COST VS. QUALITY OF SERVICE: A STUDY ON INTERNET USERS IN RURAL SABAH, MALAYSIA

Suhaimi Salleh[1]*, Noraini Abdullah[2] and Abdul Kadir Jaafar[3]
[1]Mr., Universiti Malaysia Sabah, MALAYSIA, suhaimi.binsalleh@gmail.com
[2]Dr., Universiti Malaysia Sabah, MALAYSIA, norainiabdullah.ums@gmail.com
[3]Dr., Universiti Malaysia Sabah, MALAYSIA, drkadirjaafar@gmail.com

*Corresponding author

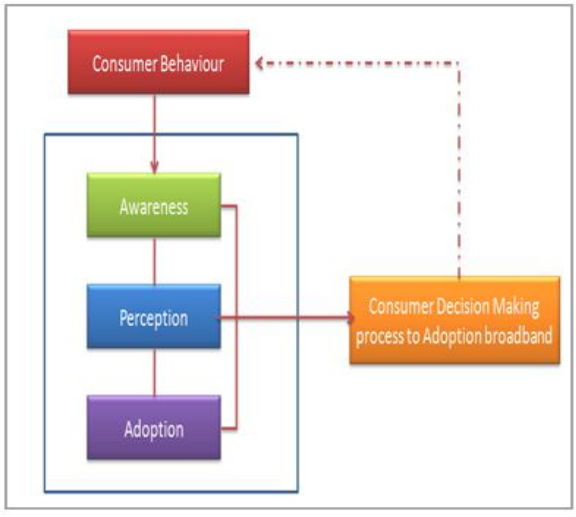
Abstract

This paper attempts to establish the current extent and reasons of broadband penetration and adoption in Sabah, a state in East Malaysia. By using these discoverable patterns as a baseline data, the investigation of the motivational factors that drive the consumer's usage of broadband is then conducted. The penetration patterns will be examined based on several categories, mainly socio-cultural backgrounds, socio-economic standards and demographic characteristics. This paper employs the APA Model, which is consistent with the audience-centric (consumer–centric) approach. This paper postulates that when a particular group of consumers seek out for internet services, they would do so typically as a result of the effectiveness of the diffusion of innovation. It is written to explore and investigate the issues based on a set of pre-identified parameters. This approach has the ability to capture the main features of broadband users, and will also provide a market context and perspective. Thus, the outcome will be useful to facilitate a better understanding of consumption patterns and motivations behind the use of broadband service in the northern part of East Malaysia. The main finding of this research is that cost does not feature as the main deterent to broadband subscription by the majority of the Internet users in this part of Malaysia.

Keywords: internet broadband access, quality of service, affordability

1. INTRODUCTION

Most often than not cost of goods or products is the main consideration amongst consumers of the medium to low income earners. Prior to the data collection exercise it was assumed that the findings of the research, on which this paper was based, will prove that the relatively high cost of broadband services was a deterent to the subscription of the service. The study examined the extent of broadband penetration and adoption in Sabah, a state in Eastern part of Malaysia. It is specifically aimed to investigate the related issues based on consumer-centric perspective and based on the following model:



Abdul Kadir Jaafar *et. al.* (2012)

Perspective	Critical Success Factors
Market	1. MI meeting DSL performance as a benchmark 2. A competitive mobile service provider industry segment
Service Providers	3. Commitment to long-term investment in infrastructure and maintenance 4. Competitive pricing model for MI access and usage
Users	5. Cost of use (purchase and ongoing) and cost stability 6. Expected quality of MI access (performance - bandwidth, latency; reliability; ease of use) 7. Expected quality of the MI service (user mobility support, mobile user-specific service characteristics)

Petrova & Huang in Zolait (2013, p.11)

Fig.1. Parameters according to the APA Model and Critical Success Factors of Mobile Internet

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2. OVERVIEW OF PAST LITERATURE

Velmurugan & Velmurugan (2014) used the consumers' awareness , perception and adoption variables (also designated as the APA Model), to investigate consumers' awareness and perceived ease of use and their influence of information technology adoption in 3G mobile phones in India. Their findings on the use of 3G mobile phone's browsing services showed that the users of emails (63.6%), search engine (56.5%) were relatively high because they were comfortable to use.

Manzoor (2014) explores the factors that affect the consumer behavioral intention to adopt broadband Internet in a developing country perspective. The empirical data for this study were collected using a self-administered questionnaire that included items related to various attitudinal, normative, and control constructs. Descriptive statistics and regression analysis were used to test various constructs for their possible influence on Indian consumers' adoption of broadband Internet. The findings suggest that perceived ease of use (PE), social outcomes (SO), hedonic outcomes (HO), service quality (SQ), facilitating conditions resources (FCR), and self-efficacy (SE) were very significant predictors of Indian consumers' behavioral intention to adopt broadband Internet.

Murdock & Goldings (2010) acknowledged that, supported by high speed connections and a proliferating range of digital devices, from notebook computers to mobile phones, the second generation of the Internet (Web 2.0) is providing a platform for an ever expanding range of services and an explosion of user-generated content - blogs, file sharing, wikis, and social networking. However, they believed that many commentators who see these developments marking the wholesale digital transformation of social life forgot that the history of the Internet has coincided with a concerted extension of market dynamics, the erosion of public provision, and deepening income inequalities.

Abdul Kadir Jaafar *et al.* (2012) in their study on broadband subscription in Sabah, Malaysia found that the level of overall penetration throughout was still below 30% in 2011 with predictably the rural and remote region most poorly covered. However, 48.8% of the respondents with monthly household earning of RM1000 and below were subscribers of broadband services ranging between RM20-RM220 per month.

McMurtrey, McGaughey & Downey (2008) notes that the "digital divide" has been present in the field of information technology (IT) since the inception of the digital computer. Throughout the course of history, one group (or more) has had better access to computer and information technology than another faction. For example: rich versus poor, young versus old, advanced societies versus less developed countries, etc. This disparity has existed for a variety of reasons, among them political, cultural, economic and even class or socioeconomic in nature.

LeRose & Eastin (2004) conducted a research explaining Internet usage that both extended and challenged the uses and gratifications approach to understanding media attendance by discovering "new" gratifications and introducing powerful new explanatory variables. It integrates these developments into a theory of media attendance within the framework of Bandura's (1986) Social Cognitive Theory. Their respondents were required to complete an online questionnaire from which the data was input into Structural Equation Modeling (SEM) techniques to test a.new model of media attendance in which active consideration of Internet uses and gratifications, moderated by Internet self-efficacy, joins habitual behavior and deficient self-regulation as determinants of media behavior.

Castells (2001, p.266) acknowledges that education, information, science, and technology become the critical sources of value creation in the Internet-based economy. Educational, informational, and technological resources are characterized by extremely uneven distribution throughout the world (UNESCO, 1999). In the same book, Castells mentioned some factors which have great influence on the phenomena of "digital divide": level of income, education, age, involvement in labour sphere, ethnic digital divide as well as family status (married – unmarried), disability, and geographical location. Interestingly gender doesn't play that big role, but lack of knowledge of English language might be a barrier to use new technology. Later, Castells concluded that in terms of access it is more likely that we will see fast diffusion of the Internet around most of globe in the coming years. He also puts on record that conditions under which the internet is diffusing are creating a deeper digital divide. Key urban centres, globalized activities, and higher educated social groups are being included in the internet based global networks, while most regions and most people are switched off. The internet in the developing world is being driven by the huge gap in telecommunications infrastructure, internet service providers, and internet content providers as well as by the strategies being used to deal with this gap.

Downey & McGuigan (1999) believed that information and communication technologies transform urban life dramatically and bringing about rapid economic and cultural globalization. In their book *Technocities*, they explored issues involved by relating advanced theoretical debates to practical matters of communication with cultural policy. It maps out a range of `optimistic' and `pessimistic' scenarios with special regard to various forms of inequality, particularly class, gender and geo-political inequalities. The book concluded that neither

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technological determinism nor economic determinism satisfactorily account for information and communication technologies and urban development. Instead, it is necessary to bring together a number of differently informing approaches, cultural, economic, political and technological, to make sense of a field of dynamic and contradictory forces.

3. METHOD

Data for this study was collected using questionnaires, interviews and observation. Prior to actual data collection exercise a pilot study was conducted to test the reliability and the validity of the questionnaires. 50 respondents were selected from west coast area for pilot study. The second phase of the data collection was carried out using questionnaires which included various items related to the consumers' awareness and perception as indicated in the APA Model, as well as several other relevant variables identified during the (qualitative) interview and pilot study. A minimum of 1000 respondents were targetted to be selected randomly for actual the actual study which covers the entire 11 administrative districts throughout Sabah: Kota Kinabalu, Kota Belud, Beaufort, Ranau, Keningau, Tenom (West Coast) and Sandakan, Beluran, Tawau, Lahad Datu, Semporna (East Coast). Samplings of respodents were taken from the six zones A, B, C, D, E and F depicted in Fig. 2 and Fig. 3 below.

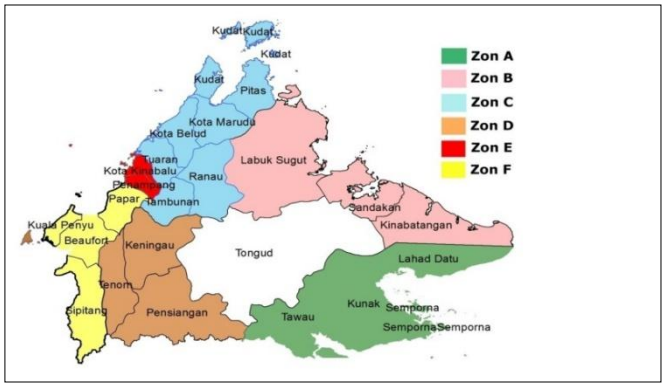

Fig. 2. Sampling Zones

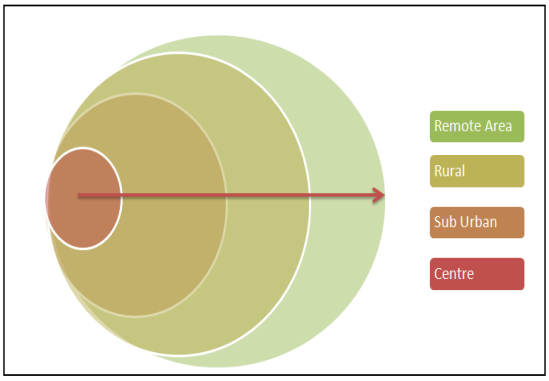

Fig. 3. Sampling spots according to urbanisation level

4. RESULTS

4.1 Profile of the Respondents

The initial target of 1000 respondents were exceded and the final number of respondents questionnaired became 3200 respondents. However after the data cleaning process was done, only data sets from 2342 respondents were finally utilised which are 130% more than the initial targetted respondents.

Table 1. Number of Respondents By Zone

Zone	Urban	Sub-urban	Rural	Remote Area	Total
A	163	203	188	7	561
B	157	101	42	0	300
C	223	148	128	1	500
D	143	49	77	31	300
E	153	158	19	0	330
F	92	64	195	0	351
Total	931	723	649	39	2,342

Table 1 above show that 24.0% of respondents came from Zone A, 12.8% from zone D, 14.1% zone E and 15.0% zone F. From 2,342 respondents, 98.1% are Malaysians and only 1.9% are non-Malaysians. Gender distributions show 48.0% are males and the rest 52.0% are females. The following Table 2 gives further details of respondents. The age between 21 to 30 years old represents the largest percentage which is 46.2% followed by those aged below 20 years old that represents 24.3% whilst 20.1% aged between 31 to 40 years and 9.4% aged 41yrs and above. Based on the findings, students represent the largest sample

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which comprises of 37.4% followed by the business group amounting to 25.6%. Respondent based on income category are also stated below.

Table 2. Respondents Demography (Frequency and Percentage)

Variables		Overall	
		Frequency	Percentage
Citizenship	Malaysian	2297	98.1
	Non-Malaysian	45	1.9
Location	Urban	865	36.9
	Suburban	721	30.8
	Rural	597	25.5
	Remote Area	39	1.7
Age	Below 20	569	24.3
	21 – 30	1082	46.2
	31 – 40	471	20.1
	41 – 50	188	8.0
	51 – 60	28	1.2
	60's and above	4	.2
Sex	Male	1124	48.0
	Female	1218	52.0
Professions	Students	877	37.4
	Executive/Professional	450	19.2
	Non-Executive	416	17.8
	Self Employed	599	25.6
Household Income	Below RM1000	1143	48.8
	RM1001 – RM2000	519	22.2
	RM2001 – RM3999	485	20.7
	Above RM4000	195	8.3
Education Level	No formal education	68	2.9
	Primary	137	5.8
	Secondary/Diploma	1511	64.5
	Bachelor Degree	594	25.4
	Post Degree	32	1.4

Table 3. Respondents' Profile by Zone

Variables		Zone					
		A	B	C	D	E	F
Citizenships	Citizens	22.8	12.7	21.1	12.7	13.9	14.9
	Non-Citizens	1.2	0.1	0.2	0.1	0.2	0.1
Location	Urban	7.0	6.7	9.5	6.1	6.5	3.9
	Suburban	8.7	4.3	6.3	2.1	6.7	2.7
	Rural	8.0	1.8	5.5	3.3	0.8	8.3
	Remote Area	0.3	0.0	0.0	1.3	0.0	0.0
Age	Below 20	8.2	4.7	3.8	3.1	1.4	3.1
	21 – 30	10.6	4.2	8.4	6.3	10.6	6.1
	31 – 40	3.5	2.9	5.4	2.6	1.3	4.4
	41 – 50	1.5	1.1	3.2	0.7	0.8	0.9
	51 – 60	0.2	0.0	0.5	0.0	0.0	0.5
	60's and above	0.0	0.0	0.2	0.0	0.0	0.0
Sex	Male	10.8	7.2	10.0	5.5	7.7	6.7
	Female	13.2	5.6	11.3	7.3	6.4	8.2
Profession	Students	9.7	5.1	5.6	3.5	9.2	4.4
	Executive/Professional	5.0	2.2	6.1	0.5	1.2	4.2
	Non-Executive	5.2	2.6	4.6	0.6	2.0	2.6
	Self Employed	4.1	2.9	5.0	8.2	1.7	3.7
Household Income	Below RM1000	15.0	6.1	7.0	10.1	5.9	4.6
	RM1001 – RM2000	5.0	2.3	4.6	1.9	4.3	4.1
	RM2001 – RM3999	3.2	3.2	6.5	0.7	2.9	4.2
	Above RM4000	0.8	1.1	3.2	0.0	1.1	2.1
Education	No Formal Education	0.2	0.1	0.5	0.0	1.7	0.3
	Primary	0.2	0.6	1.3	0.5	2.9	0.3
	Secondary/Diploma	19.4	9.9	11.5	10.6	2.9	10.2
	Bachelor Degree	4.0	2.1	7.5	1.7	6.6	3.5
	Post Degree	0.1	0.1	0.5	0.0	0.0	0.7

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Respondents whose incomes are under RM1000 are the highest sample which is 48.8%. 22.2% respondents who earned RM1001 to RM2000. Only 20.7% of the samples earned RM4000 and above. Respondents who have academic qualification at secondary to diploma level are recorded the highest samples which is 64.5%. There 25.4% who are degree holders and those who has no specified education and primary educations represents only 29% and 5.8% whilst only 32 (%) respondents posses post graduate certificate.

4.2 Broadband Usage Analysis

Based on the research data presented as Table 4 below, a total of 1772 respondents (75.7%) are mobile broadband consumers. Among the four popular broadband operators in the market, Celcom is the most subscribed which represents 49.2% among all respondents. This followed by Telekom which takes 27.2% of the market, Maxis 12.6% and Digi 9.8% whilst the others represent only 2.1%.

There are various ways of how customers subscribe to a broadband. Most of them prefer to approach the service operator directly. This approach represents a total of 45.9%. There is only 21.3% who subscribe due to influence by mass media advertisement. Promotion campaign by MCMC attracts only 16.7% subscribers of broadband.

In terms of registration ownership percentages, 87.7% subscribers have only one service operator subscription. However, the research findings shows 10.2% respondents owned 2 subscriptions on their own names. Whereas 27 respondents have 3 lines and 23 of them have up to 4 lines of broadband subscriptions. On price and quality factors, broadband selection based on good coverage and high speed data package represents 59.3%, followed by market popularity factor which is 19.1%. The competitive price factor selection is 15.5%. This to proofs that price is not a significant factor in making a decision on service selection. Even customer friendly services are regarded as the least selection factor among respondents. It is only represents 6.1%.

In terms of monthly fee rate, there are 48.5% customers who pay up to RM61.00 up to RM100.00 a month for their service usage. Only 30.4% who paid the lowest package between RM20.00 to RM60.00 monthly. Data allow indicates that 17.3% of users agree to pay more than RM101 to RM200 monthly and assumed the rate as affordable. This proves that customers are willing to pay higher price higher or for better quality services.

Table 4. Respondents' Profile (Frequency and Percentage) of Broadband Subscribers

Variable		Overall	
		Frequency	Percentage
Types of Internet Service	Fixed line Broadband	570	24.3
	Mobile Broadband	1772	75.7
Service Operator	Telekom	617	26.3
	Celcom	1153	49.2
	Maxis	294	12.6
	Digi	229	9.8
	Others	49	2.1
Channel or ways of subscription	MCMC promotion	390	16.7
	Applying via service operator	1075	45.9
	Advertisement via electronic media or	498	21.3
	through line service	104	4.4
	Others	275	11.7
Total Broadband registered under the respondent's name	1 line	2054	87.7
	2 lines	238	10.2
	3 lines	27	1.2
	4 lines	23	1.0
Reasons for operator selection	Excellent coverage and high speed package	1388	59.3
	Competitive Service Fee Rate	364	15.5
	Friendly customer service	143	6.1
	Popular Service Operator	447	19.1
Monthly Fee Rate	RM20 – RM60	804	34.3
	RM61 – RM100	1135	48.5
	RM101 – RM140	147	6.3
	RM141 – RM180	121	5.2
	RM181 – RM220	135	5.8

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4.4 Broadband Subscription Distributions by Locations

Fig. 4 below summarises types of service used according to locations. The overall broadband usage based on location shows that mobile broadband are concentrated in the suburban and rural areas representing 23.3% and 21.1% respectively. In the context of Sabah as a less-developed state in Malaysia these are considered as relatively high percentages. Comparatively, fixed line broadband in urban areas shows a substantial subscription at 9.8%. The tendency to subscribe for the service in urban and rural areas shows high percentage that is 7.6% and 6.6% respectively. These figures suggest that there is a high demand for broadband and no doubt, it has evidently becomes a new trend for communities in Sabah to have the services available to them.

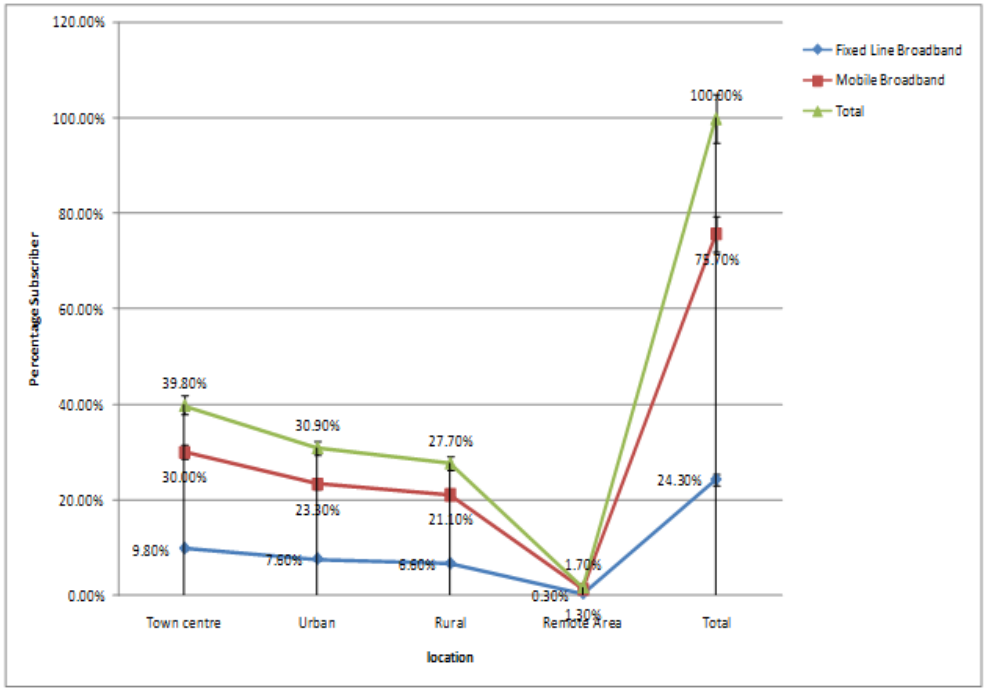

Fig. 4. Broadband Services Used According to Locations (%)

There are some indications that the urban communities have a slower rate of increase in subscription for mobile broadband compared to the subscription among the communities in suburban and rural areas. The abundance and easy accessibility of internet services made available free of charges in many premises in urban areas such as in hotels, fast food outlets and cafes have contributed to the slow rate of subscription in urban areas. See also Table 5 below.

Table 5. Percentage of Service Used and Location

Location	Fixed Line Broadband	Mobile Broadband	Total
Urban	229	702	931
	(9.8%)	(30.0%)	(39.8%)
Suburban	178	545	723
	(7.6%)	(23.3%)	(30.9%)
Rural	155	494	649
	(6.6%)	(21.1%)	(27.7%)
Remote Area	8	31	39
	(0.3%)	(1.3%)	(1.7%)
Total	570	1772	2342
	(24.3%)	(75.7%)	(100.%)

4.5 Respondent Broadband Subscription Profile and Demography

Research data depicted as Table 6 below indicates that there are overall common up take of broadband usage both for fixed and mobile broadband among all demographic respondents. Based on age category, mobile broadband users are more dominated by youth aged between 21 to 30 years old which scored of

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36.7%. This group followed by the group aged between 31 to 40 years which represents 14.9%. Among professional category, student's percentage who uses mobile broadband is 28.9% and only 8.5% students' family who provide broadband for their children at home while they are still at age school. Among executives, the needs for mobile broadband are more dominant. This is due to the nature of their jobs which require more mobile internet services. There are 13.1% broadband customers who under the category of executives and professionals users. Among self-employed group, particularly businessmen, this findings show that only 19.9% have subscribed to mobile broadband and only 5.6% who subscribed to fixed line broadband at their premises.

Table 6. Respondent's Broadband Subscription Profile and Demography

Variables		Overall Percentage	
		Fixed line Broadband	Mobile Broadband
Age	Below 20	6.2%	18.1%
	21 – 30	9.5%	36.7%
	31 – 40	5.2%	14.9%
	41 – 50	2.9%	5.1%
	51 – 60	.4%	.8%
	60's and above	.1%	.1%
Profession	Students	8.5%	28.9%
	Executive/Professional	6.1%	13.1%
	Non-Executive	4.1%	13.7%
	Self Employed	5.6%	19.9%
Household Income Distribution	Below RM1000	9.7%	39.1%
	RM1001 – RM2000	5.8%	16.3%
	RM2001 – RM3999	6.0%	14.7%
	Above RM4000	2.8%	5.5%
Education Level	No formal education	1.1%	1.8%
	Primary	1.6%	4.3%
	Secondary/Diploma	14.9%	49.6%
	Bachelor Degree	6.4%	18.9%
	Post Degree	.3%	1.0%

The findings is quite unique in the way it indicates the willingness/tendency of those with income less than RM1000.00 per month to subscribe to mobile broadband services. This group consists of 39.1% of the working group respondents. This is followed by those respondents who earn between RM1001 to RM2000.00 which represents 16.3%. The respondents, who earn RM2001 to RM3999.00, consist of only 14.7% of the number of subscribers while only and 6.0% use the fixed broadband line. Among education category, respondents who have secondary to diploma education indicates high broadband subscription at 49.6% and respondents who have bachelor degree shows 18.9%. The research findings also show that there is a trend to use the mobile broadband for information access among students.

Table 7. When do you apply for broadband? vs. What kind of internet services that you use?

When do you subscribe the broadband?	What type of Internet service that you use?		
	Fixed Line Broadband	Mobile Broadband	Total
Less than 6 months	90	271	361
	(3.8%)	(11.6%)	(15.4%)
6 - 12 months	95	296	391
	(4.1%)	(12.6%)	(16.7%)
12 month and above	115	473	588
	(4.9%)	(20.2%)	(25.1%)
No response	270	732	1002
	(11.5%)	(31.3%)	(42.8%)
Total	570	1772	2342
	(24.3%)	(75.7%)	(100.0%)

The Table 7 above shows the tabulation period of broadband subscription and type of services used by the customers either the fixed line or mobile broadband. The finding showed that the subscriptions within 12 months and above are the highest recorded. The findings explain that the customers' loyalty toward the service is quite evident. Those who have subscribed between 6 to 12 months are representing 16.7% of the overall users. 12.6% have sustainably subscribed for mobile broadband and only 4.1% for the fixed line.

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Relatively, the customers who subscribe broadband less than 6 month are low for both services. This scenario can be explained by customers who perceive by not responding which total up 1002. This scenario describes those customers who keep changing service operators are high. This is due to two factors: the awareness towards broadband and the quality of service. The findings on sites also suggest that there are customers who have changed their service provider after they have discovered that the services provided are poor and the awareness of the package offered by the previous telco is poor in term of reception. Most customers have expressed their willingness to subscribe without detailing out packages specification. Generally, subscription preference mostly and solely based on the quality of services that are assumed to be worthy purchase or affordable. 59.30% the respondents attribute their reason for subscribing to mobile broadband as due to the 'excellent coverage and high speed data package' offered by service provider. Another reason is the popularity of operator of mobile broadband in the market (15.5%). The subscribers in Sabah are more interested toward the high quality services provided rather than 'friendly customer service' and 'popular operator' when making broadband provider selection.

Table 8. Service Type Tabulation and Reasons for Operator Selection

Reasons for Internet Service Selections	Type of Broadband		Total
	Fixed Broadband	Mobile Broadband	
Excellent coverage and high speed data package	353	1035	1388
	(15.10%)	(44.20%)	(59.30%)
Competitive Service Fee Rate	96	268	364
	(4.10%)	(11.40%)	(15.50%)
Friendly Customer Service	36	107	143
	(1.50%)	(4.60%)	(6.10%)
Popular Operator in the market	85	362	447
	(3.60%)	(15.50%)	(19.10%)

Overall, broadband customers perceive that the quality of services provided by telcos are the main factor for subscription in Sabah. 59.3% among respondents have expressed their preferences based on the services quality and high transmission speed that a broadband could possibly offer. Finding shows that customers are willing to pay RM60 and above in order to have high speed and excellent services. Popular brand selections of operator services are not the main factor to determine their selections. Only 15.5% of broadband customers choose the popular service operator in the market as basis of their selection.

4.6 Broadband Affordability (Cost)

The following discuss the customers who subscribed to the fixed line and mobile broadband based on their education level, monthly income distribution, the customers' profession. The research findings try to explore the perceptions of both services in order to identify their affordability and the monthly payment rate.

4.6.1 Broadband Monthly Subscription Fees and Willingness-to-Pay

Table 9. Payment Cost vs. Type of Service

Monthly Charges/Fees	Fixed Broadband	Mobile Broadband	Total
RM20 – RM60	120	684	804
	(5.10%)	(29.20%)	(34.30%)
RM61 – RM100	246	889	1135
	(10.50%)	(38.00%)	(48.50%)
RM101 – RM140	107	40	147
	(4.60%)	(1.70%)	(6.30%)
RM141 – RM180	48	73	121

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		(2.00%)	(3.10%)	(5.20%)
	RM181 – RM220	49	86	135
		(2.10%)	(3.70%)	(5.80%)
Total		570	1772	2342
		(24.30%)	(75.70%)	(100.00%)

Table 9 above shows that only 34.3% of customers who pay broadband services more than RM20.00 to RM60.00 monthly. This is ccompared to the payment rate of 48.5% respondents who can afford to pay more than RM60.00 to RM100.00 monthly for their broadband usage. From this category 38% pay for mobile broadband and 10.5% pay for the fixed line. There are 5.8%customers who pay more than RM 181 to RM 220 monthly for multiple subscriptions. The sites findings show that respondents are willing to pay higher in order just to have the high speed broadband and to satisfy their needs. There are customers who are willing to subscribe up to four types of operators in order to ensure their internet accessibility or to ensure the constant and lasting internet surfing. Customers apparently are not aware of the subscription concept when it comes to quota. Their main assumption is the speed and accessibility are stable in accordance to the amount of payment to the telco.

4.6.2 Affordability Analysis Based on Demographics of Broadband Subscribers

Table 10 shows from profession category, student category is subscription made by head of household for their children' for learning purpose at home and other necessities. 14.50% student category pay cost subscription between RM20 RM60 one month and 16.2% pay in rate RM 61 to RM 100 one month. There are parents who conscious of the children learning process that willing to pay expensive price to ensure their children' learning are not affected.

Table 10. Monthly Fees Broadband Subscribers

Variables		Monthly Fees Broadband Subscribers					
		RM20 - RM60	RM61 - RM100	RM101 - RM140	RM141 - RM180	RM181 - RM220	Total
Professional	Students	339	379	48	60	51	877
		(14.50%)	(16.20%)	(2.00%)	(2.60%)	(2.20%)	(37.40%)
	Executive/Professional	101	245	45	18	41	450
		(4.30%)	(10.50%)	(1.90%)	(0.80%)	(1.80%)	(19.20%)
	Non-Executive	132	228	25	17	14	416
		(5.60%)	(9.70%)	(1.10%)	(0.70%)	(0.60%)	(17.80%)
	Self Employed	232	283	29	26	29	599
		(9.90%)	(12.10%)	(1.20%)	(1.10%)	(1.20%)	(25.60%)
Household Income	Below RM1000	420	546	48	70	59	1143
		(17.90%)	(23.30%)	(2.00%)	(3.00%)	(2.50%)	(48.80%)
	RM1001 – RM2000	198	256	32	18	15	519
		(8.50%)	(10.90%)	(1.40%)	(0.80%)	(0.60%)	(22.20%)
	RM2001 – RM3999	141	244	42	22	36	485
		(6.00%)	(10.40%)	(1.80%)	(0.90%)	(1.50%)	(20.70%)
	Above RM4000	45	89	25	11	25	195
		(1.90%)	(3.80%)	(1.10%)	(0.50%)	(1.10%)	(8.30%)
Education level	No formal education	24	24	8	8	4	68
		(1.00%)	(1.00%)	(0.30%)	(0.30%)	(0.20%)	(2.90%)

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	Primary	61	49	11	7	9	137
		(2.60%)	(2.10%)	(0.50%)	(0.30%)	(0.40%)	(5.80%)
	Secondary/Diploma	501	762	74	90	84	1511
		(21.40%)	(32.50%)	(3.20%)	(3.80%)	(3.60%)	(64.50%)
	Degree	214	280	50	16	34	594
		(9.10%)	(12.00%)	(2.10%)	(0.70%)	(1.50%)	(25.40%)
	Postgraduate Degree	4	20	4	0	4	32
		(0.20%)	(0.90%)	(0.20%)	(0.00%)	(0.20%)	(1.40%)

It was found that there are several subjects in schools which require the students to use internet as medium of learning. For students in the institution of higher learnings subscriptions are needed to access information. The websites enable them to download the learning materials using broadband. On average, these students subscription fee rate is RM 100 and below. For professional category the main subscription among professionals are between RM 61 until RM 100 monthly. There are also customers mainly parents who are willing to pay for a higher rate or have multiple subscriptions in order to guarantee the constant, continuous and steady data stream necessary to complete their assignments. This is due to poor service quality of the operators. The students cannot tolerate poor services in order for them to accomplish their assignments. Based on the income category, it is found that customers who earn below RM1000 monthly are willing to pay service fee RM100 a month. The reason is that there is no other cheaper option and the willingness to subscribe to this category is considerably high. 2.5% customer in this category pays between RM181 to RM220 a month. Those incomes between RM1001 to RM2000 a month, 19.4% of customers of this category pay subscription fee RM100 and below.

There are packages available which allow them to share services with other users or using the fixed line broadband at homes for multiple purposes and users. Compared to those customers who have lesser knowledge on broadband, multiple subscriptions line is offered most probably due to poor quality service. Students and those who have a secondary/diploma and bachelor degree are the highest subscribers. This is due to service operators who offerring special packages for students. Celcom as the most subscribed to provider, for example, offers package as low as RM68 monthly for secondary school children and bachelor degree students aged below 25 years old.

4.6.3 Lack of coverage in remote area

Rural households are found to overwhelmingly have less access to in-home Internet than urban households across all household types. As distance education is beneficial to economic well-being, continuation of this rural-urban dichotomy could put rural households at a disadvantage. Once a household has in-home Internet access, the upgrade to broadband is seemingly not affected by household composition. The rural-urban gap, however, is more extreme and broadband's role in distance education would sideline rural households.

Majority of the respondents regard coverage in Sabah as 'poor' in terms of service and broadband infrastructure. This fact cannot be denied that there are high number of clients but service given still remain substandard. The research finds that customers state that they need and want to subscribe to broadband services to access crucial information however the services available are 'extremely disappointing'. Their willingness to pay package rate offered by services operator does not given the returns expected. In the rural area of zones A, B, C, D clustered in this study there are significant lack of broadband infrastructure. Telecommunication towers which are still low in numbers and telco lacks commitment to upgrade their service contribute to low uptake factor of broadband penetration in Sabah. For mobile broadband customers, frequent change of services operator is due to unstable broadband service quality. In fact respondents in certain areas in Sabah assume broadband service such as dial-up takes to much time to access websites.

4.6.4 Affordability is not an issue in this part of Malaysia

Majority of the respondents expressed their intention to subscribe broadband is based on the quality of services provided by the operators. Their readiness to subscribe are not due to price factors of service packages made available. Based on the demography of respondents in this study many respondents with relatively low incomes are ready to subscribe broadband service for their children at home, especially in the suburban and rural areas. 48.8% respondents in this study that get income under RM1000.00 one month,

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especially respondent from zone A, B, C and D still subscribe to broadband services. The children in the household is a contributing factor in a household's having in-home Internet access. One way in which in-home Internet access may improve household well-being is through educational programs. The Internet has increased course offerings for students in primary, secondary, postsecondary, and continuing education programs, especially those attending small, isolated rural primary and secondary schools. The Internet has also improved interaction among students, parents, teachers, and school administrators in primary and secondary education. This is especially significant as other studies have shown the importance of parental involvement in their children's education. As a result, education programs drive household demand for in-home Internet access. Analysis of the data shows households with children have higher rates of in-home Internet access and households with teenage children are the most likely to have it.

4.6.5 Those who can afford need better quality coverage

In all areas regardless urban, suburban or rural areas, broadband wireless access is by far the easiest and most cost-effective way to realize high performance network. From customers' point of view, the main criteria for operator selection is based on excellent coverage and data high speed as motivation for their subscriptions. Service payment rates can be concluded as not the main hindrance for them. This is because package prepared by services operator do not differ much in terms of pricing. Thus, telcos must plan to actively engage their rural customers rather than just providing sales outlets. The companies must aim to get recommended by the user communities in the rural areas as they play a vital role in deciding whether the customer remain with a particular operator or move to a other competitors.

5.0 CONCLUSIONS

Mobile roadband connections are far popular among in-home Internet access across all work force categories. Regardless of work force status, whether the household is in an urban or rural location, if a household has in-home Internet access, the households will most likely also have broadband connections. The data, however, also suggest that some of the shortfall in rural Internet activity may be due to other factors that affect the decision to get a broadband connection. These factors include the lower average income for rural households, higher average age of the rural population, and lesser educational level of rural residents as compared to their urban counterparts.

The data shows that 177 respondents (7.5%) although earning RM1000 or less monthly are subscribing to packages taking up 10% or more of their incomes. 71% of respondents with income of RM2000 or less subscribes to broadband services. Several subjects in schools requires the students to use internet as medium of learning and source of information. Parents spend money to overcome poor network services to ensure their children complete their assignments. Subscribers with school-going children are willing to pay for a higher rate and have multiple subscriptions in order to guarantee the constant, continual and steady data stream. This shows certain similarity with our previous study of users of unlicensed parabola-delivered television broadcast – the need for information and entertainment drives the willingness to invest in equipments and services. It is not the quality of Internet service but the need for service regardless of quality that accounts for broadband subscriptions in rural and remote areas. Hands are tied by needs driven by socio-economic policies of the government of the day which, in certain ways, are partly influenced by the commercial sectors.

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