# Broadband Usage and Internet Diffusion Initiatives in Rural Areas: A Correlational Study

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**A R T I C L E   I N F O**

**A B S T R A C T**

The relationship of broadband usage and internet diffusion initiatives by Malaysian Government is investigated. In this study, broadband usage is defined by usage at internet community centre provided by the Malaysian government under the initiatives to close the gap of internet penetration and diffusion between rural and urban areas. A sample of 100 participants of rural area in Kelantan is selected. A survey method is opted with questionnaires of measurement items designated to serve the aim of study i.e. to investigate the relationships of broadband usage with three diffusion initiative factors: facilitating conditions, economic influence and awareness programmes. A correlational study is implemented to investigate the relationships between the dependent and independent variables. Our findings indicate that all of the three factors show positive relationships with broadband usage. Factor of awareness programme shows the strongest relationship, with correlation coefficient of r=0.85, indicating the needs of such initiatives in promoting the use of broadband internet among residents of rural areas such as at the selected area. Residents are envisaged to have high demand on internet resources to fit with the environmental factors in particular for education needs. Government initiatives should be carried on to close the internet diffusion gap between rural and urban areas, as well as to improve rural communities' internet and information literacy.

## INTRODUCTION

Internet was introduced in Malaysia in 1987 by the Malaysian Institute of Microelectronic Systems (MIMOS) through its RangKom Project. RangKom, which stands for Rangkaian Komputer Malaysia (Malaysia Komputer Network), connects several universities in Malaysia, and as the experiment was a success. RangKom was then turned into Malaysia's Internet Service Provider (ISP) offering services to a limited number of members of the public in 1991. In the following year, MIMOS launched Malaysia's first ISP called JARING. Currently, there are a total of nine ISPs in Malaysia. Telekom Malaysia (TM) has been a broadband player since 2001 when they introduced the Streamyx DSL service, and since then, TM have been consistently driving down the cost and ramping up the service and quality of broadband experience (Mohd Isa, 2009A). Malaysia's National Broadband Initiative is a government program designed to make high speed Internet accessible and affordable to the country's citizens, with a special emphasis on rural areas, children and the poor. The public-private partnership, announced by Prime Minister Y.A.B Dato' Sri Mohd Najib Tun Haji Abdul Razak on March 24, 2010, combines the efforts of the Malaysian Communications and Multimedia Commission (MCMC) and TM. Moreover, 1Malaysia Internet Centre, 1MIC (formerly known as Community Broadband Centre) is one of the Malaysia's National initiatives under Budget 2013, is a program where MCMC to provide broadband Internet performance collectively in 100 pieces Housing Program area primarily in the ports of the selected throughout the country.

The availability of broadband Internet and easy communication connections as an enabler and contributor to national aspirations and driver of national competitiveness as it speeds adoption, whereas slow connections cause user frustration and slow adoption (Mohd Isa, 2009B; UNCTAD, 2004). Relative economic advantages enjoyed by early adopter nations drove the political will allocate national resources to expensive broadband infrastructure development (Fortunato *et al.*, 2010).The Malaysian government recognizes this economic

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advantage. One of the actions taken to make this a reality throughout the country was the establishment of the Cabinet Committee on Broadband (CCB) rollout. Despite the increase in penetration, it is the urban areas which benefit more from this increase. There is still a disparity between the urban and sub-urban areas as far as penetration is concerned. Apart from the major cities like Kuala Lumpur, Johor and Penang, other areas of the country still experience low penetration.

Internet penetration is seen to set in the suburban communities mainly because of some public and private sector initiatives aiming at speeding the rate of diffusion, such as 1Malaysia Internet Centre (1MIC), Community Broadband Library (CBL) and the distribution of free Net books to low income households. 1MIC play an important role in bridging the digital divide in Malaysia and bringing about digital inclusion. Malaysia has made big strides as far as the adoptions and use of the Internet is concerned. This is obvious in the various governmental ICT initiatives such as Multimedia Super Corridor (MSC) and the newly launched High Speed Broadband (HSBB) (Salman, 2011; The Malay Mail, March 2010).

This paper aims to investigate the relationships of broadband usage with factors of facilitating conditions, economic influence and awareness programmes, of rural residents provided with 1MIC. The article is organized as follows. The subsequent section reviews on previous works, together with the methodology and sample data used.  The following section elaborates on the findings and its discussion. The final section concludes the paper.

### Related works and methods:

Gomez and Hunt (1999) defined telecentres as a physical space that provides public access to ICT, notably the Internet, for educational, personal, social, and economic development. According to United Nations (2007), the process of establishing telecentres helps to develop rural and remote infrastructure; generate employment; bring the hitherto isolated communities into the national mainstreams and international information network; promote knowledge-sharing among communities in a number of areas; provide local procedures access to market information; remove the middlemen; and increasing rural incomes. Bashir *et al*. (2011) asserted that telecentres in Malaysia are established to offer a range of services, including telephones, training for ICT literacy, local access to online government information and services, the possibility of partnerships with community welfare schemes in health and education, and sometimes even support for commercial activity.

Table 1 illustrates the various telecentre projects funded by the Malaysian government which are targeted towards different groups of citizens. In terms of number, the Universal Service Provider (USP) project, targeted to all groups of citizens was the highest with a total of 1,169. Another telecentre project which was also targeted to all groups of citizens was the Community Broadband Centres (CBC). However, the CBC project was dedicated to those living in the rural areas. According to MCMC (2009) the ultimate goal of CBC is to ensure that communities living in underserved areas such as FELDA are connected to mainstream ICT development (MCMC, 2009). In addition it is also aimed to enable and to empower these connected communities via broadband; and to bring about socio-economic development for those communities in agriculture, education, health, business, amongst others (MCMC, 2009).

**Table 1:** Telecentre Projects in Malaysia.

| Lead agencies | Target groups | Telecentres Project Name | Total number |
|---|---|---|---|
| Ministry of Rural 7 Regional Development | Rural, Indigenous | Medan Info Desa, PKUD Giat MARA | 237 30 |
| Ministry of Housing and Local Development | Urban poor | BDD Centre | 6 |
| Ministry of Youth and Sport | Youth | Rakan Muda Cyber Centre | 57 |
| Ministry of Women, Family and Community Development | Elderly women, disabled | PDKNet | 17 |
| State Government | All | Telecentres | 264 |
| Ministry of Information, Communication and Culture | All | Pusat Internet Desa Universal Service Provider (USP) Pusat Maklumat Rakyat (PMR) | 42 1169 138 |
| Malaysian Communication and Multimedia Commission | All | Community Broadband Centre (CBC) Community Broadband Library (CBL) | 70 105 |

*Source: Amat (2009)*

### Facilitating condition:

Venkatesh *et al*. (2003) defined facilitating condition "as the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system". In the context of the present study, this construct is defined as the degree to which user believes that the organizational and technical infrastructure of the CBC is adequate to support the use of the facilities provided by CBC. Many studies have found that facilitating condition is a significant predictor of ICT or IS acceptance (Venkatesh and Davis, 2000;

Hu, Lin and Chen, 2005; Ellahi and Manarvi, 2010). Venkatesh *et al*. (2003) argued that the influence of facilitating conditions on ICT usage is moderated by age and experience such that the effect will be stronger for older workers, particularly with increasing experience. Within the domain of telecentre study, Abdulwahab and Dahalin (2011) found that facilitating condition to be an important predictor of telecentre use.

### *Economic factors:*

The differences in internet and broadband diffusion across countries and their main determinants have been studied intensely in the literature from different perspectives using different methods (Guille´n and Sua´rez, 2001; Kitsing, 2002; Prieger, 2003; Distaso Lupi and Manenti, 2006; Ferro *et al*., 2007; Cava-Ferreruela, 2008; Dwivedi, Papazafeiropoulou and Choudrie, 2008; Ford, Koutsky and Spiwak, 2008; Andre´s *et al*., 2010). In this review they focus on the following factors; economic, institutional and political, technological factors and socio-demographic factors. In view of economic factors, both macro- and micro-economic factors are relevant to explain differences in broadband adoption. Some studies have shown that wealthier countries, measured by income per capita, have higher penetration (Hargittai, 1999; Kelly and Petrazzini, 1997).

### *Awareness programme factor:*

A programme can be defined as "an organized collection of activities designed to reach certain objectives" (Royse, Thyer and Padgett, 2006). This factor is considered due to efforts taken by the government of Malaysia in promoting high speed internet for people residing in rural areas such as in the selected area of study, i.e. Melawi, Bachok. Booth and Higgins (1984) pointed that the effectiveness of a programme in an organization can be generally defined in a number of ways such as percent of clients who experience the desired outcome as a result of service provided, proportion of employees with appropriate professional training and years of professional experience per employee. Just as other telecentres, CBC is required to design awareness programme for the rural residence. Effective programmes will attract more potential internet users using the facilities provided by the CBC. According to Abdulwahab and Dahalin (2011) in their study involving telecentre in Malaysia discovered that programme effectiveness is essential in predicting users' intention in using telecentres.

### *Objective:*

The objective of the study is to investigate the relationships of broadband usage with Malaysian Government internet diffusion initiatives, as follows:
1.  To determine the relationship between facilitating condition and broadband usage among rural communities.
2.  To determine the relationship between economic influence and broadband usage among rural communities.
3.  To determine the relationship between awareness programme and broadband usage among rural communities.

### *Hypothesis:*

1.  There is no significant correlation between facilitating condition and broadband usage among rural communities.
2.  There is no significant correlation between economic influence and broadband usage among rural communities.
3.  There is no significant correlation between awareness programme and broadband usage among rural communities.

### *Sample:*

This study is focused on Internet and broadband users of the rural residence. They are regular users of 1MIC Melawi, in the district of Bachok, Kelantan. With rapid changes taking place within the online environment, the communities are increasingly using the Internet as an everyday tool to engage in various types of information gathered from variety of websites. A total of 100 residents participate in the survey.

### *Data and Data Collection:*

Survey method is opted with questionnaires distributed to selected participants at internet centre, in Melawi communities, where they are as well 1MIC users. Likert scale measurement is used, with scales of 1 to 5 (strongly disagree to strongly agree), to measure the study items.

## RESULT AND DISCUSSION

*Descriptive:*

A total of 100 respondents participated in this study where 51% of them are male. The age categories of residents in Melawi selected as survey participants are ranging from below 12 years to more than 25 years old. The following table displays the distribution of the participants' age.

**Table 2:** Distribution of age categories.
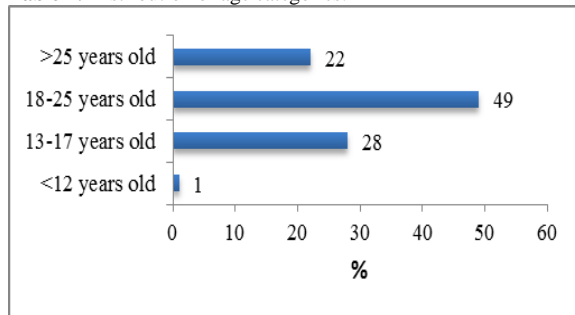


Majority of respondents are from the age category of between 18 and 25 years old (49%), followed by 13-17 years (28%). Low response of broadband internet at telecentres was shown by higher age category. As for children under 13 years old, it is expected that they are younger group that still under parents' supervision hence their presence to 1MIC Melawi is controlled and limited. The following findings describe the education background of the participants. They are grouped in five levels of education: Primary, Secondary, Certificate, Diploma, and Bachelor degrees and above (Table 3).

**Table 3:** Education background.
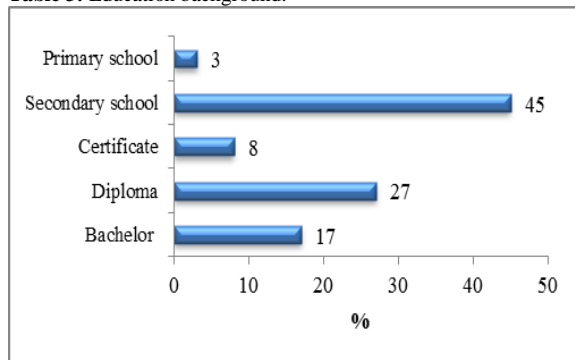


Clearly, almost half of the respondents are students of secondary school (45%). The district of Bachok does not have public or private varsities however some of skill centres are available. Due to this reason, the highest percentage of the 1MIC Melawi is expected to be secondary school students. The Kelantan government provides about 14 of secondary schools and more than 30 primary schools in Bachok district (Majlis Daerah Bachok, 2014). Moreover,

Table 4 exhibits the distribution of respondents' occupation where, as expected, majority are students, followed respondents of private sectors.

**Table 4:** Occupation background.
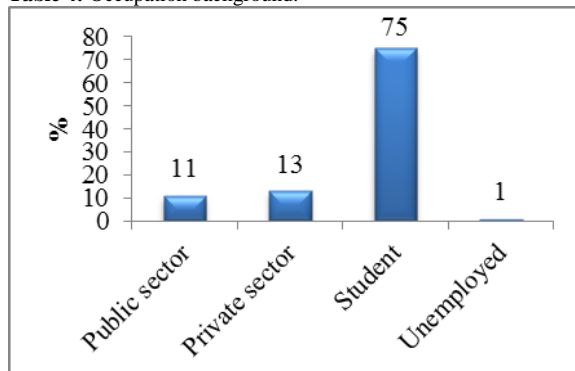
The frequency of broadband usage is measured using six measures: *more than once a day, about once a day, 2 or 3 times a week, about once a week, about once in 2 weeks, about once a month and less than once a month*. The study findings indicate that about three quarters of the respondents are frequent users (Table 5). It shows the broadband facility is not underutilised by people living nearby to the centre due to internet high usage. It is in line with the requirements of secondary school where the students are more engaging to internet resources for their homework, assignments or projects. Moreover, the facility of Internet has been increasingly used for educational course delivery (Sinha, 2004).

**Table 5:** Distribution of broadband usage, measured in frequency of use.
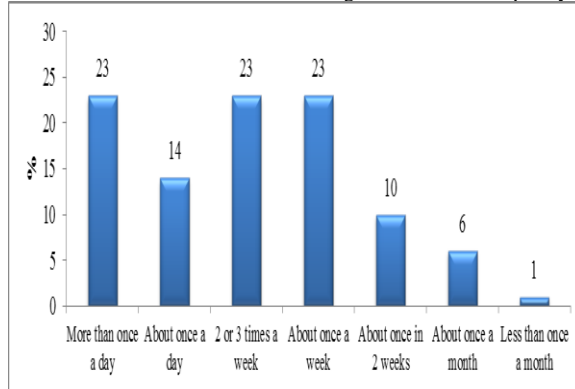


### Study variables:

Reliability test is used to test all the study variables designed in the questionnaires either. Most commonly used method to evaluate internal consistency (reliability of the measurement items) is Cronbach's Coefficient Alpha ($\alpha$) (Cronbach, 1951). According to Sekaran (2003), reliability refers to the extent to which a scale produces consistent result if measurements are made repeatedly. Table 6 shows the results of reliability analysis of the items measured in the questionnaire.

**Table 6:** Reliability analysis of the study measurement item.

| Measure | Cronbach's $\alpha$ | Number of items |
|---|---|---|
| Broadband usage | 0.807 | 3 |
| Facilitating factors | 0.810 | 6 |
| Economic factors | 0.880 | 6 |
| Awareness programme | 0.787 | 6 |
| Total question | | 21 |

According to Nunnaly (1978), $\alpha \geq 0.700$ is considered to be acceptable reliability coefficient. Table 6 indicates all of the study measures with $\alpha > 0.750$ thus all of the measures are reliable and acceptable.

### Broadband Usage:

Measurement of broadband usage consists of three items as shown in Table 7. The highest mean score is agreement on 1MIC's capability to close the digital usage gap between rural and urban areas with mean score of 3.45.

**Table 7:** Mean scores of broadband usage measurement items.

| Broadband Usage Measure | Mean | SD |
|---|---|---|
| I realize environment influenced the user's broadband usage | 3.25 | 0.744 |
| I agreed 1MIC will close the gap of digital usage between urban and rural area | 3.45 | 0.809 |
| I believe 1MIC have their objective and vision to increase the level of social life in the area | 3.25 | 0.796 |

### Facilitating Conditions:

Facilities and infrastructure conditions of 1MIC measure indicate that highest mean score of 3.79 refers to respondents' belief that 1MIC does have sufficient contents. The second highest is on the centre's regularity of operating time (mean = 3.79).

**Table 8:** Mean scores of Facilitating Conditions Measurement Items.

| Measurement Items | Mean | SD |
|---|---|---|
| 1MIC has provided many benefits to the communities | 3.32 | 0.920 |
| 1MIC has provided a sufficient services | 3.34 | 0.924 |
| 1MIC very neat and clean | 3.35 | 0.936 |
| 1MIC always provide the best facilities | 3.41 | 0.889 |

| | | |
|---|---|---|
| 1MIC always operate on time | **3.56** | 0.891 |
| 1MIC has sufficient content which I expect to find | **3.79** | 0.756 |

*Economic Influence:*

Response on the economic influence measure exhibits only one item with mean score > 3.50 i.e. the gap among users in terms of broadband usage could be influenced by economic factors.

**Table 9:** Mean scores of Economic Influence Measurement Items.

| Measurement Items | Mean | SD |
|---|---|---|
| The economic factor influence the broadband usage | 3.23 | 0.750 |
| The economic factor influence the user that using the broadband | 3.45 | 0.809 |
| The economic factor influence the gender of user | 3.23 | 0.777 |
| The economic factor influence the ownership of computer and laptop | 3.40 | 0.943 |
| The economic factor influence the gap among the user in term of broadband usage | **3.60** | 0.964 |
| The economic factor influence provides a digital divide among the rural and urban area | 3.36 | 0.718 |

*Awareness Programme:*

Findings of measurement items under the awareness program witness the highest mean scores, as compared to other items. Out of 6 items in this measurement, only one with mean < 3.50. The leading item is respondents' agreement on 1MIC achieving appropriate function and purpose with mean = 3.80.

**Table 10:** Mean scores of Awareness Programme Measurement Items.

| Measurement Items | Mean | SD |
|---|---|---|
| The awareness program enables user to increase their knowledge and skills | 3.42 | 0.878 |
| The awareness program improves user's study task performances | 3.58 | 0.901 |
| The awareness program has an appropriate function and purpose to be achieved | 3.80 | 0.765 |
| The awareness program has an appropriate methods and effects | 3.58 | 0.901 |
| The awareness program enhances user's effectiveness in the broadband usage | 3.58 | 0.901 |
| Overall, I find the awareness program very useful to me | 3.62 | 0.826 |

*Correlation analysis:*

A correlation analysis can be defined as analysis done to trace the mutual influence of variables on one another (Sekaran, 2003). A strength and direction of linear relationship between two variables can be in two forms, positive or negative relationship. The value of correlation coefficient, *r*, has the value such that $-1 \leq r \leq +1$ where it measure the magnitude and direction of a relationship (Salkind, 2003). The mathematical formula to calculate *r* (also known as Pearson product moment correlation coefficient) of variable *x* and *y* is given by:

$$r = \frac{n \sum xy - (\sum x)(\sum y)}{\sqrt{n(\sum x^2) - (\sum x)^2} \sqrt{n(\sum y^2) - (\sum y)^2}}$$

where *n* is the number of pairs of data. To interpret of relationship via correlation analysis, Cooper and Schindler's (2006) general guidelines are used. The following table depicts the guidelines.

**Table 11:** Guidelines of correlation measure.

| Correlation coefficient, *r* | Strength of relationship |
|---|---|
| 0 | No relationship |
| ± 0.01 – 0.30 | Weak, almost negligible relationship |
| ± 0.31-0.50 | Moderate; substantial relationship |
| ± 0.51-0.99 | Strong; marked relationship |
| 1.00 | Perfect relationship |

*Source: Cooper and Schindler (2006)*

Correlation results of the relationships between broadband usage and factors used in the study are as tabulated in Table 12.

**Table 12:** Correlation coefficient of broadband usage and study factors.

| Factors | *r* | *p-value* |
|---|---|---|
| Facilitating condition | 0.511 | 0.000* |
| Economic influence | 0.500 | 0.000* |
| Awareness program | 0.848 | 0.000* |

*\*p < 0.01*

Findings indicated by Table 12 are in favour only moderate positive linear relationships between broadband usage and facilitating condition, and economic influence. Nevertheless, a strong positive relationship is detected between broadband usage and awareness program factors. In addition, all results are significant at 1% of significant level. In correlational research, if a zero correlation exists, the credibility of the hypothesis weakens

(Cresswell, 2005). Since all of the three relationships are significant with $r \geq 0.500$ all of the hypotheses generated earlier are rejected, at 1% of significant level.

***Conclusion:***

A correlational study between broadband usage of 1MIC users in district of Bachok, Kelantan and factors of facilities, economic and awareness programme is presented. Findings indicated that the selected factors show statistically significant positive relationships. Moreover, awareness programme implemented by government indicates a strong significant positive relationship with broadband usage at the center. It shows the needs and positive impact of such initiatives in promoting the use of broadband internet among residents of rural areas such as at Melawi. Efforts and initiatives to improve broadband technology penetration at rural areas are worthwhile and cannot be sidelined. Likewise, through awareness programmes, residents of rural areas can be exposed to benefits of the technology, for education, work or business purposes. The broadband usage at 1MIC, if it is used properly, indeed can be benefitted for oneself in particular and for the society in general. The residents are envisaged to have high demand on internet resources to fit with the environmental factors in particular for education needs. Government initiatives should be carried on to close the internet diffusion gap between rural and urban areas, as well as to improve rural communities' internet and information literacy.

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