The Roles of Community Based Telecenters in Bridging the Digital Divide in Rural Malaysia

Zulkefli bin Ibrahim, Ainin Sulaiman, and Tengku M. Faziharudean

Abstract—Malaysia is aggressive in promoting the usage of ICT to its mass population through the support by the government policies and programs targeting the general population. However, with the uneven distribution of the basic telecommunication infrastructure between the urban and rural area, cost for being "interconnected" that is considered high among the poorer rural population and the lack of local contents that suit the rural population needs or lifestyles, it is still a challenge for Malaysia to achieve its Vision 2020 Agenda moving the nation towards an information society by the year 2020. Among the existing programs that have been carried out by the government to encourage the usage of ICT by the rural population is "Kedaikom", a community telecenter with the general aim is to engage the community to get exposed and to use the ICT, encouraging the diffusion of the ICT technology to the rural population. The research investigated by using a questionnaire survey of how Kedaikom, as a community telecenter could play a role in encouraging the rural or underserved community to use the ICT. The result from the survey has proven that the community telecenter could bridge the digital divide between the underserved rural population and the well-accessed urban population in Malaysia. More of the rural population, especially from the younger generation and those with higher educational background are using the community telecenter to be connected to the ICT.

Keywords—Digital divide, ICT, telecenters.

I. INTRODUCTION

MALAYSIA is among the most aggressive developing countries in the world that promotes the usage of ICT to its population through the support by the government policies and programs targeting its mass population. Asian-Pacific Economic Cooperation study shows that Malaysia's e-readiness level is relatively high compared to other ASEAN countries [57]. All these supports is perceived to pay off, as by the year 2007, the penetration rate for the population with Internet dial-up connection is 14.3% as compared to only a mere 7.1% in 2000 [32]. Meanwhile, the penetration rate for broadband connection has jumped from only 0.08% in the year 2002 (when the service was introduced in Malaysia) to 5.0% in 2007 [32]. The growth in the broadband connection

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penetration rate among Malaysian is very important, as most of the "meaningful" used of ICT applications could be accessed only by having the broadband Internet connection [42].

However, with the uneven distribution of the basic "infostructure" (such fixed telephony line or Internet connection) between the urban and rural area, the cost to be connected to the Internet that is still considered to be high by its rural population, as had been reflected by their low "Willingness-to-Pay" [55]; and the lack of local contents that suit their needs, it is still a challenge for Malaysia to achieve its Vision 2020 Agenda moving the nation towards an information society by the year 2020, unless the rural populations get involved and participating actively in using the ICT. It is also expected that the gap of digital divide that exist between the urban and rural population of Malaysia will get wider without government, private sectors and the community itself intervenes with programs that will encourage the usage of ICT, specifically Internet to the rural population.

Among the existing programs that have been carried out by the government to encourage the usage of ICT by the rural population include "InfoDesa" and "Kedaikom", with the general aim is to engage the community to get exposed and to use the ICT, encouraging the diffusion of the ICT technology to the rural population or the underserved community.

This paper is to investigate by using a questionnaire survey of how "Kedaikom", as a community telecenter could play a role in encouraging the rural or underserved community to use the ICT. The result from the survey will be able to provide a guideline on how the public sector involvement could significantly contribute in narrowing the digital divide between the underserved rural population and the well-accessed urban population in Malaysia.

II. LITERATURE REVIEW AND RESEARCH MOTIVATION

From the access perspectives, the digital divide is defined as the divide between those with access and benefit from new technologies and those without, or the digital 'haves' and "have not" [42], [46]. It is also defined as the gap in technological ownership and access between those who are affluent and those who are poor or live in rural areas with limited access to the Internet [6], [31]. In narrowing the digital divide, government should play important role to encourage the usage of ICT by its citizen and to focus on applying technology to achieve genuine development outcomes; and

improvements in the well-being of the underserved community [39]. Technology is perceived to be a powerful tool that can build a community. Therefore, such change requires a rigorous new focus on outcomes along with investment.

It is suggested by the Morino Institute [39] for the country to focus on both, narrowing social divides and the digital divides.

Malaysian government has many committed policies and programs in achieving its Vision 2020 National ICT Agenda for Malaysia to become a fully developed nation with a value-based knowledge society by the year 2020. The widely used of ICT applications in its citizen day-to-day life is seen as the means to achieve developed country status. Malaysia, like many other developing countries, is struggling with the challenges of ICT. New agencies have been created to speed the implementation of ICTs to address the digital divide issues that are able to pursue independent agendas or force the pace of adoption of ICTs [56].

What remains the biggest challenge for Malaysia to achieve its goal as a knowledge based society is the fact that more than 40% of its population still live in rural area, lacking in basic infostructure. Policies and programmes to bridge the digital divide will remain hype if it is not reflected in the programmes' actual implementation by the authorities. The ICTs development should be capable of uplifting the general well-being and regenerating the socio-economy of the underserved communities through the deployment of ICTs and social capital initiatives. A telecenter is one of the most cost effective programs that could encourage the diffusion of the ICT to the mass population, especially the rural population. It is cost effective, with external agents maintaining resources, knowledgeable staff member providing technical support and training, social ambience that is conducive and providing free or subsidized or flexible access [2], [52], [53].

KedaiKom is one of the government programs designed to encourage the underserved population, specifically the rural population to use ICT in their daily life. As a telecenter, its objective is to build capacity; to introduce and to encourage the usage of ICT; and to create community communication equipped with a range of ICT services to facilitate Internet access, e-commerce and e-learning. It will focus in the areas with an active community base but lack of good infostructure and with the village or local area economic activities that can benefit from this access. Every KedaiKom will be provided with hardware by the MCMC as a one-off allocation with a minimum of five computers, a printer and its relevant peripherals. The facilities include satellite access solutions that provide two payphone services and broadband internet access with a dedicated 128kbp for downloading and 64kps for uploading. Internet connection will be supplied by an ISP and the monthly access fee of RM 400 per site is paid by MCMC. The operation hour for the telecenter is from 8.00 am to 6.00 pm on weekdays and will be extended to 10.00 pm on weekends and public holidays. The operators will manage KedaiKom as their own business. The management team consists of a minimum of two personnel; a manager and an assistant manager. Training and courses are provided in the areas of usage of the Internet as a medium of communication for the target groups including KedaiKom operators, local leaders, teachers, students, youth and women. Among the classes offered is basic competency in the use of personal computer, maintenance and Internet awareness programs. There are 58 KedaiKom projects that were implemented by June 2005, and 55 of the sites were in the State of Perak.

As the implementation of the telecenters requires a significant amount of investments, either in term of cost and expenditure or human capital that capable of sustaining its operation, if there is no encouragement or positive result from the program, it is better off for the public policy and program to give a chance to the natural diffusion of technology theory for the adopters among the mass public to take place. Therefore, this research is motivated in investigating if the KedaiKom (representing a community telecenter with the backing of the government agency) could become a venue for the rural population to get access to the ICT. It is important to investigate whether a public policy and programs initiated by the government based on community enhancement could have a significant effect in encouraging the mass public to use the ICT.

III. RESEARCH METHODOLOGY

The research is primarily based on quantitative approach using survey methodology. The research framework is designed to explore and investigate how the community access to ICT would influence the digital inclusion. The role of telecenter as a medium that has capacity to build, decrease, or supplement the community development outcomes, specifically in diffusion of ICT is to be examined by the survey. The extent to which the KedaiKom implementation objectives have been fulfilled has been examined and explored through the analysis of KedaiKom beneficiaries, community technical access, and community social access relating to community technology that leads to narrowing of the digital divide:

(1) To what extent does the demographic factor influence the personalities of KedaiKom users?
(2) Is the underserved community ready to adopt ICT in their everyday life?
(3) What is the objective of using KedaiKom?
(4) Are the beneficiaries satisfied with the facilities and services provided by the KedaiKom?

Therefore, the research questions and the development of hypotheses that are corresponding to the research objective in narrowing the digital divide are as the following:-

Research Question 1
To what extent does the demographic factor influences the personalities of KedaiKom users?
Research Hypothesis 1
H0: The demographic factor influences the

KedaiKom beneficiaries to be active users.
H1: The demographic factor not influences the KedaiKom beneficiaries to be active users

Research Question 2
Is the underserved community ready to adopt ICT in their everyday life?
Research Hypothesis 2
H0: The ICT awareness among community members will influence their ability to adopt ICT in their everyday life.
H1: The ICT awareness among community members will not influence their ability to adopt ICT in their everyday life.

Research Question 3
What is the objective of using KedaiKom?
Research Hypothesis 3
H0: The effective and positive usage of the KedaiKom users will influence their ability to achieve desirable digital inclusion from their KedaiKom.
H1: The effective and positive usage of the KedaiKom users will not influence their ability achieve desirable digital inclusion from their KedaiKom.

Research Question 4
Are the beneficiaries satisfied with the facilities and services provided by KedaiKom?
Research Hypothesis 4
H0: The satisfaction among KedaiKom users will influence their ability to achieve desirable development outcomes from their KedaiKom.
H1: The satisfaction among KedaiKom users will not influence their ability to achieve desirable development outcomes from their KedaiKom.

A. Data Collection
Primary data is collected through the questionnaire that is distributed throughout the KedaiKom premises in the State of Perak.

B. Data Sampling
(a) Research Setting and Sample Frame
This research focuses on the KedaiKom located in the underserved communities in the rural areas, located in the state of Perak that comprises of 55 locations or communities. The State of Perak also represents 94.8% of the grand total of 58 nationwide KedaiKom that is operated throughout Malaysia. Perak also is chosen for the study because the role by government agencies, either at state or federal level that have programs to increase the communities to get wired, by establishing community telecenters, equipped with up-to-date peripherals and connected to the Internet through broadband.

These communities, at the forefront of the ICT for development revolution, are the bases for much of the present study fieldwork.
(b) Sample Element and Sample Size
The sample element is a KedaiKom user aged above 15 years old. The cut off point of the user's age was decided because it is found from the pre-test that users below 15 years old experienced the difficulty to answer questions relating to social capital. With an average of 10 to 20 respondents to each KedaiKom, 600 questionnaires were distributed to 55 KedaiKom users. The location of KedaiKom were distinguished into three zones, the classification of districts according to regions; (1) Zone One, the north region; (2) Zone Two, the south region; and (3) Zone Three, the central region.
(c) Sampling Design
For time and cost constraints, this study used nonprobability sampling. The design used was convenience sampling, the collection of information from the KedaiKom users of the underserved community who are conveniently available to answer the questionnaire [33], [51], [61].

C. Questionnaire Design
In phrasing the questions, this self administered questionnaire used included both fixed-choice and open-ended questions. The format of fixed-choice questions included the 'fixed-alternative question'; a question where the respondent is given specific alternative responses, and asked to choose the nearest to the respondent viewpoint; the 'simple-dichotomy question'; a fixed-alternative question which requires the respondent to choose one or two alternatives, and the 'determinant-choice question'; a type of fixed-alternative question that requires respondents to choose only one response from among several alternatives.

The questionnaire was divided into three parts: first, community technology which consists of ICT and barriers to technology integration in local development awareness; community technical and social access to KedaiKom; and user's satisfaction levels.

(a) Questionnaire Distribution and Data Collection Timeframe:
A total of 600 questionnaires were distributed to 27 KedaiKom users in the state of Perak and 360 (60%) of them were returned (Table I (A) & (B)). Although there are 55 KedaiKom in the state of Perak, the questionnaires were distributed to only 27 (49.1%) KedaiKom from the 39 (70.91%) visited. However, about 25 (95.7%) of the participating KedaiKom returned the distributed questionnaires. The other two KedaiKoms did not return the questionnaires even though they had been approached twice and the operators provided money to return the questionnaires through courier service.

TABLE I (A)
QUESTIONNAIRE DISTRIBUTION TO KEDAIKOM USERS IN STATE OF PERAK

KedaiKom			Site Surveyed			
Zone	District	No	Site Visited	%	Site Survey	%
One	Kerian	6	4	66.67	3	50.00
	Larut, Matang & Selama	8	7	87.50	4	50.00
	Hulu Perak	5	4	80.00	5*	60.00
Zone One Total		19	15	78.95	10	52.63
Two	Batang Padang	8	5	62.50	3	37.50
	Hilir Perak	7	6	85.71	4	57.14
	Manjung	5	5	100.00	3	60.00
Zone Two Total		20	16	80.00	10	50.00
Three	Kinta	5	3	60.00	3*	60.00
	Kuala Kangsar	6	3	50.00	3	50.00
	Perak Tengah	5	2	40.00	1	20.00
Zone Three Total		16	8	50.00	7	43.75
Grand Total		55	39**	70.91	27	49.09

TABLE I (B)
QUESTIONNAIRE DISTRIBUTION TO KEDAIKOM USERS IN STATE OF PERAK

KedaiKom			Site Surveyed		
Zone	District	No	Questionnaire Distribution		
			Distributed	Returned	%
One	Kerian	6	60	36	60.00
	Larut, Matang & Selama	8	105	81	77.14
	Hulu Perak	5	60	18	30.00
Zone One Total		19	225	135	60.00
Two	Batang Padang	8	85	60	70.59
	Hilir Perak	7	90	45	50.00
	Manjung	5	60	25	41.67
Zone Two Total		20	235	130	55.32
Three	Kinta	5	60	15	25.00
	Kuala Kangsar	6	60	33	55.00
	Perak Tengah	5	20	13	65.00
Zone Three Total		16	140	61	43.57
Grand Total		55	600	326	54.33

Note:
*1 site each in district of Hulu Perak and Kinta did not return questionnaires
*12 sites were closed at the time of visit or they did not operate regularly
*16 sites were omitted from the sample

The other 12 KedaiKom although have been visited for a few times, however failed to distribute any of the questionnaire for the reasons that either they were closed at the time of visit or they did not operate regularly. The remaining 16 (29.09%) KedaiKom were omitted from the sample because they did not operating anymore as mentioned by other KedaiKom operators (i.e. Kampung Bandar Lama, Kampung Ekor Bota, and Kampung Kota Pagar in district of Perak Tengah; Kampung Kota in district of Hilir Perak; and Kampung Senggang in district of Kuala Kangsar) or some of the KedaiKom were located in town area (i.e. Kampung Pengkalan Hulu) or located in more developed district (i.e. Kampung Manjoi and Kampung Batu 8 in district of Ipoh). The other reason is the background of the surveyed area which sharing similar characteristics (i.e. KedaiKom located in land settlement areas that include Felda Trolak Utara, Felda Sungai Behrang, Felda Sungai Sekiah in district of Batang Padang; and Felda Ijok in district Larut Matang and Selama – two of the such KedaiKom have been included in the survey which are Felda Gunung Besout in district of Batang Padang; and Kampung Ulu Mengkuang in district of Larut, Matang and Selama). Beside the above reasons, the other important reason for omitting certain KedaiKom from the sample including the distance, time, and cost constraints (i.e. Kampung Lempur Hilir and Kampung Sayung Hulu in district of Kuala Kangsar; and Kampung Parit Haji Hussin and Kampung Semanggol in district of Kerian. The average distance between each KedaiKom is about 50 kilometres and to cover all the KedaiKoms would be very costly.

In order for the survey to be more reliable; at least 50% of the KedaiKom in each district were surveyed. Among the nine districts, only Batang Padang and Perak Tengah accounted for less than 50% of the KedaiKom that were included in the survey. In fact, the total of KedaiKom visited in the Batang Padang district was five (62.5%); however two of them were closed both times attempted in the end of May and in the early of June, 2006. The scenario was different in the district of Perak Tengah where three (60.0%) of the five KedaiKom in that district were not operating anymore, and the other one was closed during two visits. From the total of 360 returned questionnaires, 326 (90.6%) were useable for analysis.

The data collection was carried out in two months period starting in May and ended in July 2005.

(b) Statistical Data Analysis

The Statistical Program for Social Science (SPSS) Version 12 will be used to analyse the data collected through the questionnaire technique, and the SPSS analysis applications that will be used for this study is a descriptive analysis that includes: (1) *"frequency analysis";* used to analyze and present the demographic profile of the studied community; (2) *"cross tabulation";* used to explore dominant distribution between demographic criterions and independent variables; and (3) *"correlation analysis";* employed to explain the association between the independent and dependent variables. In addition, the multivariate analyses that include *"Exploratory Factor Analysis,"* *"Stepwise Multiple Regression"*, and *"Cumulative Factor Score Index"* will be used to explore and examine the relationships between independent and dependent variables.

IV. DATA ANALYSIS AND FINDINGS

Based on the questionnaires that have been distributed at the various sites of the Kedaikom in the State of Perak, the findings are described in the following sections:-

(a) Beneficiaries of KedaiKom Project

Based on actual responses, Table II indicates that largely the respondents or users agreed that the main places for them to use a computer or the Internet is at KedaiKom (79.1%) compared to cyber cafés (65.6%), workplaces (60.7%) and at home (46.6%). The high level of user agreement in using KedaiKom was confirmed by the higher percentage of users who agreed that the implementation of KedaiKom in the local community was good (89.9%) rather than 2.7%, who disagreed (Fig. 1).

TABLE II
PLACE OF USE FOR THE COMPUTER AND INTERNET

No.	Variable	Percentage Level of Agreement		
		Agree *	Neutral	Disagree **
1.	You frequently use the computer at home	46.6	17.8	35.6
2.	You frequently use the computer at your work place	60.7	12.9	26.4
3.	You frequently use the computer at a cyber café	65.6	12.3	22.1
4.	You frequently use the computer at a community telecenter	79.1	9.2	11.7

n = 326 (based on actual responses)
*   Agree includes scales of agree, strongly agree and extremely agree
**   Disagree includes scales of disagree, strongly disagree, and extremely disagree
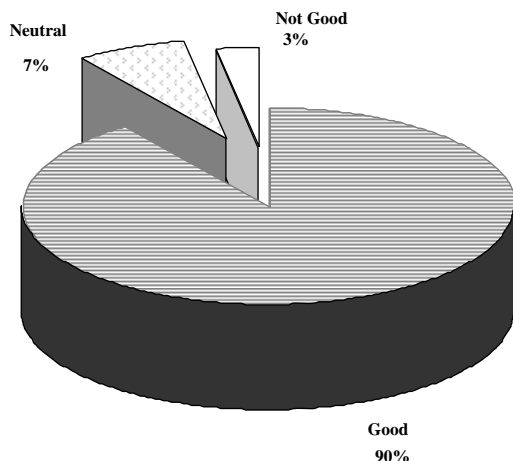
Beneficiaries Attributes

One way of evaluating and examining whether KedaiKom has fulfilled its objectives in terms of digital inclusion, was to identify the beneficiaries or users' personality. KedaiKom users were asked a series of questions relating to their demographic characteristics, frequency of visiting KedaiKom, time taken per typical visit, and experience with computers. The gender proportion seemed to be balanced, where female beneficiaries or users outnumbered the male by only 2.5%, and accounted for 52.5% of the total (Table III). Single users comprised 88.7% of total users, outnumbering the married and divorced users which consisted of 10.4% and 0.9% respectively. The marital status proportion dominance by the single seemed to match the percentage of an age group of less than 25 years (83.1%). The result suggests that most of the users are single and students, either in secondary schools, colleges or universities. The pattern was revealed by the users' education level where 67.8% of the users have secondary school level of education compared to tertiary education 25.1% (Polytechnics, colleges and universities).

The socio-economic pattern of the users illustrates that most of them belong to poor and low-income groups, were either unemployed or self employed, and a majority of the users were Malays. The study results disclose that 91.4% of the users have a family monthly income of less than RM 2,000, where 66% of them have a family monthly income of less than RM 1,000; lived in their family home (78.5%); and 99.1% were of the Malay ethnicity (as measured by the mother tongue) (Table IV). In terms of occupation, the majority were students (56.1%), while the others were self employed (12.9%), unemployed (12.3%), government employees (4.3%) and private sector employees (9.8%). Hence, the dependence group that includes students and unemployed comprised 68.4% of the total beneficiaries.

n = 326 (based on actual responses)
*   Good includes scales of fairly good, very good and extremely good
** Not good includes scales of not very good, not good at all, and extremely bad

Fig. 1 Users Opinion about the Implementation of KedaiKom

TABLE III
KEDAIKOM USERS ATTRIBUTES: GENDER, MARITAL STATUS, AGE AND EDUCATION

Attribute	Item	Freq	%	Cum %
Gender	Female	171	52.5	52.5
	Male	155	47.5	100
	Total	326	100.0	
Marital Status	Single	289	88.7	88.7
	Married	34	10.4	99.1
	Divorcee	3	0.9	100
	Total	326	100.0	
Gender	Female	171	52.5	52.5
	Male	155	47.5	100
	Total	326	100.0	
Marital Status	Single	289	88.7	88.7
	Married	34	10.4	99.1
	Divorcee	3	0.9	100
	Total	326	100.0	
Age	15 – 19 years	178	54.6	54.6
	20 – 24 years	93	28.5	83.1
	25 – 29 years	19	5.8	89.0
	30 – 34 years	9	2.8	91.7
	35 – 39 years	8	2.5	94.2
	Above 40 years	19	5.8	100
	Total	326	100.0	
Level of Education	Primary School	4	1.2	1.2
	Secondary School	221	67.8	69.0
	Skilled Institution	13	4.0	73.0
	Polytechnic/College	46	14.1	87.1
	University	36	11.0	98.2
	No Formal Education	6	1.8	100
	Total	326	100	

TABLE IV
KEDAIKOM USERS ATTRIBUTES: OCCUPATION, INCOME, RESIDENTIAL AND MOTHER TONGUE

Attribute	Item	Freq	%	Cum %
Occupation	Government Employee	14	4.3	4.3
	Private Sector Employee	32	9.8	14.1
	Self Employee	42	12.9	27.0
	Housewife	8	2.5	29.4
	Unemployed	40	12.3	41.7
	Retiree	5	1.5	43.3
	Students	183	56.1	99.4
	Others	2	0.6	100.0
	Total	326	100	
Family Monthly Income	<RM 1,000	215	66.0	66.0
	RM 1,001 – RM 2,000	83	25.5	91.4
	RM 2,001 – RM 3,000	14	4.3	95.7
	RM 3,001 – RM 4,000	5	1.5	97.2
	RM 4,001 – RM 5,000	4	1.2	98.5
	> RM 5,000	5	1.5	100.0
	Total	326	100	
Type of Residential	Rental House	36	11.0	11.0
	Owned House	34	10.4	21.5
	Family House	256	78.5	100.0
	Total	326	100	
Mother Tongue	Malay Language	323	99.1	99.1
	Chinese Language	2	0.6	99.7
	Tamil Language	1	0.3	100
	Total	326	100	

Computer Experience

About 45.0% of the users spend at least two hours per typical visit. Furthermore, 37.1% of the users have more than 3 years of computer experience compared to 29.1%, who have less than one year experience (Table V). Another 33.7% are users who have between one to three years experience using computers. Thus, this finding reveals that most of the users are

experienced when measured against the frequency of visit per average month and time spent per typical visit in addition to having more than three years' computer experience.

TABLE V
COMPUTER EXPERIENCE

Computer Experience	No. of User	Percentage
Beginner	38	11.7
Less than 1 year	57	17.5
1 to 3 years	110	33.7
3 to 5 years	42	12.9
More than 5 years	79	24.2
Total	326	100.0

Active and Passive Users

This study decided to divide the users into two groups of personalities; active and passive users. The division is based on the following: active users were those who visited KedaiKom at least once a week or four times in an average month, and passive users were those who visited KedaiKom less than four times in an average month. Based on this categorisation, this study found that 230 or 70.5% of the respondents were active users and the other 96 or 29.5% were passive users (Table VI).

TABLE VI
ACTIVE AND PASSIVE USERS OF KEDAIKOM

Visit Frequency	No. of Users	%	Type of User	%
First Time User	12	3.7	Passive (96)	29.5
Once a month	28	8.6		
Two times a month	33	10.1		
Three times a month	23	7.1		
Once a week	31	9.5	Active (230)	70.5
Two times a week	45	13.8		
Three times a week	67	20.6		
Once a day	49	15.0		
Many times a day	38	11.7		
Total	326	100	326	100

Demographic Factors

The first KedaiKom and digital inclusion research hypothesis for influencing personalities of KedaiKom users; *"The demographic factor will influence the KedaiKom beneficiary to be an active user"* is against the hypothesised direction as indicated by the Chi-square analysis of results. Through the application of Chi-square analysis, a significant difference (at $p<0.05$) was found between active and passive users in only two different demographic factors; gender and occupation (Table VII). In term of gender, this study found that, in general, male respondents tended to be more active than the female, and in terms of occupation, students tended to be more active than working users and others.

TABLE VII
ACTIVE AND PASSIVE USERS: A DEMOGRAPHIC FACTOR COMPARISON

Demographic Factor	Significance		Active Users		Passive Users		Tot.
	χ^2	P	n = 230	%	N = 96	%	n = 326
Gender:	6.71	0.01					
(a) Female			110	47.8	61	63.5	171
(b) Male			120	52.2	35	36.5	155
Total			230	100	96	100	326
Age:	4.04	0.13					
(a) <25 years			185	56.7	86	26.4	271
(b) 25 to 34 yrs			23	7.1	5	1.5	28
(c) > 35 yrs			22	6.7	5	1.5	27
Total			230	100	96	100	326
Marital Status:	2.23	0.14					
(a) Single			200	61.3	89	27.3	289
(b)Married/Divorce			30	9.2	7	2.1	37
Total			230	100	96	100	326
Level of Education:	2.36	0.97					
(a) High School/ Skilled Inst.			166	50.9	68	20.9	234
(b)Polytech/ College/Univ			57	17.5	25	7.7	82
(c) Others			7	2.1	3	0.9	10
Total			230	100	96	100	326
Occupation:	7.39	0.02					
(a)Government/ Priv./Self Employee			72	22.1	16	4.9	88
(b) Students			122	37.4	61	18.7	183
(c) Others			36	11.0	19	5.8	55
Total			230	100	96	100	326
Family Monthly Income:	1.63	0.44					
(a) < RM1,000			156	47.9	59	18.1	215
(b) RM1,001 to RM2,000			54	16.6	29	8.9	83
(c) > RM2,000			20	6.1	8	2.5	28
Total			230	100	96	100	326

In responding to the issue of KedaiKom and digital inclusion influencing the beneficiaries' ability in achieving desirable digital inclusion from their KedaiKom; *"To what extent does the demographic factor influence the personalities of KedaiKom users?"*; the above findings explained that the personalities of KedaiKom users will not influence their ability to achieve desirable digital inclusion from KedaiKom in the underserved community, particularly as active users, except for male and student users. This showed that the demographic factor has no bearing on the personalities of KedaiKom users, on whether an individual would be an active or passive user. No significant differences were found between the two user groups with respect to age, marital status, education level, and family monthly income.

Community Readiness to Adopt ICT

The second KedaiKom and digital inclusion research hypothesis for influencing community members' ability to adopt ICT; *"The ICT awareness among community members will influence their ability to adopt ICT in their everyday life"* is confirmed as indicated by the EFA analysis of results in the interrelationship of the measured variables for ICT awareness and technology integration in local development awareness.

ICT Awareness

The community's readiness to adopt ICT is measured by questions related to user awareness about ICT as well as their knowledge about the integration of technology in the local development. The finding suggests that users are certainly ready and capable to adapt to ICT. Based on the actual responses, more than 70% of users agreed that ICT is important as a tool to develop the local community (Table VIII). More than 80% of the respondents agreed that community learning is enhanced by the incorporation of ICT in everyday life; that the rural community adequately supports the implementation of ICT initiatives; and local community leadership are willing to lead ICT development.

TABLE VIII
LEVEL OF AGREEMENT: ICT AWARENESS

No.	Variable	Percentage Level of Agreement		
		Agree *	Neutral	Disagree **
1.	Community member learning is enhanced by incorporation of ICT in everyday life	89.2	7.4	3.4
2	Rural community adequately supports the implementation of ICT initiatives/ programs	82.2	13.2	4.6
3.	Local community leadership is willing to lead ICT development	80.7	11.0	8.3
4.	Rural community is willing to participate in ICT initiatives/programs	79.4	16.0	4.6
5.	Rural community places an appropriate emphasis on the integration of ICT into community development	78.8	14.1	7.1
6.	Community evaluation should include ICT component	76.7	13.5	9.8
7.	People who have ICT knowledge are respected by community at large	73.3	18.1	8.6

n = 326 (based on actual responses)
* Agree incl. scales of agree, strongly agree & extremely agree
** Disagree incl. scales of disagree, strongly disagree, & extremely disagree

Through the deployment of EFA, the variables measuring ICT awareness was split into two factors: *"ICT Support Awareness"* which consisted of four variables with loadings ranging from 0.50 to 0.74; and *"ICT Knowledge Awareness"* which comprised of three variables with loadings ranging from 0.50 to 0.74 (Table IX). The other five variables are omitted because of low loadings.

TABLE IX
FACTOR LOADING: ICT AWARENESS VARIABLES USING PAF

No.	Factor/Variable	Communality	Loading
Factor ICT Support Awareness			
1.	Rural community adequately supports the implementation of ICT initiatives/ programmes	0.69	0.74
2.	Rural community is willing to participate in ICT initiatives/programmes	0.71	0.73
3.	Rural community places an appropriate emphasis on the integration of ICT into community development	0.60	0.68
4.	Local community leadership is willing to lead ICT development	0.43	0.50
Factor ICT Knowledge Awareness			
1.	Community evaluation should include ICT component	0.68	0.74
2.	People who have ICT Knowledge are respected by community at large	0.54	0.64
3.	Community member learning is enhanced by incorporation of ICT in everyday life	0.53	0.50
Omitted Variable			
1.	Computer literacy or competency should be required of all rural community;		
2.	ICT is important in today's rural community		
3.	Rural community comfortable with the rapid changes in ICT development		
4.	Government places an appropriate emphasis on the implementation of ICT development in rural area;		
5.	Users willingness to share information with other community members		

Issue of KedaiKom and Digital Inclusion

In answering the issue of KedaiKom and digital inclusion for influencing community members ability to adopt ICT in their everyday life; *"Is the underserved community ready to adopt ICT in their everyday life?"*; the findings explained that for the Factor *"ICT Support Awareness"*, the result suggests that rural communities adequately support and are willing to participate in the implementation of ICT initiatives. In addition, rural communities place appropriate emphasis on the integration of ICT, and the local leadership is willing to lead the implementation of ICT development in their local area. For the Factor *"ICT Knowledge Awareness"*, the finding exposes that community evaluation should consider the ICT component as one of the main evaluation criteria. Accordingly, people who have ICT knowledge will be respected by other community members. Users also believed that community learning is enhanced by the incorporation of ICT in everyday life. In addition, the Factor *"Barriers to Integrate Technology in Local Development"* is a solid and clean factor suggesting that in order to make the expansion of ICT, in particular to bridge the digital divide initiatives in underserved community successful; definitely the combination of community technology and social support is crucial to overcome these barriers. Thus, the result of the EFA is in the hypothesized direction as the high level of ICT awareness and technology integration in local development awareness among community members will influence their ability to adopt ICT in their everyday life. The result indicates that the users as community members are undoubtedly ready and capable to adapt the usage of technology in their everyday life.

(a) *The KedaiKom Usage Objectives*

To measure the usage objectives, 12 variables were employed. Based on actual responses, for the skills and knowledge usage objectives, more than 70% of users agreed that improving work related skills; improving skills to attain better jobs; and finding employment are important to them. For the social networks usage objective, about 70% of users agreed that keeping them better informed with relevant information; finding mates or friends, making new or keeping existing friendships; encouraging information sharing among users; involvement in entertainment; and increasing interaction among community members are relevant for them.

The third KedaiKom and digital inclusion research hypothesis for influencing users' ability to achieve desirable outcome; *"The effective and positive usage of the KedaiKom users will influence their ability to achieve desirable digital inclusion from their KedaiKom"* is confirmed as illustrated by the EFA analysis of results. Following the application of EFA, the results show that *"Skills and Knowledge Usage Objectives"* is a solid and clean factor with all eight variables having a loading of more than 0.5. However, for the Factor *"Social Networks Usage Objective"*, only two of the four variables extracted have a loading of more than 0.5. Thus, the EFA result as illustrated in Table X is in the hypothesised direction as the effective and positive use of KedaiKom will influence their ability to achieve desirable digital inclusion from their KedaiKom. In responding to the issue of the KedaiKom and digital inclusion for achieving desirable digital inclusion from their KedaiKom; *"What is the objective of using KedaiKom?"*; the related findings revealed that most of the effective and positive usage objectives are related to improving skills and knowledge including improvement of working skills, increase in earnings; involvement in teleworks, e-commerce and e-learning; and to save personal transaction time. In addition, other effective and positive usage objectives are related to improving social networks that includes finding new friends or keeping existing friendships; involvement in entertainment; encouraging information sharing; and to be better informed with local information. Thus, the effective and positive usage of KedaiKom will further include the

community members in the adaptation of ICT in their everyday life.

TABLE X
FACTOR LOADING: USAGE OBJECTIVES VARIABLES USING PAF

No.	Factor/Variable	Communality	Loading
Factor Skills and Knowledge Usage Objective			
1.	Connecting to employer's office	0.65	0.74
2.	Connecting to colleges / univ.	0.60	0.69
3.	Saving time in personal transactions	0.62	0.68
4.	Making personal purchases online	0.64	0.66
5.	Finding employment	0.62	0.64
6.	Increasing earnings from farms and businesses	0.50	0.63
7.	Improving skills to get better job	0.57	0.59
8.	Improving work related skills	0.57	0.54
Factor Social Networks Usage Objective			
1.	Finding mate, making new or keeping existing friendships	0.66	0.71
2.	Involving in entertainment	0.61	0.68
3.	Encouraging information sharing	0.52	0.40
4.	Keeping better informed	0.61	0.40
Omitted Variables			
1.	Improving academic studies		
2.	Having more self confidence		
3.	Improving ability to use computer		
4.	Increasing interaction amongst community members		

(a) Users Satisfaction

Based on actual responses, seven variables were used to measure users' satisfaction and indicated that more than 70% of users were satisfied with the services and facilities offered by KedaiKom (Table XI).

TABLE XI
USER SATISFACTION LEVELS

#	Variable	Percentage Level of Satisfaction		
		Satisfaction *	Neutral	Dissatisfy **
1.	Community telecenter staffs' disposition	82.8	10.4	6.7
2	Community telecenter Internet connection	76.7	12.0	11.3
3.	Community telecenter hours services open to public	76.4	12.9	10.7
4.	Community telecenter charges rate	75.8	15.0	9.2
5.	Community telecenter software	74.8	13.8	11.3
6.	Community telecenter staffs' technical ability	73.9	16.9	9.2
7.	Community telecenter	73.9	16.0	10.1

	equipments			
n = 326 (based on actual responses)				
* Satisfied includes scales of somewhat satisfied, very satisfied, and extremely very satisfied				
** Dissatisfied includes scales of somewhat dissatisfied, very dissatisfied, and extremely very dissatisfied				

The fourth KedaiKom and digital inclusion research hypothesis for influencing users' ability to achieve a desirable outcome; *"The satisfaction among KedaiKom users will influence their ability to achieve desirable development outcomes from the KedaiKom"* is confirmed as revealed by the EFA analysis of results. When using EFA, two variables are omitted due to low factor loadings (Table XII). "User Satisfaction" is a solid and clean factor when all the seven variables have a loading more than 0.5. In answering the KedaiKom and digital inclusion issue; *"Are the beneficiaries satisfied with the facilities and services provided by the KedaiKom?"*; the above finding exposed that most of the users are satisfied with the facilities and services offered by the KedaiKom. The result reveals that the conditions and the physical outlook of the KedaiKom as well as the availability of courses and training are not significant in attracting users. Instead, the staff disposition, Internet speed, operating time, and rates are more important for the users to consider their likely visit to KedaiKom. Thus, the result is in the hypothesised direction as the satisfaction among KedaiKom users will influence their ability to achieve desirable outcomes from the KedaiKom.

TABLE XII
FACTOR LOADING: USER SATISFACTION VARIABLES USING PAF

No	Variable	Comm	Load
1.	Community telecentre software	0.65	0.75
2.	Community telecentre staff's technical ability	0.62	0.71
3.	Community telecentre staff's disposition	0.71	0.69
4.	Community telecentre Internet connection	0.62	0.68
5.	Community telecentre rates	0.54	0.68
6.	Community telecentre hours open to public	0.57	0.65
7.	Community telecentre equipment	0.48	0.58
Omitted Variables			
1.	Community telecentre ambience		
2.	Community telecentre courses and training		

V. DISCUSSION AND RECOMMENDATIONS

The main objectives of KedaiKom is to build capacity; to introduce and encourage growth in the usage of ICT; and to create community communications equipped with a range of ICT services to facilitate Internet access; e-commerce; and e-learning with reference to an active underserved community base but with limited or no access. The present research finding suggests that the implementation of KedaiKom in the underserved community is good and beneficial, even though KedaiKom faces several shortcomings. The results explain that the users of the KedaiKom have indicated that local and

relevant contents and skilled staff are less important in maximising their usage of KedaiKom.

In addition, the findings exposed that community members are likely to believe that the usage of the KedaiKom can be extended to beyond merely a place for using computers and connecting to the Internet, and serve as a public space for community interactions too. This finding is in line with the arguments of [1], [9], [16], [34], [45], [47] which maintained that telecenters were generally established to create public spaces in which to shape the ideas and actions of the community members by providing technical assistance and resources essential to meet the community needs as well as offering a common ground for community members to socialise comfortably. The finding suggests that the underserved community is looking forward by considering KedaiKom to serve as new good public spaces that engage diverse group of people and contribute to build local community for creating and sustaining development outcomes. It suggests a much larger role than expected for the rural telecenters to function in Malaysia case.

(a) Beneficiaries of KedaiKom

The KedaiKom equipped with adequate facilities and specifications', including broadband Internet access is the main public place for the underserved community to use computers and access the Internet. Thus, indicating that the implementation of KedaiKom in the underserved community is good. In terms of demographic characteristics; the majority of beneficiaries or the users are single; students; have at least a secondary school education; are aged below 25 years; and have a monthly family income of less than RM1, 000.

The finding suggests that most of the users are youth and in a productive cohort which has a relative high education attainment. Normally, this group of users always use KedaiKom in a productive and effective manner. Although the family monthly income is relatively low, the awareness level in the family is relatively high, thus influencing the frequency of this group of users in using KedaiKom. Furthermore, the majority of the beneficiaries have computer experience of more than three years; visit KedaiKom at least once a week in an average month, and spend at least four hours per typical visit. The finding suggests that most of the users are core users rather than peripheral users. The vast experience and the relatively high average time spent per typical visit shows that the usage of KedaiKom is principally productive and effective.

The first KedaiKom and digital inclusion research hypothesis: *"The demographic factor influences the KedaiKom beneficiary to be an active user"* is not proven as indicated by the Chi-square analysis of results. No significant differences were found between active and passive groups of users with regards to age; marital status; education level; and family monthly income. However, significant differences were found in two demographic factors, gender and occupation.

In general, male beneficiaries tended to be more active than the females and students tended to be more active than the others. The finding suggests that active users are not influenced by the demographic factors including age, marital status, education attainment, and income. However, the necessity and the need to use KedaiKom are more significant. Job hunting, information seeking and sharing, acquiring work and education related knowledge and skills, keeping and prolonging friendships as well as seeking and involving in entertainment are the main forces encouraging the users to use KedaiKom. Thus, users which are mostly youth, and in a productive cohort with family and community support will frequently visit and use KedaiKom. Students in secondary schools and in community colleges especially need Internet access to seek information for their folios and assignments. Their families need to bear the costs with limited income, in order to support the students' need to get better education with the assistance of ICTs. The finding is in agreement with [7] and [60] of the argument that social support means the individual and community awareness which can create and sustain social capital capable of supporting the implementation of telecenters in the local community. Moreover, the finding is in agreement with Gordo's [17] contention that the expansion of affordable telecenters could be realised through technology discounts and community telecenters in addition to emphasising community-level intervention in supporting and encouraging the use of a telecenters.

The males are more active because most of the users with the exception of students, others including working users, school leavers, job seekers or unemployed were mostly males. Most of the users seeking and involving entertainment were male as well as the most frequent users spending more time per typical visit. The females were generally restricted to using KedaiKom during the day because most likely the norms and values of the rural community do not encourage the females visiting public places during certain times especially at night.

(b) Community Readiness to Adopt ICT

The second KedaiKom and digital inclusion hypothesis: *"The ICT awareness among community members will influence their ability to adopt ICT in their everyday life"* is proven as indicated by the EFA analysis of results. It confirms that the high level of ICT awareness and technology integration among community members will influence their ability to adopt ICT in their everyday life. Generally, the underserved community are certainly ready and capable to adopt ICT. Most of the members of the community are adequately supportive and they are willing to participate in ICT initiatives. The local community places an appropriate emphasis on the integration of ICT, and the local leadership is willing to lead local ICT initiatives. Moreover, the community members are aware that in order for the expansion of ICT, and for the bridging the digital divide initiatives in the local community to be successful, without a doubt, the combination

of community technology and social support is crucial to overcome the barriers to technology integration in local development. The barriers that need to be overcome include the lack of skilled staff, community support, information sharing, training, planning, infrastructure, funding, and local leadership. The finding is in accordance with [48] of the argument that the success prospects of a telecenter project are likely to be affected by the combination and supportiveness of the interrelationship between the exogenous and endogenous elements. The exogenous elements include the function of the government and local authorities to continually expose and promote ICTs to the local community. The endogenous elements likely involve the strong support of ICT projects by the local community in addition to the strong local leadership. Both exogenous and endogenous elements are likely affected by the outcomes of the KedaiKom project.

(c) KedaiKom Usage Objectives

The third KedaiKom and digital inclusion hypothesis: *"The effective and positive usage of the KedaiKom users will influence their ability to achieve desirable digital inclusion from their KedaiKom"* is proven as illustrated by the EFA analysis of results. The results show the effective and positive usage by the KedaiKom users, particularly the usage to improve the user's skills and knowledge, in addition to extending and upholding the user's social networks that will influence their ability to achieve digital inclusion. The most important usage objectives are related to the improvement of the user's skills and knowledge, which include improved working skills; increased earnings; involvement in teleworks, e-commerce, and e-learning; and saving time for personal transactions. The most important effective and positive usage related to the expansion and upholding of the user's social networks include finding new friends, making new or keeping existing friendships; seeking and involving in entertainment, sharing information; and being better informed. Thus, the high, effective, and positive usage of KedaiKom will eventually encourage the community members in the adoption of ICT in their everyday life. The results suggest that the users of KedaiKom are mostly and actively involved in the positive usage of the KedaiKom in particular for improving working and education related skills and knowledge as well as for improving and prolonging social networks. This particular positive usage normally involves students, working users, job seekers and parents who have family outside the community, and tourists in home stays organised by the community. However, certain users who are unemployed and school dropouts comprise mostly of males who are heavily involved in entertainment that is in the category of unproductive usage, explicit games, chatting, movies, and music etc. The involvement in unproductive usage mostly occurred at the unsuccessful KedaiKom where the operators rarely provide a strict supervision on the usage.

The positive and effective KedaiKom usage is significantly influencing the community building of the underserved community. The finding is in agreement with [48], [58], [59]

of the arguments that positive and effective usage of the Internet particularly in telecenters will avoiding users from acquire digital skills that limited of operation, managing hardware and software, instead encouraging them to acquire digital skills on how to search, use and share information. The gap in usage of the telecenter will further divide users systematically using and benefiting from telecenters for work and education and users that use telecenters for simple application with a relatively large part being entertainment. In addition, the finding is in agreement with [58] that is also cited in [34]; and [10] of the arguments that users with limited skills and knowledge will be outpaced. Thus, there is a need for those users to increase the usage of ICT applications contributing to increased skills and knowledge which might in turn lead to more frequent and more diverse uses of telecenters. The finding also suggests that most of the KedaiKom users are core users that use telecenters positively and affectively with continuous and comprehensive usage especially for information seeking, communication and origination or production of digital contents [52]. Furthermore, the finding is in agreement with [4], [46], [59] of the contention that most of the telecenters projects run into unanticipated complications because these projects persistently neglected positive and effective usage and users are passive and non-producers of local content, which is the stumbling block for realising the expected results.

(d) KedaiKom Users' Satisfaction

The fourth KedaiKom and digital inclusion hypothesis: *"The satisfaction among KedaiKom users will influence their ability to achieve desirable development outcomes from their KedaiKom"* is proven as revealed by the EFA analysis of results. Most of the KedaiKom users are satisfied with the facilities and services provided by the KedaiKom. Moreover, the environmental and physical conditions and the availability of courses and training are not significant for satisfying and attracting users. Instead, the staff disposition, Internet speed, operating time, and rates are more important for users to consider their likely and prolonged visits to KedaiKom. Therefore, the high level of satisfaction among the KedaiKom users will achieve the inclusion of the community members in the ICT adoption process and eventually integrate technology into local development.

The present research finding suggests that for the rural community, the implementation of KedaiKom in their community is more important than anything else including the physical condition of the KedaiKom itself or the supporting materials such as local content as well as the availability of related courses and training. The availability of Internet access and the opportunity to use computers is more than sufficient for the rural folks. Moreover, the Internet speed is provided via broadband access which is fast and reliable and offered at a reasonable rate. The KedaiKom is the main source for the underserved community to use computers and access the Internet rather than at home or at the workplace. This finding is in accordance with [23] where it is argued that

the introduction of community telecenters into a typical rural community represents a significant innovation for the rural community. In this context, references [19], [21], [23] and [21] argued that a community telecenter will be the typical rural community's first encounter with ICT that offers delivery of rural and socio-economic development support services, e-commerce, e-learning, telemedicines services etc. Thus, most of the KedaiKom users' perceive that the most important step is to provide opportunities for them to access computers, the Internet and basic applications rather than provide quality services and environment, and ICT courses and training.

As a conclusion, the study finds that the community based telecenters (KedaiKom) play an important role in encouraging the digital inclusion among the rural community in Malaysia, and thus lead in bridging the digital divide of the rural community.

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