

Consumer Choice Criteria in Mobile Phone Selection: An Investigation of Malaysian University Students

Safiek Mokhlis

(Corresponding author)

Faculty of Management and Economics, Universiti Malaysia Terengganu
21030 Kuala Terengganu, Malaysia
e-mail: safiek@umt.edu.my

Azizul Yadi Yaakop

Faculty of Management and Economics, Universiti Malaysia Terengganu
21030 Kuala Terengganu, Malaysia
e-mail: azizul_yadi@umt.edu.my

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Abstract

The widespread use of mobile phones, the various information access means that it provided to its users, and the vast presence and significant impact of mobile phone on users' daily life make mobile phones important devices to study. This paper focuses on studying the importance of different choice criteria in mobile phone selection among Malaysian consumers. A quantitative study drawing data from 376 university students was employed. The collected data were analyzed using SPSS. Descriptive statistics, factor analysis, and Friedman test have been employed in the study. The principal components factor analysis resulted in seven independent dimensions: (1) innovative features, (2) image, (3) price, (4) personal recommendation, (5) durability and portable aspects, (6) media influence, and (7) post-sales service. The top three most important factors influencing consumer choice of mobile phones are: innovative features, recommendation and price. Several managerial implications are drawn from the results and future research suggestions are provided.

Keywords: Mobile phone, Choice criteria, Malaysia.

1. Introduction

The development of mobile communication technology (e.g. wireless Internet, the mobile phone, MP3 player, GPS navigation system) has been a long journey of innovation which is constantly evolving and updating as a result of consumers' changing needs and preferences. Among various contemporary mobile communication technologies, the mobile phone is regarded as "the most radiative domestic appliance ever invented" (Coghill, 2001, p. 28). The device has had one of the fastest household adoption rates of any technology in the world's modern history (Comer and Wikle, 2008). The growth has been phenomenal by any standards and there are now worldwide more mobile phone subscribers than fixed line subscribers (Rice and Katz, 2003). In 2001, mobile phone subscriptions were less than a billion worldwide with the majority of the subscriptions from the developed countries. However, at the end of 2010, mobile phone subscriptions had reached five

billion worldwide with subscriptions from developing countries outnumbering that of the developed countries (Kelly, 2009; Rebello, 2010). With the increasing of ubiquity of mobile phone ownership, the device is no longer perceived as a luxury item or a status symbol but rather a necessity in people's daily life (Walsh and White, 2006).

The widespread utilization of mobile phones in communication and information transfer leads to exponential improvement in mobile phone technology. To meet users' information needs, innovative features and applications are continuously being added to mobile phones to make them perform many more new functions. Consequently, mobile phone which is essentially a communication device has undergone numerous transformations, making its functionalities transcending the traditional voice communication between two individuals (Kushchu, 2007; Hakoama and Hakoyama, 2011). Beyond voice, mobile phones fulfill users' needs by providing: (1) communication services allowing transfer of information in the forms of text, graphics and voice, (2) wireless Internet services such as browsing and e-mail, and (3) multimedia and entertainment services such as color screen, motion picture, camera, games, and music. Because these are key features in enabling universal information access, and in facilitating the formation of social networks among its users (Ling, Hwang and Salvendy, 2006), detail assessments need to be made in order to thoroughly understand the needs and preferences of mobile phone users.

Despite the growing importance of mobile phone technology there has, to date, been relatively little research on consumers' evaluation of the importance of mobile phone attributes, particularly in the Malaysian context. As such, the purpose of this study was to identify the choice criteria consumers consider important when purchasing mobile phones. The study chose to sample a narrower group of youth in Malaysia, specifically college-age individuals. Understanding the relative importance of product attributes influencing young consumers' purchasing decisions is important to the success of new product development. If marketers can understand which criteria are used to evaluate the product, they will be better able to manage and influence the young consumer's evaluations and perceptions of the offering.

Malaysia is chosen as the setting of this study because of its position as an emerging economy in Asia that has seen a tremendous growth in its mobile phone market, both in terms of penetration rate and airtime use. According to Business Monitor International (2011), Malaysian mobile phones sales accounted for about 66% of consumer electronics spending in 2010. The number of mobile phone users in Malaysia is estimated at 33.9 million in 2010 and by the year of 2015, it will reach 40 million (refer Table 1). Malaysian mobile phone sales are expected to grow to 9 million units in 2015, as mobile subscriber passes 124%.

Some of the key trends and development in Malaysian mobile telecommunication industry are related to the growing popularity of smartphones among Malaysian consumers. IDC ASEAN telecommunication research reported that Apple iPhone, with its edition of 3G and 3GS, has gained an increasing market share with about 91,000 units sold until March 2010. Likewise, Blackberry is also reported to have sold more than 100,000 units in 2009 (Sidhu, 2010). This trend is supported due to the ever-increasing demand of mobile internet as an essential technology feature in a smartphone. It is forecasted that smartphones will account for 23% of all new mobile phones sold annually by the year 2013 (Malaysian Telecommunications and Multimedia Commission, 2009). One of the popular appeals to these smartphones is the ease of having mobile broadband and social network software in its product features. Besides, the fast gaining acceptance of touch screen and QWERTY keyboard features have set smartphones apart from the rest of conventional handsets.

The next section reviews previous research on motives and choice behavior in mobile phone markets. Section 3 provides details of the methodology that was used. Section 4 contains the results whilst, in Section 5, implications are explored and conclusions drawn.

1.1 Consumer Choice of Mobile Phone

An evolving body of knowledge concerning mobile phone attitudes and behavior has been emerging in the marketing literature. One common themes running through the research has been to identify factors affecting consumer choice of mobile phones.

A study by Liu (2002) in the Philippines showed that choices between mobile phone brands were affected by new technology features such as SMS-options and memory capacity, more than size. This finding might be due to the fact that all competing brands have quite similar sized phones that are small enough. The researcher suggests that the trend will actually be not towards smaller size of phones but towards phones with better capability and larger screen.

Karjaluoto *et al.* (2005) studied factors that influence intention to acquire new mobile phones and factors that influence on mobile phone change among Finnish consumers. The study showed that although the choice of a mobile phone is a subjective choice situation, there are some general factors that seem to guide the choice. While technical problems are the basic reason to change mobile phone; price, brand, interface, and properties are the most influential factors 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. Seventy-eight participants evaluated the design of phones on the perceived scale of image/impression characteristics, including luxuriousness, simplicity, attractiveness, colorfulness, texture, delicacy, harmoniousness, salience, rigidity, and overall satisfaction. 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, Kim, Yun, Hong and Kim (2004) carried out a user study on 65 design features of 50 different mobile phones. They developed regression models to link the design features to overall satisfaction and 'luxuriousness', 'attractiveness' and 'harmoniousness'. They found that a number of design features contributed, such as phone size and weight, color, material, button shape and interface features.

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

In their second study (Ling, Hwang and Salvendy, 2007), the researchers surveyed a sample of 1,006 college students to identify their preference of the design features and overall satisfaction of their current mobile phone. Results of this study show that users' satisfaction is greatly affected by the physical appearance, 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. Using a multi-criteria decision making approach, they compared the different weightings of mobile phone features such as physical characteristics, technical features, functionality, brand choice and 'customer excitement'. It was found that functionality was the most preferred factor for all three phones under examination, with 'customer excitement' and basic requirements being identified as least influential.

Results of Mack and Sharples (2009) also highlight the importance of product attributes in predicting choice of mobile phones. Their experiment showed that usability is important in mobile phone choice but not as much as users themselves believe. In actual fact, other attributes particularly features, aesthetics and cost may well be more of a priority when it comes to product choice.

3. Methodology

3.1 Instrument

In order to investigate the matters discussed above, data were obtained which provided details of consumers' choice criteria for mobile phones. The data were generated by means of a self-administered questionnaire. Participants were asked to rate the relative importance of 29 potential influencing factors regarding their choice of mobile phone. These items were developed based on past literature (Karjaluoto *et al.* 2005; Ling *et al.* 2007). Responses were measured on a 7-point scale with values ranging from (1) "not at all important" to (7) "very important". To counterbalance possible order-effect bias, no significance was placed on the order of the attributes in the questionnaire. To obtain personal background of the participants, questions regarding their gender, age, ethnicity, faculties and course studied were included in last of the questionnaire.

The draft version of the survey form was pre-tested using ten undergraduates to check for possible problems with statement clarity and respondent understanding as well as ability to complete the survey instrument. A slight re-wording of some of the statements was made as a consequence.

3.2 Sampling

Sample consisted of undergraduate students who were attending classes in a public university located on the East Coast of Malaysia. The student population was purposively chosen for the survey study because they represent an enthusiastic user group of mobile phones (Hakoama and Hakoyama, 2011). The whole population of undergraduates at the university's campus is estimated at 6,200 students. According to standards reported by Krejcie and Morgan (1970), the minimum sample size suggested for a population of 7,000 is 364 or 5.2% of the population.

The questionnaires were disseminated to a non-probability sample of 500 full-time students. Although the sample is selected on the basis of convenience and ease, data were gathered at different locations (classrooms and faculties), on different days of the week, and at different times of the day, thus reducing location and timing biases. Surveys were collected immediately upon completion, which yielded a total of 371 usable questionnaires, which was considered to be adequate to represent the population (Krejcie and Morgan, 1970).

4. Results

4.1 Descriptive Statistics

The responses obtained were analyzed using SPSS. Of the 371 questionnaires, 70.1% were from female respondents. Respondents' ages ranged from 19 to 26 years, with a mean of 21.9 (standard deviation [SD] = 1.03). In terms of ethnicity, 72.2% of the respondents were Malay, 14.6% were Chinese and 10.8% were Indian. In this group, there were 140 (37.7%) first-year students, 82 (22.1%) second-year, and 149 (34.2%) third-year students.

Respondents were asked about the total number of mobiles they have or use currently. As seen in Table 1, 52.9% of respondents (199 of them) owned one unit of mobile phone, while 46.8% owned two units. Ownership of mobile phones were dominated by the Nokia brand (70.8%), followed by Sony Ericsson (57.5%). In terms of service provider preferences, a majority of respondents subscribing to Celcom (73.6%). Meanwhile, in terms of the types of account preferred, a major percentage of the respondents preferred prepaid accounts (87.8%) compared to postpaid accounts (5.6%).

4.2 Exploratory Factor Analysis

As an initial step, the suitability of the data for factor analysis is investigated. The KMO measure of sampling adequacy is found to be 0.87, higher than the minimum acceptable value of 0.5, indicating that the sample size is large enough to factor analyze 29 variables. Besides, the Chi-square value of Bartlett's Test of Sphericity ($\chi^2 = 2681.98$), which shows the suitability of the intercorrelation matrix of the 29 variables for factor analysis, is significant at the 0.001 level. As for the adequacy of the sample size, there is a 37-to-1 ratio of observations to variables in this study. According to Hair *et al.* (1998), the ratio for adequate sample size should be at least 10:1, which, in this case falls well within the acceptable limits. Thus, the sample size and the nature of the data are both fit for the analysis.

In order to obtain more interpretable results solution, Varimax factor rotation was applied using the minimum eigenvalue of one as the criterion to control the number of factors extracted. This caused the loadings to be distributed among the selected factors making it easier to interpret results (Hair *et al.*, 1998). Variables with similar loadings on more than one factor were deleted, as were items that did not conceptually belong to the factor. The analysis resulted in seven homogeneous sub-scales with the eigenvalues of ranging from 1.07 to 6.25 (Table 2). The total percentage variance explained by these seven factors of the overall variance of the data was 60.94%, which satisfies the percentage of

variance criterion for social science research (Hair *et al.* 1998). All items are grouped meaningfully into the factors with high loadings.

Factor 1 is a dominating factor which explained 16.84% of the total variance of the data. The factor exhibits heavy loadings for eight items pertaining to the importance of new innovative features mobile phones nowadays have: built-in camera, larger memory capacity, multimedia, Bluetooth and infrared, audio and video recording, color screen, radio and MP3, and design and styling. This factor is labeled 'innovative features'.

Factor 2 accounts for 9.72% of the total variance and is defined by five items, namely expensive and limited edition, country of origin, new product, brand image and accessories. All the five items directly related to the 'image' of mobile phones. Factor 3 is defined by three items relating to 'price', namely model at reduced price, special offer and alternative payment condition. This factor accounts for 9.65% of the total variance. Factor 4 can be called 'personal recommendation' because the items loading at this factor refer to the importance of salesperson, family, and friend in influencing consumer choice of mobile phone.

Factor 5 has loading items of physical durability, being light and small size. This factor accounts for 6.1% of the total variability of the items. Physical durability can be defined as how long the device can last under normal use, or whether the device can resist impact from abnormal use (Ling *et al.* 2007). As a mobile device, mobile phones must have a tough case and a hard material. In addition, mobile phones need to be handy to carry around. Small and lightweight make a phone more portable. Thus, this factor is labeled 'durability and portable aspects'.

Factor 6, which explained 6.06% of the total variance, has loading items of TV advertising and positive review in media. Thus, this factor is named the 'media influence'. The seventh factor explains 5.8% of the total variance and is labeled 'post-sales service', as the items comprising the factor refer to guarantee/warranty and after sales service.

To ensure that the items constructed in the questionnaire is reliable, Cronbach's alpha was calculated. A rule of thumb is that 0.5 is the lower level of acceptability for the alpha scores (Kerlinger and Lee, 2000). Since the reliability coefficient values for all the constructs shown in Table 2 are greater than the guideline of 0.5, the scales are of acceptable reliability and can therefore be applied for further analysis.

4.3 Ranking Importance of Factors Affecting Consumer Choice

A Friedman test, which is the nonparametric equivalent of a one-sample repeated measures design or a two-way analysis of variance with one observation per cell, was performed to test the null hypothesis that k -related variables come from the same population. For each case, the k variables are ranked from 1 to k . The test statistic is based on these ranks (Sigel and Castellan, 1988). Although it is not as powerful as a parametric test, increasing the sample size can increase its power to that approaching its parametric equivalents (Sekaran, 1992). Statistical hypothesis to use Friedman test are:

H₀: Priority of factors is equal.

H₁: At least two priorities are different.

A Friedman test revealed an overall significant effect of attribute on ranking ($\chi^2 = 325.26$; degree of freedom = 6; $p < 0.001$). Since $p < 0.05$, **H₀** is rejected; the claim of equal priority of these seven factors is not supported. This suggests that consumers are able to differentiate between various choice criteria.

The result in Table 4 indicates some variation in the ranking of factors which influence consumer choice. Higher value of scale means more importance assigned to selection factor. 'Innovative features' (mean = 5.58) was the most important factor in influencing the consumers in selecting a mobile phone. 'Recommendation' (mean = 5.27) was the second prioritized factor followed by 'price' (mean = 5.17). The next two factors, ranked fourth and fifth, respectively, were 'durability and portable aspects' (mean = 5.034) and 'post-sales service' (mean = 4.86). Factors like 'media influence' (mean = 4.62) and 'image' (mean = 4.59), which were ranked sixth and seventh, respectively, are perceived to be the least important criteria by the consumers.

5. Conclusion

This study was carried out to ascertain selection criteria among students in Malaysia, and introduced a set of factors that depict the most prevalent criteria. This study heightens awareness of consumer behavior which is very much influenced by a product's features, and suggests that consumers make their purchase decisions on the basis of their evaluation of various product attributes. Results 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-sales service.

Consistent with previous findings (Liu, 2002; Karjaluoto *et al.* 2005; Mack and Sharples, 2009), the product's innovative features are the most important in the student selection of mobile phones. This is possibly related to mobile phones which have now been widely accepted as part of fashion accessories, especially among the youngsters. Hence, innovation in mobile phone features and design does arrive on top of the list in consumers' choice of mobile phones.

The second most important factor affecting students' choice of mobile phones was "personal recommendation". One plausible explanation for this finding is that mobile phones are characterized by a high degree of risk aversion due to their search and experience qualities. To cope with the hazards of buying high-risk products, consumers tend to rely on personal recommendation as a risk-reliever or as a risk reduction strategy. The importance of personal recommendation arises from its ability to create a more informed choice, such that when consumers receive word of mouth regarding a particular mobile phone, they can benefit from reduced perceived risk by either decreasing the probability that the purchase will fail, or by reducing the severity of real/imagined loss suffered if the purchase does fail or equally by shifting from one type of perceived loss to another for which there is greater tolerance.

Besides innovative features and personal recommendation, price was also found important. This finding, yet again, is reflective of the results of Karjaluoto *et al.* (2005) and Mack and Sharples (2009). This particular finding might be related to the use of student as the sample in this study. In general, Malaysian university students are similar to students from other parts of the world that are vulnerable to financial crisis (Henry, Weber & Yarbrough, 2001). Because of that reason, their spending behaviour is completely depending on the amount of money they receive and the priority they put in their spending. According to Sabri & Masud (2006), university students in Malaysia felt that the amount of money they received was not even sufficient to cover their financial needs, let alone it was adequate to spend for expensive mobile phones.

Based on this research, the following recommendations are made to manufacturers and marketers of mobile phones:

- Mobile phones often require high involvement and information processing, hence the promotion of new mobile phone models should go beyond highlighting properties to highlighting what users can do with all the technical features.
- The promotional strategies in a high-risk purchase situation should try to reach the consumers through personal channels (opinion leaders, word-of-mouth), rather than general media.
- The results of this study showed that students tend to attach greater importance on 'price' when purchasing mobile phones. Thus, the offer of incentives of various types (e.g. reduced price, flexible payment condition) should prove successful in attracting this segment.

Despite this piece of research provides some insights into consumers' choice in mobile phone market, the work is still at an early stage and certain limitations concerning the research setting should be noted in order to guide future research of this phenomenon. The small size and homogeneity of the student sample means that the findings are only representative of university students with ages ranging from 19 to 26. Consequently, they do not represent views held by the various segments of the population in Malaysia. Future research that extends sampling beyond a university environment would allow for a more representative assessment of factors influencing consumers' choice of mobile phone in general society. In addition, the scope of the study only delves into the perceptions of consumer choice of mobile phones. In the future, it would be interesting to learn the relationship between these perceptions and consumers' actual behaviour.

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Table 1. Mobile telecommunication market in Malaysia.

	2008	2009	2010	2011f	2012f	2013f	2014f	2015f
No of MP subscribers ('000)	27,713	30,144	33,922	36,297	37,748	38,881	39,658	40,055
No of MP subscribers/100 inhabitants	102.6	109.8	121.5	128.0	131.2	133.2	133.9	133.4
No of MP subscribers/100 fixed line subscribers	645.7	699.1	769.9	811.6	848.3	882.6	911.7	934.8
No of 3G phone subscribers ('000)	4,366	7,347	8,602	9,634	10,405	11,029	11,526	11,814
3G market as % of entire mobile market	15.8	24.4	25.4	26.5	27.6	28.4	29.1	29.5
Domestic sales (US\$mn)	892	939	1,225	1,402	1,560	1,703	1,824	1,954
Domestic sales (mn)	5.0	5.4	6.6	7.2	7.7	8.1	8.5	9.0

Source: Business Monitor International (2011).

Table 2. Mobile phone ownership, brand, network preferred and billing type.

Variable	Category	Frequency	Percent
No. of mobile phone	1	199	52.9
	2	176	46.8
	3	1	0.3
Brand*	Nokia	266	70.8
	Sony Ericsson	216	57.5
	CSL	16	4.3
	Samsung	21	5.6
	Motorola	11	2.9
	Blackberry	8	2.1
	iPhone	5	1.3
	Other	9	3.7
Network provider*	Celcom	277	73.6
	Maxis	193	51.3
	Digi	82	21.8
	U Mobile	2	0.5
	Tune Talk	2	0.5
Billing type	Prepaid	330	87.8
	Postpaid	21	5.6
	Both	25	6.6

*Multiple answers allowed.

Table 3. Results of factor analysis.

Factor and item	Factor loading	Eigenvalue	% of variance explained	Cronbach Alpha
Factor 1: Innovative features		6.25	16.84	0.85
Built-in camera	0.815			
Larger memory capacity	0.768			
Multimedia	0.767			
Bluetooth and Infrared	0.679			
Audio and video recording	0.665			
Color screen	0.619			
Radio and MP3	0.532			
Design and styling	0.489			
Factor 2: Image		2.01	9.72	0.69
Expensive and limited edition	0.722			
Country of origin	0.677			
New product	0.549			
Brand image	0.467			
Accessories	0.418			
Factor 3: Price		1.81	9.65	0.55
Model at reduced price	0.743			
Special offer	0.700			
Alternative payment condition	0.511			
Factor 4: Personal recommendation		1.32	6.77	0.51
Salesperson's recommendation	0.737			
Family's recommendation.	0.574			
Friend's recommendation	0.570			
Factor 5: Durability and portable aspects		1.23	6.10	0.53
Physical durability	0.752			
Being light	0.570			
Small size	0.457			
Factor 6: Media influence		1.16	6.06	0.51
TV advertising	0.754			
Positive review in media	0.734			
Factor 7: Post-sales service		1.07	5.80	0.52
Guarantee and warranty	0.800			
After sale service	0.672			

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization. Rotation converged in seven iterations.

*Range: 1 = not at all important; 7 = extremely important.

Table 4. Mean ranking of importance of factors when choosing a mobile phone.

Factors	Mean	Arithmetic	Ranking
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	Rank	Mean*	
Innovative features	5.42	5.58	1
Personal recommendation	4.47	5.27	2
Price	4.30	5.17	3
Durability and portable aspects	3.88	5.03	4
Post-sales service	3.68	4.86	5
Media influence	3.26	4.62	6
Image	2.99	4.59	7

Friedman test: $\chi^2 = 325.262$, $df = 6$, $p < 0.001$

*Descending mean order. Based on a 7-point scale 1 = not at all important; 7 = extremely important

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