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URBAN-RURAL TECHNOLOGY GAP IN MALAYSIA: AN EXPLORATORY STUDY

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ABSTRACT

Information and Communications Technology (ICT) is considered as an important in agenda in the development of a country. Governments all over the world have invested huge amount of money in acquiring latest IT gadgets and infrastructure in order to equip their citizens with the right IT knowledge in order to create a knowledgeable society. Malaysian government has implemented Multimedia Super Corridor (MSC) in the year 1996 with the aim to develop Malaysia towards Vision 2020 i.e. Becoming a fully developed nation. In this regard, government and relevance agencies trying to educate Malaysians the importance of IT in their daily life in the context of education, working, social life and economy development. However, there is still a huge gap between the people who are IT savvy and with those who are not IT savvy; this gap is known as digital divide. The aim of this study is to look at the level of technology acceptance among urban and rural community of Malaysia. For this purpose, Sepang District, Selangor was selected as for urban area and Lundu District in Sarawak was selected for rural community. A total of 230 completed questionnaires were collected and the Statistical Package for the Social Science (SPSS) was used to analyze the data and to answer the research objectives. Overall findings of the studies show that both Sepang and Lundu are not backward in term of technology acceptance and in the comparison; people at Lundu have scored higher in terms of technology acceptance. Number of recommendations was proposed to relevant authorities in order to empower Malaysians to learn and accept IT as part of their daily life, thus preparing them towards becoming knowledgeable society.

Keywords: Acceptance, Information and Communications Technology (ICT), Rural, Urban

INTRODUCTION

In today's digital and network society, the quality of life often measured by technology used and its availability in the country [3, 7].Most governments have invested huge amount of money and time in ensuring that the people are educated and equipped with the necessary Information and Communications Technologies (ICT). Advancement ICT has demonstrated opportunities to the people to utilize it in their socio economic and cultural development in a better and more sophisticated way [18]. Moreover, ICT currently has been widely used in different parts of the world to bridge the gap between the rich and the poor and the urban and rural community in term of technology changes and development initiatives especially for the purpose of information seeking [11].

As technology infiltrates our society, more and more people are required to use some kind of technology in vocation or recreation. However, many people have experienced difficulty learning and adapting to the new technology. Some people adapt to the new technologies

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quickly, while others experience a greater sense of difficulty in learning, developing knowledge and skills, and ultimately adopting their use within their daily lives. As a result of this, the government realizes the importance in delivering services at the locations convenient to the citizens [18]. Therefore, it is the responsibility of the government in ensuring that the relevant technology reaches the people whether at urban or rural area to ensure they can accept and adapt the technology implemented and lead towards technology growth in the country.

In the context of Malaysia, the government's mission in striving to achieve Vision 2020 has prompted the government to place an importance on human resource development as a vehicle towards realizing the goals of the vision [15]. However, in the process, Malaysia is confronted with the challenges to narrow the digital divide between the urban "have" and the rural "have-nots" [15]. Malaysia is now at the mid-point in its journey towards Vision 2020 and is just go aboard upon the second 10 years phase plus the ICT has changed the speed and spread of transactions in Malaysia. There is a danger of the country possessing first-class infrastructure but third-class mentality [8]. Therefore, it is important for the Malaysians to move forward and strengthen the overall mind-set, culture, values and social institutions to be more in step with the country's economic development especially in term of technology so that our country will achieve the Vision 2020.

In the Ninth and Tenth Malaysian Plan (9MP; 10MP) [9, 10], ICT has becomes the key determinant in the development process to position Malaysia as a competitive knowledge-based economy. To realize this, efforts are being made to expand the information structure such as advanced multimedia application, local content development, greater e-commerce adoption, and improved information security [15].

The Malaysian Government's effort to develop ICT obviously can be seen through the idea of Multimedia Super Corridor Malaysia (MSC), which provides a modern and developed technology infrastructure [4]. Thus, this indicates that, Malaysia is now moving another step to place our country to the eyes of other developed country in technology phase along with infrastructure so the stated government vision can be attained.

In the era of modernization and globalization, the development of rural areas especially in making zero ICT illiteracy among the rural community must not be ignored. Congruent to this objective, numerous efforts have been initiated by the government (Bahaman et.al; 2010) by promoting the use of ICT in the rural areas through various programmes of community e-Centres and these experiences are considered among the good practices in the region [21].

Given the above scenario, the objective of this paper is to examine the level of technology acceptance among urban and rural Malaysians. And the sub-objectives are as follows:

- To determine the relationship between perceived usefulness and technology acceptance among urban and rural Malaysians.
- To identify the relationship between perceived ease of use and technology acceptance among urban and rural Malaysians.

The paper is organized as follows: Section one deals with literature review and other relevant information to the study. Section two deals with the methodology and research design used while section three will present the data analysis and the main findings of the study. Finally section four will deal with main discussions, recommendations and conclusions.

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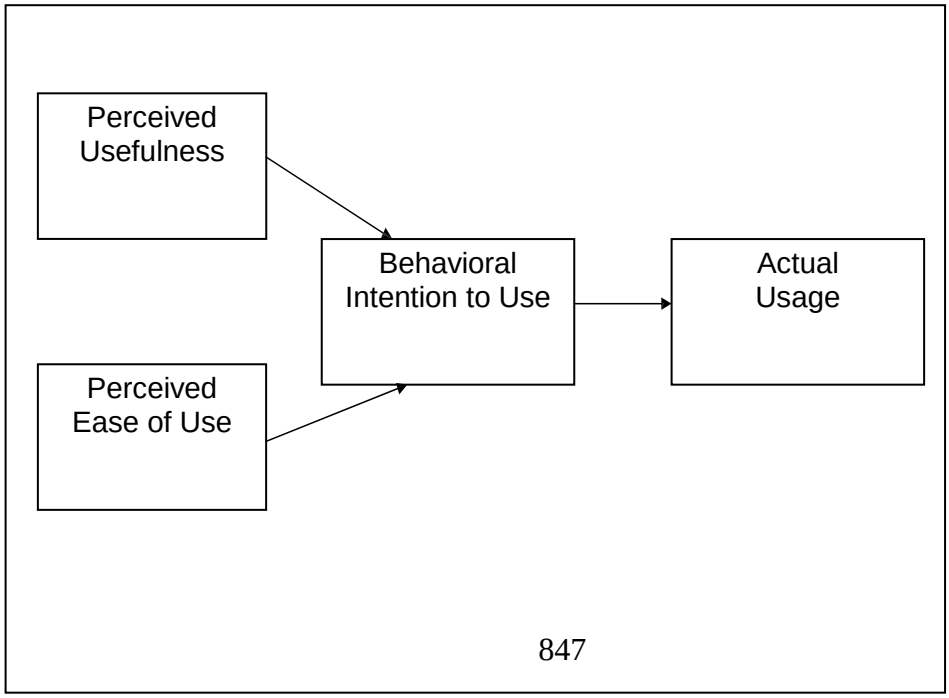
LITERATURE REVIEW

During the last two decades, technological progress has greatly accelerated with the spread of new technologies [14]. People have started using the technological tools and benefited greatly. As a result, both governments and the private sector organizations have embraced ICT to benefit the organization and the society at large. In today's increasingly global, digital, and networked economy, corporate spending and organizational dependence on information technology (IT) are mushrooming at unprecedented rates. In 1999, the IT budget of a single U.S. company, Federal Express, has been reported to be $1.4 billion [2]. When spending on information technologies by other firms is added to this figure and the scope is extended to firms across the globe, it is clear that IT represents a substantial investment for organizations of all varieties. This technology is being utilized to support diverse strategic and operational objectives ranging from enabling competitive strategy.

Attitude towards intention to use the information technology has four elements which are multidimensional, involving perceived usefulness, accessibility and quality [16]. In an attempt to understand determinants of information technology end-user's behaviors toward information technologies, various theoretical models have been developed (the theory of reasoned action, the technology acceptance model, the theory of planned behavior, the motivational model, self-efficacy theory and the big five). This study is based on the technology acceptance model (TAM) proposed by Davis (1989) [5] and which has been extended and applied to different information technologies, work environments, and end-users. Perceived usefulness and perceived ease of use are the two main indicators for technology acceptance as proposed by Davis in his model i.e. TAM (1989). Perceived usefulness is defined as the degree to which a person believes that using a particular system would enhance his or her job performance while perceived ease of use refers to the degree to which a person believes that using a particular system would be free of effort. Extensive research over the past decade provides evidence of the significant effect of perceived ease of use on usage intention, either directly or indirectly through its effect on perceived usefulness [1, 5, 6, and 22]. Figure 1 summarizes the model as proposed by Davis (1989) [5].

Figure 1: Technology Acceptance Model



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Technology Acceptance in Malaysia

Malaysian government has embarked in Vision 2020 i.e. developing the country to become a developed nation with ICT being a critical component to their growth. The government launched Multimedia Super Corridor (MSC Malaysia) in the year 1996 to realize this vision. The MSC is considered a long-term strategic initiative (1996-2020), which involves the partnership between the Government (as the chief architect of its vision) and the private sector (as the main drivers for its implementation). Besides offering the ICT initiatives, the corridor aims to attract the world's leading ICT companies to locate their multimedia industries, undertake R&D, develop new products and technologies and export from this corridor as their base. The corridor is also providing the ideal growth environment for the local entrepreneurs to transform themselves into world-class companies.

Number of ICT programs and activities has been implemented as part of the MSC Malaysia initiative to promote the awareness and importance of ICT for socio-economic developments among Malaysians. The advancement of ICT has promoted innovation, increased performance and productivity, improved quality of education and has enriched the quality of life for Malaysians [4, 17, 12, and 13]. However, the country is faced with digital divide issue i.e. the gap between people with effective access to the ICT and those with very little access of no access to ICT. This is contributed by many factors such as educational attainment, economic factors as well as the location. A number of studies in developed and developing countries indicate that there are considerable gaps in computer use and access between sub groups of the society. For example, a study by the National Telecommunication and Information Administration, U.S. Department of Commerce, reported that people who reside in rural areas and inner-city communities have less access to the Internet than households located in the more affluent metropolitan areas, senior rural citizens also recorded lowest rate in computer penetration compared to younger citizen [15].

Government has implemented many activities and programs to reduce the digital divide especially between urban and rural areas, with the involvement from Ministry of Rural and Regional Development cooperating with the Ministry of Science, Technology and Innovation and the national IT industry association on plans to establish more community personal computer centres in the country [8].

According to Multimedia Communications and Multimedia Commission Malaysia (MCMC 2009), urban users outnumber rural users six to one. This has been a feature of home Internet users since the first survey in 2005. This clearly indicates the existence of digital divide among the urban and rural Malaysians. There, concerted efforts are required to identify the reasons and propose an action plan to reduce and eventually eliminate this gap in order to achieve equal and fair ICT progress and development among Malaysians. There are some projects that the government has implemented to close the gap between the urban and rural areas and at the same time help to improve the technology at the rural areas and also encourage ICT use among citizens:

- **Gerakan Desa Wawasan**: this programme was launched in 1996. It's aimed is to increase the awareness among rural communities to participate actively by bringing about change and development to their areas. Under this programme, the Village Development and Security Committees were given computer facilities not only to assist in the management and administration of the villages but as an early step to introduce ICT at the village level. By the end of 2000, a total of 995 villages benefited from this programme [8].

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- **Internet Desa Programme**: This programme was launched in March 2000 at two pilot locations i.e. Sg. Ayer Tawar, Selangor and Kanowit, Sarawak. This programme involved the provision of ICT infrastructure at post offices and the launching of websites that provided information on government services, local events and activities as well as free electronic mail (email) and internet facilities. Students are the most user of technology. By the end of 2000, 12 such centers were implemented throughout the country [8].

- **E-Bario Project**: This programme was initiated by Universiti Malaysia Sarawak (UNIMAS) to promote ICT awareness and usage. Computers and Internet access were provided to schools to become community centers for the purpose of learning (Ministry of Education, 2005).It is a development project that utilizes computers, telephones, and VSATs to connect villagers in the remote village of Bario to the Internet. [19].

- **Smart Schools**: this school was introduced by the Government with the objective of producing a new generation of Malaysians who will be ICT literate, creative as well as innovative and able to leading the economy into the Information Age. The pilot project was implemented in 1999 and involved 90 schools (construction of 9 new schools, upgrading 81 existing schools). Schools were equipped and given with state-of-the-art multimedia equipment and also provided with comprehensive teaching-learning materials for four subjects i.e. Bahasa Malaysia, English, Science, and Mathematics. By having these materials, it is not only to enhance the network-based curricular but also enabled students with varying capabilities to progress at their own pace. The Smart School Management System allow school administrators to efficiently and effectively manage resources and processes required to support the teaching and learning functions of these schools [8].

- **The Mobile Internet Unit:** In the state of Selangor, with a US$75, 000 grant from UNDP and donations from DRB-Hicom, MIMOS and Hup Lee Coach builders Sdn. Bhd, the Mobile Internet Unit was launched in 2004. The purpose is to address the digital divide that is show in the Malaysian educational system. The project consisted of three buses equipped with 20 PCs with visits made to 20 schools that were without computer facilities in central Selangor. While two smaller ones, with 12 computers each had visited 20 schools in the capital. Then it is reported that 2,400 students and 400 teachers have benefited and gain knowledge from this programme [8].

- **1 Malaysia Laptop**: The Government allocated a total of 1.2 million laptop computers for free to low-income people and students if they subscribe to broadband service package with Telekom Malaysia Berhad which aims to expand the penetration of broadband access to the public [8].

METHODOLOGY

The study employed a cross-sectional survey in which data were collected over a given period of time from both urban and rural respondents. The questionnaire was distributed to examine the factors that affect technology acceptance among urban and rural Malaysians. Since the objectives require the relationship between the variable to be established, data collection at one point in time was sufficient [20]. The data collected was analyzed using SPSS for both

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descriptive and inferential analysis.

The sampling unit is the element or set of elements that is available for selection in some stage of the sampling process [20]. The sample units in this study were taken from the community in urban area at Sepang, Selangor and rural area at Lundu, Sarawak. To acquire the representative of citizens, a sample size of 230 respondents were selected and questionnaires had been distributed in the following way so as to have a reasonable coverage.

- 115 sets of questionnaires were distributed randomly to urban area people at Sepang, Selangor.
- 115 sets of questionnaires were distributed randomly to rural area people at Lundu, Sarawak.

Responses were captured using the five-point Likert Scale measurement i.e.:

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agre

Table 1: Summary of the Measurement Instruments

Objectives	Concepts/Constructs	Measurement
• To determine the relationship between perceived usefulness and technology acceptance among Sepang as urban and Lundu as rural Malaysians.	The respondents determine their views on benefit of the technology and their acceptance towards the technology and respondent evaluated how technology affects their job performance or daily life.	The perceived usefulness measured by using the 5 point Likert Scale.
• To identify the relationship between perceived ease of use and technology acceptance among urban and rural Malaysians.	The respondent's perception on technology whether the technology is easy to be use and their evaluation towards the use of technology and their	The perceived ease of use measured by using the 5 point Likert Scale
• Technology Acceptance	The respondents overall perception on their acceptance of technology and their view on how their acceptance of the technology.	The overall perception on technology acceptance measured by using the 5 point Likert Scale

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DATA ANALYSIS & FINDINGS

The study involved a total of 230 respondents covering both the urban and rural areas. Table 2 summarizes the results for reliability test. Overall the reliability scores indicates moderate to high consistency.

Table 2: Reliability Test

No	Items/ Descriptions	N of Items	Cronbach's Alpha Value
1	Perceived Usefulness	10	0.974
2	Perceived Ease of Use	10	0.888
3	Technology Acceptance	10	0.606
TOTAL		**30**	**0.947**

Table 3 summarizes the demographic profile of the respondents surveyed. There was almost equal distribution of questionnaires in terms of gender for both locations with average percentage of 60 percent male and female respondents. Majority of respondents are Malays (80 percent) while others are Chinese and Indians. In terms of education attainment, most of the respondents in Lundu (80 percent) have completed on secondary education while in Sepang they have completed at least up to Diploma level. Majority of the respondents are in range of 20- 35 years old in both locations as this is the group who uses technology in their daily life.

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Table 3: Demographic Profile of Respondents

Descriptions	Sepang (Urban)		Lundu (Rural)	
	Frequency	**Percent**	**Frequency**	**Percent**
Gender:				
Male	77	67	55	47.8
Female	38	33	60	52.2
TOTAL	**115**	**100**	**115**	**100**
Race:				
Malay	82	71.3	92	80
Chinese	16	13.9	9	7.8
Indian	14	12.2	2	1.7
Others	3	2.6	12	10.4
TOTAL	**115**	**100**	**115**	100
Education Attainment:				
PMR& SPM	55	47.9	91	79.1
Diploma	27	35.7	14	12.2
Degree	30	26.1	5	4.3
Others	3	2.6	5	4.3
TOTAL	**115**	**100**	**115**	**100**
Age Distribution:				
Below 25 years old	58	50.5	53	46.1
26-35 years old	32	27.8	28	24.3
Above 36 years	25	21.7	34	27.5
TOTAL	**115**	**100**	**115**	**100**

Table 4 indicates the level of technology access in both areas. Most of the respondents in Lundu area have started using technology much later compared with respondents from Sepang area. The findings show that most of them have their own computers as well as access to internet either at home or office.

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Table 4: Level of Technology Access

Descriptions	Sepang (Urban)		Lundu (Rural)	
	Frequency	**Percent**	**Frequency**	**Percent**
Q- When do you start using Computer (PC)?				
Between 1980-1990	6	5.2	1	0.9
Between 1991- 2000	75	65.2	28	24.3
After 2001	34	29.6	86	74.8
TOTAL	**115**	**100**	**115**	**100**
Q- Do you have your own PC/ laptop?				
Yes	103	89.6	85	73.9
No	12	10.4	30	26.1
TOTAL	**115**	**100**	**115**	**100**
Q- Do you have Internet access at your Office or Home?				
Yes	103	89.6	77	67
No	12	10.4	38	33
TOTAL	**115**	**100**	**115**	**100**
Q- On Average how many hours do you use Internet a day?				
Less than 5 Hours	65	56.5	90	78.3
Between 6-10 Hours	38	33	17	14.8
Between 11-15 Hours	6	5.2	8	7
More than 16 Hours	6	5.2	-	-
TOTAL	**115**	**100**	**115**	**100**

Table 5 summarizes the result for perceived usefulness. Overall the result shows a positive and high mean scores (average above 4) for all the items. This indicates that the respondents from both the areas are positive about technology usage and perceived that it enhances their performance. This is a good indicator that government's effort in promoting ICT is worth the investment. However, the scores are higher for Sepang compared to Lundu especially for efficiency that technology creates in their jobs, improvement in productivity and effort taken to learn and use ICT related matters.

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Table 5: Mean and Std. Dev. for Perceived Usefulness

No	Descriptions	Sepang (Urban) N= 115		Lundu (Rural) N=115	
		Mean	Std. Dev.	Mean	Std. Dev.
1	Technology makes me more efficient in my job	4.25	0.782	3.87	0.941
2	Using IT improves my ability to make good decision	3.97	0.847	3.71	0.953
3	Using IT applications increases the speed at which I make decision	3.87	0.932	3.68	1.013
4	Using IT applications make me understand better my job thru the information available	4.27	0.776	3.90	0.959
5	Using IT applications help me to accomplish task quickly	4.14	0.815	3.75	0.981
6	Using IT applications helps in increasing my productivity and performance	4.11	0.835	3.64	0.957
7	Using IT applications increases my effectiveness on the job	3.97	0.843	3.59	0.963
8	Using IT applications helps me in predicting root problems	3.62	0.960	3.54	1.062
9	Using IT applications helps in my social networking	4.17	0.891	3.94	0.920
10	Using IT applications makes my life easier	4.23	0.765	3.75	0.926

The result for perceived ease of use is tabulated in Table 6 and it shows that majority of the respondents agreed that using technology requires less effort but produces better results. As mentioned earlier, the scores are higher for Sepang compared to Lundu.

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Table 6: Mean and Std. Dev. for Perceived Ease of Use

No	Descriptions	Sepang (Urban) N= 115		Lundu (Rural) N=115	
		Mean	Std. Dev.	Mean	Std. Dev.
1	Using technology would be easier for me	4.33	0.734	3.84	0.914
2	IT takes the complexity out of my job	3.89	0.980	3.66	0.926
3	Learning to use IT makes my work easier	4.08	0.715	3.81	0.907
4	Learning to use IT is so complicated and difficult	2.66	1.256	2.72	1.267
5	I would find it easy to become skilful at navigating the webpages	3.93	0.896	3.80	0.938
6	It is impossible to use IT in my job without help	3.24	1.105	3.29	1.024
7	IT makes my communication with others easier	4.28	0.843	4.04	0.912
8	I understand IT applications	4.04	0.742	3.67	0.925
9	IT applications makes me easy to operate my work functions	4.05	0.686	3.62	0.951
10	I do not need to take much effort to learn and understand IT	3.54	1.095	3.28	1.089

Table 7 summarizes the overall level of technology acceptance by the residents in Sepang and Lundu. As shown in the table, respondents have high perception and experience in accepting and using the technology. Then mean scores are higher for all the items for both the areas.

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Table 7: Mean and Std. Dev. for Technology Acceptance

No	Descriptions	Sepang (Urban) N= 115		Lundu (Rural) N=115	
		Mean	Std. Dev.	Mean	Std. Dev.
1	Other people come to me for advice on new technologies	3.27	0.921	3.27	0.841
2	In general, I am among the first one in my circle of friends to acquire new technology	2.77	1.093	2.90	1.026
3	I can usually figure out new high-tech products without help from others	3.11	1.007	3.27	0.882
4	I keep up with the latest technological development in the area of interest	3.30	1.059	3.60	0.972
5	I spend a lot of money to purchase new technology	2.90	1.076	2.97	1.131
6	I use technology because my friends ask me to do so	2.56	1.156	2.62	1.144
7	Sometimes, I think technology systems are not meant for ordinary people	2.46	1.134	2.72	1.128
8	I am always worried that information sent over the Internet will be abused by others	3.38	1.128	3.46	0.967
9	Technology is not safe to use especially in terms of financial transactions	3.22	1.066	3.25	0.907

Correlation analysis between perceived usefulness and technology acceptance is shown in Table 8 where there is significant positive moderate relationship between these variables. However, the scores were higher for Lundu in comparison with Sepang (Lundu- r= 0.508, p= 0.00; Sepang - r= 0.329, p= 0.00).

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Table 8: Correlations between Perceived Usefulness with Technology Acceptance

Descriptions	Sepang (Urban) N= 115		Lundu (Rural) N=115	
	Perceived Usefulness	Technology Acceptance	Perceived Usefulness	Technology Acceptance
Perceived Usefulness Pearson Correlation Significance (1-tailed)	1	0.329** 0.000	1	0.508** 0.000
Technology Acceptance Pearson Correlation Significance (1-tailed)	0.329** 0.000	1	0.508**	1

**Correlation is significant at the 0.01 level (1-tailed).

Table 9 indicates the correlation result for perceived ease of use and technology acceptance among the respondents form both Sepang and Lundu. The result is similar to the perceived usefulness where in both areas; there is significant positive moderate relationship between these variables. Lundu scored higher r value compared to Sepang (Lundu – r = 0.637, p=0.00; Sepang- r= 0.469, p= 0.00).

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Table 9: Correlations between Perceived Ease of Use with Technology Acceptance

Descriptions	Sepang (Urban) N= 115		Lundu (Rural) N=115	
	Perceived Ease of Use	Technology Acceptance	Perceived Ease of Use	Technology Acceptance
Perceived Ease of Use Pearson Correlation Significance (1-tailed)	1	0.469** 0.000	1	0.637** 0.000
Technology Acceptance Pearson Correlation Significance (1-tailed)	0.469** 0.000	1	0.637**	1

**. Correlation is significant at the 0.01 level (1-tailed).

DISCUSSION & CONCLUSION

Overall, the study showed that people in both areas i.e. Sepang and Lundu have accepted the technology and understand the importance of it ion improving their socio-economic status. All the important variables for technology acceptance i.e. perceived usefulness and perceived ease of use as well as technology access have recorded high mean values. In addition, the is a positive correlation between their level of technology acceptance with perceived usefulness and perceived ease of use. However, as the results indicated, respondents in Lundu though have lower mean value for technology access compared with Sepang, but they have scored higher in terms of the correlations value.

Based on the results obtained, respondents in both areas have indicated somehow positive attitude towards technology acceptance and this echoes government's effort in providing the right incentives and infrastructure. However, more need to be done in educating them on the advantages of technology and ICT as well as provide the right tools, techniques and incentives to further improve the level of technology adoption and usage.

Government agencies especially the local governments in both areas should be strategically proactive in promoting ICT among their residents. They can organize ICT related events like ICT awareness campaigns, ICT workshops/clinics, ICT related programs at local schools and colleges etc. Events like this will provide an opportunity for the locals to know more about technology and eventually become users. In addition, government intervention can save a lot more money for the locals who face financial constraints in acquiring ICT.

Private sector organizations should also play their roles in promoting the usage of technology as part of their Corporate Social Responsibility projects. They can set up and sponsor local IT centres which can be used as the training centre for the locals to learn more about IT related matters. This is complement government's initiatives and as a result can yield

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better results in empowering the locals becoming more IT savvy community.

In short, Malaysians either form urban or rural need to be IT savvy in order to achieve a better socio-economic development since the government is pushing the agenda of Vision 2020 i.e. making Malaysians a knowledgeable society. There is a pressing need for Malaysians to be more proactive in adopting and using technology as part of their lives in order to enjoy the development of the country. Support and strong partnerships between the relevant partners' i.e. federal and local government agencies, private organizations and residents are required to achieve the goal of making Malaysians IT savvy community in the near future.

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