SURVEY OF THE MOBILE PHONE PREFERENCES: A CST CASE STUDY

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ABSTRACT

Mobile phones are becoming core communication device in people's lives. The vast presence and significant impact on users' daily life make mobile phones important devices to study. In Bhutan, the living standard domains of populations are measured using material wellbeing. Mobile phone is appliance asset indicator of material wellbeing(K. Ura et al, 2012), which ensures the fulfillment of basic material needs for a comfortable living. Despite the growing importance of mobile phone technology there has, to date, been relatively little research on consumers' evaluation of the mobile phone, particularly in the Bhutanese context. In this study, we proposed to investigate mobile phone preferences scenario among users, its operating systems and platforms. The recent surveys provide inside into mobile phone choice, operating systems and platforms. To look into Bhutanese scenario, a quantitative study drawing data from 351 users was employed. The result showed 195 Nokia phones as the popular brand; 63 with Nokia featured phone, 81 with Nokia smart phones and 51 with smart phone with 3G. The second brand was 100 Samsung phones; 48 with featured phones, 9 with smart phones and 43 with smart phones with 3G. At district level, Trashigang stood as the highest responded, followed by Thimphu, Paro and Trongsa.

The implications drawn from the study is presented under recent surveys, case study and conclusion for future search suggestion of Interface Design and Development in mobile phones.

Keywords: Mobile phones, OS, 3G, mobile platform, communication device

1. INTRODUCTION

The mobile communication technology innovation is evolving as a result of consumers' changing needs and preferences. The mobile phone is viewed as "the most radiative domestic appliance ever invented" (Coghill, 2001). This device took over as one of the fastest household adoption rates of any technology in the world's modern history (Wikle, 1995-2005). World wide scenerio is changing, mobile phone subscriber has over taken fixed line subscribers(R. Rice and J. Katz, 2003). At the end of 2010, mobile subscription in developing country outnumbered that of the developed

countries (Kelly, 2009; S. Mokhlis, A.Y. Yaakop, 2012).

Mobile usage, which was restricted to urban areas a few years ago, has started penetrating the rural areas of Bhutan at a good pace. Mobile is now the biggest digital channel in Bhutan (Bhutan Project Report on emerging Mobile Applications Opportunity, June 2012). As of 2012, 92.8% of population own mobile phones (Bhutan Living Standards Survey Report, 2012). It is seen as a device that has the potential to break the rural–urban developmental gap by delivering information on a variety of economic and social issues (Jenny C. Aker and Isaac M. Mbiti, 2010).

Mobile phones facilitate need-based and user-centric information and services at an affordable cost to Bhutan's rural population, which was hitherto unreachable. As such, the study is proposed to study mobile phone preferences emerging in the new area of mobile phone users in Bhutan. It would help policymakers, mobile phone operators, researchers and technology transfer specialists frame developmental strategies in the future.

2. RECENT SURVEYS

2.1 MOBILE PHONE CHOICE

Riguelme (2001) examined choice between different mobile phone brands constructing 6 key attributes. The research showed that consumers with prior experience about a product can predict their choices relatively well.

Mobile phone choice and use has also been found to be related to prior consumption styles, According to the survey of Finnish young people aged 16-20, it was found that mobile phone choice and especially usage is consistent with the respondents' general consumption styles (Wilska, 2003). The research showed that addictive use was common among females and was related to trrendy and impulsive consumption styles. Instead, males were found to to have more technology enthusiasm and trend-consciousness.

A study by Liu (2002) showed that choices between mobile phone brands were affected by new technology features. The trend is actually not towards smaller size of phones but towards phones with better capability and larger screen.

H. Karjaluoto et al. (2005) studied factors that influence intention to acquire new mobile phones and factors that influence on mobile phone change among Finnish consummer. The study showed subjective choice situation, with general factors guiding the choice, while technical problems are the basic reason to change mobile phone; price, brand, interface and properties are the most influential factor affecting the actual choice between brands.

Yun, Han, Hong and Kim (2003) investigated the look-and-feel of fifty different mobile phones using a consumer survey. It was found that the image and impression characteristics of the products were closely related to the human-product interface specifications as well as overall shape of the product.

Han et al (2004) carried out a user study on 65 design features of 50 different mobile phones. They found that a number of design features contributed, such as phone size and weight, color, material, button shape and interface features.

Ling, Hwang and Salvendy (2005) in their investigation of the relationship among the design features of the cell phone and identification of the most important design features and design factors, they revealed that ten cell phone design features and five design factors significantly impact a user's satisfaction. The most important design features being the physical appearance, size and menu organization, which together account for 42% of the total variance of a user's overall satisfaction.

Ling et al (2006) examined users' preference levels with five mobile phone design features. The results showed that color screen, voice-activated dialing, and Internet browsing feature predict users' satisfaction level.

In their second study (Ling et al (2007), the researchers surveyed a sample of 1006 college students to identify their preference of the design features and overall satisfaction of their current mobile phone. Results showed users' satisfaction is grately affected by theh physical apperance, size and menu organization of the mobile phone.

Isiklar and Buyukozkan (2007) conducted a study to evaluate the mobile phone options in respect to the users' preferences order. It was found that functionality was the most preferred factor for all three phones under examination, with 'costomer excitement' and basic requirements being identified as leased influential.

Result of Mack and Sharples (2009) also highlight the importance of product attributed in predicting choice of mobile phones. Their experiment showed usability is important in mobile phone choice.

Mokhlis and Yaakop (2012) carried out research on the consumer choice criteria in mobile phone selection. Result of the study showed that seven factors characterize mobile phone choice: innovative features, image, price, personal recommendation, durability and portable aspects, media influence and post-sale service.

The study from this section revealed twelve factors characterize mobile phone choice: Basic requirements, Prior experience, Innovative features, Physical appearance, Price, Image, Personal recommendation, Durability, Brand, Portable aspects, Media influence, Sale services.

2.2. MOBILE PHONE OPERATING SYSTEM AND PLATFORM

Jindal (2012) carried out comparative study on iOS by Apple, Android by Google and Symbian of Nokia. Researched concluded iOS enjoys a large variety of functionalities needed by the customer. Android on other hand has a faster growing App store and is alredy having largest App stores to provide conglomeration in routine apps. Symbian, the largest market share holder is now on verge to be on history due to lacked of continours updations and support for application.

In a comparative analysis of identifying strength and weakness of future mobile platforms deploying six parameter, Java (J2ME) has been the dominating platforms for mobile. Researcher (Table 1) recommended Android to be future focus as Google/Android . is in initiative of developing an OS which can run on all mobile devices.

Parameter	iPhone	Android	Symbian	Blackberry	Windows Mobile	WebOS
Openness	*(*)	*****	****	**	***	*****
Look and feel	****(*)	****(*)	***	***(*)	**	****
Web integration	*****	*****	***	**	***	*****
Industry and community support	****	****	****	**	***(*)	*(*)
Future perspectives	***	*****	****[1]	**	***(*)	**
Deployed software development platform	Objective C, WRT widgets	Android Java, native C/C++/ ARM[1]	Qt, Python Mobile, J2ME, Flash Lite, Ruby, NET, WRT Widgets, Symbian C++, Standard C/C++	J2ME, WRT widgets	J2ME, Qt, Visual Basic, NET, Visual C++, WRT widgets, Flash Lite	WRT widgets

[1] Assuming Nokia and Samsung will not discontinue their work on Symbian, despite the rumours of lack of support in the coming years

Table 1: (Hammershoj, A. Sapuppo and R. Tadayoni, 2009)

Ferguson et al (2012) conducted investigation of today's four leading mobile operating system: BlackBerry OS, Apple iOS, Windows Phone and Android. They used 60 security and management criteria organized in 12 categoriess. Reseach finding showed OS average score as: BlackBerry (7.0)=2.89, iOS(5)=1.7, WP(7.5)=1.61 and Android(2.3)=1.37.

In a comparative investigation of features of mobile phone platforms, Sharma et al (2013) confirms finding as summarised in Table 2.

Vendor	Programming Language	Operating System	Application Store
Symbian Foundation	C++	Symbian OS	Nokia Ovi Store
Open Handset Alliance	Java	Android OS	Android Market
Apple	Objective -C	iPhone OS (iOS)	iPhone App Store
RIM	Java	BlackBerry OS	Blackberry App World
Microsoft	Visual C#, C++	Windows Phone	Windows mobile market Place

Table 2: (T. N. Sharma, M. K. Beniwal and A. Sharma, 2013)

In an attempt of evaluation of the best developemnt tools according to requirements, Palmieri (2012) tabulated different kind of mobile operating system supported by each tools in Table 3:

Tool Name	Mobile OS Support	OS Support
RhoMobile	iPhone, Windows Mobile, BlackBerry, Android	Linux, Mac, Windows
PhoneGap	iPhone, Windows Mobile, BlackBerry, Android, Symbian, WebOS	Linux, Mac, Windows
DragonRad	iPhone, Windows Mobile, Blackberry, Android	Linux, Mac, Windows
MoSync	iPhone, Windows Mobile, BlackBerry, Android, JavaME, Symbian	Linux, Mac, Windows,

Table 3: (M. Palmieri, 2012)

Smartphones are becoming the worlds dominant computing device. Figure 1, forecast shows decline in feature phones and increase in smartphones.

Figure 1: (Cocotas, 2013)

From the investigation of mobile phone OS and platforms, the result showed Java(J2ME) dominating deployment of software development platform. The result showed presence of following mobile Operating System: Symbian, Android, iPhone, BlackBerry, Windows phone and WebOS. BlackBerry is leading in security management in OS, followed by iPhone, windows phone and Android. Symbian, once the largest market shareholder lacks updations and supports for application. Android is seen as the future focus as it is initiating development of cross platform OS which can run on all mobile devices. The study discovered existent of mobile

application development tools such as RhoMobile, PhoneGap, DragonRad and MoSync which supports Linux, Mac and Windows OS. The study revealed forecast of decline in features phone and increase in smartphones.

3. METHODOLOGY

The questionnaire was developed on the basis of focus group interview(Karjaluoto et al (2005). The seven parameters: Gender(male, female), Dzongkhag(20 dzongkhag), Phone brand(Nokia, Samsung, Sony, Motorola, Siemens, other), Type of phone(Featured phone, Samart phone, smart phone + 3G), Phone Model/Series, Mobile Phone OS and Operator(B Mobile, Tashi Cell, Both) was used. the questionnaiare was tested with 50 students before distributed onward. 400 questionnaires were distributed to the first year students who joined College of Science and Technology from different part of the country. Students were instructed to collect at least one sample from rural area. After eliminating 49 questionnaires who submitted incomplete surveys, a sample of 351 respondents was obtained.

4. RESULT: THE CST CASE STUDY

The case study result shows finding from 87.75% data. Of the sample, 51 were from Trashigang, 46 from Thimphu, followed by paro(30) and Trongsa(26). The lowest data were 4 from Haa and Gasa(3)(Figure. 2).

Dzongkhag	Number
Mongar	18
Trashigang	51
Trashi yangtsi	11
Lhuntsi	12
Pema Gatshel	17
Samdrup Jongkhar	16
Bumthang	5
Trongsa	26
Wangdi Phodrang	8
Punakha	7
Gasa	3
Haa	4
Samtse	22
Chhukha	24
Paro	30
Tsirang	13
Zhemgang	12
Sarpang	13
Thimphu	46
Dagana	13
Total	351

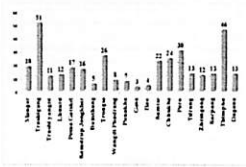

Figure: 2. Respondent at District Level

Among the respondent 122 were female and 229 male(Figure. 3). It indicates shows male users mobile more than female.

Gender	Number
Female	122
Male	229
Toal	351

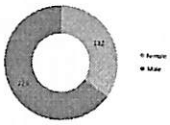

Figure: 3. Respondent by Gender

The study revealed 195 respondent own nokia phone followed by 100 Samsung phones. Nokia brand came out as the popular brand(Figure.4).

Smart phone with 2G are popular choice of nokia phone. In samsung featured phones are popular. Interestingly in other category, user are with smart phone with 3+G. The overall result showed 127 with featured phone, 123 with smart phone 3+G and 101 with smart phone (Figure. 5). it showed rural popular choice is with featured phones and there is shift in user's choice from featured to smart phone with 3+G.

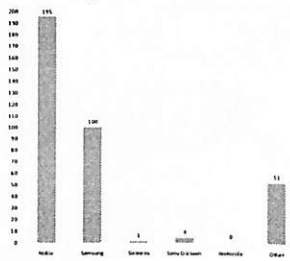

Figure: 4: Phone user by brand

Figure: 5, Type of Mobile Phone Used

nokia	Type of phone	Number
	Featured phones	63
	smart phones	81
	smart phones + 3G	51

Samsung	Type of phone	Number
	Featured phones	48
	smart phones	9
	smart phones + 3G	43

Other	Type of phone	Number
	Featured phones	14
	smart phones	11
	smart phones + 3G	26

In an attempt of investigation of operator used, the study revealed 292 uses B Mobile, 48 uses Tashi cell and 11 uses both(Figure. 6). B Mobile being the first service provider in the country, it has 83.19% of subscriber with it.

Operator	Number
B Mobile	292
Tashi cell	48
Both	11
Total	351

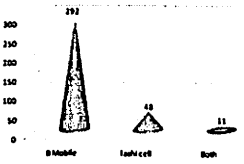

Figure: 6. Mobile Phone Subscribers with Operator

The case study also attempted to find out operating system used in the phones. It was found that nokia uses symbiam and window phone while samsung uses android and widow phones. In the third category other, the android is seen(Fig. 6).

Nokia	Type of platform	Number
	android	0
	window phone	39
	ios	0
	symbiam	156
	others	0

Samsung	Type of platform	Number
	android	41
	window phone	28
	ios	1
	symbiam	1
	others	16

Other	Type of platform	Number
	android	14
	window phone	0
	ios	5
	symbiam	2
	others	30

Figure: 6. Platform in phone

5. CONCLUSION.

This study was carried out to explore baseline evidences for the research on interface design and development in mobile phones. The study revealed that Nokia as a popular brand followed by Samsung. The study on mobile OS revealed Simbiam and Android as a dominating OS. Therefore for the research of mobile interface design and development, three types of mobile phones Samsung Galaxy Grand Quattro(Win Duos) I8552 with Android, 4.1.2 OS, Nokia Lumia 720 with windows phone, v8 OS and Micromax A116 canvas HD with Android V4.0 OS were procured.

The study also revealed a shift of preferences in user from featured phones to smart phones with 3G.

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