in this study has direct relationship with both service quality and broadband continuous usage, indicating the possible relationship between the independent and dependent variable. Thus, Hypothesis H_{13} tested the influence of user satisfaction on the relationship between service quality and broadband continuous usage among youth in the rural areas and found supported. This result is empirically and statistically proved as shown in Tables 5.23 and 5.24 ($Z = 9.5664$; $p < 0.05$; 95% CI of 0.2736 to 0.4147). This shows the comfortability that youth derives from using the broadband technology in the rural areas can bring about its success towards long-term use. Hence, the result has shown that there is indirect significant relationship between service quality and broadband continuous usage among youth in the rural areas.

The results have shown in this study that the experienced shared from the use of broadband technology by the youth in the rural areas lead to the creation of a specific behaviour towards frequent usage of broadband technology. Indeed, youth in the rural areas of northern region of Malaysia have expressed their feelings that service quality that they receive from the use of broadband technology is one of the factors causing broadband continuous usage in their domain. This result is in accordance with previous studies (Soud & Fisal, 2011; Park et al., 2010; Park et al., 2009) that uphold indirect significant relationship between service quality and broadband continuous usage.

6.2.3 Discussion of Moderating Effect Hypotheses

A moderating variable gives direction or strength of its impact on the relationship between independent variable and dependent variable (Baron & Kenny, 1986; Kahn, 2006). On the other hand, researchers have argued that moderation effect does not only give the strength of effect on the relationship but also substantiate the significance of the relationship that was not immediately revealed (Kahn, 2006; Luan et al., 2005). Thus, this study examines the effect of the moderations variables on some of the relationship in the research model, so as to ascertain their relationship. The moderating variables in the research model are gender and broadband experience. Therefore, gender is grouped into male and female, while broadband experience is grouped into high and low experience.

6.2.3.1 Impact of Gender Differences as Moderator

The study investigates the effect of gender on the relationship between performance expectancy and user behavioural intention as proposed in Hypothesis H_{14} which is in line with the previous researchers by Venkatesh et al. (2003) and Wang and Shih (2008). Thus, the obtained result shows that effect between performance expectancy and user behavioural intention is significantly different, such that the effect is much in male broadband users than the female broadband users. This result is supported by the previous studies by (Venkatesh et al., 2003; Wang & Shih, 2008; Suha & Anne, 2008). This reveals that formation of habit of believe to use broadband is stronger among the male users than the female users of broadband technology among youth in the rural areas.

Moreover, the result of hypothesis H_{14} has shown that the use of broadband technology among youth in the rural areas is more in male youth than the female. This means that there are some activities that are peculiar to male's youth which are absent among the female counterpart. For instance, previous studies have shown that the use of ICT tools is increasing among male youth than the female while taking part on the architectural drawing (Ramayah, 2008; Luan et al., 2008; Luan et al., 2005). On the other hand, a technical work that is tedious and rigorous while learning requires a strong mind and agile students which is commonly found among male students (Alias et al., 2008; Luan et al., 2005). Indeed, the success of the technical work like architectural drawing is done with the use of modern technology in the present days (Ramayah, 2008). Therefore, the use of broadband technology will be higher among male youths than the female counterparts in the rural areas since the use of broadband technology is common among them and they believe it would give them a good performance at the end of their academic activities.

From the hypothesis H_{15}, the effect of gender was tested on the relationship between effort expectancy and user behavioural intention. The result shows that effect of male and female on the relationship between effort expectancy and user behavioural intention is significantly different, such that effect of female users of broadband are stronger than male users. The implication of this result is that female youths show passion for the usage of broadband technology than male users in the rural areas. This influences their argument that the simplicity of broadband devices eases users' behavioural intention in the rural areas towards broadband continuous usage. Hence, the result is in accordance with some previous studies like, Venkatesh et al. (2003), Suha and Anne (2008).

However, the result of hypothesis H_{15} shows that effort expectancy is one of the contributing factors towards continuous usage of broadband among youth in the rural areas. The result implies that female youths expect that the simplicity of use of broadband technology will encourage them to develop behaviour towards continuous usage in the rural areas. Previous studies have argued that female teenagers enjoying the use of technology that is not difficult to handle and assist them in the academic activities (Alias et al., 2008; Ramayah et al., 2003). Therefore, the more the ease of using the broadband technology is guaranteed among the female youth in the rural areas, the higher the success of broadband technology.

Moreover, the result of hypothesis H_{16} on the influence of gender on the relationship between social influence and user behavioural intention ended not supported. Therefore, it has shown that there is significant difference on the relationship between social influence and user behavioural intention, such that the effect is stronger in male youth of users of broadband technology than the female users. This implies that male youth welcome the intervention of important people in their villages in forming a specified behaviour towards continuous usage of broadband technology. This result is in line with finding of Wang et al. (2009) that males are more interested in using technology than the female counterpart. However, the study's result is contrary to some previous researchers (Venkatesh et al., 2003; Venkatesh et al., 2000; Morris & Venkatesh, 2000) that female forms determinant factor than male towards usage of information technology.

6.2.3.2 Impact of Broadband Experience Differences as Moderator

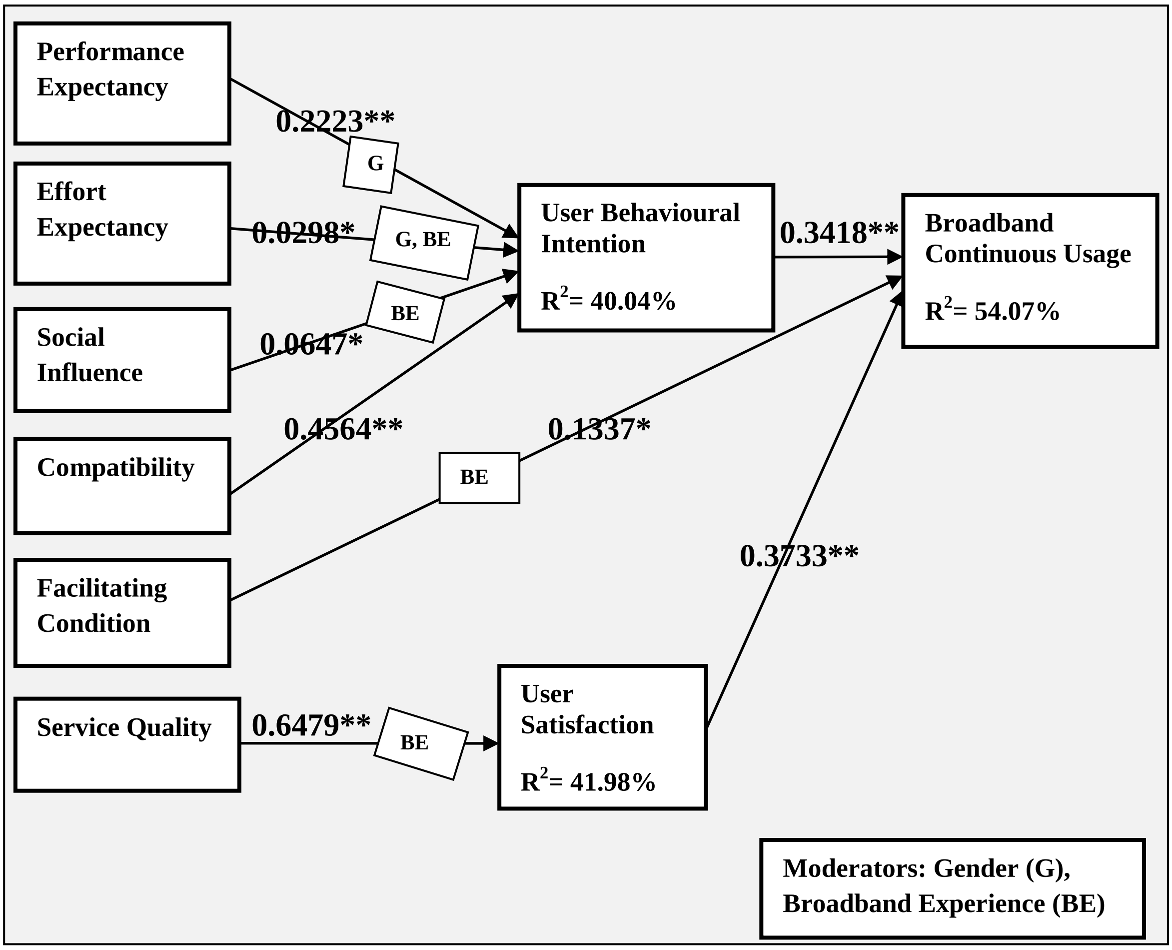
This study proposed that effect of high broadband experience users is greater than low experience users among the youth in the rural areas on the relationship between effort expectancy and user behavioural intention in Hypothesis H_{17}. The empirical result confirms that there is significant difference on the relationship between effort expectancy and user behavioural intention among youth in the rural areas, such that the effect is higher in highly experienced users than the low experienced users of broadband technology. The implication of this is that users of broadband in the rural areas expect that broadband technology would simply their activities with respect to the level of their shared experience. Hence, the result is consistence with findings of some previous researchers who stressed that highly experienced users of technology enjoy it than the low experienced users (Birth & Irvine, 2009; Helaiel, 2009; Suha & Anne, 2008; Venkatesh et al., 2003). However, effort expectancy may not be useful for the youth; such as secondary school student in the rural areas due to their level of education, but their experience is counted towards the long-term use of broadband technology in their villages.

The result of the proposed Hypothesis H_{18} confirms that the relationship between social influence and user behavioural intention is significantly different, such that the effect is more in the highly experienced users of broadband technology than the low experienced users among youth in the rural areas. Venkatesh et al. (2003) emphasised that social influence is related to the user behavioural intention only when the experience is injected. In the context of this study, the result reveals that youth in the rural areas would forms habit of continuously using the broadband technology based on the level of experience shared through the motivation received from the colleagues in their respective villages. Indeed, the outcome of this finding is in line with some previous studies (Venkatesh et al., 2012; Venkatesh et al., 2003) that high level of experience of users of technology builds attitude or behaviour towards continuous usage of the technology. This substantiates the need of social influence as a contributing factor for continuous usage of broadband technology among youth in the rural areas.

Furthermore, facilitating condition was initially found not supported while testing its relationship with broadband continuous usage among youth in the rural areas during the main hypothesis testing. However, with the introduction of broadband experience as suggested by the literatures, statistical result of Hypothesis H_{19} reveals that there is relationship between facilitating condition and broadband continuous usage among youth in the rural areas, such that the effect is much in the high experienced users of broadband than the low experience users. This implies that high experience of youth in the rural areas serves as motivating or facilitating condition for the continuous usage of broadband technology in the rural areas. The outcome enjoys the back-up of some previous studies that the support given to the rural dwellers for long-term use of technology is tantamount to high experience of the users (Lee et al., 2012; Venkatesh et al., 2011b, 2003). The implication of this result is that the high experience gained by the users of broadband in the rural areas assists the technical support received in order to continuously use the broadband technology.

In addition, Hypothesis H_{20} tested the effect of broadband experience users on the relationship between service quality and user behavioural intention. The result shows that not only the fulfilment of assurance, reliability and promptness of service getting from the use of broadband determines the behaviour that tends to continuous usage of broadband technology, but also the high experience gained by the users. This result is consistence with the findings of previous researchers like Park et al. (2010), Helaiel (2009), Suha and Anne (2008). Hence, the high experience of youth in the rural areas in terms of broadband usage assists the intrinsic values of users to form habit for broadband technology continuous usage.

In conclusion, the significant findings among the eight main hypotheses and five mediating effect hypotheses, including the moderating effect hypotheses revealed that all the 8 determinants supported the hypothesised structural relationships and enumerated as (PE -> UBI, EE -> UBI, SI -> UBI, CP -> UBI, SQ -> US, FC -> BCU, UBI -> BCU and US -> BCU). Therefore, performance expectancy, effort expectancy, social influence, compatibility, service quality, facilitating condition, user behavioural intention and user satisfaction are the contributing factors for continuous usage of broadband technology among youth in the rural areas of Malaysia. Besides, Figure 6.1 depicts the revised model of continuous usage of broadband technology among youth in the rural areas of Malaysia.



*P < 0.05; **P < 0.01

Figure 6.1: Revised Model of Continuous Usage of Broadband Technology among Youth in the Rural Areas of Malaysia

6.3 Summary

This chapter has presented the detailed discussion about the results of the hypotheses on the relationships between independent variables and dependent variables. Indeed, a total number of 20 hypotheses have been tested and discussed their implications towards achieving objectives of this study. Precisely, only 5 hypotheses were significant in the direct hypotheses testing while all the 5 mediating effect hypotheses found significant and supported as proposed in chapter 3, which leads to reconsider of significant of direct relationship in the research model. This makes the proposed model of contributing factors for continuous usage of broadband technology among youth in the rural areas of Malaysia to be valid. Moreover, the results of 7 moderating effect hypotheses tests were discussed leading to the conclusion that proposed effect of female users over male users of broadband technology on the relationship between social influence and user behavioural intention not supported. Thus, gender is discarded as moderator on the relationship between social influence and user behavioural intention in the revised model for contributing factors for broadband continuous usage among youth in the rural area. Hence, the next chapter is the final chapter for this study and presents accomplishment of the research objectives.

CHAPTER SEVEN

CONCLUSION

7.0 Introduction

This chapter addresses the summary of the findings which leads to the accomplishment of the research questions and objectives of the study. Hence, the contributions of the study together with research limitations and suggestions for directions of future research are highlighted.

7.1 Research Questions of the Study

The research questions in this study cover some issues beginning with level of broadband technology usage in the rural areas of Malaysia, leading to the contributing factors for continuous usage of broadband technology. Based on the problem statement in chapter 1, the study came up with four research questions in addressing the highlighted problems as follows:

7.1.1 Research Question 1*:* What are the effects of low usage of broadband technology in the rural areas of Malaysia?

Answering this research question entails rigorous review of previous studies on the usage of internet and broadband related issues, especially in the rural areas. The study shows that low usage of broadband technology in the rural areas of Malaysia is vulnerable to the social and economic issues which would have adverse effect on the development of the rural communities. Lack of adequate usage of broadband technology has negative effect on the youth's performance in their academic activities. Indeed, the study reveals that low usage of broadband technology in the rural areas brings about low community involvement and reduction in income and human capital development.

7.1.2 Research Question 2*:* How can continuous usage of broadband technology be achieved among the youth in the rural areas of Malaysia?

The research question two was answered through the use of chosen sample (secondary school student) which helps in generalisation of the study. Moreover, the study suggested the use of PLS-SEM which is quantitative approach in nature while researching on the population that is prone to obtaining both normal and non-normal data. In the context of this study, the study covers all the four states in the northern region of Malaysia making it easy to achieve large data for the study. Thus, the PLS-SEM was able to take care of internal error that is common in the quantitative data and does not require data transformation after data collection, unlike CB-SEM.

7.1.3 Research Question 3*:* What are the significant factors that influence continuous usage of broadband technology among the youth in the rural areas of Malaysia?

Provision of answer to this question entails assessment and review of many models and previous studies on the usage and continuous usage of technology. The study finally adapts the IS continuance post acceptance model and UTAUT model, thus, finalised with eight contributing factors for continuous usage of broadband technology among youth in the rural areas; performance expectancy, effort expectancy, social influence, compatibility, facilitating condition, service quality, user behavioural intention and user satisfaction. The indirect effect analyses (mediation and moderation) helped in considering the effort expectancy, social influence and facilitating condition as contributing factors. Hence, the study suggested the eight significant factors as contributing factors for continuous usage of broadband technology among youth in the rural areas, confirmed by the study's hypotheses and presented in Table 7.1.

Table 7.1: Contributing Factors for Continuous Usage of Broadband Technology among Youth in the Rural Areas

Contributing Factors	**Measures**
Performance Expectancy	1. Using broadband enhances my academic performance 2. Using broadband services helps achieve academic activities more quickly 3. Using broadband facilitates academic efficiency 4. Usage of broadband would make it easier to do my assignment 5. My frequent use of broadband would make me smarter in my academic work
Effort Expectancy	1. My interaction with the broadband device would be clear and understandable 2. I found that broadband devices are easy to operate 3. I found broadband services easy to use 4. I found using facilities in broadband to be flexible 5. It would be easier for me to become skilful in my academic assignment while using broadband

Table 7.1 Continued

Social Influence	1. Colleagues in my village think I should use broadband 2. People who are important to me would want me to use broadband 3. People that use broadband in my village have more prestige 4. I would use the broadband if my friends use it 5. My village has supported the use of broadband
Compatibility	1. Using broadband is compatible with my academic work 2. Using broadband fits with the way I do my academic work 3. Using the broadband fits into my school's academic work style 4. Using a broadband is compatible with the current situation in my school
Facilitating Condition	1. I have the resources to use broadband at my village, e.g PID 2. I have the knowledge to use broadband 3. Given the specific instruction, it would be easier for me to use broadband 4. A technical person is available to support in case of difficulty in using broadband service in my village 5. Adequate ICT facilities are available at my village to access broadband services
Service Quality	2. The broadband technical support is very efficient 4. I am satisfied with the speed of broadband access 6. The broadband service is reliable in the village that I live 7. The overall service quality of the connection of my broadband is satisfactory
User Behavioural Intention	1. I believe that everyone in my village should use broadband services in the future 3.I intend to continue my current subscription of my broadband 4. I intend to continue the usage of broadband service in the future

Table 7.1 Continued

User Satisfaction	1. I feel happy about my experience with the broadband usage 2. I am satisfied with my overall experience with broadband usage 3. I feel pleased about the usage of broadband services 4. I feel contended with the usage of broadband services 5. I feel satisfied about my overall experience with broadband services

7.1.4 Research question 4*:* To what extent do gender and experience of users of broadband technology moderate the relationship between the influential factors and continuous usage of broadband technology among the youth in the rural areas of Malaysia?

The group comparison analysis suggested the moderating effect of gender, male against female on the structural model. The study reveals in the analysis that moderating effect of gender is stronger for male than female (0.2435* > 0.1696) on the relationship between Performance Expectancy (PE) and User Behavioural Intention (UBI). However, further analysis revealed that the effect of gender is stronger for female than male (0.1551* > -0.0261) on the relationship between Effort Expectancy (EE) and User Behavioural Intention (UBI). Besides, the relationship between Social Influence (SI) and User Behavioural Intention (UBI) has stronger effect on male than female (0.1365 > 0.0343), negating the hypothesis.

Furthermore, group comparison analysis once suggested the moderating effect of broadband experience, high broadband experience and low broadband experience on the structural model. Therefore, the empirical analysis shows that high broadband experience is stronger than the low broadband experience on the relationship between Effort Expectancy (EE) and User Behavioural Intention (UBI) in the rural areas of Malaysia (0.1664* > 0.0323). Indeed, the relationship between Social Influence (SI) and User Behavioural Intention (UBI) has stronger effect on the high broadband experience than the low broadband experience (0.123 > 0.0713). Besides, high broadband experience user has much effect than low broadband experience users on the relationship between Facilitating Condition (FC) and Broadband Continuous Usage (BCU) (0.2778* > 0.0553). Hence, relationship between Service Quality (SQ) and User Satisfaction (US) has more effect of high broadband experience users than the low broadband experience users (0.7706* > 0.6713). Consequently, gender and broadband experience are the moderators between the contributing factors towards continuous usage of broadband technology among youth in the rural areas of Malaysia.

7.2 Research Objectives Achieved

The research objectives for this study are divided into two; main objective and sub objectives. The primary objective is to develop and validate a model for continuous usage of broadband technology among youth in the rural areas of Malaysia. This objective has been achieved and presented in Figure 6.1 which comprises of eight contributing factors. The subsequent sections explain accomplishment of secondary objectives.

7.2.1 Research Objective 1*:* To determine the effect of low usage of broadband technology in the rural areas of Malaysia.

This objective was achieved through the review of previous works. The study expressed that both social and economic factors that have been enjoyed by the urban settlers are lack or insufficient in the rural areas due to the low usage of broadband technology. The review of previous works reveals that people in the rural areas have less participation in the use of free calls that could be made by using the smart phones. Therefore, this affects the communication among the people in the rural areas and with their relative in the urban centres which is as a result of the low usage of broadband technology. Moreover, the low usage of broadband in the rural areas has affected the education of the youth that are residing in the rural areas. The rigorous review of literature showed that the use of ICT contents is low among the youth in the rural areas and has termed as one of the factors affecting the rural development. Besides, the study has shown that the low usage of broadband technology in the rural areas has prevented the inhabitants from enjoying modern healthcare (telemedicine). The low usage of broadband technology has also caused reduction in community participation, low employment opportunity and weak intra-rural communication among the rural dwellers.

7.2.2 Research Objective 2*:* To determine the approach for achieving continuous usage of broadband technology among youth in the rural areas of Malaysia.

The research objective 2 has been achieved by choosing the secondary school students that are residing in the rural areas as respondent in the study. The achieving of the research objective 2 is confirmed by the high response rate of 87.33% at the end of data collection from the field. The secondary school students were found in all the rural areas of northern region of Malaysia where the data collection exercise taken place. This gives the results of this study to fit generalisation and applicable to all the rural areas where the relative research could be conducted in the future. In addition, the study uses the PLS-SEM analytical package which is capable of handling both normal and non-normal data for analysing the collected data. Thus, the approach helps to develop the research model for continuous usage of broadband technology among youth in the rural areas and achieves model fit of 54.07% which is sufficient for the rural Community Informatics research.

7.2.3 Research Objective 3*:* To determine the significant factors that influences the continuous usage of broadband technology among youth in the rural areas of Malaysia.

The research objective 2 was achieved and shown in Figure 6.1, represents the significant factors for continuous usage of broadband technology among youth in the rural areas of Malaysia. The significant factors are Performance Expectancy, Effort Expectancy, Social Influence, Compatibility, Facilitating Condition, Service Quality, User Behavioural Intention and User Satisfaction. The suggested factors in the revised model became valid through the hypotheses testing (direct and indirect analyses) that revealed the relationship between the contributing factors. The obtained results from the relationships showed that the factors are related and justifying the basis for recommended them as significant contributing factors for continuous usage of broadband technology among youth in the rural areas of Malaysia.

7.2.4 Research Objective 4*:* To examine the moderating effect of gender and experience of users of broadband technology on the relationship between the influential factors and continuous usage of broadband technology in the rural areas of Malaysia.

This objective was achieved by conducting the analysis on group comparison using PLS-SEM. The moderating effect of gender and broadband experience were established on the proposed hypotheses and supported, except on the effect of gender on the relationship between social influence and user behavioural intention towards continuous usage of broadband technology among youth in the rural areas. Hence, gender and broadband experience are suggested as the valid moderators on the broadband technology continuous usage among youth in the rural areas.

7.3 Implications of the Study

The outcome of the hypotheses on the relationship between independent variables and dependent variable, together with the effects of moderators on the variables resulted into the theoretical implication and practical implications.

7.3.1 Theoretical Implications

This study has successfully developed a model for the continuous usage of broadband technology among the youth in the rural areas of Malaysia as showed in the revised model in Figure 6.1. The revised model shows a sufficient model fit and has good variance explanation which is capable to use in the rural informatics research. Moreover, the study is able to integrate two prominent IS theories (IS continuance post acceptance and UTAUT models) in producing the model for continuous usage of broadband technology among youth in the rural areas. Unlike many of IS models that always focus on the first-time use of technology, IS continuance post acceptance model and UTAUT model have been recommended by the previous studies as models that do not limit their effect on the first-time use of technology but also on the long-term use. Therefore, using these two models to form the research model for this study serves as basement for the rural informatics researchers while studying the success of technology in the rural areas.

Furthermore, the integration of the two models has contributed to this study with the combination of variance explanations of US from IS continuance post acceptance model and UBI from UTAUT model as 0.4198 and 0.4004 respectively towards continuous usage of broadband among youth in the rural areas. Previous researchers have argued that for a model to be accepted to provide solution in IS study, it has to show that its predictive reliance (Q^2) is more than zero (Hair et al., 2011a; Henseler et al., 2009; Ringle & Spreen, 2007; Ringle et al., 2006). In the context of this study, the Q^2 as shown in Table 5.21 have values that are more zero. This shows that integration of the two IS models (IS continuance post acceptance and UTAUT) will help the IS domain and rural informatics researchers in solving the rural problems.

Another contribution that has been made in the study is the inclusion of service quality and compatibility variables to the integrated model towards continuous usage of broadband technology among youth in the rural areas. Service quality has been presented as variable that posits to the success of IS wherever it's being applicable. The inclusion of service quality in the research model recorded the highest path coefficients (0.6479) among the variables in the research model, showing that service quality of the broadband technology has high impact on the users towards continuous usage of broadband technology in the rural areas.

However, failure to include services quality as one of the variables in the model would have adverse effect on the variance explanation of user satisfaction (US) $R^2 = 0.4198$ that is sourced from IS continuance post acceptance model. Indeed, the effect size (f^2) of 0.7241 of service quality on the dependent variable in the integrated model is large, implies that absent of service quality from the model would affect the model's output in a negative way. Hence, inclusion of service quality in the model is a contribution to the body of knowledge for the IS researcher in rural informatics. A related contribution is the inclusion of Broadband Experience as moderator on the linkage between Service Quality and User Satisfaction, which strengthen achieving continuous usage of broadband technology among youth in the rural areas.

Moreover, addition of compatibility variable in the research model is a contribution to the body of knowledge towards continuous usage of broadband technology among youth in the rural areas. The path coefficient of compatibility (0.4564) in the model is also large which shows that it has great impact on the user behavioural intention

(UBI) which is sourced from UTAUT model. Thus, the variance explanation (R^2) of UBI in the model becomes 0.4004. The effect size (f^2) of compatibility is 0.1329 which is moderate, implies that presence of compatibility in the model towards continuous usage of broadband technology among youth in the rural areas would assist the rural informatics researcher.

A notably contribution in the study is on the design of survey instruments for assessing continuous usage of broadband technology among youth in the rural areas. Thus, the designed instrument in the study is of great benefits to the future researchers in the context of Community Informatics (CI) focusing on the rural areas. Moreover, application of SEM by using smartPLS 2.0 in the study is recognised as another contribution. Argument of Sowa, Selden and Sandfort (2004) suggested that there should be fully capturing of entities and the associated reality which entails usage of understanding and methodological tools. Thus, the use of PLS-SEM in this study eases the analysis in this situation of researching with complex model, specifically in modelling multivariate relationships. The usage of PLS-SEM in the study helps in simultaneous assessment of validation of measurement model and hypothesised model on the user behaviour towards continuous usage of broadband technology among youth in the rural areas.

7.3.2 Practical Implications

This study identifies the steps that need to be taken in order to end the low usage of broadband technology among the youth in the rural areas of Malaysia and is focused on both users and policy makers. This is in line with study of Adria and Brown (2012) that effective use of broadband comes from continuous usage and that both users and providers should play important roles in achieving its frequent usage in the communities. The practical implications are drawn from the results of analysis of collected data and the review of previous works. Therefore, implications to the policy makers and users are discussed in sections 7.3.2.1 and 7.3.2.2 respectively.

7.3.2.1 Practical Implication towards Policy Maker

i. Widespread of broadband infrastructure in the rural areas of Malaysia.

This study reveals that if the rural communities are blessed with broadband infrastructures; their communities would be connected to the outside worlds and will eventually have positive impact on the usage of broadband technology. The study shows that proportion of youth in the rural areas that have computer at home is low, which is an indication of lack of adequate infrastructure among the rural dwellers. Having computers at home would facilitate the users to subscribe for the broadband connection in their respective homes and could serve as means of communications among the users. Therefore, policy makers like MCMC and KKMM (KPKK) in Malaysia should ensure that a policy is made to cater for the acquisition of personal computers through the subsidised price in the rural areas.

Moreover, the provision of broadband infrastructure should go towards wired and wireless infrastructure in the rural areas. Many of the locations in the rural areas of Malaysia depend on the use of wired infrastructure as means of service provision. The studies have shown that wired broadband provides lesser intensity while compare to wireless broadband. This implies that any location that depends on the use of wired connectivity would enjoy lesser connectivity. Thus, government of Malaysia is expected to ensure that there is even distribution of broadband infrastructure in the rural areas of Malaysia, so as to achieve the success of broadband technology in the rural areas.

ii. Increase in service intensity of broadband in the rural areas.

The KKMM which is the body in charge of communication in Malaysia should ensure that the priority is given to the people residing in the rural areas in terms of giving high service intensity. They should ensure that broadband service providers extend and increase the services giving to the rural areas, since most of the rural communities have problems of terrain and topology which are the hindrance to the planting of broadband infrastructure.

iii. The starting cost of broadband usage should be affordable for the rural dwellers.

Many of the users of broadband technology in the rural areas believe that starting cost of using the broadband is too high. Thus, they get discourage to continuously using the broadband technology and has affected their social and economic activities. It has shown that income of people in the rural areas is low, thus, they would patronise an affordable technology. Hence, to ensure the success of broadband technology in the rural areas of Malaysia, the provider of broadband service and government agency in charge of communication should ensure that the cost of acquiring the broadband technology is affordable to the rural users.

iv. Provision of uninterrupted power supply in the rural areas in order to strengthen the rural dwellers' intentions in continuous usage of broadband.

Study and results from the survey show that one of the causes of backwardness in the use of broadband technology among the youth in the rural areas is intermittent power supply. The broadband infrastructure at home and the communities have to be powered by the electricity. Thus, interrupted and intermittent power supply can destroy the broadband infrastructure in the rural areas. Hence, government of Malaysia and ministry in charge of power should ensure that uninterrupted powers are supply to the rural areas. This would prolong the life span of the broadband infrastructure and provide more encouragement to the rural users of broadband technology.

7.3.2.2 Practical Implication towards Users

i. Provision of supportive learning environment for the users

This study reveals that usage of broadband among youth in the rural areas gives a supportive environment in terms of surfing internet for providing solutions to the assignment given by their teachers. It shows that broadband can serve as self tutors to the youth, specifically secondary school students in the rural areas who do not have enough fund to engage in tuition classes. Nowadays, there are many tutorials on the subjects like; Mathematics, English Language, Chemistry, Physics, Biology and others on YouTube. This could be accessible by using a high speed internet which could be provided by broadband technology. Moreover, the learning behaviour of youth in the rural areas would receive an increment since they can access the websites and blogs which can solve their academic issues easily. Hence, a supportive learning environment that is provided by the use of broadband encourages continuous usage of broadband technology among youth in the rural areas.

ii. Bridging of digital divide in broadband usage

The existing differences in the usage of broadband technology between the rural and urban areas have been addressed in this study. The study shows that users of broadband technology in the rural areas are lower than those in the urban areas. Thus, the study presents the contributing factors that see to the continuous usage of broadband technology in the rural areas. Those contributing factors which are performance expectancy, effort expectancy, social influence, facilitating condition, compatibility, service quality, user behavioural intention and user satisfaction were validated in this study. Hence, the study has paved way for bridging the gaps in the usage of broadband technology between urban and rural users.

iii. Creation of avenue for studies on rural informatics

This study serves as basement for the forthcoming studies on the continuous usage of technology in the rural areas. As far as researcher's knowledge, there are no studies on the continuous usage of broadband technology and the related issues in the rural areas. This study would encourage the researchers on the rural informatics, specifically on the continuous usage of broadband technology in the rural areas.

7.4 Limitations of the Study

The fact that this study is pioneer in the determination of the contributing factors for continuous usage among of broadband technology among youth in the rural areas of Malaysia, the study is limited to some ways despite its theoretical and practical implications. Therefore, the limitations of this study are as follows:

i. Being the first study to be conducted on the continuous usage of broadband technology in the rural areas, additional studies are needed to confirm the obtained results in this study.

ii. This study applied the cross-sectional design for survey research in capturing the perceptions of respondents at a point in time due to the cost effectiveness and time factors. Hence, the researcher finds it difficult to collect data at multiple times.

iii. The identified contributing factors of continuous usage of broadband technology among youth in the rural areas of Malaysia are prone to changes overtime as a result of variation in culture of different rural areas. Therefore, a longitudinal study is required in order to fully ascertain the dynamic nature of those factors.

iv. Some of the respondents' answers to the survey questionnaires were not completed which make few responses to be invalid, becoming outliers and could not be used during the analysis.

v. The collection of data in the study was through the use of self administered questionnaires, which means that the data may be affected by error of same source bias. However, self administered questionnaires gave high response rate in the study.

vi. Lastly, the proposed model is limited to the broadband technology continuous usage among youth in the rural areas, cautions should be made while generalising the model to other context of CI in the rural areas.

7.5 Directions for Future Research

To overcome the limitations to this study, the study suggests many future research directions by adhering to the following:

i. The study suggests that there should be additional studies in order to test the model for continuous usage of broadband technology among youth in the rural areas in different locations to compare the obtained results.

ii. In addition to service user behavioural intention and user satisfaction, more relevant and powerful factors that fits explaining continuous usage should be used in the future study.

iii. One of the scopes of this study was the use of secondary school students that reside in the rural areas. The future research should consider other set of inhabitants that frequently found in the rural areas in order to confirm the relationship between the suggested contributing factors.

iv. In conclusion, a longitudinal study horizon is suggested to be applied in the future research since user satisfaction is a factor that is characterised to be accumulated over time.

7.6 Conclusion

This study was empirically conducted and tests the proposed research model with the objectives of exploring the contributing factors for continuous usage of broadband technology among youth in the rural areas. Therefore, the results of the study suggested that the continuous usage of broadband technology among youth in the rural areas can be achieved by considering Performance Expectancy, Effort Expectancy, Social Influence and Compatibility. Others are Facilitating Condition, Service Quality, User Behavioural Intention and User Satisfaction. Indeed, the obtained results from the relationships among the contributing factors showed that they are related and call for a basis for model of broadband technology continuous usage among youth in the rural areas.

The results from the group comparison analyses confirm the significant moderating effect of gender and broadband experience on the relationships between the variables. Thus, the final revised model is proposed to explain and predict the youth in the rural areas towards the broadband continuous usage. Due to the fact that gender and broadband experience of the users of broadband technology are the main moderating variables, more attention should be given to female and highly experienced user of broadband as the empirical results favoured them than the other groups. A detailed understanding of the revised model in Figure 6.1 would assist both policy maker and the broadband providers on the needs of youth in the rural areas towards broadband continuous usage. Finally, this study has shown that the revised research model could be successfully used in achieving continuous usage of broadband technology among youth in the rural areas of Malaysia and rural areas of developing countries that share the same attributes with Malaysia.

References

Abby, L. (2005). Tourism in Rural Areas: Kedah, Malaysia. *Journal of Tourism Management, Vol. 27,* pp. 878-889.

Abdulwahab, L., & Zulkhairi, M. D. (2011). Effectiveness of Telecentre Using a Model of Unified Theory of Acceptance and Use of Technology (UTAUT): Structural Equation Modelling Approach. *Journal of Emerging Trends in Computing and Information Sciences, Vol. 2, No. 9,* pp. 402 – 412.

Abdulwahab, L., & Zulkhairi, MD. (2012). Modeling the Determinants and Gender, Age and Ethnicity Difference in Telecommunication Centre Acceptance. *Research Journal of Information Technology, Vol. 4, No. 3,* pp. 85-105.

Adams, G. (2003). *Rural and Primary Industry: A Renaissance in Our Heartland*. Auckland: TUANZ G., Adams (Ed.), Survival of the Fastest, pp. 53-64.

Adekunle, P.A., Omoba, R.O., & Tella, A. (2007). Attitudes of Librarians in Selected Nigerians Universities toward the Use of ICT. *Library Philosophy and Practice, Vol. 9, No. 2,* pp. 1-8.

Adria, M., & Brown, D. (2012). Ambiguity and Uncertainty in the “Last Mile”: Using Sense-Making to Explore How Rural Broadband Networks Are Created. *Journal of Community Informatics, Vol. 8, No. 3,* pp. 1-15.

Afsar, S., Mateen, A., & Korbatov, A. (2005). Towards the Enhancement of Electronic Democracy: the Adoption of Reinventing Government and Electronic Government at the Municipal Level. *Journal of Agriculture and Social Sciences, Vol. 1,* pp. 133–137.

Agarwal, R., & Karahanna, E. (2000). Time Flies When You're Having Fun: Cognitive Absorption and Beliefs about Information Technology Usage. *MIS Quarterly, Vol. 24, No. 4,* pp. 665-694.

Agarwal, R., & Prasad, J. (1998). A Conceptual and Operational Definition of Personal Innovativeness in the Domain of Information Technology. *Information Systems Research, Vol. 9, No. 2,* pp. 204–215.

Agarwal, R., & Prasad, J. (2000). A Field Study of the Adoption of Software Process Innovations by Information Systems Professionals. *IEEE Transactions on Engineering Management, Vol. 47, No. 3*, pp. 295-308.

Aguinis, H., Ryan, K.G., & Harry, J. (2013). Best-Practice Recommendations for Defining, Identifying and Handling Outliers. *Organisational Research Methods, Vol. 16, No. 2,* pp. 270-301.

Ajzen, I., & Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behaviour*. Prentice-Hall, Englewood Cliffs, NJ.

Ajzen, I. (1991). The Theory of Planned Behaviour. *Organizational Behaviour and Human Decision Processes, Vol. 50*, pp. 179-211.

Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes, Vol. 50, No. 2*, pp. 179-211.

Allen, R. (2013). Statistical for evidence-based practice and evaluation. 3rd edition, Books/ Cole, Cengage Learning, Belmont USA.

Ashok, J., David, K., & Bhaskar, R. (2007). Broadband to Empower Rural India. *IETE Technical Review, Vol. 24, No 4*, pp. 195-201.

Alex, D., Christy, C.S., & Ralph, D. (2007). *Pharmaceutical Statistics using SAS: A Practical Guide*. SAS Institute Inc., United State.

Al-Gahtani, S., Hubona, G., & Wang, J. (2007). Information technology (IT) in Saudi Arabia: Culture and the acceptance and use of IT. *Information & Management, Vol. 44, No. 8,* pp. 681-691.

Alias, N. A., Jamaludin, H., Hashim, S., Ismail, I. S., & Suhaili, N. (2008). Theories of Change and Evaluation of Malaysian Rural Internet Centers. *Proceedings of IPID Postgraduate Strand at ICTD 2010*, pp. 5-9.

Allison, P. (1999). *Multiple regressions: A primer*. CA: Pine Forge Press.

Alphonsus, O.A., Elochukwu, A.U., & Sylvanus, I. (2011). Internet Penetration and Diffusion in Orlu Zone of Imo State, Nigeria: Prospects and Bottlenecks. *Asian Journal of Information Technology, Vol. 10, No. 4*, pp. 149-153.

Alshehri, M., Drew, S., Alhussain, T., & Alghamdi, R. (2012). The Effects of Website Quality on Adoption of E-Government Service: An Empirical Study Applying UTAUT Model Using SEM. *Website Quality and E-Government Service*, pp. 1-13.

Amichai-Hamburger, Y.A., Katelyn, Y.A., McKenna, B. C., & Samuel-Azran, T. (2008). E-empowerment: Empowerment by the Internet. *Computers in Human Behaviour, Vol. 24*, pp. 1776–1789.

Amin, M. E. (2005). *Social Science Research: Conception, Methodology and Analysis*. Makerere University Printery, Kampala.

Amitabh, O., Sahu, G.P., & Gupta, M.P. (2009). Antecedents of Paperless Income. *Academy of Marketing Science, Vol. 16, No. 1*, pp. 74-94.

Anderson, B., Gale, C., Jones, M.L.R., & McWilliam, A. (2002). Domesticating Broadband-What Consumers really do With Flat Rate, always-on and Fast Internet Access. *BT Technology Journal*, *Vol. 20 No. 1*, pp. 103-14.

Anderson, C. (2006). *The Long Tail: Why the Future of Business is Selling Less of More*. Hyperion, New York, NY.

Anderson, J. E., & Schwager, P. H. (2004). SME Adoption of Wireless LAN Technology: Applying the UTAUT Model. *Proceedings of the 7th Conference of the Southern Association for Information Systems*.

Andersson, K. (2000). Knowledge Technology Applications for Knowledge Management. Retrieved from www.uu.diva-portal.org/smash/get/diva2:170306/ FULLTEXT01, May 13th, 2012.

Andrea, H.T., Alison, P., & Julio, A.O. (2009). Reforming Policy to Promote Local Broadband Networks. *Journal of Communication Inquiry, Vol. 33, No. 4*, pp. 354-375.

Andy, C., Chris, G., Andy, F., Tom, R., & Steve, B. (2006). Exploiting Digital Records: New Resources and Tools for Qualitative in Contemporary Social Sciences. Retrieved from www.eval.org/resources/qda.htm, March 28th, 2012.

Antun, C., Danijel, M., & Josip, S. (2011). Broadband Ecosystem for Rural Areas in the Republic of Croatia. *IEEE Explore, pp. 1-9.*

Armin, M., & Friedrich, L. (2012). Sem-PLS: Structural Equation Modeling Using Partial Least Squares. *Journal of Statistical Software, Vol. 48, No. 3*, pp. 1-32.

Association of College and Research Libraries, 2006. Blueprint for Collaboration. American Library Association. Retrieved from www.ala.org/ala/acrl/acrlpubs/ whitepapers/acrlaaslblueprint.htm, January 15th, 2012.

Ayankunle, A.T., Ahmad, K.M., & Alan, G.D. (2012). User Acceptance of E-Government: Integrating Risk and Trust Dimensions with UTAUT Model.

International Conference on Computer & Information Science, IEEE Explore, pp. 109-113.

Ayres, R.U., & Williams, E. (2004). The Digital Economy: Where Do We Stand? *Journal of Technology Forecasting and Social Change, Vol. 71, No. 4*, pp. 315–339.

Bagozzi, R.P., & Yi, Y. (1988). *On the Evaluation of Structural Equation Models*.

Bahaman, A. S., Hayrol, A. M. S., Jeffrey, L. D., & Musa, A. H. (2010). Information Communication Technology, Village Development and Security Committee and Village Vision Movement: A Recipe for Rural Success in Malaysia. *Journal of Asian Social Science, Vol. 6, No. 4*, pp. 136-144.

Baker, K.H., Singleton, C.J., & Veit, T.E. (2011). *Survey Research in Corporate Finance: Bridging the Gap between Theory and Practice*. Oxford University Press, Inc., 198 Madison Avenue, New York, USA.

Balakrishnan, R. (2002). Harnessing ICT for Advancement of Rural Women: FOA Perspectives and Strategic Actions. United Nations Division for the Advancement of Women (DAW) Expert Group Meeting on "Information and Communication Technologies and Their Impact on and Use as an Instrument for the Advancement and Empowerment of Women" Seoul, Republic of Korea.

Bar, F., & Park, N. (2006). Municipal Wi-Fi networks: The Goals, Practices, And Policy Implications of the U.S. Case. *Communication & Strategies, Vol. 61, No. 1,* pp. 107-125.

Barbara, M.R. (2010). *Structural Equation Modeling with AMOS: Basic Concept, Applications and Programming*. 2nd Edition, Routledge Taylor & Francis Group, New York, USA.

Barkley, D.L., Markley, D.M., & Lamie, R.D. (2007). E-Commerce as a Business Strategy: Lessons Learned from Case Studies of Rural and Small Town Businesses. Southern Rural Development Center's National Rural E-Commerce Extension Initiative. *IEEE Explore*, pp. 1-6.

Barnes, S.J. (2011). Understanding Use Continuance in Virtual Worlds: Empirical Test of a Research Model. *Information & Management, Vol. 48, No. 8*, pp. 313-319.

Baron, R.M., & Kenny, D.A. (1986). The Moderator-Mediator Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations. *Journal of Personality and Social Psychology, Vol. 51*, pp. 1173–1182.

Barroso, C., Gabriel, C.C., & Jose, L.R. (2010). Applying Maximum Likelihood and PLS on Different Sample Sizes: Studies on SERVQUAL Model and Employee Behaviour Model. Vinzi et al. (Eds.), Handbook of Partial Least Square, Springer-Verlag Berlin Heidelberg. Based on UTAUT. *IEEE Explore*, pp. 1-4.

Bauer, H., & Grether, M. (2005). Virtual Community: It's Contribution to Customer Relationships by Providing Social Capital. *Journal of Relationships Marketing, Vol. 4, No. 1/2*, pp. 91-109.

Beilock, R., & Dimitrova, D. (2003). An Exploratory Model of Inter-Country Internet Diffusion. *Telecommunications Policy, Vol. 27, No. 3*–4, pp. 237–252.

Bell, S. (2004). Trapped by the Wrong Dependent Variable: A Call for Individual Technology Routinization and Infusion Research. *Proceedings of ASAC*.

Bentler, P.M. (1988). *Causal Modeling Via Structural Equation Systems: Handbook of Multivariate Experimental Psychology*. 2nd Edition, Plenum, New York. USA.

Betty, J. P., & Oded, S. (2007). *International Management Research*. 2nd Edition, University of Michigan Press, USA.

Bhattacherjee, A., & Premkumar, G. (2004). Understanding Changes in Beliefs and Attitudes toward IT Usage. *MIQ Quarterly, Vol. 28, No. 2*, pp. 229–255.

Bhattacherjee, A. (2001a). Understanding Information Systems Continuance: An Expectation-Confirmation Model. *MIS Quarterly, Vol. 25, No. 3*, pp. 351-370.

Bhattacherjee, A. (2001b). An Empirical Analysis of the Antecedents of Electronic Commerce Service Continuance. *Decision Support Systems, Vol. 32, No. 2,* pp. 201-214.

Batte, M.T. (2005). Changing Computer Use in Agriculture: Evidence from Ohio. *Computers and Electronics in Agriculture, Vol. 47*, pp. 1-13.

Bernroider, E.W.N. (2008). IT Governance for Enterprise Resource Planning Supported by the DeLone-McLean Model of Information Systems Success. *Information and Management, Vol. 45,* pp. 257-269.

Bischoff, S., Aier, S., & Winter, R. (2014). An Exploration of Factors Influencing the Continuous Use of Business Intelligence Systems. *Multikonferenz Wirtschafts informatik*, pp. 221-235.

Biggs, P., & Tim, K. (2006). Broadband Pricing Strategies. *Info Vol. 8, No. 6*, pp. 3–14.

Birth, A., & Irvine, V. (2009). Preservice Teachers' Acceptance of ICT Integration in the Classroom: Applying the UTAUT Model. *Educational Media International, Vol. 46, No. 6*, pp. 295-315.

Bob, E. Y. (2008). Measuring Customer Satisfaction and Loyalty: Survey Design, Use and Statistical Analysis Methods. *3rd Edition, America Society for Quality, Milwaukee USA.*

Bock, G.W., Zmud, R.W., & Kim, Y.G. (2005). Behavioural Intention Formation in Knowledge Sharing: Examining the Roles of Extrinsic Motivators, Social-Psychological Forces, and Organizational Climate. *MIS Quarterly, Vol. 29, No. 1*, pp. 87-111.

Bode, S., & Riebisch, M. (2010). Impact Evaluation for Quality-Oriented Architectural Decisions Regarding Evolvability. *4th European Conference on Software Architecture, Vol. 6285 of LNCS*, pp. 182–197.

Bontis, N., Booker, L., & Serenko, A. (2007). The Mediating Effect of Organizational Reputation on Customer Loyalty and Service Recommendation in the Banking Industry. *Management Decision, Vol. 45, No. 9*, pp. 1426-1445.

Bostjan, S., Gregor, P., & Marjan, H. (2010). An Empirical Study of Virtual Learning Environment Adoption Using UTAUT. *IEEE Explore Computer Society*, pp. 17-22.

Breitband (2008). Breitband-Informations Portal Baden-Wurttemberg. Retrieved from http://breitbandbw.info/31.html, December 13th, 2012.

Breivold, H., & Crnkovic, I. (2010). A Systematic Review on Architecting for Software Evolvability. *21st Australian Software Engineering Conference*, pp. 13–22.

Brewer, E., Demmer, M., Du, B., Ho, M., Kam, M., Nedevschi, S., Pal, J., Patra, R., Surana, S., & Fall, K. (2005). The Case for Technology in Developing Regions. *Computer, Vol. 38, No. 6*, pp. 25-38.

Briggs, L. & McBride, K. B. (2002). Rethinking the Digital Divide. *Computer, Vol. 35, No. 10*, 107-108.

Broadband Commission for Digital Development (2010). A 2010 Leadership Imperative: The Future Built on Broadband. New York: International Telecommunication Union and UNESCO. Retrieved from www.broadbandcommission.org/report1/report1.pdf, March 1st, 2014.

Broadband Commission (2009). Retrieved from http://www.broadbandcommission.org/, December 13th, 2011.

Brown, S., & Venkatesh, V. (2005). Model of Adoption of Technology in Households: A Baseline Model Test and Extension Incorporating Household Life Cycle. *MIS Quarterly, Vol. 29, No. 3*, pp.399–426.

Brown, S. (2008). Household Technology Adoption, Use, and Impacts: Past, Present, and Future. *Journal of Information System Frontier, Vol. 10, No. 4*, pp. 397–402.

Brutus, S., Aguinis, H., & Wassmer, U. (2013). Self-Report Limitations and Future Directions in Scholarly Reports: Analysis and Recommendations. *Journal of Management, Vol. 39*, pp. 48-75.

Bryman, A., & Bell, A. (2007). *Business Research Methods*. Oxford: Oxford University Press.

BSG Briefing Paper (2004). The Impact of Broadband-Enabled ICT, Content, Applications and Services on the UK Economy and Society to 2010.

Retrieved from http://www.broadbanduk.org/news/news/backgroundpaper, January 3rd, 2012.

BSG Report (2008). Report and Strategic Recommendations. Retrieved from http://www.broadbanduk.org/reports/BSG_report1, January 3rd, 2012.

Burton, M. C., & Hicks, M. J. (2005). *The Residential and Commercial Benefits of Rural Broadband: Evidence from Central Appalachia*. Final Report West Virginia.

Burton-Jones, A., & Hubona, G. (2006). The Mediation of External Variables in the Technology Acceptance Model. *Information and Management, Vol. 43, No. 6*, pp. 706-717.

Byrne, M. (2010). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. 2nd edition, 270 Madison Avenue New York, NY 10016: Routledge Taylor & Francis Group.

California Broadband Task Force (2008). The State of Connectivity: Building Innovation through Broadband, State of California.

Carayannis, E.G., & Turner, E. (2006). Innovation diffusion and technology acceptance: the case of PKI technology. *Journal of Technovation, Vol. 26, No. 7*, pp. 847–855.

Carlaw, K.I., Lipsey, R. G., & Webb, R. (2007). *The Past, Present and Future of the GPT-Driven Modern ICT revolution*. Industry Canada, Final (Blue) Report.

Caroline, I. P., Brenda, M., & David, S. (2006). An Exploration of the Categories Associated with ICT Project Sustainability in Rural Areas of Developing Countries: A Case Study of Dwesa Project. *Proceedings of SAICSIT*, pp. 100 – 106.

Caroline, P., Brenda, M., & David, S. (2009). An Exploration of the Critical Success Factors for the Sustainability of Rural ICT Projects: The Dwesa Case Study. *Information Systems Development*, p. 339.

Carolyn, F. W., Ora, L. S., & Elizabeth, R. L. (2010). *Measurement in Nursing and Health Research*. 4th Edition, Springer Publishing Company, LLC., New York, USA.

Carriere, R., Rose, J., Sirois, L., Turcotte, N. & Christian, Z. (2000). Broadband changes Everything. McKinsey & Company. Retrieved from www.mckinsey.de/_downloads/knowmatters/telecommunications/broadband_changes.pdf., March 13th, 2012.

Casalo, L.V., Flavian, C., & Guinaliu, M. (2010). Determinants of the Intention to Participate In Firm-Hosted Online Travel Communities and Effects on Consumer Behavioral Intentions. *Tourism Management , Vol. 31*, pp. 898-911.

Castaneda, J., Francisco, M.L., & Teodoro, L. (2007). Web Acceptance Model (WAM): Moderating Effects of User Experience. *Information and Management, Vol. 44*, pp. 384-396.

Cawley, A., & Preston, P. (2007). Broadband and Digital ‘Content’ In the EU-25: Recent Trends and Challenges. *Journal of Telematics and Informatics, Vol. 24, No. 4*, pp. 259–271.

Chanclou, P., Gosselin, S., Ferna´ ndez Palacios, J., Alvarez, V., & Zouganeli, E. (2006). Overview of the optical broadband access evolution: A joint article by operators in the IST Network of Excellence e-Photon/ONe, Telenor R&D. *IEEE Communications Magazine*, pp. 29–35.

Chang, I. C., Hwang, H. G., Hung, W. F., & Li, Y. C. (2007). Physicians' Acceptance of Pharmacokinetics-Based Clinical Decision Support Systems. *Expert Systems with Applications, Vol. 33, No. 2,* pp. 296-303.

Chaudhuri, A., Flamm, K., & Horrigan, J. (2005). An Analysis of the Determinants of Internet Access. *Telecommunications Policy, Vol. 29, No. 9–10,* pp. 731–755.

Chen, L.D., Gillenson, M.L., & Sherrell, D.L. (2002). Enticing Online Consumers: An Extended Technology Acceptance Perspective. *Information & Management, Vol. 39, No. 8,* pp. 705-719.

Cheung, C., & Lee, M. (2009). Understanding the Sustainability of a Virtual Community: Model Development and Empirical Test. *Journal of Information Science, Vol. 35, No. 3,* p. 279.

Cheung, C. M. K., & Lee, M. K. O. (2007). What Drives Members to Continue Sharing Knowledge in a Virtual Professional Community? The Role of Knowledge Self-Efficacy and Satisfaction. *Second international conference KSEM 2007 proceedings*, pp. 472-484.

Cheung, M.W.L. (2007). Comparing of Approaches to Constructing Confidence Intervals for Mediating Effects Using Structural Equation Models. Structural Equation Modeling, Vol. 14, pp. 227-246.

Chin W.W., Marcolin, B.L., & Newsted, P.R. (2003). A Partial Least Squares Latent Variable Modeling Approach for Measuring Interaction Effects: Results from a Monte Carlo Simulation Study and an Electronic-Mail Emotion/Adoption Study. *Information Systems Research, Vol. 14, No. 2,* pp. 189-217.

Chin, W.W. (1998). *The Partial Least Squares Approach to Structural Equation Modeling*. Modern Methods for Business Research, Mahwah, NJ: Lawrence Erlbaum Associates, pp. 295-358.

Chin, W.W. (2010). *How to Write Up and Report PLS Analysis? Handbook of Partial Least Squares: Concepts, Methods and Applications*. Springer Handbooks of Computational Statistics, pp. 655-690.

Chin, W.W., Marcolin, B.L., & Newsted, P.N. (2003). A Partial Least Squares Latent Variable Modeling Approach for Measuring Interaction Effects: Results from a Monte Carlo Simulation Study and an Electronic-Mail Emotion/ Adoption Study. *Information Systems Research, Vol. 14, No. 2,* 189–217.

Chin, W.W., Marcolin, B.L., & Newsted, P.R. (1996). A Partial Least Squares Latent Variable Modeling Approach for Measuring Interaction Effects. Results from a Monte Carlo Simulation Study and Voice Mail Emotion/Adoption Study. In J. I. DeGross, S. Jarvenpaa, & A. Srinivasan (Eds.), *Proceedings of the Seventeenth International Conference on Information Systems*, pp. 21–41.

Chiu, C.M., & Wang, E.T.G. (2008). Understanding Web-Based Learning Continuance Intention: The Role of Subjective Task Value. *Information & Management, Vol. 45, No. 3,* pp. 194-201.

Cho, N., & Park, S. (2001). Development of Electronic Commerce User-Buyer Satisfaction Index (ECUSI) for Internet Shopping. *Industrial Management + Data Systems, Vol. 101, No. 8-9,* pp. 400-405.

Cho, V., Cheng, T.C.E., & Hung, H. (2009). Continued Usage of Technology Versus Situational Factors: An Empirical Analysis. *Journal of Engineering and Technology Management. Vol. 26*, pp. 264-284.

Choudrie, J., & Dwivedi, Y. K. (2005). The Demographics of Broadband Residential Consumers of a British Local Community: The London Borough of Hillingdon. *Journal of Computer Information Systems, Vol. 45, No. 4*, pp.93–101.

Carl-Erik, S., Bengt, S., & Jan, W. (2003). *Model Assisted Survey Sampling*. Springer-Verlag New York Inc.

Chen, L. (2010). An Extended Model of IS Continuance for Information Oriented Mobile Applications. *IEEE Computer Society*, pp. 453-458.

Chen, S.C., Chen, H.H., Lin, M.T., & Chen, Y.B. (2011). A Conceptual Model to Understand the Effects of Perception on the Continuance Intention in Facebook. *Australian Journal of Business and Management Research, Vol. 1, No. 8*, pp. 29-34.

Chin, Y. L., & Yusop, F. D. (2011). Potential Use of Social Networking Tool to Assist Reading Comprehension: Implications for Practice and Future Research. *Journal of Educational Research*, Vol. 31, No. 1, pp. 189-201.

Christopher, U.S., & Maria-Gorretti, E. (2012). Availability and the Use of Computer and Internet by Secondary School Students in Benin City, Nigeria. *International Journal of Library and Information Science, Vol. 4, No. 2*, pp. 16-23.

Choudrie, J., & Dwivedi, Y. K. (2006). A Comparative Study to Examine the Socio-Economic Characteristics of Broadband Adopters and Non-Adopters. *Electronic Government, An International Journal, Vol. 3, No. 3*, pp.272–288.

Choudrie, J., & Dwivedi, Y.K. (2004). Analysing the Factors of Broadband Adoption in the Household. *Proceedings of the 12th European Conference on Information Systems, Turku Finland*, June 14–16, 2004.

Choudrie, J., & Dwivedi, Y.K. (2005). The Demographics of Broadband Residential Consumers of a British Local Community: The London Borough of Hillingdon. *Journal of Computer Information Systems, Vol. 45 No. 4*, pp. 93-101.

Choudrie, J., & Lee, H. (2004). Broadband Development in South Korea: Institutional and Cultural Factors. *European Journal of Information Systems, Vol. 13, No. 2*, pp. 103-114.

Choudrie, J., & Middleton, C. (2014). *Management of Broadband Technology Innovation: Policy Development and Use*. Rougtledge 711 Third Avenue, N.Y, USA.

Choudrie, J., & Papazafeiropoulou, A. (2006). Lessons Learnt from the Broadband Diffusion in South Korea and the UK: Implications for Future Government Intervention in Technology Diffusion. *Electronic Government: An International Journal, Vol. 3 No. 4*, pp. 373-85.

Christine & Carlo (2009). Economic Impact of Broadband. Retrieved from www.book.google.com/advantages+of+broadband, February 3rd, 2012.

Christine, R. M. (2010). *Research Methods for Generalist Social Work*. 5th Edition, Cengage Learning, 20, Davis Drive, USA.

Christodoulos, C., Michalakelis, C., & Varoutas, D. (2011). On The Combination of Exponential Smoothing and Diffusion Forecasts: An Application to Broadband Diffusion in the OECD Area. *Technological Forecasting and Social Change, Vol. 78, No. 1*, pp. 163–170.

Churchill, A.G., Brown, J.T., & Suter, A.T. (2010). *Basic Marketing Research*.7th Edition.ISBN-10:1439041393.

Churchill, G.A., & Brown, T.J. (2004). *Basic Marketing Research.* (5th Ed.), Sydney: South-Western College.

Churchill, G.A., & Suprenant, C. (1982). An Investigation into the Determinants of Customer Satisfaction. *Journal of Marketing Research, Vol. 19, No. 4*, pp. 491-504.

Click to Tech (2011). The ISDN Connection. Retrieved from http://clicktotech.blogspot.com/2010/05/isdn-integrated-service-digital-network.html, February 28th, 2014.

Cohen, J., Cohen, P., West, S.G., & Aiken, L.S. (2003). *Applied Multiple Regression/ Correlation Analysis for the Behavioural Sciences*. 3rd Edition, Mahwah, NJ: Lawrence Erlbaum.

Compeau, D., Higgins, C.A., & Huff, S. (1999). Social Cognitive Theory and Individual Reactions to Computing Technology: A Longitudinal Study. *MIS Quarterly, Vol. 23, No. 2*, pp. 145-158.

Cooper, D. R., & Schindler, P. S. (2003). *Business Research Methods*. 8th Edition, Boston: MA: McGrraw Hill.

Corning (2005). Broadband Technology Overview. Retrieved from www.corning.com/ docs/opticalfiber/wp6321.pdf, January 13th, 2012.

Cox, D. R., & Christl, A. D. (2011). *Principles of Applied Statistics*. Cambridge University Press, New York, United Kingdom.

Craig, K.E. (2010). *Applied Missing Data Analysis*. The Guilford Press, 72 Spring Street, New York, USA.

Crandall, R. W., Jackson, C. L., & Singer, H. j. (2003). *The Effect of Ubiquitous Broadband Adoption on Investment, Jobs and Us Economy*. Washington, D.C, Criterion Economics, L.L.C.

Crandall, R.W., Litan, R.E., & Lehr, W. (2007). The Effects of Broadband Deployment on Output and Employment: A Cross-Sectional Analysis of U.S. Data. *Issues of Economic Policy, Vol. 6*, pp. 1–34.

Creswell, J. W., & Plano-Clark, V. L. (2011). *Designing and Conducting Mixed Methods Research*. Thousand Oaks, CA: Sage Publication.

Creswell, J. W. (2003). *Research Design: Qualitative, Quantitative, and Mixed Method Approaches*. Thousand Oaks, Calif. London: Sage Publications.

Creswell, J. W. (2009). *The Research Design: Qualitative, Quantitative and Mixed Methods Approaches*. 3rd Edition, Sage Publications, Inc., California, USA.

Croatia Government (2007). Strategy of Rural Development of the RoC from 2008 to 2013. Ministry of Agriculture, Fisheries and Rural Development of the Republic of Croatia.

Curtis, L., Edwards, C., Fraser, K., Gudelssky, S., Holmquist, J., & Thornton, K. (2010). Adoption of Social Media for Public Relations by Non-Profit Organizations. *Public Relations Review, Vol. 36*, pp. 90-92.

Czernich, N., Falck, O., Kretschmer, T., & Woessmann, L. (2011). Broadband Infrastructure and Economic Growth. *The Economic Journal, Vol. 121, No. 552*, pp. 505-532.

Dahlan, N., Ramayah, T., & Koay, A.H. (2002). Data mining in the banking industry: an Exploratory Study. *The proceedings of the International Conference, Internet Economy and Business*, Kuala Lumpur, Malaysia.

Damiani, M.L., Bertino, E., & Silverstri, C. (2008). An Approach to Supporting Continuity of Usage in Location-Based Access Control. *IEEE Computer Society*, pp. 199-205.

Damiani, M.L., Bertino, E., & Silvestri, C. (2008). An Approach to Supporting Continuity of Usage in Location-Based Access Control. *IEEE Computer Society*, pp. 199-205.

DeLone, W.H., & McLean, E.R. (2003). The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. *Journal of Management Information Systems, Vol. 19, No. 4,* pp. 9-30.

Damon, P. S., Paul, M. P., & Chad, D. M. (2011). *Research Methods and Design in Sport Management*. Human Kinetics, USA.

Daniel, M. (2012). *Design Characteristics of Virtual Learning Environments: A Theoretical Integration and Empirical Test of Technology Acceptance and IS Success Research*. Springer Gabler, Germany.

David, C., & Robert, W.C. (2007). *Designing and Constructing Instruments for Social Research and Evaluation*. John Wiley & Sons, Inc.

David, L.O., & Dursun, D. (2008). *Advanced Data Mining Techniques*. Springer-Verlag Berlin Heidelberg, USA.

Davis, F. D. (1986). A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Results. Doctoral dissertation, Sloan School of Management, Massachusetts Institute of Technology.

Davis, F.D., & Venkatesh, V. (2004). Toward Preprototype User Acceptance Testing of New Information Systems: Implications for Software Project Management. *IEEE Transactions on Engineering Management, Vol. 51, No. 1*, pp. 31-46.

Davis, F.D., Bagozzi, R.P., & Warshaw, P.R. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science, Vol. 35*, 982–1002.

Davison, A.C., & Hinkley, D.V. (1997). *Bootstrap Methods and their Application*. Cambridge, UK: Cambridge University Press.

De Vaus, D. (2001). *Research Design in Social Research*. London: Sage Publications.

DeepSearcher Inc. (2012). Narrowband Dial-Up Connection. Retrieved from http://www.intelligentedu.com/computer_security_for_everyone/13-networking-security.html, January 13th, 2014.

Delone, W.H., & McLean, E.R. (1992). Information System Success: The Quest for the Dependent Variable. *Information Systems Research, Vol. 3, No. 1*, pp. 60-95.

Delone, W.H., & McLean, E.R. (2003). The Delone and McLean Model of Information Systems Success: A Ten-Year Update. *Journal of Management Information Systems, Vol. 19, No. 3*, pp. 9-30.

Deng, L., Turner, D.E., Gehling, R., & Prince, B. (2010). User Experience, Satisfaction, and Continual Usage Intention of It. *European Journal of Information Systems, Vol. 19, No. 1*, pp. pp. 60-75.

Denis, C., & Sylvain, C. (2010). Outliers Detection and Treatment: A Review. *International Journal of Psychological Research, Vol. 3, No. 1*, pp. 58-67.

Derek, D.R., Kristopher, J.P., Zakary, L.T., & Richard, E.P. (2011). Mediation Analysis in Social Psychology: Current Practices and New Recommendations. *Social and Personality Psychology Compass, Vol. 5, No. 6*, pp. 359-371.

Derry, S. J. (2007). Video Research in Classroom and Teacher Learning: Standardize That! *Video Research in the Learning Science*, pp. 305-320.

Derry. J. S, Roy, D. P., Brigid, B., Randi, A. E., Frederik, E., Ricki, G., Rogers, H., Timothy, K., Jay, L. L., Miriam, G. S., & Bruce, L. S. (2010). Conducting Video Research in the Learning Sciences: Guidance on Selection, Analysis, Technology and Ethics. *Journal of Leaning Sciences, Vol. 19*, pp. 3-53.

Devaraj, S., & Kohli, R. (2003). Performance Impacts of Information Technology: Is Actual Usage the Missing Links. *Management Science, Vol. 49, No. 3*, 273–289.

DeVellis, R.F. (2003). *Scale Development: Theory and Implications*. 2nd Edition, Thousand Oaks, California: Sage.

Dewan, S., & Riggins, F. (2007). The Digital Divide: Current and Future Research Directions. *Journal of the Association for Information Systems, Vol. 6, No. 2*, pp. 298–337.

Dickes, A., Lamie, R.D., & Whitacre, B.E. (2010). The Struggle for Broadband in Rural America. *Choices, Vol. 25, No. 4*, pp. 23-34.

Djamasbi, S., & Strong, D.M. (2008). The Effect of Positive Mood on Intention to Use Computerised Decision Aids. *Information and Management, Vol. 45*, pp. 43-51.

Dong, C., Gang, L., Cheng, Q., & Song, Y.F. (2008). Customer Acceptance of Internet Banking: Integrating Trust and Quality with UTAUT Model. *IEEE Explor*e, pp. 383-388.

Douglas, C.M., Elizabeth, A.P., & Vining, G.G. (2013). *Introduction to Linear Regression Analysis*. 5th edition, New York: John Wiley & Sons, Inc.

Du, H.S., & Wagner, C. (2006). Weblog success: exploring the role of technology. *International Journal of Human-Computer Studies, Vol. 64, No. 9,* pp. 789-798.

Dutta, A., & Roy, R. (2005). The mechanics of Internet growth: A developing-country perspective. *International Journal of Electronic Commerce, Vol. 9,* 143–165.

Dwivedi, Y. K., & Weerakkody, V. (2007). Examining the Factors Affecting the Adoption of Broadband in the Kingdom of Saudi Arabia. *International Journal of Electronic Government, Vol. 4, No. 1,* pp. 43-58.

Dwivedi, Y. K., Choudrie, J., & Brinkman, W. P. (2006). Development of a Survey Instrument to Examine Consumer Adoption of Broadband. *Industrial Management and Data System, Vol. 106, No. 5,* pp. 700-718.

Dwivedi, Y. K., Choudrie, J., & Brinkman, WP. (2006). Consumer Usage of Broadband in British Households. *International Journal of Services and Standards, Vol. 2, No. 4,* pp. 400-416.

Dwivedi, Y. K., Khan, N., & Papazafeiropoulou, A. (2006). Consumer Adoption and Usage of Broadband in Bangladesh. *Proceedings of the Twelfth Americas Conference on Information Systems*.

Dwivedi, Y. K., Khan, N., & Papazafeiropoulou, A. (2007). *Consumer Adoption and Usage of Broadband*. Hershey, PA, USA: IRM Press-IGI Global.

Dwivedi, Y. K., Khan, N., & Papazafeiropoulou, A. (2007). Consumer Adoption and Usage of Broadband in Bangladesh. *International Journal of Electronic Government, Vol. 4, No 3*, pp. 299-313.

Dwivedi, Y. K., papazafeiropoulou, A., Brinkman, W. P., & Lal, B. (2010). Examining the Influence of Service Quality and Secondary Influence on the Behavioural Intention to Change Internet Service Provider. *Journal of Information System Front, Vol. 12*, pp. 207-217.

Dwivedi, Y.K. (2005). *Investigating Adoption, Usage and Impact of Broadband: UK Households*. DISC, Brunel University, UK.

Earl, B. (2011). *The Basics of Social Research*. Fifth Edition, WADSWORTH CENGAGE Learning, USA.

Economic and Environmental Science Team (2009). *Broadband Spotlight*. Oireachtas Library and Research Services, pp. 1-16.

Ellershaw, J. C., Riding, J. L., Tran, A. V., Guan, L. J., & Smith, T. (2008). Economic analysis of broadband access for Australian rural and remote areas, *ATNAC*, pp. 1-4.

Elliot, S., Li, G., & Choi, C. (2012). Understanding Service Quality in a Virtual Travel Community Environment. *Journal of Business Research*, pp. 1-8.

Ellison, S.L.R., Barwick, V.J., & Farrant, T.J.D. (2009). *Practical Statistics for the Analytical Scientist: A Bench Guide*. RCS Publishing, Science Park, Milton Road Cambridge CB4 0WF, UK.

Emily, S. A., & Roger, C. (2011). *An Invitation to Social Research: How It's Done*. Fourth Edition, WADSWORTH CENGAGE Learning, USA.

Eneh, O. C., & Owo, N. J. (2008). Development and ICTs in Developing Countries. *Int. J. Dev. Stud., Vol. 3,* pp. 42-47.

Eneh, O. C. (2008). Research and Computer Applications in Developing Countries. *A Review. J. Sci. Eng. Technol., Vol. 15*, 8032-8044.

Ensley, M. D., Pearce, C. L., & Hmieleski, K. M. (2006). The Moderating Effect of Environmental Dynamism on the Relationship between Entrepreneur Leadership and New Venture Performance. *Journal of Business Venturing, No. 21*, pp. 243-263.

Eriksson, K., & Nilsson, D. (2007). Determinants of the Continued Use of Self-Service Technology: The Case of Internet Banking. *Journal of Technovation, Vol. 27*, 157-167.

European Commission (2006). Broadband Internet Access: The Territorial Divide. Retrieved from http://europa.eu/scadplus/leg/en/lvb/124190c.htm, January 10th, 2012.

Evens, T., Schuurman, D., De Marez, L., & Verleye, G. (2010). Forecasting Broadband Internet Adoption on Trains in Belgium. *Journal of Telematics and Informatics, Vol. 27, No. 1,* pp. 10–20.

Fang, X., Chan, S., Brzezinski, J., & Xu, S. (2006). Moderating Effects of Task Type on Wireless Technology Acceptance. *J Manag Inf Syst, Vol. 22, No. 3*, pp. 123–157.

Faziharudean, T. M., & Mitomo, H. (2006). Digital Divide among Public Servants in Malaysia: Urban -Rural Differences in Valuing the Use of Internet. *Journal of Japan Section of Regional Science Association, Vol. 35, No. 4*, pp. 837-849.

Feller, B. (2006). Digital Divide Still Separates Students. Retrieved from www.msnbc.msn.com, August13th, 2014.

Frank, G., Johannes, N., & Yvonne, K. (2013). Assessing Individual Differences in Basic Computer Skills: Psychometric Characteristics of an Interactive Performance Measure. *European Journal of Psychological Assessment, Vol. 29, No. 4*, pp. 263-275.

Federal Communications Commission. (2009). Bringing Broadband to Rural America. Retrieved from www.transistion.fcc.gov/Bureaus/Common_Carrier/Reports/fcc99005.txt, January 14th, 2014

Federal Communications Commission (1999). Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion and Possible Steps to Accelerate such Deployment Pursuant to Section 706 of Communications Act of 1996. Retrieved from www.fcc.gov, February 10th, 2013.

Federal Trade Commission (2008). Shopping for Broadband: Satisfying your Need for Speed. Retrieved from www.ftc.gov, February 7th, 2012.

Field, A. (2009). *Discovering Statistics Using SPSS*. 3rd Edition, London: Sage

Floh, A., & Treiblmaier, H. (2006). What Keeps the e-Banking Customers Loyal? A Multi-Group Analysis of the Moderating Role of Customer Characteristics on e-Loyalty in the Finance Service Industry. *Journal of Electronic Commerce Research, Vol. 7, No. 2,* pp. 97-110.

Foo, S. & Cheung Hiu, S. (1998). A Framework for Evaluating Internet Telephony Systems. *Internet Research: Electronic Networking Applications and Policy, Vol. 8*, *No.* 1, pp. 14–25.

Fornell, C., & Larcker, D.F. (1981). Structural Equation Models with Unobservable Variables and Measurement Error: Algebra and Statistics. *Journal of Marketing Research, Vol. 18, No. 3*, pp. 328-388.

Fornell, C. (1982). *A Second Generation of Multivariate Analysis: An Interview*. Fornell C. (Edu.), Vol. 1, pp. 1-21, Praeger, New York, USA.

Fouad, S., & Kay, F. (2008). ICT Provision in a Rural Community: A New Zealand Case Study. *AIDIS International Conference ICT, Society and Human Beings*.

Fowler, F. J. (2002). *Survey Research Methods*. London: SAGE Publications Inc.

Fox, S. (2004). Older Americans and the Internet. The Pew Internet and American Life Project. Retrieved from www.pewInternet.org, June 22nd, 2012.

Fransman, M. (Ed.). (2006). *Global broadband battles: Why the US and Europe lag while Asia leads*. Stanford: Stanford University Books.

Freezone (2014). ADSL Connection. Retrieved from from www.cyber.law.harvard.edu/readinessguide/glossary, January 26th, 2012.

Gan, C., Clemes, M., Limsombunchai, V., & Weng, A. (2006). A Logit Analysis of Electronic Banking in New Zealand. *Information Journal of Bank Marketing, Vol. 24, No. 6*, pp. 360-383.

GAO, Government Accountability Office. (2006). Broadband Deployment is Extensive throughout the United States, But it is Difficult to Assess the Extent of Deployment Gaps in Rural Areas. Retrieved from www.gao.com/pdf, January 5th, 2013.

Garcia, F.A.A. (2012). Tests to Identify Outliers in Data Series. Retrieved from habcam.whoi.edu/HabCamData/HAB/processed/Outlier Methods_external.pdf, September 2nd, 2013.

Garson, D. (2002). *Guide to Writing Empirical Papers, Thesis and Dissertation*. New York: Marcel Dekker.

Gefen, D., & Straub, D.W. (2005). A Practical Guide to Factorial Validity using PLS-graph: Tutorial and Annotated Example. *Communications of the AIS, Vol. 16, No. 5*, pp. 91-109.

Gholami, R., Higon, D.A., Hanafizadeh, P., & Emrouznejad, A. (2010). Is ICT the Key to Development? *Journal of global information management, Vol. 18, No. 1*, p. 1.

Ghosh, A., Wolter, D.R., Andrews, J.G., & Runhua, C. (2005). Broadband Wireless Access with WIMAX/802.16: Current Performance Benchmarks and Future Potential. *IEEE Communication Magazine, Volume 43, No. 2,* pp. 129-136.

Gianni, G., & Franceschini, F. (2003). A New Model to Support the Personalised Management of a Quality e-Commerce Service. *International Journal of Service Industry Management, Vol. 14, No. 3*, pp. 331-346.

Gillett, S., Lehr, W., & Sirbu, M. (2006). Measuring the Economic Impact of Broadband Deployment. Final Report, National Technical Assistance, Training, Research and Evaluation Project 99-07-13829. Washington, D.C: Economic Development Administration, US Department of Commerce.

Global e-School and Communities Initiative (2010). Retrieved from http://www.gesci.org, November 30th, 2011.

Gnanial, J., Peter, S., Alvin, Y., Hushairi, Z., & Khairuddin, A.H. (2006). The Needs for Community Informatics in Malaysia. *Encyclopedia of Developing Regional Communities with Information and Communication Technology, Hershey PA: Idea Group Publishing*, pp. 512-517.

Gregor, S., & Jones, K. (1999). Beef Selling Online: Diffusion Theory Applied. *Information Technology & People, VOl. 12, No. 1*, pp. 71–85.

Globalcomm Data Services (2009). Retrieved from www.telegeography.com/research-services/globalcomms-database-service, March 1st, 2012.

Goldfarb, A., & Prince, J. (2008). Internet Adoption and Usage Patterns Are Different: Implications for the Digital Divide. *Information Economics and Policy, Vol. 20, No. 1*, pp. 2–15.

Gregory, S., & Theresa, W. (2007). Doing the Things We Do: A Grounded Theory of Academic Procrastination. *Journal of Education Psychology, Vol. 99, No. 1*, pp. 12-25.

Grimes, S, (2000). Rural Areas in the Information Society: Diminishing Distance or Increasing Learning Capacities? *Journal of Rural Studies, Vol. 16*, pp. 13-21.

Haenlein, M., & Kaplan, A.M. (2004). A Beginner Guide to Partial Least Squares Analysis. *Understanding Statistics, Vol. 3, No. 4,* pp. 283-297.

Haines, R., & Leonard, L.N.K. (2007). Individual Characteristics and Ethical Decision-Making in an IT Context. *Industrial Management & Data Systems, Vol. 107 No. 1*, pp. 5-20.

Hair, J.F., Black, W., Barry, B.J., Anderson, R.E., & Tatham, R.L. (2006). *Multivariate Data Analysis*. 6th Edition, Upper Saddle River, N.J.: Pearson Education Inc.

Ham, J., park, J., Lee, J.N., & Moon, J.Y. (2012). Understanding Continuous Use of Virtual Communities: A Comparison of Four Theoretical Perspectives. *IEEE Computer Society*, pp. 753-762.

Hansen, T., Jensen, J.M., & Solgaard, H.S. (2004). Predicting Online Grocery Buying Intention: A Comparison of the Theory of Reasoned Action and the Theory of Planned Behaviour. *International Journal of Information Management, Vol. 24, No. 6*, pp. 539-560.

Hargittai E. (2008). *The Digital Reproduction of Inequality*. In Grusky D, ed. Social Stratification. Boulder, CO: Westview Press.

Hasan, B., & Ali, J.M.H. (2004). An Empirical Examination of a Model of Computer Learning Performance. *The Journal of Computer Information Systems, Vol. 44, No. 4*, pp. 27-34.

Herman, J.A., Gideon, J.M., & David, J.H. (2008). *Advising On Research Methods: A Consultant's Companion*. Johannes Van Kessel publishing, Huizen, The Netherlands.

Ho, C.H. (2010). Continuance Intention of E-Learning Platform: Toward an Integrated Model. *International Journal of Electronic Business Management, Vol. 8, No.* 3, pp. 206-215.

Ho, C.T. (2009). The Relationship between Knowledge Management Enablers and Performance. *Industrial Management and Data Systems, Vol. 109, No. 1*, pp. 98-117.

Huh, W.K. (2008). Can Information Technology Revive Rural Economies? The Cases of E-Villages in Korea and Japan. *Korea Geography Society Journal, Vol. 43, No. 5,* pp. 728-742.

Hussein, R., Mohamed, N., Ahlan, A.R., & Mahmud, M. (2010). E-government Application: An Integrated Model on G2C Adoption of Income Tax. *Transforming Government: People, Process and Policy, Vol. 5, No. 3,* pp. 225-248.

Hair, J.F., Hult, G.T.M., Ringle, C.M., & Sarstedt, M. (2014). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Sage Publications, Inc., 2455 Teler Road, California USA.

Hair, J.F., Mary, W.C., Arthur, H.M., Phillip, S., & Michael, J.P. (2011c). *Essentials of Business Research Methods*. 2nd Edition, Sharpe M.E. Inc., USA.

Hair, J.F., Ringle, C.M., & Sarstedt, M. (2011a). PLS-SEM: Indeed a Silver Bullet. *Journal of Marketing Theory and Practice, Vol. 19, No. 2*, pp. 139-151.

Hair, J.F., Sarstedt, M., Ringle, C.M., & Mena, J.A. (2011b). An Assessment of the Use of Partial Least Squares Structural Equation Modeling in Marketing Research. *Journal of the Academy of Marketing Science*, pp. 1-20.

Hair, J.F.J, William, C.B., Barry, J.B., & Rolph, E.A. (2010). *Multivariate Data Analysis*. 7th Edition, Uppersaddle River, New Jersey: Pearson Education International.

Ham, J., Park, J., Lee, J.N., & Moon, J.Y. (2012). Understanding Continuous Use of Virtual Communities: A Comparison of Four Theoretical Perspectives. *IEEE Computer Society*, pp. 753-762.

Hanadi, B., Mark, H., & Lan, M. (2011). Stakeholders' Perspectives of LIS Students' ICT Skills in Kuwait. *Second Kuwait Conference on e-Services and e-Systems*, pp. 1-9.

Hancook, B. (2002). *Trend Focus for Research and Development in Primary Health Care: An Introduction to Qualitative Research*. Division of General Practice. Trend Focus Group, University of Nottingham.

Hannemyr, G. (2003). The Internet as hyperbole: a critical examination of adoption rates. *The Information Society, Vol. 19, No. 2*, pp. 111–121.

Harvard Law School (2007). The Berkman Center for Internet and Society. Glossary of Items: Information Age. Retrieved www.law.harvard.edu, March 13th, 2011.

Hassanien, A., Rouibah, K., Khalil, O., and AlShawaf, A. (2008) Emerging Markets and E-Commerce in Developing Economies. Retrieved from www.igi-global.com/reference/details.asp?id=8178, May 21st, 2012.

Hayes, A.F. (2009). Beyond Baron and Kenny: Statistical Mediation Analysis in the New Millennium. *Communication Monographs, Vol. 76, No. 4*, pp. 408-420.

He, J.W., & Wei, K.K. (2006). Knowledge Management Systems (KMS) Continuance in Organizations: A Social Relational Perspective. *Information and Management. Vol. 43*, pp. 822-829.

He, W., & Wei, K. K. (2009). What Drives Continued Knowledge Sharing? An Investigation of Knowledge Contribution and Seeking Beliefs. *Decision Support Systems, Vol. 46*, pp. 826-838.

Hee, S.L., Taek, G.K., & Ji, Y.C. (2012). A Study on the Factors Affecting Smart Phone Application Acceptance. *3rd International Conference on E-Education, E-Business, E-Management and E-Learning*, pp. 27-33.

Heidi, J., & Susan, B. (2009). How High-School Students Find and Evaluate Scientific Information: A Basis for Information Literacy Skills Development. *Library and Information Science Research, Vol. 31, No. 1,* pp. 12-17.

Helaiel, A. (2009). Validating the Unified Theory of Acceptance and Use of Technology in Kuwait Ministries: A Structural Equation Modeling Approach. *International Journal of Information Systems and Change Management, Vol. 3, No. 3*, pp. 191-219.

Helm, S., Eggert, A., & Garnefeld, I. (2010). *Modeling the Impact of Corporate Reputation on Customer Satisfaction and Loyalty Using Partial Least Squares*. In V. Vinzi, W. Chin, J. Henseler & H. Wang (Eds.), Handbook of Partial Least Squares, Berlin, Germany Springer-Verlag Berlin Heidelberg, pp. 515-534.

Henseler, J., & Fassott, G. (2010). *Testing Moderating Effects in PLS Path Models: An Illustration of Available Procedures*. V. Esposito Vinzi et al. (eds.), Handbook of Partial Least Squares, Springer Handbooks of Computational Statistics, Springer-Verlag Berlin Heidelberg, pp. 713-735.

Henseler, J., Ringle, C.M., & Sinkovics, R.R. (2009). The Use of Partial Least Squares Path Modeling in International Marketing. *Advances in International Marketing, Vol. 20*, pp. 277-319.

Herman, A. P., & Ettema, J. S. (2007). *A Community Confronts the Digital Divide: A Case Study of Social Capital Formation through Communication Activism. Communication Activism: Media and Performance Activism*. Cresskill, NJ: Hampton Press, pp. 255−284.

Hilberg, J.S., & Gabriele, M. (2008). Undergraduate Fluency with Information and Communication Technology: Perceptions and Reality. *ACM Special Interest Group for Information Technology Education*, pp. 1-5.

Hoehle, H., Huff, S., & Goode, S. (2012). The Role of Continuous Trust in Information Systems Continuance. *Journal of Computer Information Systems, Vol. 52, No. 4*, pp. pp. 1-9.

Hoffman, D.L., & Novak, P.P. (1996). Marketing in Hypermedia Computer-Mediated Environments: Conceptual Foundations. *Journal of Marketing, Vol. 60, No. 3*, pp. 50-68.

Holmbeck, G.N. (1997). Toward Terminological, Conceptual and Statistical Clarity in the Study of Mediators and Moderators: Examples from the Child-Clinical and Pediatric Psychology Literatures. *Journal of Consulting and Clinical Psychology, Vol. 95, No. 4*, pp. 599-610.

Homburg, C., & Giering, A. (2001). Personal Characteristics as Moderators of the Relationship between Customer Satisfaction and Loyalty: An Empirical Analysis. *Psychology & Marketing, Vol. 18, No. 1*, pp. 43–66.

Hong, S. J., Tam, K. Y., & Kim, J. (2006). Mobile Data Service Fuels the Desire for Uniqueness. *Commun. ACM, Vol. 49, No. 9*, pp. 89-94.

Hong, S.J., James, Thong, J.Y.L., & Tam, K.Y. (2006). Understanding Continued Information Technology Usage Behaviour: A Comparison of Three Models in the Context of Mobile Internet. *Decision Support Systems, Vol. 42*, pp. 1819-1834.

Hong, S.J., Thong, J.Y.L., & Tam, K.Y. (2008). Understanding Continued Information Technology Usage Behaviour: A Comparison of Three Models in the Context of Mobile Internet. *Decision Support Systems, Vol. 42*, pp. 1819-1834.

Horrigan, J., & Murray, K. (2006). Rural Broadband Internet Use. Pew Internet and American Life Project Available. Retrieved from www.pewinternet.org/Reports/2009/10-Home-Broadband-Adoption-2009.aspx, December 10th, 2012.

Horrigan, J. (2009). Home broadband adoption in Washington, D. C. Pew Internet & American Life Project Available. Retrieved from www.pewinternet.org/Reports/2009/10-Home-Broadband-Adoption-2009.aspx, December 14th, 2013.

Horrigan, J.B., & Rainie, L. (2002). The Broadband Difference: How Online Americans' Behaviour Changes with High-Speed Internet Connections at Home. Pew Internet and American Life Project. Retrieved from www.pewinternet. org/pdfs/PIP_Broadband_Report.pdf, March 10th, 2012.

Houghton, J. (2009). ICT and the Environment in Developing Countries: Opportunities and Developments. Center for Strategic Economic Studies, Victoria University Australia, DRAFT REV 3, pp. 1-21.

Houghton, J.W., & Welsh, A. (2009). Australian ICT Trade Update 2009. Australian Computer Society, Sydney. Retrieved from www.cfses.com, January 25th, 2012.

Howick, S., & Whalley, J. (2008). Understanding the Drivers of Broadband Adoption: The Case of Rural and Remote Scotland. *J Opl Res Soc., Vol. 59, No. 10*, pp. 1299–1311.

Hsiao, K.L. (2012). Exploring the Factors that Influence Continuance Intention to Attend One-To-Some Online Courses via Videoconferencing Software. *The Turkish Online Journal of Educational Technology, Vol. 11, No. 4*, pp. 155-163.

Hsing, I.W., & Heng, L.Y. (2005). The Role of Personality Traits in UTAUT Model under Online Stocking. *Contemporary Management Research, Vol. 01, No. 01*, pp. 69-82.

Hsu, C. L., & Lu, H. P. (2004). Why Do People Play On-Line Games? An Extended TAM with Social Influences and Flow Experience. *Inform Mngt., Vol. 41, No. 7*, pp. 853–868.

Hsu, T.H., Wang, Y.S., & Wen, S.C. (2006). Using the Decomposed Theory of Planned Behaviour to Analyse Consumer Behavioural Intention towards Mobile Text Message Coupons. *Journal of Targeting, Measurement and Analysis for Marketing, Vol. 14, No. 4*, pp. 309-324.

Hung, S.Y., Chang, C.M., & Yu, T.J. (2006). Determinants of User Acceptance of the E-Government Services: The Case of Online Tax Filing and Payment System. *Government Information Quarterly, Vol. 23, No. 1*, pp. 97-122.

Hwang, I.H., Yu, C.C., Tsai, S.J., & Lin, C.H. (2011). An Empirical Study of the Factors Affecting Continuous Usage Intention of Double Reinforcement Interactive E-Portfolio Learning System. *IEEE Explore*, pp. 246-249.

Ibrahim, K., & Erik, B. (2011). An Assessment of Mobile Broadband Access in Indonesia: A Demand and Supply Problem? *Internetworking Indonesia Journal, Vol. 3, No. 2,* pp. 15-22.

ICTlogy (2007). Retrieved from www.ictlogy.net/review/?p=518, 17th October, 2012.

Ifinedo, P., & Davidrajuh, R. (2005). Digital Divide in Europe: Assessing and Comparing the E-Readiness of a Developed and an Emerging Economy in the Nordic Region. *International Journal of Electronic Government, Vol. 2, No. 2,* pp.111–133.

Igbaria, M., & Tan, M. (1997). The Consequences of Information Technology Acceptance on Subsequent Individual Performance. *Information & Management, Vol. 32, No. 3,* pp. 113-121.

International Telecommunication Union (2012a). The Impact of Broadband on the Economy: Research to Date and Policy Issues. Geneva: ITU Telecommunication Development Bureau. Retrieved from www.itu.int/ITU-D/ict/publications/idi/material/2012/MIS2012_without_Annex_4.pdf, December 28th, 2013.

International Telecommunication Union (2012b). Measuring the Information Society. Geneva: International Telecommunication Union. Retrieved from www.itu.int/ITU-D/ict/publications/idi/material/2012/MIS2012_without_Annex_4.pdf, December 30th, 2013.

Internet World Stats (2010). Malaysia Internet Usage Stats and Marketing Report. Retrieved from http://www.internetworldstats.com/asia/my.htm, December 14th, 2011.

Internet World Stats. (2005). Internet Usage Statistics- The Big Picture: World Internet Users and Population Stats. Retrieved from www.internetworldstats. com/ stats. htm, June 22nd, 2012.

Irani, Z., Dwivedi, Y. K., & Williams, M. D. (2009). Understanding Consumer Adoption of Broadband: An Extension of Technology Acceptance Model. *Journal of the Operational Research Society, Vol. 60*, pp. 1322-1334.

Inteco (1998). *Why Do People Choose ISPs And Why Do They Drop Them*? Inteco Corporation Press Report, Stamford Connecticut, USA.

ITU (2004). Information Technology Indicators. Retrieved from http://www.itu.int/ITU-D/ict/publications/wtdr_02/material/WTDR02-Sum_E.pdf, May 1st, 2012.

ITU (2010). News Room-Press Release. Retrieved from www.itu.int/pressoffice/ press_release/2010/39.aspx, February 10th, 2012.

ITU (2011). Retrieved from www.itu.int/osg/spu/publications/birthofbroadband/faq-es.html, 17th October, 2012.

ITU Internet Report (2006). Digital Life. Retrieved from www.itu.int/osg/spu/ publications/digitalife/docs/digital-life-web.pdf, March 28th, 2012.

Ives, B., Olson, M.H., & Baroudi, J.J. (1983). The Measurement of User Information Satisfaction. *Communications of the ACM, Vol. 26, No. 10*, pp. 785-793.

Jan, R. (2013). *Scientific Research in Information Systems: A Beginner's Guide*. Springer Heidelberg, New York, USA.

Jan, W., & Colin, D. (2009). *Marketing Research*. Juta and Company Ltd., Cape Town, South Africa.

Jae-Nam, L., & Young-Gul, K. (2005). Understanding Outsourcing Partnership: A Comparison of Three Theoretical Perspectives. *IEEE Transactions on Engineering Management, Vol. 52, No. 1*, pp. 43-58.

John, L., & Khaled, H. (2010). A Continuance Model for a Mobile/Web Based Self Management System for Adolescent Diabetics: The Role of Loyalty Incentives. *Proceedings of 18th European Conference on Information Systems*, pp. 1-12.

Junaida, I., Mahadir, L.A., & Sharunizam, S. (2010). Service Quality Performance in Academic Libraries. *International Conference on Science and Social Research, IEEE Explore*, pp. 867-871.

Jeff, S. (2007). *Street Fighter Marketing Solutions: How-One-On-One Marketing Will Help You Overcome the Sales Challenges of Modern-Day Business*. Free Press, Simon and Schuster Inc.

Jelke, B. G. (2009). *Applied Survey Methods: A Statistical Perspective*. John Wiley & Sons, Inc., Hoboken, New Jersey, USA.

Jeruwachirathanakul, B., & Fink, D. (2005). Internet Banking Adoption Strategies for a Developing Country: The Case of Thailand. *Internet Research, Vol. 15, No. 3*, pp. 295-311.

Jin, Y. S., & Li, Z. H. (2011). A Use-Diffusion Model of 3G Services in China. *African Journal of Business Management, Vol. 5, No. 27*, pp. 11168-11177.

John, W.G. (2012). *Missing Data: Analysis and Design*. Springer Science, New York, USA.

Jovanovic, B., & P. L. (2005). Handbook of Economic Growth. *Elsevier B.V, Vol. 1B*, pp. 1181-1224.

Jung, Y., Perez-Mira, B., & Wiley-Patton, S. (2009). Consumer Adoption of Mobile TV: Examining Psychological Flow and Media Content. *Computers in Human Behaviour, Vol. 25*, 123–129.

Junhee, P., Kwangil, L., Donghwan, P., & Kyeongdeok, M. (2007). QoS Aware Bridge for High-Speed Powerline Communication and Ethernet. *IEEE Transaction on Computer Electronics, Vol. 53, No. 1*, pp. 50-54.

Juyeon, H., Jihun, P., Jae-Nam, L., & Jae, Y. M. (2012). Understanding Continuous Use of Virtual Communities: A Comparison of Four Theoretical Perspectives. *45th Hawaii International Conference on System Sciences*, pp. 753-762.

Kakooza, T. (2002). *Research: An Introduction to Research Methodology*. National Adult Education Association, Kampala.

Kahn, J. (2006). Reporting mediation and moderation. Retrieved from www.jeremydrawson.co.uk/slopes.htm, December 14th, 2013.

Kandasamy, M., & Shah, P.M. (2013). Knowledge, Attitude and Use of ICT among ESL Teachers. *Proceedings of the Global Summit on Education*, pp. 914-930.

Kettinger, W.J., & Lee, C.C. (1997). Pragmatic Perspective on the Measurement of Information Systems Service Quality. *MIS Quarterly, Vol. 21, No. 2,* pp.223-240.

Kok-Lim, A.Y., Corinne, J.P., Heng, T.D.C., Kae, H.K., & Alvin, T. (2011). Exploring Sustainability of the Deployment of Wireless Broadband in Malaysia Rural Areas: Comprehensive Insights. *IEEE Colloquium on Humanity, IEEE Explore*, pp. 148-152.

Kotler, P. (2003). *Marketing Management*. New Jersey: Prentice Hall.

Krejcie, R.V., & Morgan, D.W. (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement, Vol. 30*, pp. 607-610.

Krieglmeyer, R., Deutsch, R., Houwer, J.D., & Raedt, R.D. (2010). Being Moved: Valence Activates Approach-Avoidance Behaviour Independently of Evaluation and Approach-Avoidance Intentions. *Journal of Psychological Science, Vol. 21, No. 4*, pp. 607-613.

Kuhlemeier, H., & Hemker, B. (2007). The Impact of Computer Use at Home on Students' Internet Skills. *Computer and Education, Vol. 49, No. 2*, pp. 460-480.

Kankanhalli, A., Tan, B.C.Y., & Wei, K.K. (2005). Contributing Knowledge to Electronic Knowledge Repositories: An Empirical Investigation. *MIS Quarterly, Vol. 29, No. 1*, pp. 113-43.

Karahanna, E., Agarwal, R., & Angst, C. (2006). Reconceptualising Compatibility Beliefs in Technology Acceptance Research. *MIS Quarterly*, *Vol.30, No.4*, pp. 781-804.

Karahanna, E., Ahuja, M., Srite, M., & Galvin, J. (2002). Individual Differences and Relative Advantage: The Case of GSS. *Decision Support Systems*, *Vol.32, No.4*, pp. 327-341.

Karahanna, E., Straub, D.W., & Chervany, N.L. (1999). Information Technology Adoption across Time: A Cross-Sectional Comparison of Pre-Adoption and Post-Adoption Beliefs. *MIS Quarterly, Vol. 23, No. 2*, pp. 183-213.

Kasim, M. Y., Malek, M. A., & Hambali, Z. S. (2011). The Provision of High Speed Broadband (HSBB) in Malaysia in Enhancing Malaysia Access to Internet

Application: A Case of Telecom Malaysia. *Global Media Journal, Vol. 2, No.* 8, pp. 1-14.

Katz, R., & Suter, S. (2009). Estimating the Economic Impact of the Broadband Stimulus Plan. Retrieved from www.elinoam.com/raulkatz/Dr_Raul_Katz_-_BB_Stimulus_Working_Paper.pdf, December 23rd, 2013.

Katz, R. (2009). Estimating Broadband Demand and Its Economic Impact in Latin America. *The 3rd ACORN-REDECOM Conference. Mexico City*.

Katz, R.L. (2010). The Impact of Broadband on the Economy: Research to Date and Policy Issues. 10th Global Symposium for Regulators "Enabling Tomorrow's Digital World" Dakar, Senegal. Retrieved from www.itu.int, February 25th, 2014.

Kedah Location (2013). Details of Kedah State. Retrieved from www.impressions.my/kedahmain/kedahinfo.htm, February, 8th, 2012.

Keller, G., & Joseph, L. R. (2009). *Managerial Statistics*. USA, Eight Edition, South- Western Cengage Learning.

Kellerman, A. (2004). Internet Access and Penetration: An International Urban Comparison. *Journal of Urban Technology, Vol. 11*, pp. 63–85.

Kelly, T., Mulas, V., Raja, S., Zhen-Wei Qiang, C., & Williams, M. (2009). What Role Should Governments Play In Broadband Deployment? Retrieved from http://www.oecd.org/dataoecd/40/47/43631862.pdf, January 13th, 2012.

Ooi, K.B., Jia-Jia, S., King-Tak, W., & Binshan, L. (2011). Exploring Factors Influencing Consumers' Behavioural Intention to Adopt Broadband in Malaysia. *Computer in Human Behaviour Journal*, pp. 1-11.

Kenneth, S. B. (2005). *Research and Design Methods: A Process Approach*. Sixth Edition, New York: McGraw-Hill.

Keong, M.L., Ramayah, T., Kurnia, S., & Chiun, L.M. (2012). Explaining Intention to Use an Enterprise Resource Planning (ERP) System: An Extension of the UTAUT Model. *Business Strategy Series, Vol. 13, No. 4*, pp. 173-180.

Khoumbati, K., Dwivedi, Y. K., Lal, B., & Chen, H. (2007). Broadband Adoption in Pakistan. *International Journal of Electronic Government, Vol. 4, No 4*, pp. 451-465.

Kijsanayotin, B., Pannarunothai, S., & Speedie, S.M. (2009). Factors Influencing Health Information Technology Adoption in Thailand's Community Health Centres: Applying the UTAUT Model. *International Journal of Medical Informatics, Vol. 78, No. 6*, pp. 404-416.

Kim, B. (2012). The Diffusion of Mobile Data Services and Applications: Exploring the Role of Habit and Its Antecedents. Telecommunications Policy, Vol. 36, No. 1, pp. 69-81.

Kim, C., Mirusmonov, M., & Lee, I. (2010). An Empirical Examination of Factors Influencing the Intention to Use Mobile Payment. *Computer in Human Behaviour, Vol. 26, No. 3*, pp. 310-322.

Kim, G., Shin, B., & Lee, H.G. (2006). A Study of Factors that Affect User Intentions toward Email Service Switching. *Information and Management, Vol. 43, No. 6*, pp. 884-893.

Koellinger, P. (2006). *Impact of ICT on Corporate Performance, Productivity and Employment Dynamics*. European Commission, e-Business W@tch, DG Enterprise & Industry.

Kolodinsky, J., Hogarth, J., & Hilgert, A. (2004). The Adoption of Electronic Banking by US Consumers. *The International Journal of Bank Marketing, Vol. 22, No. 4*, pp. 238-259.

Komerik, N. (2005). Use of the Internet among Dental Students in Turkey. *Journal of Dental Education, Vol. 69, No. 4*, pp. 470-475.

Koridor Utara (2007). *Northern Corridor Economic Region Socio Economic Blueprint 2007-2025*. Sime Darby Berhad, p. 10.

Kothari, C. R. (2009). *Research Methodology: Methods and Techniques*. 2nd Edition, New Age International Publisher Limited, Daryaganj, New Delhi.

Koziolek, H. (2011). Sustainability Evaluation of Software Architectures: A Systematic Review. *QoSA and ISARCS*, pp. 1 – 10.

Krizanovic, V., Zagar, D., & Grgic, K. (2011). Techno-Economic Analysis of Wireline and Wireless Broadband Access Networks Deployment in Croatian Rural Areas. *11th International Conference on Telecommunication*, pp. 265-272.

Kruschke, J.K., Aguinis, H., & Joo, H. (2012). The Time Has Come: Bayesian Methods for Data Analysis in the Organisational Sciences. *Organisational Research Methods, Vol. 15*, pp. 722-752.

KTAK (2006). Ministry of Information, Communication and Culture. Retrieved from www.kpkk.gov.my, June 28th, 2012.

Kutner, M.H., Nachtsheim, C.J., Neter, J., & Li, W. (2004). *Applied Linear Statistical Models*. 5th Edition, Boston, McGraw-Hill/ Irwin.

Lai, J.Y., & Chang, C.Y. (2010). User Attitudes toward Dedicated E-Book Readers for Reading: The Effects of Convenience, Compatibility and Media Richness. *Online Information Review, Vol. 35 No. 4*, pp. 558-580.

Lancaster, G. (2005). *Research Methods in Management: A Concise Introduction to Research in Management and Business Consultancy*. Oxford: Elsevier Butterworth-Heinemann.

Lankton, N.K., & McKnight, H.D. (2012). Examining Two Expectation Disconfirmation Theory Models: Assimilation and Asymmetry Effects. *Journal of the Association for Information Systems, Vol. 13, No. 2*, pp. 88-115.

Landrum, H., & Prybutok, V.R. (2004). A Service Quality and Success Model for the Information Service Industry. *European Journal of Operation Research, Vol. 156*, pp. 628-642.

LaRose, R., Strover, S., Gregg, J.L., Straubhaar, J. (2011). The Impact of Rural Broadband Development: Lessons from a Natural Field Experiment. *Government Information Quarterly, Vol. 28, No. 1*, pp. 91-100.

Lee, H.S., Kim, T.G., & Choi, J.Y. (2012). A Study on the Factors Affecting Smart Phone Application Acceptance. *3rd International Conference on E-Education, E-Business, E-Management and E-Learning, Vol. 27*, pp. 27-33.

Lee, K.C., & Chung, N. (2009). *Understanding Factors Affecting Trust and Satisfaction with Mobile Banking in Korea: A Modified DeLone and McLean's Model Perspective.* Interacting with Computers.

Lenhart, A., Madden, M., & Hitlin, P. (2005). Teens and technology: Youth are Leading the Transition to a Fully Wired and Mobile Nation. Washington, DC: Pew Internet and American Life Project. Retrieved from www.pewinternet.org, September 2nd, 2014.

Lenhart, A., Purcell, K., Smith, A., & Zickuhr, K. (2010). *Social Medial and Mobile Internet Use among Teens and Young Adults*. Pew Internet and American Life Project, Millennials, a Portrait of Generation Next, pp. 1-51.

Liaw, S.S., Chang, W.C., Hung, W.H., & Huang, H.M. (2006). Attitude toward Search Engines as a Learning Assisted Tool: Approach of Liaw and Huang's Research Model. *Computers in Human Behaviour, Vol. 22, No. 2*, pp. 177-190.

Lin, H.F. (2007). The Role of Online and Offline Features in Sustaining Virtual Communities: An Empirical Study. *Internet Research, Vol. 17, No. 2,* pp. 119-138.

Lin, MYC., & Ong, C.S. (2010). Understanding Information Systems Continuance Intention: A Five-Factor Model of Personality Perspective. *Proceedings of PACIS,* pp. 367-376.

Luan, W.S., Fung, N.S., Nawawi, M., & Hong, T.S. (2005). Experienced and Inexperienced Internet Users among Pre-Service Teachers: Their Use and Attitudes toward the Internet. *Educational Technology and Society, Vol. 8, No. 1,* pp. 90-103.

LaRose, R., Gregg, J., Strover, S., Straubhaar, J., & Carpenter, S. (2007). Closing the Rural Broadband Gap: Promoting Adoption of the Internet in Rural America. *Telecommunications Policy, Vol. 31*, pp. 359–373.

LaRose, R., Gregg, L., Strover, S., Straubhaar, J., & Inagaki, I. (2008). Closing the Rural Broadband Gap. Retrieved from www.msu.edu/~larose/ruralbb/, January 13th, 2014.

LaRose, R., Strover, Gregg, J.L., & Straubhaar, J. (2011). The Impact of Rural Broadband Development: Lessons from a Natural Field Experiment. *Government Information Quarterly, Vol. 28*, pp. 91–100.

Lassar, W., Manolis, C., & Lassar, S. (2005). The Relationship between Consumer Innovativeness, Personal Characteristics, and Online Banking Adoption. *International Journal of Bank Marketing, Vol. 23, No. 2*, pp. 176-199.

Lean, O.K., Zailani, S., Ramayah, T., & Fernando, Y. (2009). Factors Influencing Intention to Use E-Government Services Among Citizens in Malaysia. *International Journal of Information Management, Vol. 29*, pp. 458–475.

Lee H, O'Keefe R. M., & Yun, K. (2003). The Growth of Broadband and Electronic Commerce in South Korea: Contributing Factors. *Inform Soc., Vol. 19, No. 1*, pp. 81–93.

Lee, C., & Chan-Olmsted, S. (2004). Competitive Advantage of Broadband Internet: A Comparative Study between South Korea and the United States. *Telecommunications Policy, Vol. 28*, pp. 649–677.

Lee, C.K., & Al-Hawamdeh, S. (2002). Factors Impacting Knowledge Sharing. Journal of Information and Knowledge Management, 1(1), 49-56.

Lee, H., & Choudrie, J. (2002). *Investigation Broadband Technology Deployment in South Korea*. Brunel – DTI International Technology Services Mission to South Korea, DISC, Brunel University, Uxbridge.

Lee, H., O'Keefe, B., & Yun, K. (2003). The Growth of Broadband and Electronic Commerce in South Korea: Contributing Factors. *The Information Society, Vol. 19*, pp.81–93.

Lee, M-C. (2009). Factors Influencing the Adoption of Internet Banking: An Integration of TAM and TPB with Perceived Risk and Perceived Benefit. *Electronic Commerce Research and Applications, Vol. 8, No. 3,* pp. 130-141.

Lee, S., & Brown, J. (2008). Examining Broadband Adoption Factors: An Empirical Analysis between Countries. *Info. Vol. 10, No. 1*, pp. 25–39.

Lee, U.K., Lee, K.K., & Lee, J.R. (2013). The Effect of Community Artifacts and Media Richness Elements on the Experiences of the Social Network Game Users: 'Anypang' Case. *Journal of Society for E-Business Studies, Vol. 18, No. 1,* pp. 24-40.

Lee, Y., & Kwon, O. (2009). Can Affective Factors Contribute to Explain Continuance Intention of Web-Based Services? *ACM*, pp. 302-310.

Lee, Y., & Kwon, O. (2011). Intimacy, Familiarity and Continuance Intention: An Extended Expectation-Confirmation Model in Web-Based Service. *Electronic Commerce Research and Application, Vol. 10, No. 3*, pp. 342-357.

Lee, Y.L., Hwang, S.L., & Wang, E.M.Y. (2006). An Integrated Framework for Continuous Improvement on User Satisfaction of Information Systems. *Industrial Management & Data Systems, Vol. 106, No. 4,* pp. 581-595.

Lehr, W. C., Osorio, S. G., & Sirbu, M. (2006). Measuring Broadband Economic Impact. *The 33rd Research Conference on Communications, Information and Internet Policy, Arlington V.A.*

Lehr, W., Sirbu, M., & Gillett, S. (2006). Wireless is changing the Policy Calculus for Municipal Broadband. *Government Information Quarterly, Vol. 23, No. 3-4*, pp. 435–453.

Leiyu, S. (2008). *Health Services Research Methods*. 2nd Edition, Delmar learning, USA.

Lenhart, A., Horrigan, J., Rainie, L., Allen, K., Boyce, A., & Madden, M. (2003). The Ever Shifting Internet Population: A New Look at Internet Access and the Digital Divide. The Pew Internet and American Life Project. Retrieved from www. pewinternet.org, June 22nd, 2012.

Leonard, L.N.K., & Cronan, T.P. (2005). Attitude toward ethical behaviour in computer use: a shifting model. *Industrial Management & Data Systems, Vol. 105 No. 9*, pp. 1150-71.

Leone, L., Perugini, M., & Ercolani, A. P. (1990). A Study of Three Models of Attitude-Behaviour Relationships in the Studying Behaviour Domain. *European Journal of Social Psychology, Vol. 29*, 161-189.

Liang, T.P., & Yei, Y.H. (2011). Effect of Use Contexts on the Continuous Use of Mobile Services: The Case of Mobile Games. *Pers Ubiquity Comput, Vol. 15*, pp. 187-196.

Liao, C., Chen, J.L., & Yen, D.C. (2007). Theory of Planning Behavior (TPB) and Customer Satisfaction in the Continued Use of E-Service: An Integrated Model. *Computers in Human Behavior, Vol. 23*, pp. 2804-2822.

Liao, C., Palvia, P., & Chen, J.C (2010). Information Technology Adoption Behaviour Life Cycle: Toward A Technology Continuance Theory (TCT). *International Journal of Information Management, Vol. 29*, pp. 309-320.

Liebenau, J., Atkinson, R., Ka¨rrberg, P., Castro, D., & Ezell, S. (2009). The UK's Digital Road to Recovery. Retrieved from www.itif.org/files/digitalrecovery.pdf, January 12th, 2014.

Liff, S., & Shepherd, A. (2004). *An Evolving Gender Digital Divide*. Oxford Internet Institute, Oxford, UK.

Lightner, N. J., Yenisey, M. M. Ozok, A. A., & Salvendy, G. (2002). Shopping Behaviour and Preferences in E-Commerce of Turkish and American University Students: Implications from Cross-Cultural Design. *Behaviour and Information Technology, Vol. 21, NO. 6,* pp. 373-385.

Limayem, M., & Cheung, C.M.K. (2008). Understanding Information Systems Continuance: The Case of Internet-Based Learning Technologies. *Information & Management, Vol. 45, No. 4,* pp. 227-232.

Limayem, M., & Hirt, S.G. (2003b). Force of Habit and Information Systems Usage: Theory and Initial Validation. *Journal of the Association for Information Systems, Vol. 4, No. 1,* pp. 65-97.

Limayem, M., Hirt, S.G., & Cheung, C.M.K. (2003a). Habit in the Context of IS Continuance: Theory Extension and Scale Development. *ECIS Proceedings*. Paper 90.

Limayem, M., Hirt, S.G., & Cheung, C.M.K. (2007). How Habit Limits the Predictive Power of Intention: The Case of Information Systems Continuance. *MIS Quarterly, Vol. 31, No. 4,* pp. 705-737.

Lin, H.F. (2007). Predicting Consumer Intentions to Shop Online: An Empirical Test of Competing Theories. *Electronic Commerce Research and Applications, Vol. 6, No. 4*, pp. 433-442.

Lin, M.Y.C., & Ong, C.S. (2010). Understanding Information Systems Continuance Intention: A Five-Factor Model of Personality Perspective. Retrieved from www.bibsonomy.org/bibtex, May 13th, 2013.

Lin, T.T., Hsiao, K.L., Chiang, H.S., & Huang, C.T. (2013). Continuous Usage Intention of Videoconferencing Software: A Case Study of One-to-Some online courses. *27th International Conference on Advanced Information Networking and Applications Workshops*.

Liu, R., Ji, C., Mock, J.J., Chin, J.Y., Cui, T.J., & Smith, D.R. (2009). Broadband Ground-Plane Cloak. *Journal of Science Magazine, Vol. 323, No. 5912*, pp. 366-369.

Lm, I., Hong, S., & Kang, M.S. (2011). An International Comparison of Technology Adoption : Testing the UTAUT Model. *Information and Management, Vol. 48, No. 1*, pp. 1-8.

Loo, W., Yeow, P. H., & Chong, S. (2009). User Acceptance of Malaysian Government Multipurpose Smartcard Application. *Government Information Quarterly*, Vol. 26, *No. 2*, pp. 358-367.

Lu, H.P., & Hsiao, K.L. (2007). Understanding Intention to Continuously Share Information on Weblogs. *Internet Research, Vol. 17, No.* 4, pp. 345-361.

Lu, J., Yao, J. E., & Yu, C. S. (2005). Personal Innovativeness, Social Influences and Adoption of Wireless Internet Services via Mobile Technology. *Journal of Strategic Inform Systems, Vol. 14, No.* 3, pp. 245–268.

Luarn, P., & Lin, H. H. (2005). Toward An Understanding of the Behavioural Intention to Use Mobile Banking. *Comput Hum Behav., Vol. 21, NO. 6*, pp. 873–891.

Lynn, S. C., & Ronald, R. P. (2010). *Basic Research Methods for Librarians*. Fifth Edition, Greenwood Publishing Group, USA.

Lyytinen, K., & Hirschheim, R. (1987). Information Systems Failures: A Survey and Classification of the Empirical Literature. *Oxford Surveys in Information Technology, Vol. 4*, pp. 257–309.

MacKinnon, D.P., Lockwood, C.M., Hoffman, J.M., West, S.G., & Sheets, V. (2002). A Comparison of Methods to Test Mediation and Other Intervening Variable Effects. *Psychological Methods, Vol. 7,* pp. 83–104.

Madu, C. (2006). Employers and Employees: The Gender Digital Divide Implications of the Proliferation of Business Centers in Nigeria. *Public Relations Journal, Vol. 3*, pp. 50-59.

Majumdar, S.K., Carare, O., & Chang, H. (2010). Broadband Adoption and Firm Productivity: Evaluating the Benefits of General Purpose Technology. *Industrial and Corporate Change, Vol. 19, No. 13,* pp. 641-674.

MAL Group of Companies (2014). Regional Locations in Malaysia. Retrieved from www.mal-tel.com/malaysia-dealers, January 2nd, 2014.

Malaysia Communication and Multimedia Commission (2008). Facts and Figure of Internet Subsriber. Retrieved from www.mcmc.gov.my/facts_figures/ stats/

Malaysia Rural Definition (2010). Rural Expedition and Discovery. Retrieved from www.ruralexpedition.blogspot.com/2010/12/malaysia-rural-definition.html, 5th November, 2012.

Malhotra, N.K., Hall, J., Shaw, M., & Oppenheim, P. (2006). *Marketing Research: An Applied Orientation*. 3rd Ed., Frenchs Forest: Prentice Hall.

Mallat, N., Rossi, M., Tuunainen, V.K., & Oorni, K. (2009). The Impact of Use Context on Mobile Services Acceptance: The Case of Mobile Ticketing. *Information & Management, Vol. 46,* pp. 190 – 195.

Mamdouh, R. (2010). *Data Preparation for Data Mining Using SAS*. Morgan Kaufmann, 500 Sansome Street, CA USA.

Manecksha F. (2002). *Tackling the Digital Divide*. News Straits Times, 29 April.

Manohar, S.P. (2004). *Data Collecting Methods and Experiences: A Guide for Social Researcher*. New Dawn Press Group, A-59 Okhla Industrial Area, Phase II New Dehli, India.

MarChewka, J. T., Chang, L., & Kostiwa, K. (2007). An Application of the UTAUT Student Perceptions Using Course Management Software. *Communication of the IIMA, Vol. 7, No. 2,* pp. 93-104.

Marcus, S. (2005). Broadband Adoption in Europe. *IEEE Communications Magazine*, pp. 18–20.

Marhaini, M. N. (2010). Accessing the Impacts of Rural Internet Centre Programs on Quality of Life in Rural Area of Malaysia. *Proceedings of IPID Postgraduate Strand at ICTD 2010*. Karlstad University Studies, London.

Markendahl, J., & Casey, T. (2012). *Business Opportunities Using White Space Spectrum and Cognitive Radio for Mobile Broadband Services*. CrownCom, Sweden.

Madell, D., & Muncer, S. (2004). Gender Differences in the Use of the Internet by English Secondary School Children. *Social Psychology of Education, Vol. 7*, pp. 229-251.

Martyn, D. (2007). *The Good Research Guide for Small-Scale Social Research Projects*. 3rd Edition, Open University Press, McGraw-Hill House, England.

Matheson, K., & Zanna, M.P. (1990). Computer-Mediated Communications: The Focus is on Me. *Social Science Computer Review, Vol.* 8, pp. 1-12.

McCalla, R., & Ezingeard, J. N. (2005). Examining the Link between Technology Use, Emotional Expression and Service Quality Perceptions: The Data

Collection Protocol. *Proceedings of the 13th European Conference on Information Systems*, 26th to 28th June. Regensberg, Germany.

McFarland, D. J., & Hamilton, D. (2006). Adding Contextual Specificity to the Technology Acceptance Model. *Comput Hum Behav., Vol. 22, NO.* 3, pp. 427–447.

Mckinney, V., Yoon, K., & Zahedi, F.M. (2002). The Measurement of Web-Customer Satisfaction: An Expectation and Disconfirmation Approach. *Information Systems Research, Vol. 13, No.* 3, pp. 296-315.

Mcknight, D. H., Choudhuryb, V., & Kacmar, C. (2002). The Impact of Initial Consumer Trust on Intentions to Transact With a Web Site: A Trust Building Model. *Journal of Strategic Information Systems, Vol. 11*, pp. 297-323.

McKnight, L. W., & Leida, B. (1998). Internet Telephony: Costs, Pricing and Policy. *Telecommunications Policy, Vol. 22, No. 7*, pp. 555–569.

MCMC (2007). Industry Performance Report. Retrieved from http://www. skmm.gov.my/link_file/what_we_do/Research/IPR07.pdf, December 13th, 2011.

MCMC (2008). Retrieved from http://www.ktak.gov.my, January 13th, 2012.

MCMC (2010). Retrieved from http://www.ktak.gov.my, December 14th, 2011.

Meinrath, S. (2005). *Wirelessing the World: The Battle over (Community) Wireless Networks*. In R. McChesney (Ed.), the Future of the Media: Resistance and Reform in the 21st Century , pp. 219-242. Seven Stories Press, New York, USA.

Meyers, L.S., Gamst, G., & Guarino, A.J. (2006). *Applied Multivariate Research: Design And Interpretation*. Thousand Oaks, CA: Sage Publications.

Michael, G. M., & Earl, R. B. (2012). *Basics of Research Methods for Criminal Justice and Criminology*. WADSWORTH CENGAGE Learning, USA.

Michael, G.M., & Earl, R.B. (2011). *Basics of Research Methods for Criminal Justice and Criminology*. 2nd Edition, Wadsworth Cengage Learning, 10 Davis Drive, USA.

MICUS Management of Consulting GmbH (2008). The Impact of Broadband on Growth and Productivity. Retrieved from http://ec.europa.edu/ informationsociety /eeurope/i2010/docs/ benchmarking/ broadbandimpact2008. pdf, January 30th, 2012.

Milner, H. (2004). The Digital Divide: The Role of Political Institutions in Technology Diffusion. *Journal of Computing and Political Studies, Vol. 39, No. 2,* pp. 176–199.

Min, Q., Ji, S., & Qu, G. (2008). Mobile Commerce User Acceptance Study in China: A Revised UTAUT Model. *Tsinghua Science and Technology, Vol. 13, No. 3*, pp. 257-264.

Mohammad R. N., & Jila, S. (2010). Self E-Nursing: A new Idea in Nursing. *ACM SIGSOFT Software Engineering Notes, Vol. 35, No. 2,* pp. 1-4.

Mohammad, A.A., & Samar, M. (2012). Do Offline Factors Trigger Customers' Appetite for Online Continual Usage? *Asia Pacific Journal of Marketing and Logistics, Vol. 24, No. 4*, pp. 640-657.

Mohrman, S.A., & Lawler, E.E. (2012). Generating Knowledge that Drives Changes. *Academy of Management Perspectives, Vol. 26*, pp. 41-51.

Moore, G. C., & Benbasat, I. (1991). Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation. *Information Systems Research, Vol.2, No.3*, pp. 192-222.

Moore, G. C., & Benbasat, I. (1991). Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation. *Information Systems Research. Vol. 2, No. 3*, pp. 192-222.

Moran, M. J. (2006). *College Student's Acceptance of Tablet PCs and Application of the Unified Theory of Acceptance Technology (UTAUT)* Model. Papella University. Mennesota, USA.

Morris, M., & Venkatesh, V. (2000). Age Differences in Technology Adoption Decisions: Implications for a Changing Work Force. *Personnel Psychology, Vol. 53, No. 2*, pp. 375- 403.

Morris, M., Venkatesh, V., & Ackerman, P. (2005). Gender and Age Differences in Employee Decisions about New Technology: An Extension to the Theory of Planned Behaviour. *IEEE Transactions on Engineering Management, Vol. 52, No. 1*, pp. 69-84.

Morris, M.G., & Venkatesh, V. (2000). Age Differences in Technology Adoption Decisions: Implications for a Changing Work Force. *Personnel Psychology, Vol. 53 No. 2*, pp. 375-403.

Mugenda, A. G. (2008). *Social Science Research: Theory and Principles. Applied Research and Training Services. Nairobi, Kenya. Multivariate Data Analysis.* 6th ed., Upper Saddle River, NJ: Pearson Prentice Hall.

Muzafar, S. H., Dayang-Affizzah, A.M., & Chin-Hong, P. (2012). Regional Income Disparities in Malaysia: A Stochastic Convergence Analysis. *Malaysia Journal of Society and Space, Vol. 8, No. 5*, pp. 100-111.

My Perak (2012). Retrieved from www.mymalaysiabooks.com/Perak/Perak.htm, 19th October, 2012.

National Broadband Task Force (2001). The New National Dream: Networking the Nation for Broadband Access. Ottawa: Industry Canada. Retrieved from www.dsp-psd.pwgsc.gc.ca/Collection/C2-574-2001E.pdf, January 29th,

Ng, B., & Wiemer-Hastings, P. (2005). Addiction to the Internet and Online Gaming. *Journal of Cyber-Psychology and Behaviour, Vol. 8, No. 2,* pp. 110–113.

Ngcobo, P., & Herselman, M. E. (2007). Evaluating ICT Provision in Selected Communities in South Africa. *Journal of Issues in Information Science and Information Technology. Vol. 4,* pp. 714–724.

Niexi, H., & Guifeng, Q. (2011). A Study of Online Virtual Fitting Room Adoption Based on UTAUT. *IEEE Explore*, pp. 1-4.

Nachmias, R., Mioduser, D., & Shemla, A. (2000). Internet Usage by Students in an Israeli High School. *Journal of Educational Computing Research, Vol. 22,* pp. 55-73.

Nair, M., Han, G.S., Lee, H., Goon, P., & Muda, R. (2010). Determinant of the Digital Divide in Rural Communities of a Developing Country: The Case of Malaysia. *Development and Society, Vol. 39, No. 1*, pp.139-162.

Ndubisi, N.O. (2008). Social-Environmental Marketing in Developing Nations: A Comparison of African and Asian Businesses. *Journal of Asian and African Studies, Vol. 43, No. 3*, pp. 251-277.

Ndubisi, N.O., & Chukwunonso, N.C. (2005). Diffusion of Landscaping Services in Organisations: A Two Nations Study of Determinant Factors. *Management of Environmental Quality: An International Journal, Vol. 16, No. 4,* pp. 291–308.

Nelson, R.R., Todd, P.A., & Wixom, B.H. (2005). Antecedents of Information and System Quality: An Empirical Examination within the Context of Data Warehousing. *Journal of Management Information Systems, Vol. 21, No. 4*, pp. 199-323.

Norris, P. (2001). *Digital Divide: Civic Engagement, Information Poverty and the Internet Worldwide*. New York: Cambridge University Press.

NITC-MOSTI (2013). Broadband Penetration Rate by States. Retrieved from www.nitc.mosti.gov.my/nitc_beta/index.php/ict-indicator/broadband-penetration-rates-by-state, September 12th, 2013.

Noce, A., & McKeown, L. (2008). A New Benchmark for Internet Use: A Logistic Modeling of Factors Influencing Internet Use in Canada. *Government Information Quarterly, Vol. 25, No. 3*, pp. 462–476.

Noor-Sharifah, S. S. (2003). Model Planning on Traditional Village in Peninsular Malaysia. Rural Planning Center, Faculty of Alam Bina, Technology University of Malaysia, Skudai, Johor.

Nor Alias, A., Jamaludin, H., Hashim, S., Ismail, I. S., & Suhaili, N. (2010). Theories of Change and Evaluation of Malaysian Rural Internet Centres. *Proceedings of IPID Postgraduate Strand at ICTD 2010*.

Nor Iadah, Y., Zahurin, M. A., Huda, I., Rafidah, Abd. R., & Wan, R. S. O. (2007). Rural Internet Centre (RIC) as Catalysts for Building Knowledge-Based- The Case of Northern State of Malaysia. *Online Communities and Social Computing, Vol. 4564*, pp. 485-490.

Northern Peninsular Malaysia (2012). Retrieved from www. travelfish.org/ region/ malaysia/northern_peninsular_malaysia, October 17th, 2012.

Northern Region of Malaysia (2005). Retrieved from http://www.2malaysia.com/ states. htm, October 13th, 2012.

NTIA, National Telecommunications and Information Administration. (2009). Testimony of Mark G. Seifert before the Subcommittee on Communications,

Nunnally, J.O. (1978). Psychometric Theory. New York: McGraw-Hill.

OECD Directorate for Science, Technology and Industry (2001). The Development of Broadband Access in OECD Countries: Paris OECD. Retrieved from www.oecd.org/dataoecd/18/3/16234106.pdf, December 23rd, 2013.

OECD Report (2001). Learning to Bridge the Digital Divide. OECD Publications, France.

OECD Report (2008). Broadband and the Economy: OECD Ministerial Meeting on the Future of the Internet Economy. DSTI/ ICCP/ IE, p. 7.

Oh, S., Ahn, J., & Kim, B. (2003). Adoption of Broadband Internet in Korea: The Role of Experience in Building Attitude. *Journal of Information Technology, Vol. 18, No. 4*, pp. 267-280.

Ojha, A., Sahu, G.A., & Gupta, M.P. (2008). Antecedents of Paperless Income Tax Filing By Young Professionals in India: An Exploratory Study. *Transforming Government: People, Process and Policy, Vol. 3, No. 1*, pp. 65-90.

Okamoto, Y., & Reynolds, T. (2006). *Multiple Play: Pricing and policy trends*. Paris, OECD, DSTI/ICCP/TISP, 12.

Oliver, R.L., & Burke, R.R. (1999). Expectation Process in Satisfaction Formation: A Field Study. *Journal of Service Research, Vol. 1, No. 3*, pp. 196-214.

Onyenekenwa, C. E. (2010). Gender Digital Divide: Comparative Assessment of the Information Communications Technologies and Literacy Levels of Students in Nigeria. *Journal of Information Technology, Vol. 9, No. 8*, pp. 1739-1746.

Open internet advisory committee (2013). Openness in the Mobile Broadband Ecosystem: Mobile Broadband Working Group. Retrieved from www.fcc.gov/cgb/oiac/Mobile-Broadband-Ecosystem.pdf, January 1st, 2014.

Organisation of Economic Cooperation Development (2010). Fixed (Wireless) Broadband Penetration, Historical Time Series. Retrieved from www.oecd.org/dataoecd/63/53/41551452.xls, December 13th, 2013.

Organisation of Economic Cooperation Development (2013). OECD Fixed and Wireless Subscriptions by Technology. Retrieved from http://www.oecd.org/sti/ICTindicators, January 10th, 2014.

Organization for Economic Cooperation and Development (2008). Households with Access to the Internet in Selected OECD Countries. Retrieved from http://www.oecd.org/sti/ICTindicators, December 20th, 2012.

Orlikowski, W.J. (1992). The Duality of Technology: Rethinking the Concept of Technology in Organizations. *Organization Science, Vol. 3, No. 3*, pp. 398-427.

Ortiz, J. A., & Tapia, A. H. (2008). Bandwidthing together: the Public Policy Process Generating Municipal Wireless Broadband Networks. IFIP Working Group 8.2 Conference on IT and Change in the Service Economy, Toronto, Ontario, Canada.

Oshlyansky, L., Cairns, P., & Thimbleby, H. (2007). Validating the Unified Theory of Acceptance and Use of Technology (UTAUT) Tool Cross-Culturally. *IEEE Computer Society*, pp. 990-995.

Ouelette, J.A., & Wood, W. (1998). Habit and Intention in Everyday Life: The Multiple Processes by Which Past Behaviour Predicts Future Behaviour. *Psychological Bulletin, Vol. 124, No. 1*, pp. 54-74.

Pade, C., Mallinson, B., & Sewry, D. (2006). An Investigation of Sustainable ICT Projects in Rural Development. *Proceedings of 2nd Sangonet Conference on ICTs for Civil Society*. PP. 100 – 103.

Pallant, J. (2001). *SPSS Survival Manual: A Step By Step Guide to Data Analysis Using SPSS for Windows*. 3rd ed., England: McGraw Hill Open University Press.

Pallant, J. (2011). *SPSS Survival Manual: A Step By Step Guide to Data Analysis Using SPSS for Win*dows. 4th Ed., Allen & Unwin, 83 Alexandra Street, Australia.

Papastergiou, M., & Solomonidou, C. (2005). Gender Issues in Internet Access and Favourite Internet Activities among Greek High School Pupils Inside and Outside School. *Computer and Education, Vol. 44, No. 4,* pp. 377-393.

Pete, G. (2008). Quantitative Data Analysis using SPSS: An Introduction for Health and Social Science. Open University Press, McGraw-Hill Education, England.

Peter, S., & McLean, E.R. (2009). A Meta-Analytic Assessment of the DeLone and McLean IS Success Model: An Examination of IS Success at the Individual Level. *Information and Management, Vol. 46*, pp. 159-166.

Pierre, L. (2007). Springer Science and Business Media, LLC.

Preece, J. (2000). *Online Communities: Designing Usability, Supporting Sociability*. New York, NY: Wiley.

Palvia, P. (2009). The Role of Trust in E-Commerce Relational Exchange: A Unified Model. *Information & Management, Vol. 46*, pp. 213–220.

Panchanathan S. (2002). Ubiquitous Multimedia: Bridging the Digital Divide, Multimedia. *IEEE Vol. 9,* pp. 12-15.

Papacharissi, Z., & Zaks, A. (2006). Is broadband the future? An Analysis of Broadband Technology Potential and Diffusion. *Telecommunications Policy Vol. 30, No. 1*, pp. 64–75.

Parasuraman, A., Berry, L., & Zeithaml, V. A. (1991). Refinement and Assessment of the 'SERVQUAL' Scale. *Journal of Retailing, Vol. 67, NO. 4*, pp. 420–451.

Parasuraman, A., Zeithaml, V. A., & Malhotra, A. (2005). E-S-QUAL: A Multiple-Item Scale for Assessing Electronic Service Quality. *Journal of Service Research, Vol. 7, No. 3*, pp. 213–234.

Parasuraman, A., Zeithaml, V. A., & Berry, L. (1988). SERVQUAL: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality. *Journal of Retailing, Vol. 64, No. 4*, pp.12–40.

Pare, G., Lepanto, L., & Sicotte, C. (2005). Evaluating PACS Success: A Multidimensional Model. *Proceedings of the 38th Hawaii International Conference on System Sciences*.

Park, J., Jung, K., Lee, Y., Cho, G., Kim, J., & Koh, J. (2009). The Continuous Usage Intention in the Web Analytical Services. *42nd Hawaii International Conference on System Sciences, IEEE Explore*, pp. 1-7.

Park, J., Kim, J., & Koh, J. (2010). Determinants of Continuous Usage of Intention in Web Analytics Services. *Journal of Electronic Commerce Research and Applications, Vol. 9*, pp. 61-72.

Park, J., Yang, S., & Lehto, X. (2007). Adoption of Mobile Technology for Chinese Consumers. *Journal of Electronic Commerce Research, Vol. 8, No. 3*, pp. 196-205.

Park, J., Yang, S., & Lehto, X. (2007). Adoption of Mobile Technology for Chinese Consumers. *Journal of Electronic Commerce Research, Vol. 8, No. 3*, pp. 196-205.

Park, S., & Yoon, S.-H. (2005). Separating Early-Adopters from the Majority: The Case of Broadband Internet Access in Korea. *Journal of Technology Forecasting and Social Change, Vol. 72, No. 3*, pp. 301–325.

Parthasarathy, A. (2003). IT future lies in developing world. The Hindu Chennai. Retrieved from www.hindu,com/stories/2003121201801500.htm., march 30th, 2012.

Pavathamma, N. (2003). Digital Divide in India: Need for Correcting Urban Bias. *Information Technology and Libraries, Vol. 22, No. 1*, pp. 15-24.

Pavlou, P. A., & Fygenson, M. (2006). Understanding and Predicting Electronic Commerce Adoption: An Extension of the Theory of Planned Behaviour. *MIS Quart., Vol. 30, No. 1*, pp. 115–143.

Penang (2011). Penang in a State of Renaissance. Retrieved from www.georgetown penang.com, June 30th, 2012.

Pentland, A., Fletcher, R., & Hasson, A. (2004). DakNet: Rethinking Connectivity in Developing Nations. *IEEE Computer, Vol. 37, No. 1*, pp. 78–83.

Peter, B. (2009). *An Analysis of Predictive, Convergent and Discriminant Validity of Measures*. UMI Microform, United state.

Picot, A., & Wernick, C. (2007). The Role of Government in Broadband Access. *Telecommunication Policy, Vol. 31, No. 10–11*, pp. 660–674.

Polites, G.L., & Karahanna, E. (2012). Shackled to the Status Quo: The Inhibiting Effects of Incumbent System Habit, Switching Costs, and Inertia on New System Acceptance. *MIS Quarterly, Vol. 36, No. 1*, pp. 21-42.

Pollard, C. (2003). Exploring Continued and Discontinued Use of IT: A Case Study of Optionfinder, a Group Support System. *Group Decision and Negotiation, Vol. 12, No. 3*, pp. 171–193.

Polykalas, S.E., Prezerakos, G.N., & Nikolinakos, N.T. (2012). Wholesale Provision of Broadband Services: Alternative Pricing Strategies and Associated Policies. *Emerald Group Publishing Limited, Vol. 14, No. 3*, pp. 16-34.

Portal PID (2012). Pusat Internet Desa. Retrieved from www.pid.net.my, June 28th, 2012.

Porter, C. E., & Donthu, N. (2006). Using the Technology Acceptance Model to Explain How Attitudes Determine Internet Usage: the Role of Perceived Access Barriers and Demographics. *Journal of Business Research, Vol. 59*, pp. 999-1007.

Preacher, K.J., & Hayes, A.F. (2004). SPSS and SAS Procedures for Estimating Indirect Effects in Simple Mediation Models. *Behaviour Research Methods, Instruments and Computers, Vol. 36, No. 4*, pp. 717-731.

Preacher, K.J., & Hayes, A.F. (2008). Asymptotic and Resampling Strategies for Assessing and Comparing Indirect Effects in Multiple Mediator Models. *Behaviour Research Methods, Vol. 40, No. 3*, pp. 879-891.

Premkumar, G., & Bhattacherjee, A. (2008). Explaining Information Technology Usage: A Test of Competing Models. *Omega: The International Journal of Management Science, Vol. 36, No. 1*, pp. 64–75.

Preston, P., & Cawley, A. (2008). Broadband Development in the European Union to 2012—A Virtuous Circle Scenario. *Futures, Vol. 40, No. 9*, pp. 812–821.

Prieger, J.E., & Heil, D. (2010a). *The Macro Economic Impact of E-Business. Lee (Ed.), Encyclopedia of E-Business Development and Management in the Global Economy*. IGI Global, pp. 12–22.

Prieger, J.E., & Heil, D. (2010b). *The Micro Economic Impact of E-Business. Lee (Ed.), Encyclopedia of E-Business Development and Management in the Global Economy*. IGI Global, pp. 12–22.

Prieger, J.E., & Heil, D. (2012). *Economic Implications of E-Business for Organizations. F.Martı´nez-Lo´ pez (Ed.*). Research Handbook One-Business Strategic Management, Springer-Verlag.

Prieger, J.E. (2013). The Broadband Digital Divide and the Economic Benefits of Mobile Broadband for Rural Areas. *Telecommunications Policy, Vol. 37*, pp. 483–502.

Proenza, F, J. (2006). The Road to Broadband Development in Developing Countries is Through Competition Driven by Wireless and Internet Telephony. *Information Technologies and International Development, Vol. 3, No. 2*, pp. 21-39.

Punch, K. F. (Ed.). (2003). *Survey Research: The Basic*. California: Mc Graw-Hill.

Pyramid Research Group (2008). *Global Fixed and Mobile Broadband Outlook: The Transformation of Networks, Business Models, and Growth Opportunities*. Cambridge, MA. Pyramid Research Group.

Qiang, C. (2009). Broadband Infrastructure Investment in Stimulus Packages: Relevance for Developing Countries. World Bank, Washington, DC. Retrieved from www.siteresources.worldbank.org, March 2nd, 2012.

Qiang, C. Z., & Carlo, M. R. (2009). *Information and Communications for Development: Extending Reach and Increasing Impact*. Washington DC: World Bank Publications.

Qiang, W., Rossotto, C.M., & Kimura, K. (2009). *Economic Impacts of Broad*band. World Bank (Ed.), Information and Communications for Development 2009: Extending Reach and Increasing Impact, pp. 35-50.

Quick Fact (2012). Internet use: differences between urban and rural mississipi. Retrieved from www.ers.usda.gov/ersDownloadHandler.ashx, January 13th, 2014.

Rajapakse, J. (2011). Extending the Unified Theory of Acceptance and Use of Technology (UTAUT) Model. *IEEE Explore*, pp. 47-52.

Ramayah, T., Noor Hazlina, A., & May-Chiun, L. (2010). The Role of Quality Factors in Intention to Continue Using an E-Learning System in Malaysia. *Procedia Social and Behavioural Sciences, 2*, pp. 5422-5426.

Ranjit, K. (2011). *Research Methodology: A Step-By-Step Guide for Beginners*. London, 3rd Edition: Sage Publication Limited.

Raman, A. (2011). The Usage of Technology among Education Students in University Utara Malaysia: An Application of Extended Technology Acceptance Model. *International Journal of Education and Development Using Information and Communication Technology, Vol. 7, No. 3,* pp. 4-17.

Ramayah, T., & Jaafar, M. (2008). Technology Use among Construction Students: The Moderating Role of Gender. *Journal of Construction in Developing Countries, Vol. 13, No. 1,* pp. 63-77.

Ramayah, T., & Osman, M. (2005). Complementing classroom teaching with an internet course website: Does gender and race matter. *Proceedings of the 5th*

South East Asia Association for Institutional Research Conference. Westin Resort Nusa Dua, Bali, Indonesia, 14–16 September.

Ramayah, T., Ahmad, N.H., & Lo, M.C. (2010). The Role of Service Quality in Intention to Continue Using an E-Learning System in Malaysia. *Procedia Social and Behavioural Sciences*, *Vol. 2,* pp. 5422-5426.

Ramayah, T., Jantan, M., & Bushra, A. (2003). Internet Usage among Students of Institutions of Higher Learning: The Role of Motivational Variables. *Proceedings of the 1st International Conference on Asian Academy of Applied Business Conference, Sabah M*alaysia.

Riemenscheider, C.K., Jones, K., & Leonard, L.N.K. (2009). Web Trust: A Moderator of the Web's Perceived Individual Impact. *Journal of Computer Information Systems, Vol. 49, No. 4,* pp. 10-18.

Rogers, E.M. (2003). *Diffusion of Innovations*. Free Press, New York, NY.

Rogers, E.M., & Shoemaker, F.F. (1971). *Communication of Innovations*. New York: Free Press.

Russell, G., & Green, C.K. (2008). *Accessing the Accuracy of Remotely Sensed Data: Principles and Practices*. CRC Press, Taylor & Francis Group, NW.

Reinartz, W., Haenlein, M. & Henseler, J. (2009). An Empirical Comparison of the Efficacy of Covariance-Based and Variance-Based SEM. *International Journal of Research in Marketing, Vol. 26*, pp. 332-344.

Riemenschneider, C.K., Hardgrave, B.C., & Davis, F.D. (2002). Explaining Software Developer Acceptance of Methodologies: A Comparison of Five Theoretical Models. *IEEE Transactions on Software Engineering, Vol. 28, No. 12,* pp. 1135-1145.

Rigdon, E. E., Schumacker, R. E., & Wothke, W. (1998). *A Comparative Review of Interaction and Nonlinear Modeling*. R. E. Schumacker, & G. A. Marcoulides (Eds.), Interaction and nonlinear effects in structural equation modeling, Mahwah, NJ: Lawrence Erlbaum, pp. 1–16.

Ringle, C.M., & Spreen, F. (2007). Beurteilung der Ergebnisse von PLSPfadanalysen. *Das Wirtschaftsstudium, Vol. 36, No. 2*, pp. 211-216.

Ringle, C.M., Boysen, N., Wende, S., & Will, A. (2006). Messung von Kausalmodellen mit dem Partial-Least-Squares-Verfahren. *Das Wirtschaftsstudium, Volume 35, No. 1*, pp. 81-87.

Ringle, C.M., Gotz, O., Wetzels, M. & Wilson, B. (2009). *On The Use of Formative Measurement Specifications in Structural Equation Modeling: A Monte Carlo Simulation Study To Compare Covariance-Based and Partial Least Squares Model Estimation Methodologies (METEOR Research Memoranda RM/09/014)*. Maastricht, the Netherlands, Maastricht University.

Ringle, C.M., Sarstedt, M., & Straub, D.W. (2012). A Critical Look at the Use of PLS-SEM in MIS Quarterly. *MIS Quarterly, Vol. 36, No.1*, pp. 3-14.

Rob, M.M., Susan, O.D., Richard, S.D., Brian, W., & Brian, B. (2011). Digital Divides and the 'First Mile': Framing First Nations Broadband Development in Canada. *The International Indigenous Policy Journal*, pp. 1-15.

Robert, M. G., Floyd, J. F., Couper, M. P., James, M. L., Eleanor, S. & Roger, T. (2011). *Survey Methodology*. 2nd Edition, Wiley & Sons, Inc., Hoboken, New Jersey, USA.

Robert, N., John, E., & Gary, M. (2009). *Statistical Analysis and Data Mining Applications*. Elsevier Inc., 30 Corporate Drive, Suite 140, Burlington, USA.

Roca, J.C., Chiub, C.M., & Martíneza, F.J. (2006). Understanding E-Learning Continuance Intention: An Extension of the Technology Acceptance Model. *International Journal of Human-Computer Studies, Vol. 64*, pp. 683-696.

Roger, D. W. & Joseph, R. D. (2011). *Mass Media Research: An Introduction*. Nineth Edition, WADSWORTH CENGAGE Learning, USA.

Roger, M. (2007). Strategic Purchasing and Supply Management: A Strategy-Based Selection of Suppliers. Gabler Edition Wissenschaft, Deutscher Universitats-Verlag.

Roger, W. H., Yogeesvaran, K., & Laura, W. Y. L. (2007). Telecenters for National E-Inclusion in Malaysia. Retrieved from www.i4donline.net/ATF/2007/ full papers /rogers, November 22nd, 2011.

Rogers, E. M. (1995). The Diffusion of Innovations, New York, NY, Free Press.

Rogers, E. M. (2003). The Diffusion of Innovation. Fifth ed., Free Press, New York.

Roland, H. C. Y., & Rajiv, R. (2008). Physical Access Protection Using Continuous Authentication. *IEEE Explore*, pp. 510-512.

Sanchez-Franco, M.J., Ramos, A.F.V., & Velicia, F.A.M. (2009). The Moderating Effect of Gender on Relationship Quality and Loyalty toward Internet Service Providers. *Information and Management, Vol. 46*, pp. 196-202.

Sang, S., Lee, J.D., & Lee, J. (2009). E-government Adoption in Cambodia: A Partial Least Square Approach. *Transforming Government: People, Process and Policy, Vol. 4, No. 2*, pp. 138-157.

Shashaani, L. (1997). Gender Differences in Computer Attitudes and Use among College Students. *Journal of Educational Computing Research*, 1*6*, pp. 37–51.

Simond M (2008). Influence of Internet on the Education System. Retrieved from http://ezinearticles.com/?Influence-of-Internet-on-the-Education--System&id=985543, July 18th, 2014.

Rosemann, M., & Vessey, I. (2005). Linking Theory and Practice: Performing a Reality Check on a Model of IS Success. *Proceedings of the 13th European Conference on Information Systems, Regensberg, Germany*.

Rowe, M. (2002). Plant or People. *Dev. Int. Magazine, issue 18*, pp. 1-10.

Ruth, M. T. (2011). *Advanced Nursing Research from Theory to Practice*. Jones & Bartlett learning, 40 Tall Pine Drive, USA.

Salman, A., & Hasim, M.S. (2011). Internet Usage in a Malaysian Sub-Urban Community: A Study of Diffusion of ICT innovation. *The Innovation Journal; the Public Sector Innovation Journal, Vol. 16, No. 2*, pp. 1-15.

Samuel, O., Akinsola, O., Marlien, E. H., & Jacob, S. J. (2005). ICT Provision to Disadvantaged Urban Communities: A Study in South Africa and Nigeria. *International Journal of Education and Development Using ICT, Vol.* 1, pp. 13-22.

Sánchez-Franco, M.J. (2006). Exploring the Influence of Gender on the Web Usage via Partial Least Squares. *Behaviour & Information Technology, Vol. 25, No. 1*, pp. 19-36.

Sangwan, S. (2005). Virtual Community Success: A Uses and Gratification Perspective. *38th Hawaii International Conference on System Sciences*.

Santhanamery, T., & Ramayah, T. (2012). Continued Usage Intention of E-Filing System in Malaysia: The Role of Optimism Bias. *Social and Behavioural Sciences, Vol. 65*, pp. 397 – 403.

Santosh, K., & Maziar, N. (2012). Is Wireless Broadband Provision to Rural Communities in TV whitespaces viable? A UK Case Study and Analysis. *IEEE International Symposium on Dynamic Spectrum Access Networks*, pp. 461-466.

Sarasvathy, S., & Venkataraman, S. (2009). *Made, as Well as Found: Researching Entrepreneurship as a Science of the Artificial*. Yale University Press.

Sarasvathy, S. D., & Dew, N. (2005). New Market Creation through Transformation. *Journal of Evolutionary Economics, Vol. 15, No. 5,* 533–565.

Savage, S., & Waldman, D. (2005). Broadband Internet Access, Awareness and Use: Analyses of United States Household Data. *Telecommunications Policy, Vol. 29*, 615–633.

Sawyer, S., Allen, J. P., & heejin, L. (2003). Broadband and Mobile Opportunities: A Socio-Technical Perspective. *Journal of Information Technology, Vol. 18, No. 4,* pp. 121-136.

Schaupp, L.C., Carter, L., & McBride, M.E. (2010). E-File Adoption: A Study of US Taxpayers' Intentions. *Computers in Human Behavior, Vol. 26, No. 4*, pp. 636-644.

Sekaran, U., & Roger, B. (2010). *Research Method for Business: A Skill Building Approach*. 5th Edition, John Wiley & Sons.

Sekaran, U., & Roger, B. (2011). *Research Methods for Business: A Skill Building Approach*. 5th Edition, TJ International Ltd, Padstow, Cornwall, Great Britain.

Sekaran, U. (2000). *Research Methods for Business: A Skill-Building App*roach. John Wiley & Sons.

Sekaran, U. (2003). *Research Methods for Business: A Skill Building Approach*. 4th Ed., New York, USA, John Wiley & Sons, Inc.

Selamat, M. S., Dwivedi, Y. K., Abdwahab, M. S., Samsudin, M. a. M., Williams, M. D., & Lal, B. (2008). Factors Affecting Malaysian Accountants' Broadband Adoption and Use Behaviour. *Proceedings of the 4th Americas Conference oon Information Systems, Toronto, ON, Canada*.

Shaffril, H. A. M., & Samah, B. A. (2009). Perception towards Importance of Information and Communication Technology among Rural Administrators. *Journal of Agriculture and Social Sciences, Vol. 5*, pp. 67-72.

Shane, S., & Venkataraman, S. (2000). The Promise of Entrepreneurship as a Field of Research. Academy of Management. *The Academy of Management Review, Vol. 25, No. 1*, pp. 217–226.

Shane, S. (2004). *A General Theory of Entrepreneurship: the Individual-Opportunity Nexus*. Edward Elgar Publishing Incorporated, Northampton.

Sharma, J. K. (2007). *Business Statistics*. 2nd Edition, Dorling Kindersley, India.

Sherif, K., Dina, R., & Mohammed, E. (2009). The Impact of ICT Investments on Economic Development in Egypt. *Electronic Journal for Information System in Developing Countries, Vol. 36, No. 1*, pp. 1-21.

Sherri, L. J. (2011). *Research Methods and Statistics: A Critical Thinking Approach*. Fourth Edition, WADSWORTH CENGAGE Learning, USA.

Shiblaq, F., & Fielden, K. (2008). *ICT Provision in Rural Community: A New Zealand Case Study*. IADIS International Conference ICT, Society and Human Beings. Amsterdam, the Netherland.

Shin, G., Ahn, J., & Kim, T. (2009). IPTV in Korea: The Effect of Perceived Interactivity on Trust, Emotion and Continuous Use Intention. Retrieved from www.globdev.org, January 29th, 2014.

Shom Teoh (2006). *Rethinking the Digital Divide*. The Star Online. March 2nd, 2006.

Shrout, P.E., & Bolger, N. (2002). Mediation in Experimental and Non-Experimental Studies: New Procedures and Recommendations. *Psychological Methods, Vol. 7*, pp. 422–445.

Singh, R., & Siddhartha. R. (2008). Convergence in ICT Services: Emerging Regulatory Phone Services (AMPS). *Management Decision, Vol. 51, No. 4*, pp. 824-838.

SKMM (2005). Guidelines on Broadband over Power Line Communications. Retrieved from http://register.skmm.gov.my/facts_figures/codes_gl/guidelines/pdf,

SKMM (2009). Household Use of By Urban and Rural Areas as at 2008. *My Broadband, Vol. 2, No. 1*, p. 2.

SKMM Press Release (2010). National Broadband Initiative: SKMM Allocates One Million 1malaysia Netbooks for Distribution. Retrieved from www. skmm. gov. my/PR_1_Million_1Malaysia_Netbooks, June 19th, 2012.

Slyke, C. V., Johnson, R. D., Hightower, R., & Elgarah, W. (2008). Implications of Researchers Assumptions about Perceived Relative Advantage and Compatibility. *Advances in Information Systems, Vol. 39, No. 2*, pp. 50-65.

So, W.C.M., Wong, T.N.D., & Sculli, D. (2005). Factors Affecting Intentions to Purchase via the Internet. *Industrial Management & Data Systems, Vol. 105 No. 9*, pp. 1225-44.

Sobel, M. (1982). *Asymptotic Confidence Intervals for Indirect Effects in Structural Equation Models*. In S. Leinhardt (Ed.), Sociological methodology, Washington, DC: American Sociological Association, pp. 290-312.

Socorro, A. G., Elizabeth, M. K., Aniceto, C. O., & Prudenciano, G. (2010). *Internet Use among Filipino Public High School Students*. 2010 Population Association of America Annual Meeting Program, Dallas Texas, USA. Retrieved from http://paa2010.princeton.edu/abstracts/101023, December 3rd, 2012.

Sosik, J.J., Surinder, S.K., & Michael, J.P. (2009). Silver Bullet or Voodoo Statistics? A Primer for Using Partial Least Square Data Analytic Technique in Group and Organisation Research. *Group and Organisation Management, Vol. 34, No. 1*, pp. 5-36.

Soud, A., & Fisal, A.R. (2011). Factors That Determine Continuance Intention to Use E-Learning System: An Empirical Investigation. *Proceedings of International Conference on Telecommunication and Applications, Vol. 5*, pp. 242-246.

Sowa, J.E., Selden, S.C., & Sandfort, J.R. (2004). No Longer Unmeasurable? A Multidimensional Integrated Model of Nonprofit Organizational Effectiveness. *Non-Profit and Voluntary Sector Quarterly, Vol. 33*, pp. 711-728.

Stanton, L. J. (2004). Factors Influencing the Adoption of Residential Broadband Connections to Internet. *Proceedings of the 37th Hawaii International Conference on System Sciences, IEEE: Hawaii, USA.*

State of Michigan (2013). Fixed Wireless Broadband Technology. Retrieved from http://www.dleg.state.mi.us/mpsc/comm/broadband/broadband/wireless.htm, February 28th, 2014.

Stenberg, P., Morehart, M., Vogel, S., Cromartie, J., Breneman, V., & Brown, D. (2009). *Broadband Internet's Value for Rural America. Washington, DC: U.S.* Department of Agriculture, Economic Research Service, Economic Research Report No.78.

Stern, M.J., & Adams, A.E. (2010). Do Rural Residents Really Use the Internet to Build Social Capital? An Empirical Investigation. *American Behavioural Scientist, Vol. 53, No. 9*, pp. 1389–1422.

Stern, M.J., Adams, A.E., & Boase, J. (2011). Rural Community Participation, Social Networks and Broadband Use: Examples from Localized and National Survey Data. *Agricultural and Resource Economics Review, Vol. 40, No. 2*, pp. 158–171.

Stevens, J. (1996). *Applying Multivariate Statistics for the Social Sciences*. New Jersey: Lawrence Erlbaum Associates.

Straub, D. W., Boudreau, M. C., & Gefen, D. (2004). Validating Guidelines for IS Positivist Research. *Communications of Association for Information Systems, Vol. 13*, pp. 380-427.

Suha, A., & Anne, M. (2008). The Use of the UTAUT Model in the Adoption of E-Government Services in Kuwait. *Proceedings of the 4th Hawaii International Conference on System Sciences, IEEE Explore*, pp. 1-11.

Sumac, B., Polancic, G., & Hericko, M. (2010). An Empirical Study of Virtual Learning Environment Adoption Using UTAUT. *IEEE Computer Society*, pp. 17-22.

Sung, G.M., Chang, Y.T., Chen, W.H., & Hsieh, H.Y. (2010). A New Technique of Broadband Network System Suitable For Asymmetric Digital Subscriber Line Application. *International Conference on Networking and Digital Society*, pp. 624-628.

Susuki, M., Horiuchi, Y., Hayashi, M., & Otani, T. (2007). Optical Network for High-Quality Broadband Services. *Proceedings of ICTON, IEEE Explore*, pp. 46-49.

Tabachnick, B.G. & Fidell, L.S. (2007). *Using Multivariate Statistics*. 5th ed., Pearson Education.

Tai, T.L., Kuo, L. H., Hsiu, S.C., & Ching, T.H. (2013). Continuous Usage Intention of Video Conferencing Software: A Case Study of One-To-Some Online Courses. *International Conference on Advanced Information Networking and Applications Workshops, Barcelona Sp*ain, pp. 990-995.

Tao, Z. (2008). Exploring Mobile User Acceptance Based on UTAUT and Contextual Offering. *International Symposium on Electronic Commerce and Security, IEEE Computer Society*, pp. 241-245.

Taylor, S., & Todd. (1995). Understanding Information Technology Usage: A Test of Competing Models. *Information Systems Research, Vol. 6, No. 2*, pp. 144-176.

Tengku, M. F. F. (2005). Digital Divide in Malaysia: Examining the Issues of Income, Workplace and Geographical Difference in Diffusing ICT to the Mass Public. Retrieved from dspace.wul.waseda.ac.jp/dspace, May 5th, 2012.

Tenth Malaysia Plan. Retrieved from www.parlimen.gov.my/news/eng-ucapan, November 22nd, 2011.

Teo, T.S.H., Srivastava, S.C., & Jiang, L. (2008). Trust and Electronic Government Success: An Empirical Study. *Journal of Management Information Systems, Vol 25, No. 3*, pp. 99-131.

The World Bank (2009). *Information and Communications for Development 2009: Extending Reach and Increasing Impact*. Washington DC: The World Bank.

Theme of WTISD (2011). The World Telecommunication and Information Society Day (WTISD): Better Life in Rural Communities with ICTS. Retrieved from www.itu.int/wtisd, 6th December, 2011.

Things Asian (2008). Retrieved from http://www.thingsasian.com/stories-photos/1804, 17th October, 2012.

Thorngate, W. (1976). Must We Always Think before We Act? *Personality of Social Psychology Bulletin, Vol. 2, No. 1*, pp. 31-35.

Ting, G., & Yanhong, D. (2012). A Study on Users' Acceptance Behaviour to Mobile Phone Services (AMPS). Management Decision, Vol. 51, No. 4, pp. 824-838. Responses to Multiple Play. Retrieved from www.siteresources. worldbank. org/ extinformationandcommunicationand-technologies/resources, December 10th, 2012.

Travelpack Malaysia (2012). States Locations in Northern Region of Malaysia. Retrieved from www.malaysia.travelpack.com/west-malaysia/northern-region, January 2nd, 2014.

Tan, K.S., Eze, U.C., & Chong, S.C. (2009). Factors Influencing Internet-Based Information and Communication Technologies Adoption among Malaysian Small and Medium Enterprise. *International Journal of Management and Enterprise Development, Vol. 6, No.* 4, pp. 397-418.

Townsend, L., Sathiaseelan, A., Fairhurst, G., & Wallace, C. (2013). Enhanced Broadband Access as a Solution to the Social and Economic Problems of the Rural Digital Divide. *Local Economy, DOI: 10.1177/0269094213496974, Vol. 28, No. 6,* pp. 580-595.

Trkman, P., Borka, J. B., & Tomaz, T. (2008). Factors of Broadband Development and the Design of a Strategic Policy Framework. *Journal of Telecommunications Policy, 32,* pp. 101-115.

Tulu, B., Burkhard, R.J., & Horan, T.A. (2006). Information Systems and Health Care XIV: Continuing Use of Medical Information Systems by Medical Professionals: Empirical Evaluation of a Work System Model. *Communications of AIS, Vol. 18,* pp. 641-656.

Tung, X., Sebastian, I.M., Jones, W., & Naklada, S. (2002). E-commerce Readiness in East Asian APEC Economies: A Precursor to Determine HRD Requirements and Capacity Building. Asia-Pacific Economic Cooperation, Telecommunications and Information Working Group, Business Facilitation Steering Group, National Electronic and Computer Technology Centre, Bangkok, Thailand.

Turk, T., Jerman-Blazic, B. & Trkman, P. (2008). Factors and Sustainable Strategies Fostering the Adoption of Broadband Communications in an Enlarged European Union. *Technological Forecasting and Social Change, Vol. 75, No. 7,* pp. 933–951.

Ullman, J. (2007). *Structural Equation Modelling*. US: Pearson Education Inc, 676-780.

UN-ICT Task Force. Internet Monitoring. Retrieved from http://www.unicttaskforce.org/, December 10th, 2011.

UNESCAP (2006). Guidebook on Developing Community e-Centres in Rural Areas: Based on the Malaysian Experience. United Nations Economic and Social Commission for Asia and the Pacific.

United Nations Millennium Development Goals, Washington, DC, USA. Retrieved from www.econ.worldbank.org, 10th December, 2011.

Usha, L., Damodar, S., & Pratap, K.J.M. (2010). Soft and Hard Aspects of Quality Management Practices Influencing Service Quality and Customer Satisfaction in Manufacturing-oriented Services. *Global Business Review, Vol. 11, No. 1,* pp. 79-101.

Van Belle, J. P., & Trusler, J. (2005). An Interpretivist Case Study of a South African Rural Multi-Purpose Community Center. The Journal of Community Informatics, 1(2). Retrieved from www.ci-journal.net/index.php/ciej/article/view/231, March 28th, 2012.

Van Slyke, C., Comunale, C., & Belanger, F. (2002a). Gender Differences in Perceptions of Web-Based Shopping. *Communications of the ACM, Vol.45, No.8,* pp. 82-86.

Vahid, A., & Khaled, H. (2010). Continuance Intention to Use High Maintenance Information Systems: The Role of Perceived Maintenance Effort. *Proceedings of 18th European Conference on Information Systems,* pp. 1-11.

Venkatesh, V., Thong, J.Y.L., Chan, F.K.Y., Hu, P.J.H., & Brown, S.A. (2011b). Extending the Two-Stage Information Systems Continuance Model: Incorporating UTAUT Predictors and the Role of Context. *Information Systems Journal, Vol. 21*, pp. 527-555.

Van Slyke, C., Lou, H., & Day, J. (2002b). Impact of Perceived Innovation Characteristics on Students' Intention to Use Groupware. *Information Resources Management Journal, Vol.15, No.1,* pp. 5-12.

Vatanasombut, B., Igbaria, M., Stylianou, A.C., & Rodgers, W. (2008). Information Systems Continuance Intention of Web-Based Applications Customers: The Case of Online Banking. *Information & Management, Vol. 45, No. 7*, pp. 419-428.

Venkatesh, A., Chuan-Fong, E.S., & Stolzoff, N.C. (2000). A Longitudinal Analysis of Computing in the Home Census Data 1984-1997, in Sloane, A. and van Rijn, F. (Eds), Home Informatics and Telematics. *Information, Technology and Society*, pp. 205-15.

Venkatesh, V., & Brown, S. A. (2001). A Longitudinal Investigation of Personal Computers in Homes: Adoption Determinants and Emerging Challenges. *MIS Quarterly, Vol. 25, No. 1,* pp. 71–102.

Venkatesh, V., & Morris, M.G. (2000). Why Don’t Men Ever Stop to Ask for Directions? Gender, Social Influence and their Role in Technology Acceptance and Usage Behaviour. *MIS Quarterly, Vol. 24, No. 1*, pp. 115-139.

Venkatesh, V. (2000). Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model. *Information System Research, Vol. 11, No. 4*, pp. 342-365.

Venkatesh, V., Morris, M., Davis, G., & Davis, F. (2003). User Acceptance of Information Technology: Toward A Unified View. *MIS Quarterly, Vol. 27, No. 3*, pp. 425-478.

Venkatesh, V., Morris, M., Davis, G., & Davis, F. (2003). User Acceptance of Information Technology: Towards A Unified View. *Inform. Syst. Q., Vol. 27*, pp. 425-478.

Venkatesh, V., Sykes, T. A., & Zhang, X. (2011a). 'Just What the Doctor Ordered': A Revised UATUT for EMR System Adoption and Use by Doctors. *44th Hawaii International Conference on System Sciences*, pp. 1-10.

Venkatesh, V., Thong, J.Y.L., & Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly, Vol. 36, No.1*, pp. 157-178.

Venkatesh, V., Thong, J.Y.L., Chan, F.K.Y., Hu, P.J.H., & Brown, S.A. (2011b). Extending the Two-Stage Information Systems Continuance Model: Incorporating UTAUT Predictors and the Role of Context. *Information Systems Journal, Vol. 21, No. 6,* pp. 527-555.

Vetter, P. (2006). *The Role of Wireline Access Technology to Bridge the Digital Divide*. MUSE IST Workshop, Brussels, Belgium.

Vijayasarathy, L.R. (2004). Predicting Consumer Intentions to Use On-Line Shopping: The Case for an Augmented Technology Acceptance Model. *Information and Management, Vol. 41*, pp. 747–762.

Von-Hippel, E. (2005). *Democratizing Innovation*. Cambridge, MA., The MIT Press.

Wan, W., Luk, C., & Chow, W. (2005). Customers' Adoption of Banking Channels in Hong Kong. *International Journal of Bank Marketing, Vol. 23, No. 3*, pp. 255-272.

Wang, D., Xu, L., & Chan, H.C. (2008). Understanding Users' Continuance of Facebook: The Role of General and Specific Computer Self-Efficacy. *ICIS Proceedings, Paper 168*.

Wang, H.I., & Yang, H.L. (2005). The Role of Personality Traits in UTAUT Model under Online Stocking. *Contemporary Management Research, Vol. 01, No. 01*, pp. 69-82.

Wang, H.W., & Wang, S.H. (2010). User Acceptance of Mobile Internet Based On the Unified Theory of Acceptance and Use of Technology: Investigating the Determinants and Gender Differences, Social Behavior & Personality. *An International Journal, Vol. 33, No. 3,* pp. 415-424.

Wang, Y.S. (2003). The Adoption of Electronic Tax Filing Systems: An Empirical Study. *Government Inform Quart Vol. 20, No. 4*, pp. 333–352.

Wang, Y.S., & Shih, Y.W. (2008). Why Do People Use Information Kiosk? A Validation of the Unified Theory of Acceptance and Use of Technology. *Government Information Quarterly*, 501-519.

Wang, Y. S., Wang, Y. M., Lin, H. H., &Tang, T. I. (2003). Determinants of User Acceptance of Internet Banking: An Empirical Study. *Int J Service Indust Mngt., Vol. 14, No. 5*, pp. 501–519.

Wang, Y., Meister, D.B., & Gray, P.H. (2013). Social Influence and Knowledge Management Systems Use: Evidence from Panel Data. *MIS Quarterly, Vol. 37, No. 1*, pp. 299-313.

Wang, Y., Wu, M., & Wang, H. (2009). Investigating the Determinants, Age and Gender Differences in the acceptance of Mobile Learning. *British Journal of Educational Technology, Vol. 40, No. 1,* pp. 92-118.

Wang, Y.S., Hung, Y.H., & Chou, S.C. (2006). Acceptance of E-Government Service: A Validation of the UTAUT. *5th Proceeding of the WSEAS International Conference on E-Activities, Venice Italy*, pp. 165-170.

Wang, Y.S., Wu, M.C., & Wang, H.Y. (2009). Investigating the Determinants and Age and Gender Differences in the Acceptance of Mobile Learning. *British Journal of Education Technology, Vol. 40, No. 1*, pp. 92-118.

Warschauer, M. (2003). Demystifying the Digital Divide. Scientific American, 289, pp. 42-47.

Warshaw, P., & Davis, F. (2001). The Accuracy of Behavioural Intention versus Behavioural Expectation for Predicting Behavioural Goals. *Journal of Psychology, Vol. 119, No. 6*, pp. 599-602.

Wasko, M.M., & Faraj, S. (2005). Why should I share? Examining Social Capital and Knowledge Contribution in Electronic Networks of Practice. *MIS Quarterly, Vol. 29, No. 1*, pp. 35-57.

Wei, J. (2004). Worldwide Internet Usages and Online Multi-Linguistic Population Comparison Study. *Information Systems Education Journal, Vol. 2, No. 25*, pp. 24-25.

Wendy, O. (2012). *Data Collection: Key Databases and Methods in Social Research*. Sage Publications Limited, India.

Whitacre, B.E. (2008). Factors Influencing the Temporal Diffusion of Broadband Adoption: Evidence from Oklahoma. *The Annals of Regional Science, Vol. 42, No. 3*, pp. 661–679.

Whitacre, B.E., Hartman, P.S., Boggs, S.A., & Schott, V. (2009). A Community Perspective on Quantifying the Economic Impact of Teleradiology and Telepsychiatry. *Journal of Rural Health, Vol. 25, No. 2*, pp. 194–197.

Wicander, G., Hatakka, M., & Kromidha, E. (2010). Accessing the Impacts of Rural Internet Centre Programs on Quality of Life in Rural Area of Malaysia. *Proceedings of IPID Postgraduate Strand at ICTD 2010. Karlstad University Studies, London*.

Williams, M. D., Rana, N. P., Dwivedi, Y. K., & Lal, B. (2012). Is UTAUT Used or Just Cited for the Sake of IT? A Systematic Review of Citations of UTAUT's Originating Article. *Integrated Series in Information Systems, Vol. 28,* pp. 37-62.

Wilson III, E. J. (2004). *The Information Revolution and Developing Countries*. The MIT Press, Cambridge, Massachusetts, U.S.A.

Wilson, B. (2010). *Using PLS to Investigate Interaction Effects Between Higher Order Branding Constructs*. Handbook of Partial Least Squares: Concepts, Methods and Applications, Springer Handbooks of Computational Statistics, pp. 621-652.

Woodcock, B., Middleton, A., & Nortcliffe, A. (2012). Considering the Smartphone Learner: An Investigation into Student Interest in the Use of Personal Technology to Enhance their Learning. *Student Engagement and Experience Journal, Vol.1, No. 1*, pp. 1-15.

World Internet Usage and Population Statistics (2006). Retrieved from www.internet worldstats.com/stats.htm, February 13th, 2012.

World Summit on the Information Society (2010). Retrieved from http: // gerardbest. wordpress.com/2010/11/10/2010-world-summit-on-the-information-society-wsis-mid-term-report, November 10th, 2011.

Wu, J. H., & Wang, S. C. (2005). What Drives Mobile Commerce? An Empirical Evaluation of the Revised Technology Acceptance Model. *Information and Management, Vol. 42,* pp. 719-729.

Wu, J. H. (2008). Technology Acceptance Model for Evaluating Healthcare Professionals' Intention to Use an Adverse Event Reporting System. *International Journal for Quality in Health Care, Vol. 20, No.2,* pp.123-129.

Wu, Y.L., Tao, Y.H., & Yang, P.C. (2007). Using UTAUT to Explore the Behaviour of 3G Mobile Communication Users. *IEEE Explore,* pp. 199-203.

Wang, Y., Yu, Q., & Fesenmaier, D.R. (2002). Defining the Virtual Tourist Communities: Implications for Tourism Marketing. *Tourism Management, Vol. 23*, No. 4, pp. 407-417.

Wang, Y.S., & Liao, Y.W. (2008). Accessing Egovernment Systems Success: A Validation of DeLone And McLean Model of Information Systems Success. *Government Information Quarterly, Vol. 25, No. 4,* pp. 717-733.

Wang, Y.S., Wu, M.C., & Wang, H.Y. (2009). Investigating The Determinants and Age and Gender Differences in the Acceptance of Mobile Learning. *British Journal of Education Technology, Vol. 40, No. 1,* pp. 92-118.

Wee, S.H. (1999). Internet Use amongst Secondary School Students in Kuala Lumpur, Malaysia. *Malaysian Journal of Library and Information Science, Vol. 4, No. 2*, pp. 1-20.

Wittwer, J., & Senkbeil, M. (2008). Is Students' Computer Use at Home Related to their Mathematical Performance at School? *Computer and Education, Vol. 50, No. 4*, pp. 1558-1571.

Wu, J.H., & Wang, Y.M. (2006). Measuring KMS Success: A Respecification of the DeLone and McLean's Model. *Information and Management, Vol. 43,* pp. 728-739.

Yang, K. C. C. (2005). Exploring Factors Affecting the Adoption of Mobile Commerce in Singapore. *Telematics and Informatics, Vol. 22, No. 3*, 257-277.

Yang, Z., Cai, S., Zhou, Z., & Zhou, N. (2005). Development and Validation of an Instrument to Measure User Perceived Quality of Information Presenting Web Portals. *Information & Management, Vol. 42, No. 4,* pp. 575–589.

Yangsoo, K., Tim, K., & Siddhartha, R. (2010). *Building Broadband: Strategies and Policies for Developing World*. The World Bank, Infodev.

Yusop, F.D., & Sumari, M. (2013). The Use of Social Media Technologies among Malaysia Youth. *Procedia Social and Behavioural Sciences, Vol. 103,* pp. 1204-1209.

Yi, M., Jackson, J., Park, J., & Probst, J. (2006). The Use of Unified Theory of Acceptance and Use of Technology to Confer the Behavioural Model of 3G Mobile Telecommunication Users. *Journal of Statistical Management System, Vol. 43*, pp. 350-363.

Ying-Chang, L., Anh, T.H., & Hsiao-Hwa, C. (2004). Cognitive Radio on TV Bands: A New Approach to Provide Wireless Connectivity for Rural Areas. *IEEE Wireless Communications*, pp. 16-22.

Yogesh, K. D. (2008). *Consumer Adoption and Usage of Broadband*. Hershey, New York. IRM Press.

Yongsoo, K., Tim, K., & Siddhartha, R. (2010). Building Broadband: Strategies and Policies for the Developing World. Global Information and Information Technologies Department in World Bank. Retrieved from www.worldbank.org, January 10th, 2012.

Yoshimoto, N. (2005). *NTT's Deployment of FTTH Services and Future Developments*. FTTH Conference, USA.

Yu, J., Ha, I., Choi, M., & Rho, J. (2005). Extending the TAM for a t-Commerce. *Inform Mngt., Vol. 42,* pp. 965–976.

Yun, H., Han, D., & Lee, C.C. (2013). Understanding the Use of Location-Based Service Applications: Do Privacy Concerns Matter? *Journal of Electronic Commerce Research, Vol. 14, No. 13*, pp. 215-229.

Zaitun, A. B., & Barbara, C. (2005). Overcoming the Digital Divide: A Proposal on How Institutions of Higher Education Can Play a Role. Malaysian Online *Journal of Instructional Technology, Vol. 2, No. 1,* pp. 1-11.

Zammuto, R. F., Keaveney, S. M., & O'connor, E. J. (1996). Rethinking Student Services: Assessing and Improving Service Quality. *Journal of Marketing in Higher Education, Vol. 7, No. 1,* pp. 45-69.

Zhang, M., & Wolff, R. (2004). Using Wi-Fi for Cost-Effective Broadband Wireless Access in Rural and Remote Areas. *IEEE Communications Society,* pp. 1347-1352.

Zhang, S., Janakiraman, R. Sim, T., & Kumar, S. (2006). Continuous Verification Using Multimodal Biometrics. *2nd International Conference on Biometrics,* pp. 562-570.

Zhao, X., Lynch, J.G.J., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and Truths about Mediation Analysis. *Journal of Consumer Research, Vol. 37*, pp. 197–206.

Zhou, T. (2013). An Empirical Examination of Continuance Intention of Mobile Payment Services. *Decision Support Systems, Vol. 54, No. 2*, pp. pp. 1085-1091.

Zhou, Z., Fang, Y., Vogel, D.R., Jin, X.L., & Zhang, X. (2012). Attracted to or Locked In? Predicting Continuance Intention in Social Virtual World Services. *Journal of Management Information Systems, Vol. 29, No. 1*, pp. 273-306.

Zoltan, D., & Tatsuya, T. (2010). *Questionnaires in Second Language Research: Construction, Administration, and Processing*. 2nd Edition, Routledge, New York, USA.

Zulkefli, I., Ainin, S., & Tengku, M. F. (2008). The Roles of Community Based Telecenters in Bridging the Digital Divide in Rural Malaysia. *World Academy of Science, Engineering and Technology, Vol. 46*, pp. 352-364.

Zulkhairi, M.D., Huda, H.I., Suhaidi, H., Wan, R.S.O., Azman, Y. Shafiz, A.M.Y., Khairudin, K.M., Osman,G., Amir, M.A.S., Nizam, S.M., NorIadah, Y., Rafidah, A.R., & Suwannit, C.C. (2008). *Requirements for ICT Applications and Content: Including Broadband Usage for Rural Areas in Kedah and Perlis*. University Utara Malaysia Research Report.