

Problems in Using the Wireless Village Services in Malaysia: The Non-Users Perspectives

¹Hamizah Sahharon, ¹Jusang Bolong, ²Siti Zobidah Omar

¹Faculty of Modern Language and Communication, ²Institute for Social Science Studies

Email: hamisahharon@gmail.com, jusang@upm.edu.my, zobidah@upm.edu.my

DOI Link: <http://dx.doi.org/10.6007/IJARBSS/v7-i3/2728>

Published Date: 09 March 2017

Abstract

This study aims to identify problems faced by rural community in Malaysia in using the wireless village services. The study is quantitative in nature and was conducted in four districts in Malaysia, namely Setiawan (Perak), Bahau (Negeri Sembilan), Marang (Terengganu) and Kundasang (Sabah). With a total of 300 respondents the study used a survey method to identify the problems faced by an ICT project called 1Malaysia Wireless Village. Analysis performed has confirmed on four main problems that were possibly affected the progress of rural development and digital equality towards economic development. A number of discussions have been highlighted and it is a hope that it can assist the concern parties in constructing the best ICT usage strategies particularly among the rural community.

Keywords: Rural Development, ICT Projects, ICT Project Sustainability, Internet Usage

Introduction

When it comes to the digital age, both developed and developing countries struggle to adhere to the standard of bridging digital divide between the urban and the rural population. Since the beginning of the Internet age in 1995, Malaysians were given the opportunity to evidently seek information without boundaries. The Malaysian government saw the internet as one of the key elements in the Tenth Malaysia Plan formulated to progress the government's vision to turn Malaysia into an advanced socio-economic country by 2020 (Economic Planning Unit, 2010).

Apparently the Millennium was the prospering age of ICT benefits and internet usage as the fundamental role in innovation and new employment opportunities for developing countries. Although Malaysia and Singapore introduced the internet during that age, Malaysia is still lacking significantly in internet penetration than Singapore (George, 2005). Malaysians' internet usage according to the Network Readiness Index 2014 (NRI), ranked the 30th out of the 148 states of the world for its technology infrastructure and digital content economy compared to Singapore remaining in 2nd place. The outreach of the four outstanding Asian tigers; consisting of Singapore (2nd), Hong Kong SAR (8th), the Republic of Korea (10th) and Taiwan (14th) digital strategies remained in the performance of their excellent digital

infrastructures and innovation systems in ICT use (Osorio et al., 2014). ICT infrastructures that have been persistently and continuously being implemented by the Malaysian government have yet to improve its digital gap.

Although the broadband subscriptions and the internet penetration rate in Malaysia is steadily prospering from 2013 to 2014 with 67.3%, the gap between its household internet use by the urban and the rural area is still clearly visible. The internet penetration rate of the urban households has reached 75.8% compared to only 24.2% of the rural households (Book & Statistics, 2014). Nowadays, government efforts were eminent to address this issue through implementations of telecentres in the rural areas to give more exposure to the use of Information and Communication Technology (ICT) to be aligned with other developed nations.

When building an innovative and knowledgeable society, several ICT practitioners said that a new tool intended for development has been corroborated by potentials associated with ICT and it should benefit the population rather than a few (Annan, 1997; Mansell & When, 1998; Badsar et al., 2011). ICT brings about the national's development in terms of poverty reduction, boosting economic growth, and improving accountability, governance, service quality (World Bank Group Strategy, 2012), enhancing IT infrastructure and the E-Commerce in Malaysia (Jehangir, Dominic, Naseebullah, & Khan, 2011). The social and economic development through ICT is seen through the rapid changes in the ICT sector in Malaysia over the last decade, this includes a dramatic increase in the use of mobile phones and the Internet, and the increasing popularity of social media among netizens (Sahharon, 2014). Jehangir et al. (2011) claimed that ICT usage can instigate knowledge base economy, while Sahharon (2014) claimed that ICT could create connections and gain information, opportunities for an effective communication, create a first-class mind individual, allows economic impact at community level and exposure to online services. These studies verify the ways ICT brings economic and social development.

The implementations of ICT solutions in Malaysia have been prominent; they have been providing e-government services to the Malaysian citizens to ease the efficiency of their daily routine. Since 2002, there have been several ICT projects done by Malaysian Communications and Multimedia Malaysia (MCMC) with Universal Service Provision (USP). As such Telecentre services implemented around rural areas to provide access to the internet and communications have encouraged the use of ICT and bridge the digital divide (Colle, 2000). To name a few, there is a total of 437 1Malaysia Internet Centres, 99 Community Broadband Libraries, 120 Mini Community Broadband Centres and up-to-date 4,803 1Malaysia Wireless Villages which started in 2011 to complement their previous 1,169,619 1Malaysia Netbook distribution project (Malaysian Communications and Multimedia Commission, 2014).

Despite having several ICT project exposures, there still exist non-users within the 1Malaysia Wireless village community who made no use of the digital infrastructure provided and whether it satisfies their basic communication needs. Has the provision of internet been successfully provided by Universal Service Provider works aligned with its slogan "To bring wireless Internet access to the doorstep of small communities in remote villages"? This question has led the researchers to conduct a study on four different 1Malaysia Wireless Village zones to seek out problems faced by the villagers with regards to the hindrance to their Wi-Fi utilization. Although the satellite dishes were erected in their locale, the Malaysian government seemed to face a dilemma in uncovering the problems that exist among the villagers and the reasons why they refuses to use the Wi-Fi provided.

The contribution of this paper will lead to practice, policy and knowledge towards the problems faced by ICT projects funded by the Malaysia government in its attempt to progress rural development.

What Is Wireless Village?

1Malaysia Wireless Village is another project under the USP program. Its objective is “to provide basic wireless internet access” for the underserved areas nationwide by installing a wired connection, microwave or the satellite system in strategic places. By 2014 there are already a total of 4,803 1Malaysia Wireless Villages implemented through either Community Broadband Centre (CBC) -to-Home technology infrastructure or Collective Broadband Access (CBA) phase 1 technology infrastructure. These two infrastructures appointed a wireless access point (AP) of 4Mbps within a radius of 50 metres that is connected from a wired network router to the villager’s home. The service providers for Wi-Fi, 3G or WiMAX coverage of each zone is different based on the existing communication tower facilities in that particular village such as Packet 1, Telekom Malaysia™, Celcom, Digi, Maxis, and Redtone. The Wireless Village concept is to give internet exposure to the rural communities without any fee. The users can access the Wi-Fi by standing around the indicated hotspot signage and it is open to all users and locals living nearby the service centre. Several Wireless Village services require an account registration beforehand to get a username and a password meanwhile some Wireless Village services does not. The management of these services depends on the caretaker of each zone and how the infrastructure was implemented.

Problems Facing The Use Of Ict Projects Implemented By The Malaysian Government

With several ICT projects implemented by the Malaysian Government, there were still flaws in forecasting the effectiveness of the project’s existence. Hassan et al. (2008) highlighted the ineffectiveness for rural ICT exposure was due poor rural community’s enrolment and lack of encouragement from the responsible parties. On the other perspective, Omar et al. (2008) asserted a different view on the failure an ICT project was principally based on the lack of physical facilities. Omar et al. (2008) argued that the lack of proper appliances, management, finances and support services from the project’s host. Towards the end, these two studies emphasized on the importance of support and encouragement to be more involved in ICT project by the village representatives. This form of provision needs to be taken into consideration as only the village representatives know the importance of telecentre services to their community, and to guide corrective actions effectively towards community development (Musa, 2011; Rothenberg, 2005). Another study on 360 telecentres users in rural areas around Malaysia emphasized that the suitability of the telecentres location, and the leadership competency within the telecentres, played a major role in successful ICT acceptance from the rural communities (Mohammad et al., 2011; Omar et al., 2008, Bashir et al., 2011; Badsar et al. 2011). One of the foremost problems that discouraged people from getting access to the use of internet was because the telecentres were located far away from their home and as a result as they refused to walk the mile to go to the telecentre. Bashir et al. (2011) depicted how telecentres should be located in a public place known by the community, for example, schools, libraries, and other similar places.

Kwong et al. (2011) conducted a study on Wireless Village Project and found that the implementation of its infrastructure to be cheaper, faster to deploy, and more efficient compared to wired backhaul connectivity. However, in Kwong et al. case study of Kampung Ulu Dusun (Sabah), the issue of connectivity was highlighted. The network provided by the

1Malaysia Wireless Village was founded to be easily jammed with a high number of users and the unstable connection got easily disconnected when it was struck by lightning; as a result the Wi-Fi cannot function effectively. One of the addressed issues that could negatively impact a telecentres function would be the lack of sustainability of its facilities; so as not to cloud the rural community's acceptance with dissatisfaction (Meng et al., 2013). Kwong et al. (2011) and Meng et al. (2013) asserted that lack of constant power supply and stable connectivity as well as difficulties in maintaining the facilities were the most common problems affecting a telecentres objective. Hence the role of the caretaker for telecentre sustainability emerged as the essential need for maintenance after the service agency has departed (Bailey, 2009; Harris et al., 2003). Harris et al (2003) accentuated the role of the telecentres caretakers to acknowledge and attend the technical problems.

Although several studies have pointed out the success of several ICT projects and the importance of internet access towards rural development, the digital gap between the rural and the urban was still clear. What made this gap still eminent was due to the existence of rural communities who still refused to utilize the services implemented in their remote area. Hence, in order to understand the reasons behind the ineffectiveness of 1Malaysia Wireless Village project to function effectively, there is a need to further get personal from the non-user's point of view as to why they chose not to utilize 1Malaysia Wireless Village's Wi-Fi service.

Methodology

The current study was quantitative in nature. The main instrument used in collecting the data was a questionnaire which was developed via review of literature and questions of past studies. The questionnaire was then pre-tested on 30 respondents around the area of Tanjung Karang, Selangor. The resulted Cronbach alpha value of 0.809 has exceeded the recommended alpha value of 0.700 by Nunnally (1978) and thus depicted the reliability of the developed questionnaire. The questionnaire was later on validated through a number of instrument development workshops.

Through a multistage cluster sampling, a total 300 villagers who were non-users of the wireless village internet services have been selected as the respondents. The data collection process took place across four districts in Malaysia, namely Setiawan (Perak), Bahau (Negeri Sembilan), Marang (Terengganu) and Kundasang (Sabah). Each of the districts was represented by 75 respondents and the duration of the data collection took five months, which started from April 2014 and ended in August 2014. The data collection process was assisted by trained enumerators and monitored by the research team members.

The main data collection technique used was surveyed and the respondents took between 20-30 minutes to complete a survey. For each of the questions regarding the problems faced, the respondents were given an option of a Likert like scale ranging from 1 (strongly disagree) to 5 (strongly agree). The data were then analysed descriptively. The mean score of the problems was categorized into three groups, namely low, moderate and high. The calculation was based on the range of score of possible scores on problems faced by the rural community in using the wireless village internet service ranging from 1.00 to 5.00 which resulted in an interval of 4. Since the study intends to categorize the mean score of problems faced by the rural community in using the wireless village internet service into three categories, the range then was divided by 3, yielding class interval of 1.33. The interval then resulted in three categories, namely – low (mean score from 1.00 to 2.33), moderate (mean score between 2.34 to 3.67) and high (mean score from 3.68 to 5.00).

Results

The data were obtained through 300 non-users of 1Malaysia Wireless Village. According to table 1, out of the 300 respondents, 53% were male and the rest female. The majority has at least basic secondary high school certificate SPM/SPMV (43.7%) and most of them were Malays (71%), employed (57.3%) and were the ages of >41 (29%). Quite a number of respondents lived within the range of 101-500metres or further from the hotspot and have inhabited the village for 16-25 years (29.3%).

Table 1:
Demographic Background

Factor	Frequency	Percentage %	Mean
Gender			
Male	159	53.0	
Female	141	47.0	
Educational achievement			
Never been to school	16	5.3	
Primary school	40	13.3	
PMR	67	22.3	
SPM/SPMV	131	43.7	
Skill certificate/STPM	20	6.7	
Diploma	13	4.3	
Degree/Master/PhD	13	4.3	
Race			
Malay	213	71.0	
Chinese	8	2.7	
Indian	4	1.3	
Dusun	75	25.0	
Age (years)			
<20	75	25.0	33.4
21-30	65	21.7	
31-40	73	24.3	
>41	87	29.0	
Distance to the nearest KTW (meter)			
<100m	45	15.0	1100
101-500m	101	33.7	
501-1000m	85	28.3	
>1001m	69	23.0	
Duration of staying at the village (years)			
<5	34	11.3	24.1
6-15	57	19.0	
16-25	88	29.3	

26-35	53	17.7
>36	68	22.7
Employed		
Yes	172	57.3
No	128	42.7

Based on the results presented in Table 2, the main reason for the non-users to not utilize the Wi-Fi from 1Malaysia Wireless Village was due to the limited and poor connection of its service provision; "The radius of 1Malaysia Wireless Village Wi-Fi access is rather limited" with $M = 3.37$ followed by "Poor internet connection when the weather is severe" with $M = 3.30$. Most of the items recorded a moderate mean score.

Table 2:

The mean scores for each problems regarding 1Malaysia Wireless Village usage.

Problems	Mean scores
The radius of 1Malaysia Wireless Village Wi-Fi access is rather limited	3.37
Poor internet connection when the weather is severe	3.30
Prefer to use other internet service providers (e.g. TM, Celcom, Digi, Maxis, U Mobile)	3.27
The internet speed is not so good	3.26
Too many users causing the Wi-Fi connection to slow down	3.13
Live far from the 1Malaysia Wireless Village Centre	3.11
Difficult to obtain the username and the password	2.87
No lap top	2.84
Difficult to convey complain to the service provider	2.79
Do not know how to use it	2.67
Quality of service provider is not satisfactory	2.65
Prefer to go to the other Internet centre	2.61
Wi-Fi connection is often damaged due to no maintenance	2.55
1Malaysia Wireless Village Wi-Fi usage late at night causes social problems to local residents.	2.51
Not interested in using it	2.43

Discussion

The findings of the current study lead us to discover four main reasons for the problems encountered by 1Malaysia Wireless Village Project.

- *Poor enrolment and lack of encouragement from the rural communities*

Even though many non-users had an interest in using the Wi-Fi provided by the 1Malaysia Wireless Village as the problem "Not interested in using it" ($M = 2.43$) scored moderately low, the majority (the elders and housewives) personally claimed that they "Do not know how to use it" ($M = 2.67$) in response to the problem that hindered them from using the Wi-Fi provided. Besides, they said it was "Difficult to obtain the username and the password" ($M = 2.87$), which was why they refused to use it. Another problem that arises through this research was that the elders of the rural communities often complain that "1Malaysia Wireless Village Wi-Fi usage late at night causes social problems to local residents" ($M = 2.51$). In line with the

findings of Hassan et al. (2008), although several of these non-users live quite near to the hotspot, the ineffectiveness for 1Malaysia Wireless Village internet exposure was due to low ICT awareness and low maturity of the rural community's enrolment. Several villagers were uninterested in the service provision provided because they found no personal use of computers or not bestowing significance to internet use and likewise unwilling to visit the centre were the reasons for the lack of interest in 1Malaysia Wireless Village and its service. According to Diffusion of Innovation theory by Everett M. Rogers (1995), the rural communities in Malaysia can be considered as 'late majorities' in his categories of adopters due to their traditional mind-set, which makes it hard for them to quickly adapt to new concepts and technologies. The late majorities said it was no use to them and saw the internet as a hassle to use; therefore 1Malaysia Wireless Village Project did not fully receive the villager's acceptance.

- *Lack of gadgets and appliance facilities*

Although some of the villagers were interested in using it, without proper appliances, limited gadgets, and lack of exposure to new technologies hindered them to use the free Wi-Fi services offered by the Malaysian government. The villagers claimed that they have "No laptop" (M= 2.84) as to the reason why they could not access the Wi-Fi. While getting personal with the non-users during the data collection, the late majorities all confessed to not owning any gadgets that could access the internet, especially families who did not receive the 1Malaysia Netbook. The majority also suggested to the Project's host to provide appliances such as computers and laptops to ease the burden of families who could not afford new technologies. This problem was coherent with Omar et al. (2008) assertion to the failure of an ICT project was principally based on the lack of physical facilities. Omar et al. (2008) argued that the lack of the proper appliances, and financial support from the Project's host.

- *Location of infrastructure and leadership competency*

Another source of problems for the non-users to utilize the Wi-Fi was due to the barrier of the non-strategic location as they 'Live far from the 1Malaysia Wireless Village centre' (M= 3.11). This finding illustrates how those living far from the hotspot tending to feel excluded from the privilege of access. Some respondents complained how they would have to walk 3 to 5 kilometres to the hotspot just to use the Wi-Fi. Some even "Prefer to go to other Internet centre" (M= 2.61) if they could access a nearer telecentre with a better connection.

The researchers saw that the wireless villages in Kundasang, Sabah were not strategic places to allocate the infrastructure as it lacks basic communication infrastructure line, in addition to the frequent severe weather condition up the mountainous area; the rural communities especially complained how hard it was to get the connection without a regular supervision from the service providers. That was why "Difficult to convey complaints to the service provider" (M= 2.79) scored moderately.

In some cases during the data collection, we encountered several respondents who live within the radius of the hotspot but still claimed that they were not aware of its existence due to the poor Wi-Fi connection, while several others agreed that they feel like the internet was not necessary to their occupation, such respondents came from a background of farmers, housewives and late majorities. That is why support and encouragement to be more involved in ICT projects should be accentuated by the village representatives (Musa, 2011; Rothenberg, 2005). One of the foremost problems that discouraged people from getting access to the use of internet was because the telecentres were located far away from their home and as a result as they refused to walk the mile to go to the telecentre.

Another problem faced by the locals was the way the satellite dish was implemented in their village. A village called Mohimboyon in Kundasang protested the installation of their Wireless Village's service provider that is implemented inside a villager's home. They were not satisfied with the implementation as they could hardly access it due to the home owner turning the router off. Thus they suggested the implementers to change the AAP to a more public location. Bashir et al. (2011) depicted how telecentres should be located in a public place known by the community, for example, schools, libraries, and other similar places. Hence the suitability of the telecentres location, and the leadership competency within the telecentres, played a major role in successful ICT acceptance from the rural communities (Mohammad et al., 2011; Omar et al., 2008, Bashir et al., 2011; Badsar et al. 2011).

- *Poor management and lack of technical maintenance from the service provider*

An additional problem faced that impedes the acceptance of an ICT project is the maintenance and sustainability of its infrastructure. Kwong et al. (2011) case study of Kampung Ulu Dusun (Sabah) highlighted the issue of connectivity and the network was found to be easily jammed with a high number of users and the unstable connection got easily disconnected, which was in line with the outcome of our study. The majority of the non-users agreed that "The radius of 1Malaysia Wireless Village Wi-Fi access is rather limited" (3.37) especially when there are "Too many users causing the Wi-Fi connection to slow down" (M= 3.13). With only 4 Mbps of wireless access, "The internet speed is not so good" (M= 3.26) and the "Quality of service provided is not satisfactory" (2.65), they refused to waste the mile, energy and time to go there.

Meng et al. (2013) also addressed the issue of lack of sustainability of the infrastructure facilities, which could delay the rural community's ICT acceptance. The villager's problem towards the management of the service provider; "Wi-Fi connection is often damaged due to no maintenance" (M= 2.55) scored moderately. Kwong et al. (2011) and Meng et al. (2013) asserted that lack of constant power supply and stable connectivity as well as difficulties in maintaining the facilities were the most common problems affecting an ICT project's objective. Hence the role of the caretaker for telecentre sustainability emerged as the essential need for maintenance after the service agency has departed (Bailey, 2009; Harris et al., 2003).

As a result, from the limited internet connection due to bad connection and lack of technical maintenance lead them to "Prefer to use other internet service providers (e.g. TM, Celcom, Digi, Maxis, U Mobile)" in lieu from the provided Wi-Fi. This finding have abide accordingly to the Malaysian Communications and Multimedia Commission's objective, which is to give basic exposure of the internet to the rural communities, thus have sparked rural interest in subscribing to other existing service providers for a stronger internet connection. Not only does this help raise internet awareness, broadband subscriptions have contributed to the socio-economy of local stakeholders.

Conclusion

1Malaysia Wireless Village Project has not reached its full potential yet as the service was not fully used within the rural community as it faced several challenges; firstly, they had poor enrolment and lacked encouragement from the rural communities due to lack of interests and lack of knowledge on its usage; secondly, they lacked gadgets and appliance facilities which hindered them from accessing the Wi-Fi provided; thirdly, the inaccessibility of infrastructure location due to disadvantageous areas the Wi-Fi was erected and their leadership competency within the telecentres; fourthly, they faced poor management and

lack of technical maintenance from the service provider as the connection was poorly managed. Due to these exertions, the non-users lack encouragement to use the Wi-Fi provided.

All these problems require consideration from different parties. Further actions are proposed taking account for the Project to progress into the stage of routinization (Cooper & Zmud, 1990) where the wireless service provision would be used as part of the rural community's basic communication and information medium.

In the foremost attempt to encourage these non-users in using the internet, the responsible parties should reinforce the basic communication infrastructure (phone line coverage) in extremely remote areas such as Kundasang, Sabah. This emphasized the need for mobile service providers such as Celcom, Maxis and Telekom to sustainably monitor and increase the lineage of coverage for the rural areas as the internet provided by them did not reach the satisfying level of the wireless village rural communities. Another important fact to be taken into consideration is the lack of digital exposure by the Village Representatives and the project implementers to remote communities. Therefore, a strategy should be implemented favourably to focus on making the internet coverage more accessible for public use and not focus impartially on individual usage, thus an increase to 4G coverage would be fitting. Correspondingly a promotion process once the project was implemented should be elongated or sustained by the responsible parties to ensure their digital project is put into nation use.

This study was based on the views of 300 villagers from four KTW villages and the number is far too small to claim the results as generally valid within the Malaysia scope. Furthermore, the results might be enriched if the respondents' views from other villages are included. Although the study is facing these limitations, yet, it managed to produce its own and unique findings.

Acknowledgment

This research was supported by Universiti Putra Malaysia's Putra Grant, 2013.

References

- Badsar, M., Samah, B. A., Hassan, M. A., Osman, N. B., & Shaffri, H. A. (2011). Predictor factors of telecentres outcome from the users perspectives in rural communities. *American Journal of Applied Sciences*, 8(6), 617.
- Bashir, M. S., Samah, B. A., Emby, Z., Badsar, M., Shaffril, H. M., & Aliyu, A. U. (2011). Information and Communication Technology Development in Malaysia: Influence of competency of leaders, location, infrastructures and quality of services on telecentre success in rural communities of Malaysia. *Australian Journal of Basic and Applied Sciences*, 5(9), 1718-1728.
- Colle, R. D. (2000). Communication shops and telecenters in developing nations. *Community informatics: Enabling communities with information and communications technologies*, 415-445.
- Cooper, R. B., & Zmud, R. W. (1990). Information technology implementation research: a technological diffusion approach. *Management science*, 36(2), 123-139.
- Economic Planning Unit. (2010). *Tenth Malaysia Plan: 2011-2015*. Putrajaya: Percetakan Nasional Malaysia Berhad.
- George, C. (2005). The internet's political impact and the penetration/participation paradox in Malaysia and Singapore. *Media, Culture & Society*, 27(6), 903-920.

- Harris, R. W. (2003). Information and communication technologies for rural development in Asia: Methodologies for systems design and evaluation. *Closing the digital divide: transforming regional economies and communities with information technology*, 101-120.
- Hassan, M. A., Ismail, N., Omar, S.Z., & Bolong, J. (2008). Kesan Terhadap Peserta yang Mengikuti Projek ICT di Luar Bandar. *Pertanika Journal of Social Science & Humanities*, 16(1), 85-94.
- Hudson, H. (1999). Design research for telecentre evaluation. In Gomez, Hunt, Lamoureux (eds.) *Telecentre Evaluation and Research: a global perspective*, Ottawa: IDRC. Retrieved March 28, 2007 from http://idrinfo.idrc.ca/archive/corpdocs/115668/20_Des.html
- Ibrahim, Z., & Ainin, S. (2009). The influence of Malaysian telecenters on community building. *Electronic Journal of e-Government*, 7(1), 77-86.
- Jehangir, M., Dominic, P. D. D., & Khan, A. (2011). Towards digital economy: the development of ICT and e-commerce in Malaysia. *Modern Applied Science*, 5(2), 171.
- Johansson Hedberg, L. (2011). Telecentre for community development: Evaluation of the Tunjang telecentre, Malaysia. *The Journal of Community Informatics*, 6(2).
- Kwong, K. H., Nghoh, A. T. K., Chieng, D. H. T., & Abbas, M. (2011, October). WiFied up Malaysia villages: A case study of using WiFi technology to increase internet penetration rate in Malaysia rural areas. In *Communications (MICC), 2011 IEEE 10th Malaysia International Conference on*, 7-12.
- Malaysian Communications and Multimedia Commission. (2014). *Communications & Multimedia: Pocket Book of Statistics Q1 2014*. Cyberjaya: Digital Perspective Sdn. Bhd.
- Malaysian Communications and Multimedia Commission. (2014). *Universal Service Provision: Projects*. Retrieved from <http://usp.skmm.gov.my/Projects/Telephony.aspx>
- Mansell, R., & When, U. (1998). *Knowledge Societies: Information Technology for Sustainable Development*. New York: Oxford University Press Inc.
- Meng, C. C., Samah, B. A., & Omar, S. Z. (2013). A review paper: Critical factors affecting the development of ICT projects in Malaysia. *Asian Social Science*, 9(4), 42.
- Omar, S. Z., Abu Hassan, M., Ismail, N., & Bolong, J. (2008). Faktor kejayaan dan kegagalan projek ICT di luar Bandar. *Pertanika Journal of Social Sciences & Humanities*, 16(2), 173-186.
- Osorio, B. B., Dutta, S., & Lanvin, B. (2014). *The Global Information Technology Report 2014: Rewards and Risks of Big Data*. Geneva: World Economic Forum. Retrieved from <http://widgets.weforum.org/global-information-technology-report-2014/#>
- Razak, N. A., Amir, Z., Ismail, M., & Shuja, N. (2010). The impact of wireless technology among Malaysian society. In *Proceedings of the 9th WSEAS international conference on Electronics, hardware, wireless and optical communications*, 54-59.
- Reilly, K., & Gómez, R. (2001). Comparing approaches: telecentre evaluation experiences in Asia and Latin America. *The Electronic Journal of Information Systems in Developing Countries*, 4.
- Rogers, E. M. (1995). *Diffusion of Innovations* (4th ed.). New York: Free Press.
- Rothenberg, J. (2005). *Rural Telecentre Impact Assessments and the Political Economy of ICT for development (ICT4D)*. BRIE working paper. Retrieved from <http://brie.berkeley.edu/research/WP%20164revised.pdf>

- Sahharon, H., Omar, S. Z., Bolong, J., Shaffril, H. A. M., & D'Silva, J. L. (2014). Potential benefits of the wireless village programme in Malaysia for rural communities. *Journal of Applied Sciences*, 14(24), 3638.
- Tipton, F. B. (2002). Bridging the digital divide in Southeast Asia: Pilot agencies and policy implementation in Thailand, Malaysia, Vietnam, and the Philippines. *ASEAN Economic Bulletin*, 83-99.
- World Bank Group Strategy. (2012). *ICT for Greater Development Impact*. Retrieved from https://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/WBG_ICT_Strategy-2012.pdf