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Consumer demand for the mobile Internet in a greenfield emerging market: The case of Myanmar

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Consumer demand for the mobile Internet in a greenfield emerging market: The case of Myanmar¹

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Abstract

This paper offers a baseline for understanding the mobile Internet market in Myanmar before widespread adoption occurs. The purpose of the paper is to explore consumers' initial demand for existing and future mobile services; the behaviour of mobile users and mobile Internet usage in such a greenfield market where mobile phone services are still emerging. The results of this study are aimed to gain insight into the current dynamics that may become more important when mobile networks and services are in place in near future. The results show that communications is the primary motive for both mobile phone users and non-users. Unexpectedly, gaining help in an urgent situation is the most vital motivation for mobile owners in Myanmar. It is surprising to see that social networking services were highly ranked compared to other mobile services available today. Respondents predict that the future services they will be most willing to use include access to community information and healthcare services. Interestingly, the mobile Internet is the most frequently used Internet services in Myanmar. In addition, demographic factors have a significant effect on mobile Internet usage. Lastly, the study contributes some thoughts for future research.

Keywords: mobile services, consumer demand, Myanmar

¹ This paper is based on the research conducted by the first and second author for the second edition of Pacific Telecommunications Council Broadband Reports, Myanmar: Telecoms' Last Frontier, available at www.ptc.org.

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1. Introduction

The Internet penetration has grown exponentially on a global scale in the past two decades. By the end of 2014, the ITU (2014a) estimates that the global Internet users will reach nearly 3 billion, which is 40% of the world's population. And, there will be 2.3 billion mobile Internet subscribers globally, 55% of them are from developing world. The rapid development of wireless devices and technologies has shifted usage from the fixed Internet to the mobile Internet, especially in developing nations. Globally, mobile broadband is the fastest growing market segment. In recent years, much effort has been put into the development of the mobile communication sector by the researchers, companies, institutions and governments since mobile broadband can have substantial positive impact on economic development (Kenny & Keremane, 2007; Andrianaivo & Kpodar, 2011; Ericsson, 2013; ACMA, 2014). However, the mobile telecommunication markets in developing countries are relatively under studied, especially that of Myanmar.

Myanmar is the second largest country in Southeast Asia with a total land area of 676,578 square kilometres and total population of 53.26 million (World Bank, 2014). Its neighbouring countries are Bangladesh, India, the People's Republic of China, Lao People's Democratic Republic (Lao PDR) and Thailand. Hence, it is located at the heart of the world's fastest growing economic region. After being isolated by military dictatorship for 59 years, the country opened up again in 2011. Myanmar begins its reforms in the digital age; therefore, it has a greenfield advantage to leapfrog over intermediate stages of economic, political and social development.

Myanmar as a least-developed nation with low Internet penetration (10%) and a market of over 50 million customers has a potential telecom market with enormous growth potential. The country has been the focus of massive interest from global telecom providers due to this unique opportunity to build networks and services for a significant number of customers who have not yet adopted mobile technology. In the world of telecommunications, Myanmar is widely described as the "last frontier" for Asian telecom given the scarcity of such markets with low penetration, yet substantial growth potential to the mobile industry (Fife, 2014). After liberalization of its telecom sector and the granting of nationwide licences to two international firms and two local operators, Myanmar's telecom sector is expected to explode in the next few years with mobile driving Internet penetration.

The historical features of mobile market are reflected in usage since mobile phone provides the users with various functions and services. The variables, such as performance, quality, cost, privacy, accessibility etc., can influence the users to either adopt or reject the mobile Internet usage. Many studies have focused on mobile Internet adopters (Bigné, Ruiz & Sanz, 2007; Westlund & Bohlin, 2008), what are their profile characteristics (Paireekreng & Wong, 2009; Assimakopoulos, 2013), what are the factors that determine their profile (Papaioannou, Georgiadis, Kourouthanassis & Giaglis, 2011) and the changes in perceptions of mobile Internet users and the value of technological features (Suominen, Hyrynsalmi & Knuutila, 2014). The study of Lim, Bentley, Kanakam, Ishikawa and Honiden (2014) investigates whether there are any differences in attitudes of mobile Internet services users across 15 countries. The results show that user behavior differs significantly across countries. For example, users from USA are more likely to use medical services, users from UK and Canada are more sensitive to price, users from Brazil and Spain are more likely to stop using services due to low performance and usability.

Currently, there are only a handful of studies related to Myanmar (Ericsson, 2012; Chhor et al., 2013; Evans, 2013; Goeres, White & Tun, 2013; Fife, 2014). Given the fact that there is very little data available and a near complete lack of any consumer surveys, the purpose of the study is to explore the ways people in Myanmar own and use mobile phones, the degree of mobile Internet services usage and their interest in mobile services coming in the future. In Myanmar, many other forms of communication are poor such as roads, postal services, telegrams and fixed-line phones; it is interesting to investigate how the population value mobile communications. The study is also intended to provide a baseline before widespread adoption occurs.

The research questions are as follows:

- RQ 1: What is the role and significance of owning a mobile phone and using mobile communication services for mobile phone owners and non-owners?
- RQ 2: How do Burmese people value mobile device features?
- RQ 3: Do demographic factors affect mobile Internet usage?

The paper is organized as follows. Section 2 describes briefly the background of the mobile telecommunications sector in Myanmar. Section 3 illustrates how our user survey was conducted and data was collected. Results are presented and chi-square analysis was performed in Section

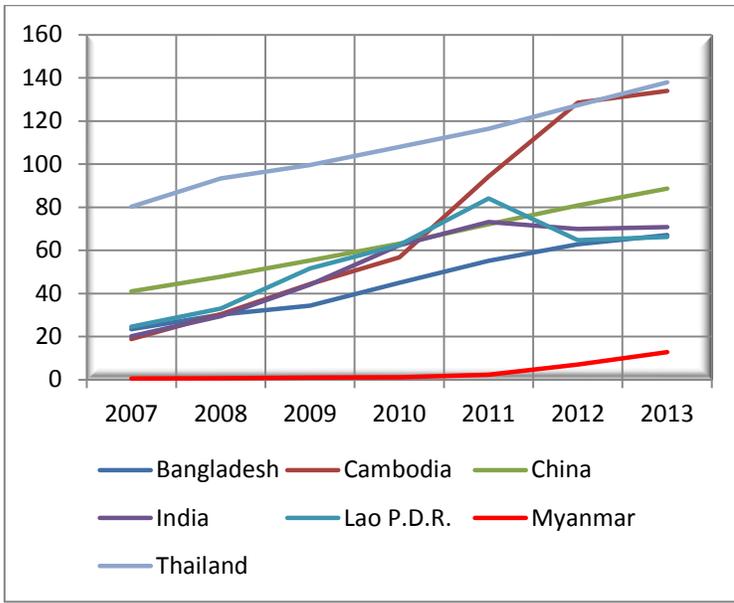
4. Finally, Section 5 concludes and presents limitations while Section 6 provides implications for future research.

2. Myanmar's mobile telecommunications sector

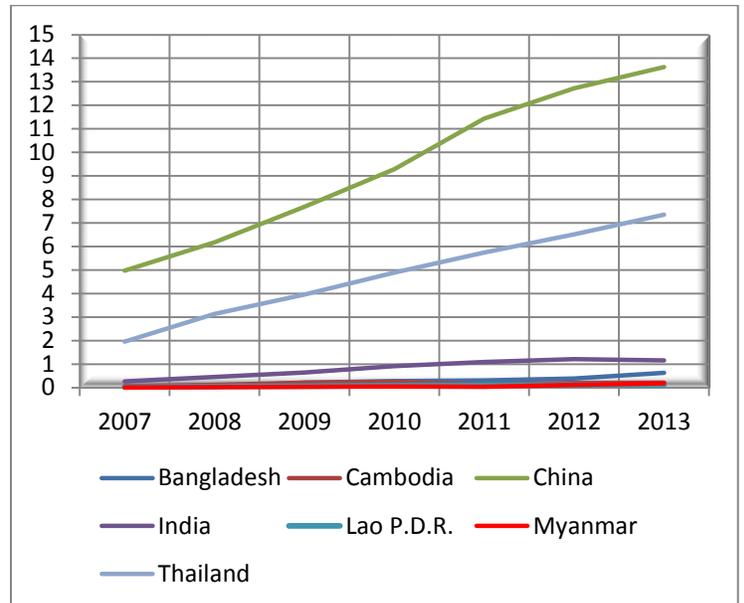
Cut off from the rest of the world for many decades, the country's former economy and social development was turned into the backwater of Asia. In 2012, Myanmar was one of the least developed telecommunications markets in Asia (Goeres et al., 2013). With regard to the current ICT development in Myanmar, the disparity between Myanmar and its neighbouring countries is still very significant, notably for mobile penetration. The comparison can be seen in Fig. 1.

Fig. 1 presents ITU indicators showing the gaps between neighbouring countries with regards to their ICT diffusion. Among neighbouring countries, China and Thailand are leading in every aspect of ICT. The severe gaps between Myanmar and its neighbouring countries can be found in levels of mobile-cellular telephone subscription. Neighbouring countries had achieved more than 20% mobile-cellular telephone subscription in 2007, while Myanmar has just achieved around 10% in 2013. It means that Myanmar will require many decades to catch up with its neighbouring countries. However, in case of Cambodia, its mobile penetration rate has increased dramatically in the past 7 years, jumping from around 20% in 2007 to 134% in 2013. If the rate of mobile penetration in Myanmar will rise rapidly as Cambodia, the gap between Myanmar and its neighbouring countries will be about ten years.

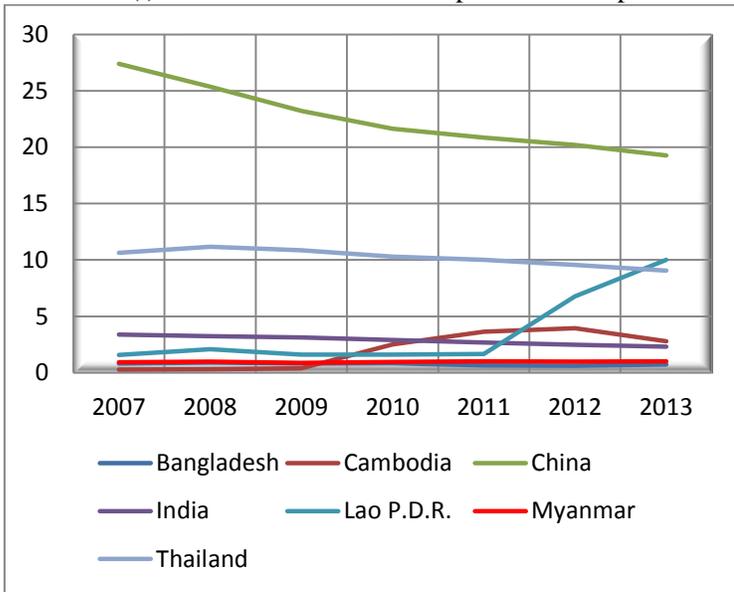
A wider disparity can also be seen between countries in an indicator related to the number of individuals using the Internet. In 2007-2013, the number of individuals using the Internet in China has increased 30%, whereas that in India, Lao P.D.R and Thailand has grown 11%, 11% and 9% respectively. However, Myanmar has just achieved the growth of 1% in the past 7 years. Besides China and Thailand, the other two indicators show a small gap between neighbouring countries in fixed broadband subscription and fixed-telephone subscription. The broadband penetration rate of China and Thailand has risen 9% and 5% respectively, while the remaining countries have increased less than 1%. It can be seen that the broadband penetration rate is slower than mobile penetration rate in Southeast Asia.



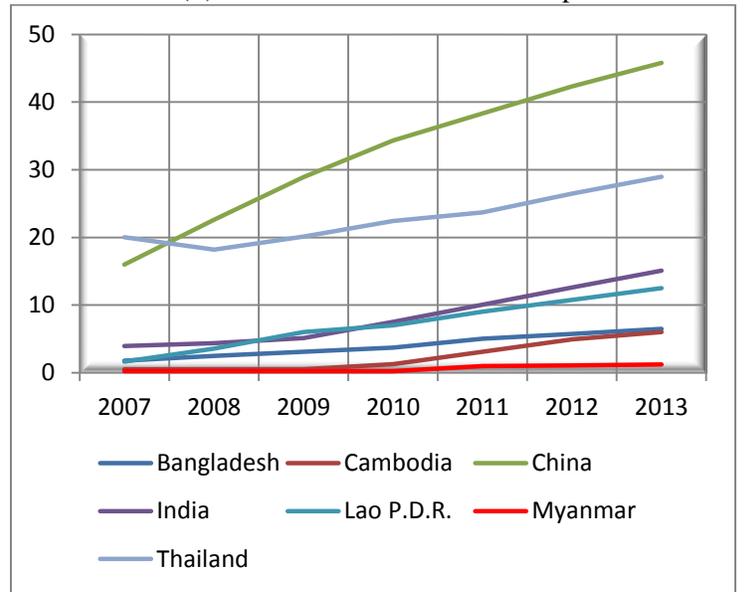
(i) Mobile-cellular telephone subscription



(ii) Fixed broadband subscription



(iii) Fixed-telephone subscription



(iv) Individual using the Internet

Source: ITU (2014b)

Fig. 1. Penetration rate of ICT sectors in neighbouring countries (2007 – 2012)

2.1 Mobile networks in the Urban Areas

Until recently, Myanmar Post and Telecommunication (MPT) was the country's sole operator providing mobile services, mainly in the major urban areas Yangon, Mandalay and Naypyidaw. In the 1990's, MPT launched a variety of cellular systems in the major urban areas, such as Advanced Mobile Phone Service (AMPS), Digital Advanced Mobile Phone Service (D-AMPS),

International Direct Dialling Service, Wireless in the Local Loop (WLL) automatic radio telephone systems (TDMA), Digital European Cordless Telecommunications (DECT) radio telephone system and CDMA (See Table 1). MPT launched GSM in Yangon and Mandalay in 2002, and W-CDMA in 2008. However, 3G was introduced on a limited basis due to insufficient UMTS infrastructure. Fourth generation network (LTE, 1800 MHz) is still at a trial stage. Cooperating with France Telecom/Orange, MPT has launched international roaming services for GSM and WCDMA in the first quarter of 2014 (Evans, 2013; TeleGeography, 2013; Bushell-Embling, 2014; Min, Fife & Bohlin, 2014).

Table 1. Mobile services in Myanmar

Mobile Service	Generation	Frequency	Service Provider	Launch
AMPS	1G	800 MHz	MPT	1993
D-AMPS	2G	800 MHz	MPT	1993
TDMA	2G	800 MHz	MPT	1995
CDMA	2G	800 MHz/ 450 MHz	MPT	1997/ 2008
GSM	2G	900 MHz	MPT	2002
W-CDMA	3G	2100 MHz	MPT	2008
LTE	4G	1800 MHz	MPT	Trail

Source: Min et al. (2014)

In January 2014, the government officially issued four mobile licences: two to foreign operators (Telenor and Ooredoo) and two to native operators MPT and Yatanarpon Teleport (YPT). The new mobile carriers, Telenor and Ooredoo have decided to begin with 2G and 3G networks, offering mainly voice, SMS and mobile data services in the urban and rural areas. However, Telenor and Ooredoo have different network strategies with regards to their rollouts. Telenor has intended to implement 2G network in rural areas and both 2G and 3G networks in urban centers. On the other hand, Ooredoo has decided to jump directly to 3G networks, providing both 3G and 4G networks in urban areas and 3G in rural areas (Fife, 2014). In August 2014, Ooredoo launched its first commercial service in three major cities, which is, selling its low-cost data-enabled SIM cards with a 3G connection in Yangon, Mandalay and Naypyidaw (Kuwait Times, 2014). Telenor is expected to launch its mobile networks, offering both 2G and 3G in these major cities by the end of September (Fierce Wireless Europe, 2014).

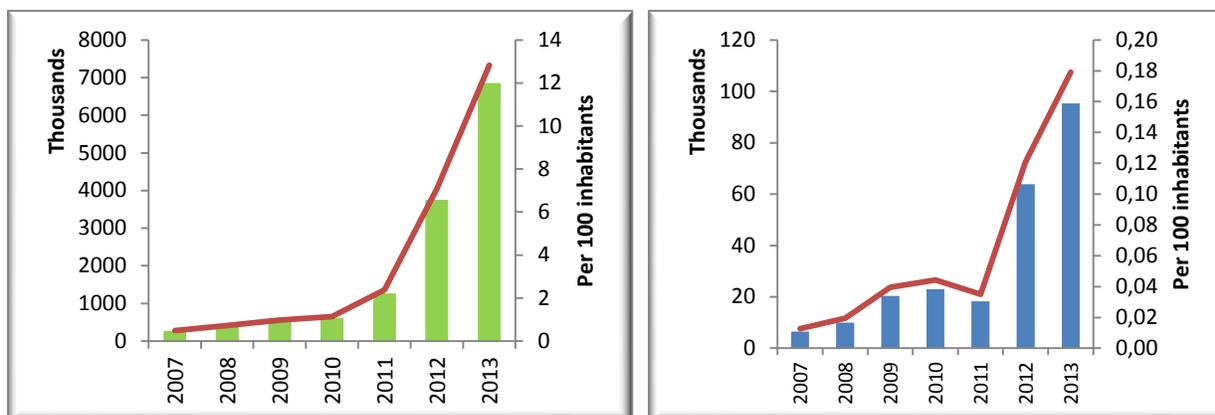
2.2 SIM card pricing

In past years, mobile adoption in Myanmar was limited by the high price of its SIM cards. In 2000, MPT issued CDMA 800MHz SIM cards with retail price ranging from MMK 2.5 million (US\$2,500) to MMK 5 million (US\$5,000). GSM SIM cards were introduced later in 2002. The price was set at MMK 500,000 (US\$500) initially, then rose to MMK 1.5 million (US\$1,500). In addition, the cost of registering SIM cards was also very expensive; it is approximately US\$150–200. The waiting period could take up to 2 years. Hence, mobile communication had been a relatively rare commodity in Myanmar. In 2011, MPT reduced the price of SIM cards from MMK 1.5 million (US\$1,500) to MMK 500,000 (US\$500) and then to MMK 200,000 (US\$200) in 2012 (Nomura Research, 2012; Evans, 2013; The Nation, 2014).

After the announcement of the plan to liberalize its telecom sector, the incumbent carrier began to prepare for the entry of foreign players. In 2013, MPT issued first-ever low-priced CDMA 800MHz SIM cards at the price of MMK 1,500 (US\$1.5). 350,000 SIM cards were sold through a public lottery and further batches were distributed across the country on monthly basis (Fife, 2014). In August 2014, Ooredoo launched 3G SIM cards for MMK 1,500 (US\$1.5), whereas, Telenor is expected to sell 2G and 3G services with a comparable price by the end of September (Kuwait Times, 2014; Fierce Wireless Europe, 2014). This leads to bringing an affordable and competitive mobile network in Myanmar.

2.3 Mobile and Internet penetration

Myanmar has relatively poor and insufficient telecom infrastructure. The infrastructures are mainly located between the larger cities of Yangon, Nay Pyi Daw and Mandalay; with approximately 400 base stations, 1800 towers and 15,000 km of fiber (TMT Finance, 2013). Capacity is very limited due to a lack of submarine cable links (Nomura Research, 2012). There are about 2.8 million telephone lines, out of which 2 million are mobile and the rest are fixed lines. The teledensity is the lowest in the ASEAN, at only 1.32 % for mobile and fixed combined (Fife, 2014). The market penetration in 2012 was 5.44 million subscribers according to official Myanmar government reports (Nomura Research, 2012).



(i) Mobile-cellular telephone subscriptions

(ii) Fixed-broadband subscriptions

Source: ITU (2014b)

Fig. 2. Mobile and fixed-broadband subscriptions, total and per 100 inhabitants, 2007–2013

The mobile and fixed-broadband penetration rates during 2007–2013 are illustrated in Fig. 2. It can be seen that there was a big gap between diffusions of mobile communication and broadband. In 2013, the total number of subscriptions of mobile-cellular telephone has reached nearly 7 million, whereas, fixed-broadband subscriptions have just approached around 95,000. Hence, the penetration of mobile communication is faster than that of fixed-broadband. During 2007–2010, the mobile-cellular telephone subscription has growth gradually. However, the growth rate has accelerated dramatically in the last two years, jumping from around 2.4% in 2011 to 12.8% in 2013, which is approximately 6 times. As for fixed-broadband subscriptions, it has just increased from 0.03% to 0.18% in 2011–2013. The number of subscribers in different mobile technologies can be seen in Table 2. The most subscribed mobile technologies in Myanmar are GSM and CDMA 2000 (450 MHz) while CDMA 2000 (450 MHz) is widely available across the country.

Table 2. Mobile subscribers in Myanmar (As of 2011)

Technology	Subscribers	Number of Cities
GSM	836 967	98
W-CDMA	28 000	1
CDMA 2000 (450 MHz)	698 060	210
CDMA 2000 (800 MHz)	382 750	19
Multi-carrier WiLL	150 000	12

Source: Min et al. (2014)

3. Methodology

3.1 User Survey

A questionnaire was distributed to mobile phone users and non-users to gather baseline data on usage and preferences. The survey included questions regarding the demographics of the respondents, mobile phone usage, users' value towards mobile phones, and the frequency of use of mobile Internet services, Internet usage and computer usage. The questionnaire was translated to Burmese and pre-tested with 10 selected individuals who were familiar with mobile and Internet usage. The survey was revised according to their feedback.

3.2 Data collection

Although the majority of the population is located in rural areas (60–70%), the mobile usage in rural is still minimal so the study covered only major urban areas where mobile networks are available. Hence, the data was collected in Yangon and Mandalay. These two cities were chosen, due to the fact that the highest density of mobile phone users is located in these sites. The survey was carried out face-to-face and completed in January 2014. A convenience sampling method was deployed. The respondents were collected in cyber-cafes and shopping centres and they were given a small incentive. Out of 350 questionnaires, 8 responses were excluded due to incomplete responses. The remaining 342 respondents were used in the data analysis. The sample descriptive statistics of the respondents are listed in Table 3.

In brief, the majority of respondents are female, young and have a high school level education. Sixty-two percent of the respondents own a mobile phone. Among them, 86% of mobile phone owners use smartphones. Over 60% of the respondents do not own a laptop while nearly 80% of them do not have Internet access at home. Hence, access to the Internet is largely based on mobile phones. Most survey respondents (almost 90%) use prepaid cell phone plans while only a minority have monthly paid plans. The mean monthly expense for mobile phone users is MMK 18,756 (US\$18.76) in a range from MMK 1,000 (US\$1) to MMK 100,000 (US\$100) (See Table 4). It can be seen in Fig. 3 that there exists some outliers. However, the effect of outliers on average monthly expense is not significant.

Table 3. Respondent characteristics (total = 342)

Age	Percentage (%)	Mobile phone	Percentage (%)
Under 18	3.6	Owners	62.3
18–24	27.3	Non-owners	37.7
25–34	31.8		
35–49	28.5	Smartphone	
50–65	8.1	Users	85.5
Above 65	0.6	Non-users	7.3
		Not sure	7.3
Education			
High School	32.8	Laptop	
Bachelor	24.1	Owners	34.7
Diploma	4.0	Non-owners	65.3
Post-graduate	22.3		
Others	16.7	Internet at home	
		Yes	20.6
		No	79.4
Gender			
Male	39.3		
Female	60.7	Mobile phone subscription	
		Prepaid	88.8
		Monthly paid	11.2

Table 4. Descriptive statistics of respondents monthly expenses

Expense per month (Kyats)	N	Minimum	Maximum	Mean	Std. Deviation
	209*	1,000	100,000	18,756	15,285

* Missing data are excluded.

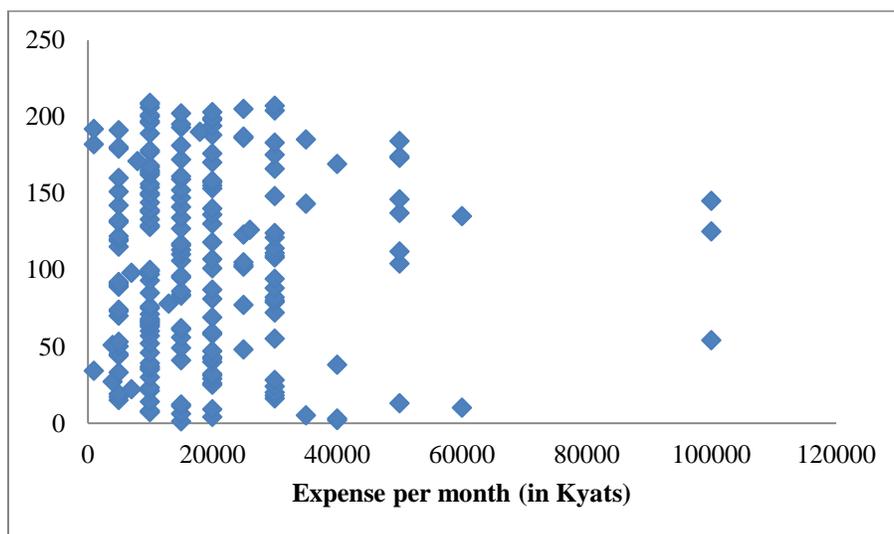


Fig. 3. Outliers

4. Findings and discussions

Findings indicate that the vital obstacle for Burmese people owning a mobile phone is their ability to pay even though the survey was done in the major cities where incomes are expected to be higher than the rest of the country. The respondents' main reason for not owning a mobile phone is that it is too expensive. In addition to mobile handset prices, people in Myanmar also need to take the price of SIM card in consideration in order to own a mobile phone. As mentioned in Section 2.2, SIM card prices used to be very high. Until recently, the price of SIM cards was reduced to MMK 1,500 (US\$1.5). However, users still have to pay higher price due to the shortage of available SIM cards in the market (Fife, 2014). Another reported reason why people do not own a mobile phone is they share a phone owned by someone else. This reflects cost constraints as well as culture of Burmese people, sharing mobile phones with friends and family.

4.1 Role and significance of owning mobile phone and its mobile communication services

Fig. 4 compares the types of mobile communication services that mobile owners use and non-mobile owners are willing to use at the point when they have a mobile phone. Interestingly, mobile services such as social networking and entertainment (both account for 25%) appear to be key drivers of mobile phone use. Also, mobile owners use the phone for the following services: communication (18%), getting information (17%) and web browsing (15%). As for non-users, the primary need for owning a mobile phone is communication (accounting for 45%), followed by info services (21%), social networking (13%) and then by entertainment (12%). Noteworthy, the result points out that accessing information such as local and national news over the mobile phone is a considerably important service for both users and non-users. In the past, all news media were strictly controlled and censored by the military regime. With current reforms, the government has eased its media control. Hence, the use of the mobile phone for news fills demand in the vacuum of other alternatives. In addition, Burmese people, especially the younger generation, are gaining awareness of the importance of new media in politics. This helps explain the rapid growth of interest in accessing news through a digital mobile medium.

In Myanmar, the major motivational factors for people to use a mobile phone are getting assistance in an urgent situation (96%), usefulness (95%), communication (94%), saving time (92%) and instant access to information (90%) (See Fig. 5). The unexpected finding is that gaining help in an urgent situation is the most crucial motivation for mobile owners. This can be explained

by the fact that Myanmar has a low level of social capital, that is, poor health care and poor transportation facilities. Compared to the rest of the world, well-being in Myanmar is relatively low (OECD, 2013). In an emergency situation, Burmese people reach out their families and friends to get help. Thus, the mobile phone acts as a tool to find assistance.

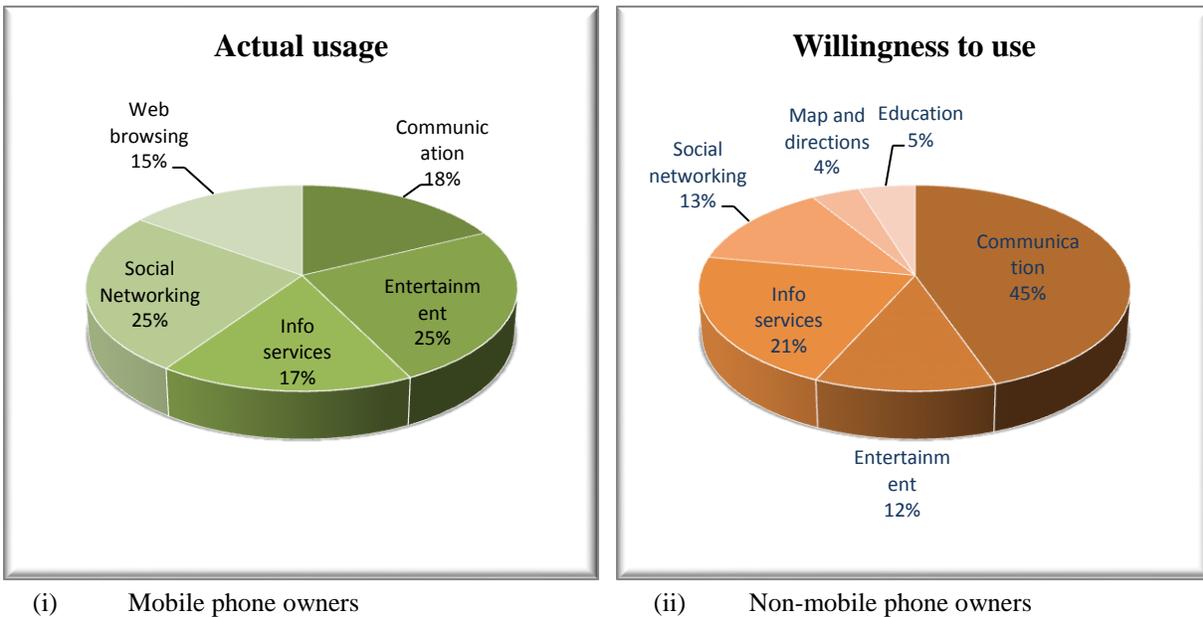
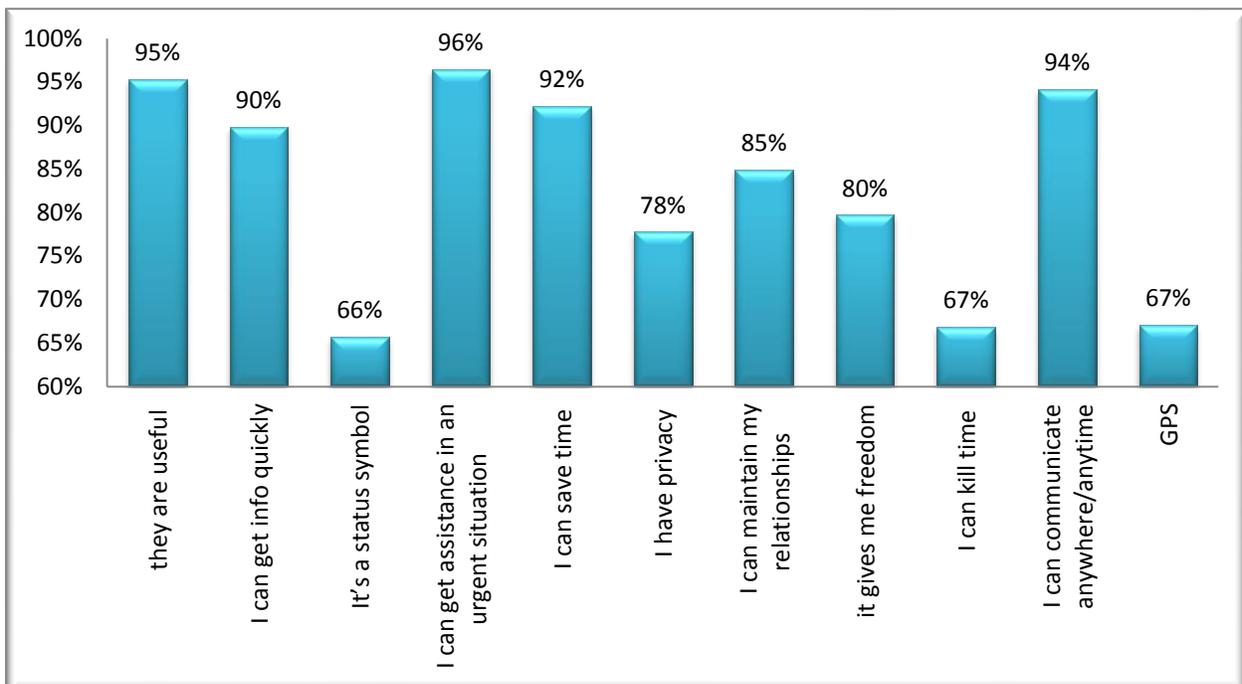


Fig. 4. Comparison of mobile services for users and non-users



Note: Chart shows percentage of respondents agreeing to some extent or to a great extent

Fig. 5. Motivations to use mobile phone

Fig. 6 presents the frequency usage of mobile communication services in a month by mobile users. The most frequently used mobile services are voice calling (83%), texting (52%) and social networking (43%). As predicted, mobile phones are mostly used for communication. However, social networking service is an unexpected stand out in the study. In Myanmar, the use of social networking is rapidly growing and it is widely used for a variety of activities such as communicating with friends and relatives, commercial transactions, news media and discussion of debated topics. This can be explained by the fact that Myanmar still lacks access to many forms of social interaction and has limited transport alternatives. Therefore, social networking services fulfil the need of a disconnected society to stay connected with peers and share information. Furthermore, it is not surprising to see that the least used mobile communication services are Blogging, IP Telephony and Live chat that require a good Internet connection.

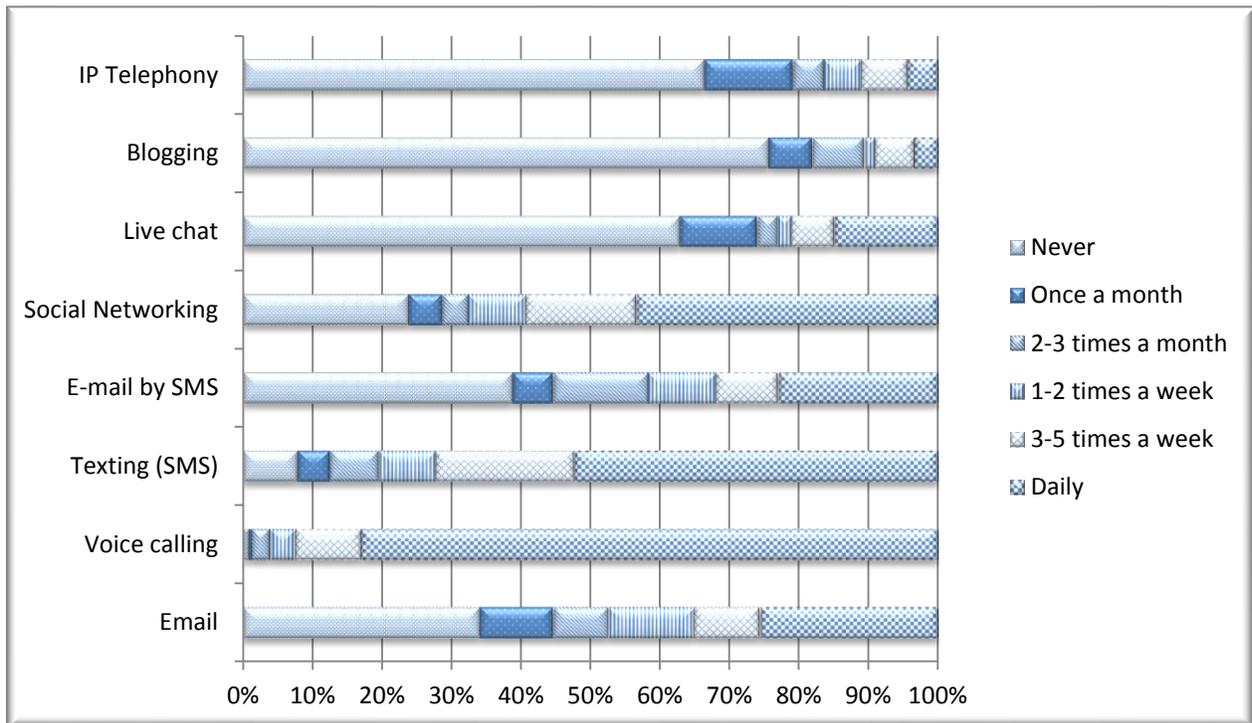


Fig. 6. Usage of mobile communication services in a month

A variety of categories of mobile Internet services that respondents are willing to use if they are available in the future are shown in Fig. 7. Getting community information gets a high rank among the proposed services, accounting for nearly 40%. Almost one-third of respondents want to use healthcare services on their phone, while others are finding jobs opportunities and mobile money which accounts for 23% and 6% respectively. In-line with previous result, it is not surprising to see

that the primary mobile Internet services which consumers would use in the future are related to media and healthcare. This reflects upon Burmese people's desire to fill the need of a disconnected society and get better healthcare. At present, very little people are willing to use mobile banking services. This can be explained by the fact that Myanmar's banking infrastructure is currently in the transitional state and mobile banking and payment services are still in its initial stages of development. Thus, people are not yet aware of these services. However, the government is supporting mobile banking and payment services with its current reform. In addition, one of foreign operator (Telenor) plans to offer mobile banking services to its customers (Fife, 2014). When banking infrastructure and mobile networks are implemented, the use of mobile banking services in Myanmar will likely be dramatically increased.

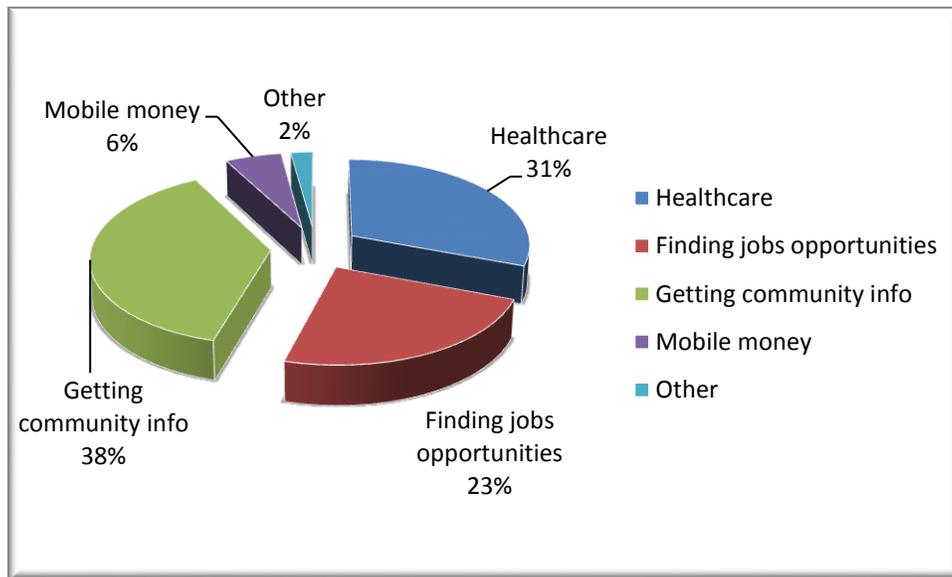


Fig. 7. Willingness to use future mobile Internet services

4.2 The value of mobile device features

Presented in Fig. 8, our study shows that the ability to simply make calls is the most important feature of a mobile phone in Myanmar. The second most important feature is ease of use, which is considered a critical device feature across all demographic groups and markets. Since the majority of people access the Internet via their phone, it is not surprising to find that users do value Internet access, but we found it surprising that it was ranked higher than affordability. Unlike some other markets where voice calls are taken for granted, Burmese people vastly value high quality of call performance. This can be explained by the fact that the importance of call performance is indicative of the lack of alternatives (landline access) and the difficulty of making calls in the overburdened

mobile networks. However, it can be expected that the values shown below may shift once access is improved through the construction of new networks.

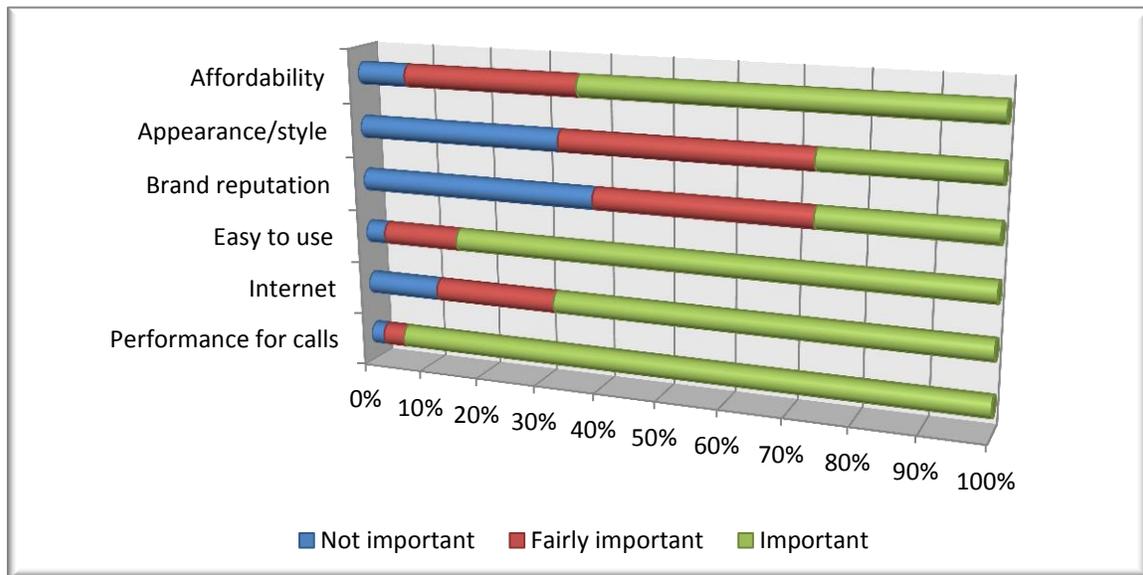


Fig. 8. Features valued in a mobile phone

4.3 Relationship between demographic factors and mobile Internet usage

The effect of demographic factors such as age, gender and education on mobile Internet usage was tested as in Table 5.

Table 5. Chi-square statistics

Hypothesis	χ^2	df	Sig.
Age → Mobile Internet usage	28.0166	5	.000***
Gender → Mobile Internet usage	8.2438	1	.004***
Education → Mobile Internet usage	72.3989	4	.000***

Note: *** represent significance at 1% levels.

The results indicate that the relationship between demographic factors and the usage of mobile Internet is statistically significant. The study shows that the respondents who are aged less than 18 and more than 50 are less likely to access mobile Internet compared with respondents who are aged from 18 to 49. Thus, the core segment for mobile Internet usage in this study is people of university and working age (18–34 years old). In terms of gender, female respondents are more likely to access mobile Internet than male respondents. Regards to level of education,

respondents with a higher education are more likely to use mobile Internet. This suggests that the diffusion of mobile Internet use is concentrated among “young and educated people”. Thus, digital literacy is also an important factor to consider in the study of Internet usage. Fife (2014) points out that digital illiteracy remains a major obstacle for Internet penetration in South Asia. In this study, the surveyed cities (Yangon and Mandalay) have a high literacy rate. However, the literacy rate in rural areas is relatively low. When the networks have rolled out in rural areas, much will need to be done by the government to encourage digital literacy and support Internet usage in rural areas.

5. Conclusions

The aim of the paper is to provide a snapshot view of initial demand for mobile services, future mobile services, behaviour of mobile users and mobile Internet usage in a unique market where mobile phone services are in a nascent stage. These results are intended to capture some of the current dynamics that may become more significant when mobile networks are rolled out in coming years. As expected, communications is the primary motive for both mobile phone users and non-users. Unexpectedly, gaining help in an urgent situation is the most crucial motivation for mobile owners in Myanmar. Surprisingly, social networking service was highly ranked among other mobile services. Getting community information and healthcare services are the most likely services that the respondents are willing to use in the future. It is interesting to see that there exists the sharing behaviour of mobile phones with friends and family in Myanmar just like Africa (Vodafone Group, 2005). Interestingly, the mobile Internet is the most frequently used Internet services in Myanmar (cf. Table 3). And, age, gender and education have a significant effect on the usage of mobile Internet. There are some limitations regarding this study. The findings only reflect mobile adoption in two major cities. The sample cannot represent the whole population in Myanmar, particularly the rural experience. Since the study is exploratory, the results should be considered preliminary, but provides a guide for further nationally representative surveys which are needed for better understanding of mobile adoption in Myanmar.

6. Implications for future research

Myanmar market is a singular opportunity to study adoption as it develops from the ground up. Currently, the telecom market in Myanmar is at the early stage of liberalization. Competition

is just yet introduced and network infrastructures are just started to rollout by the new entrants in the urban areas – mainly, the triangle between Mandalay, Yangon and Naypyidaw, then will be follow to some rural areas in 2015. Myanmar government has targeted the operators to achieve goals of 45% teledensity in mobile broadband and 15% in fixed broadband by 2015 and making telecommunication services available to the public at affordable prices in both urban and rural areas (World Bank, 2013; Fife, 2014). At present, rural areas are underserved and there is very little data on the rural market and potential for adoption. Since the majority of Burmese people live in rural areas, the further study should investigate the use of mobile phones and mobile services; user attitudes and valued features of mobile device; and mobile Internet usage in rural communities.

Additional research on changes in consumers' values and use patterns of mobile Internet, what cognitive perceptions are fulfilled and what factors determine the changes in consumers' usage behaviour would be interesting to study when the networks are rolled out widely across the country. Another interesting study would be the comparison of mobile Internet diffusion and adoption in both urban and rural areas before the rollout and after the rollout. These studies will help telecommunication providers better understand how consumers develop their perceptions of mobile Internet and how consumers contribute to adoption and usage and will provide implications for policy and managerial practice for telecommunication regulator and government. When competition is fully introduced in telecom market in Myanmar, the prices of calling plans and mobile Internet services will be important determinant factors which will influent consumers' decisions. Hence, these attributes should be considered in the future study of consumer demand of mobile Internet in this emerging market.

According to Andrianaivo and Kpodar (2011), mobile Internet are substitute service to fixed Internet in developing countries, whereas, it is a complementary service to fixed Internet in developed countries. The mobile Internet market is continuously growing around the world, especially in developing world, due to low investment, widespread adoption, powerful hand-held devices, advanced network technologies and a variety of mobile services and applications. Many experts believe that mobile Internet market will likely be the driver of Internet penetration in Myanmar (Ericsson, 2012; Chhor et al., 2013; Mullins, 2013). Thus, it is important to investigate whether mobile Internet is a substitute or complement for fixed Internet in Myanmar in the near

future. Another interesting area is to identify what are the drivers and barriers of both fixed and mobile broadband access and use in Myanmar where the broadband service is still emerging.

As mentioned in the earlier session, Ooredoo decided to leapfrog to 3G technology for both urban and rural areas, while Telenor focused 3G technology only in urban centers. At this moment, the 3G network is well established in three main cities and will be penetrating the rest of the market soon. It would be interesting to examine different reasons and factors affecting the take-up of 3G in Myanmar. Moreover, mobile Internet could be an alternative technology to bridge the digital divide between urban and rural areas in Myanmar. Further research on analysing the determinant factors of the digital divide is needed to gain understanding of the digital divide in Myanmar and how Myanmar can overcome the digital divide in both global and social respects; and to provide potential policies for bridging the digital divide in Myanmar.

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