

A Study of the Trend of Smartphone and its Usage Behavior in Malaysia

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ABSTRACT

The purpose of this exploratory study is to better understand the current dynamics of the Malaysian market for smartphone and the usage behaviors of consumers. This paper presents the result of a survey on the trend of smartphone from the perspective of end consumers. The data was collected from 1814 respondents across major cities in Malaysia. This study has looked into the familiarity of users towards smartphones, choices of smartphone brand and service providers, and most importantly the determinants that influence their purchasing decision. Additionally, the consumers' preferences on smartphone specifications such as design, computing power, operating platform, and price were investigated. Furthermore, consumers' usage behaviors such as using smartphone for email, web browsing, gaming, and document reading were examined. The statistics presented provides fundamental information regarding the trends in the smartphone market and usage behaviors in Malaysia. Such information are useful for academics for the development of future works in the field, whereas for smartphone manufacturers, application developers and other stakeholders, they are able to plan their direction in the Malaysian smartphone market.

KEYWORDS

Mobile phone, Smartphone, Usage behavior, Market survey, Consumers study

1 INTRODUCTION

Mobile phone usage has proliferated in recent years. Some areas of the world have enjoyed rapid deployment and high penetration of mobile telephony. 70% of the world's population own at least one mobile phone. Based on the statistics, children in United States now are more likely to own a mobile phone than a book, with 85% of kids owning a phone as to only 73% owning books [1]. Without exception, Malaysia is one of the countries riding the wave of telecommunication evolution. Mobile phone usage in Malaysia has gained the ever increasing momentum. It is reported that 85% of Malaysians own mobile phone(s) [2].

Most of the mobile phones nowadays are addressed as 'smartphone', as they offer more advanced computing power and connectivity than a contemporary mobile phone. Along with the smartphone fundamental capabilities to make voice call, video call, SMS, and MMS, smartphones have been repositioned as a "new information medium" [3]. In other words, smartphones have extended list of

information processing functionalities such as managing personal time schedule, accessing Internet contents, editing documents, utilizing location-awareness function, and many other exciting applications. Nonetheless, no matter how smart the smartphone is; it will not result in expected benefits and effectiveness, if they are not being utilized [4].

With the sheer size of smartphone market, it influences the economic growth in a country and provides job opportunities in the economic chain [5]. The market opportunities for mobile phone software and mobile contents are huge and attractive. For instance, the sales for ringtone download in Europe and Japan totaled US\$5 billion in 2003. Regardless of the macro impact of the smartphone market, the demands largely depend on the individual consumers. Hence, an understanding of the smartphone market and trends from the perspective of consumers are valuable.

2 PROBLEM STATEMENTS

Despite the pervasiveness of smartphone penetration in Malaysia, surveys that have been carried out are still less and far between for adequate understanding of the consumers' preferences on smartphone and behaviors on the smartphone usage. Moreover, most of the previous studies focused on the usage of specific mobile applications [6-8], the overall picture of smartphone market in Malaysia is unclear, and the statistics are hardly available. Thus, the purpose of this study is to provide the information on the consumers' preference on smartphone and its usage behavior in Malaysia.

Such information are vitally important for both academics and practitioners. From the academic viewpoint, the overview of the smartphone market in Malaysia provides them a foundation where they further design their research. On the other hands, practitioners such as mobile phone manufacturers, application developers, and relevant stakeholders in the industry would

greatly appreciated the information as they can be used to strategize their marketing strategies, and plan for the future directions.

3 HISTORY OF CELLULAR NETWORKS IN MALAYSIA

The first cellular network was introduced by Telekom Malaysia in 1985, based on NMT 450. The mobile phones were initially big and bulky. Subsequently, the country's second 1G cellular operator, Celcom started in 1989 with the introduction of ART 900 (Automatic Radio Telecommunication 900) based on British ETACS technology (Extended Total Access Communications System) [9]. With the system, the size of mobile phones became considerably smaller, making them more acceptable.

In the middle of 1990, Malaysia adopted three different 2G mobile network standards. Two of them were European-based, namely GSM900 (Global System for Mobile Telecommunications) and PCN1800 (Personal Communications Networks). The American-based standard was TDMA (Time Division Multiple Access) [9]. However, the different 2G technologies did not well integrate as they were based on different standards.

In late 2004 and early 2005, the consolidation of cellular operators in Malaysia was completed with the encouragement from the government, bringing the number of cellular operators down to only 3 operators, namely Celcom, Maxis, and DiGi. This period also represented the phasing out of the 1G cellular networks, namely ATUR450 and ART900 in Malaysia [9].

Subsequently, the 2.5G - General Packet Radio Services (GPRS) came into the picture. It is a packet-based wireless communication service specifically designed for data and allows for continuous connection to the Internet for mobile phone and computer users. The entry of GPRS enabled consumers to instantly access WAP, HTML or even I-mode sites using appropriate mobile phones, PDAs or

Notebooks [10]. With the available of GPRS, information became accessible from anywhere, anytime, anyplace, as it allows info to be sent and received across a mobile network.

2.75G or better known as Enhanced Data rates for GSM Evolution (EDGE), an add-on to GPRS to increase data rates on the GPRS link, is a radio-based high-speed mobile data standard that allows data transmission speeds of 384kbps. EDGE was initially developed for mobile network operators who were either unable to obtain the 3G spectrum or did not wish to bid for one. This gave incumbent GSM operators the opportunity to offer data services at speeds that are close to those available on 3G networks. In Malaysia, DiGi Telecommunication launched their EDGE network throughout Klang Valley in May, 2004. Although Maxis also implemented EDGE, they have not promoted it heavily as they concentrated more on 3G [10].

3G started in Malaysia in the second half of 1995 [9]. It is a packet-based transmission of text, digitized video and multimedia at data rates up to and possibly higher than 2 megabits per second (Mbps), offering a consistent set of services to mobile computer and phone users wherever they may be in the world. Once 3G is fully implemented, they can be constantly connected to the Internet, given their service provider's roaming capabilities. For better perspective, there are two 3G formats in the world. CDMA 2000 is implemented in the United States and Korea while WCDMA 2000 is implemented in Malaysia. With regard to the transmission speed, 3G is 6 times faster than GPRS and 3 times faster than EDGE.

HSDPA technology or generally known as 3.5G is an upgraded network path that allows higher data transfer speed. HSDPA stands for High Speed Downlink Packet Access. The minimum speed of HSDPA that can be achieved is 5 times faster than the current 3G technology (384kbps). As of November 2007, both Maxis and Celcom are offering HSDPA connectivity in major cities around Malaysia [9].

4 RESEARCH METHODOLOGY

4.1 Overview of Methods

In order to collect generalizable data that represent the whole population from the samples, questionnaire survey was adopted as a data collection method. Moreover, questionnaire survey is a commonly used in similar research [11-13]. This study collected primary data through questionnaire survey that targets at individual users. Subsequently, the data collected were analyzed using appropriate non-parametric analysis method and presented in an intuitive and insightful presentation format.

4.2 Subject and Procedures

The data used in this study were collected via both online and offline self-administrated survey. The data were collected from the publics across the main cities in Malaysia. Publics in main cities are selected as the respondents because they constitute the major propositions of Smartphone user in Malaysia. Hence, it implies that the purposive sampling method is adopted in this study. Publics in major cities of Malaysia were common samples chosen by previous studies on mobile phone usage in Malaysia [2, 14].

The questionnaire items are designed in such way that technical jargons are minimized in order to enhance the understandability for the users from different knowledge backgrounds. At the end of data collection process, a total of 1814 sets of questionnaire have been successfully collected and usable. By acquiring this large sample size, the data collected is speculated to has low level of random errors, and the responses should be well distributed over all answer categories [15]. Thus, the quality of data is considered as fairly good, and suitable for data analysis.

5 DATA ANALYSIS

5.1 Profile of Respondents

Demographic variables indicate the profile of respondents, which could also be helpful for the understanding of the subsequent analysis of the outcomes. Table 1 shows the demographic of the respondents. The statistics shows that approximately 90% of the respondents are below 36 years old. This result is consistent to previous studies which found that majority of the smartphone users are teenagers and younger adults [16]. By comparing the respondent profiles with respondent profiles in the Mobile Phone User Survey conducted by Malaysian Communications and Multimedia Commission (MCMC) that based on 4,925 respondents [2], the structure of respondents are found to be similar. In other words, it

can be inferred that the samples in this study are likely to be reflective of the population, as the large sample size does.

5.2 Familiarity towards Smartphone

Fig. 1 illustrates the familiarity of respondents toward Smartphone. The data shows that approximately 72% of respondents are common users, about 17% are advanced users, while about 11 % work in the field related to mobile phone such as engineers, software developers, or customer service staff, or sales personnel. On the other hand, the advanced users are those who have advanced knowledge more than a common user. For instance, advanced users may have the knowledge to tweak the smartphone for better performance, and to frequently follow the latest news and updates about smartphone. This implies that

Table 1. Profile of Respondents

Item	Frequency	Percentage (%)
Gender		
Male	947	52.2
Female	867	47.8
Total	1814	100
Age		
16 and Less	77	4.2
17 – 26	1178	64.9
27 – 36	378	20.8
37 – 46	101	5.6
47 – 56	64	3.5
More than 57	16	0.9
Total	1814	100
Education level		
Secondary	740	40.8
Bachelor	856	47.2
Master	94	5.2
Ph. D	17	0.9
Others	107	5.9
Total	1814	100
Occupation		
Government	118	6.5
Professional	165	9.1
Self-Employed	146	8.0
Freelancer	793	43.7
Student	176	9.7
Executive	29	1.6
Management	143	7.9
Retired	71	3.9
Unemployed	22	1.2
Others	151	8.3
Total	1814	100

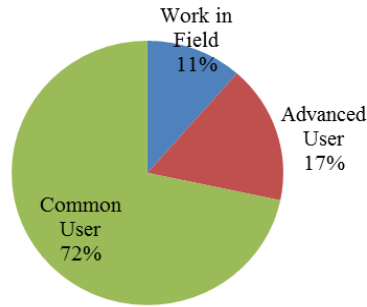


Fig. 1. Familiarity of Respondents towards Smartphone

majority of consumers in Malaysia are common users, with typical level of knowledge that is sufficient for typical usage of mobile phone such as making phone call, SMS, MMS, multimedia playing, and operating common applications.

Fig. 2 has pointed out that male consumers tend to have higher familiarity towards smartphone compared to their female counterparts. It implies that smartphones as a kind of information and communication technologies do inherit the nature of general technology in which male users are speculated to have higher interest and skills in technology [17].

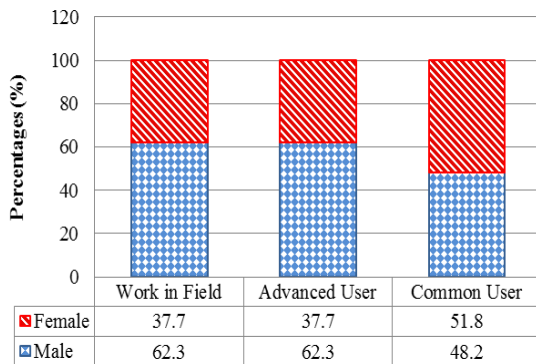


Fig. 2. Familiarity Crosstab by Gender

5.3 Brands and Service Providers

Among the respondents, Nokia (40%) is the most popular brand, followed by Sony Ericsson (34%) and Apple iPhone (11%). Blackberry and HTC respectively constitute 5% and 4% of the total. As the brand is closely related to the operating platform, this information provides a hint to application

developers about the common operating platforms in Malaysia. For instance, most of devices from Nokia are loaded with their respective proprietary operating system, namely Symbian OS. There is a visible trend that Sony Ericsson is gradually changing from their proprietary operating system to Android OS, which is reflected through the circumstance that about 80% of their new smartphone are loaded with Android OS.

In terms of service provider, majority of the respondents are the subscribers of Maxis (47%) and DiGi (39%), and the rests are subscribers of Celcom (13%) and U-Mobile (1%). All of the service providers do provide 3G data services. DiGi offers unlimited data plan at approximately USD 27 per month, while Maxis offers various data plans ranged from 3 gigabytes data limit at the price USD 27 per month, to 12 gigabytes data limit at the price of USD 66 per month. The prices of 3G data services have become reasonable and affordable by the majority of the consumers. Hence, it is not irrational to posit that the competitive pricing of 3G data service could have contributed to the popularity of 3G smartphone in Malaysia.

5.4 Preferences of Internet Connection

The data also indicate that more respondents prefer to connect to Internet through Wi-Fi (62%) than 3G (38%). This result would imply that the Wi-Fi wireless network adapter is perceived as a necessity in the Smartphones. Nonetheless, the 3G capabilities of a smartphone do not lose its importance. 3G data network is expected to gradually become the main network in the market in the near future. This is because 3G wireless data services are gaining momentum in Malaysia as the competitive price offered by service providers and the signal coverage areas have been significantly expanded.

5.5 Determinants of Purchasing Decision

As a main interest of this study, the determinants of smartphone purchasing decision have been identified and discussed. Table 2 shows the percentage of total respondents that have chosen a particular determinant.

Table 2. Factors of Acquiring Smartphone

Determinants	Percentage (%)
Trend in community	35.6
Needs	34.4
Software	33.1
Cost of plan	28.8
Hardware	17.6
Signal reception	11.0
Others	3.5

For instance, 35.6% of the total 1814 respondents reported that the trend in community is an important criterion that influences smartphone purchasing decision. The next most important determinants are the needs for the smartphone, software preferences, cost of plan, and hardware. Signal reception seems to be the weakest determinants for the consumers to acquire smartphone. A point worth to be emphasized is that about 30% of the respondents agreed that cost of plan is an important factor to be considered in the purchase decision process. Nowadays it is common that cellular providers offer attractive package where consumers can purchase the mobile phone with discounted price, with the condition that they will be bonded with the cellular operator for a specified period. The finding in this study indicates that these attractive offers have become one of the important determinants for the consumers in Malaysia in buying a smartphone.

The overall results demonstrate that trend in the community is a more influential factor for the consumers to acquire smartphone, instead of the actual needs. This implies that marketing and promotion are effective influencers that shape the trend of smartphone market, and subsequently influence the purchase decision or intention of the consumers. In line with this justification, Taylor and Todd (1995) have

pointed out that the influencers from important ones and surroundings (i.e. subjective norms) are important factors that lead the intention and behavior.

The crosstab analysis on the data shows 35.6 % of the respondents who perceived trend as a factor influencing their decision are fairly equal in terms of gender. In other words, the trend is a pertinent factor of acquiring smartphone for both male and female consumers. The same situation applies on other factors, namely needs, cost of plan, and others; they are all considerably equal in terms of gender.

Nonetheless, the percentage of male respondents who choose software and hardware as the purchasing determinant are obviously higher than the percentage of female respondents. For example, 61% of the respondents who agreed that hardware is important are male, whereas only 39% of those who agreed on this are female. It implies that in general there are more male consumers who tend to perceive hardware and software of smartphones as an important factor than the female consumers do.

5.6 Preference of Smartphone Specifications

Additionally, the preferences of respondents on the specifications of Smartphone device are presented in the Table 3. Based on Table 3, the design of smartphones is reported as the most common specification that user considers when buying a smartphone, where 56% of the respondents feel that it is important. As design is the most visible feature and representing the first impression to the consumers, it is sound that design becomes the specification that is prevalent to most of the consumers. Previous studies have also revealed a similar result where design was found to be the most important determinant of new product sale success [18]. Moreover, Crilly, Moultrie, and Clarkson [19], have asserted that design is the tangible property of a product that critically influences consumer response and product success.

According to the statistics, built-in Wi-Fi adapter is the second most common specification that is important to consumers, and this is followed by computing power. Crosstab analysis on the Wi-Fi adapter by age suggests that about 40% of the consumers from all age groups equally perceive Wi-Fi adapter as important to them, with exception of only approximately 19% of the consumers older than 57 years old who perceive that Wi-Fi capability is pertinent to them. The plausible explanation of this phenomenon could be due to the fact that the consumers above 57 years old in Malaysia are generally poor in English proficiency and not computer literate. Thus, these situations have become obstacles to Internet browsing. Their usage of mobile phone is most probably limited to the fundamental functions such as making voice call.

Table 3. Importance of Device Specifications

Specifications	Percentage
Design	56.0
Built-in Wi-Fi Adapter	38.5
Computing Power	34.2
Price	30.2
Screen Size	28.5
Music Player and Formats	28.3
Simplicity	24.5
Brand	22.2
Battery Life	19.7
Operating Platform	12.3
Business Supports	8.4
Other	2.7

Surprisingly, only 30.2% of the total respondents reported that price factor is a consideration in purchasing decision. This phenomenon could be due to the fact that smartphone is considered as durable merchandise, which can be used for years. Hence, the consumer might perceive the design, features, and overall quality would outweigh the price difference in the long run. Previous study has also found that consumer price sensitivity tends to be lower towards other durable items [20].

Fig. 3 shows the percentage of respondents who agreed that design is an important factor, categorized by age groups. The result demonstrates that design of smartphone is less important to the older consumers, compared to their younger counterparts. With regard to the operating platform, the finding implies that generally there are more male consumers who tend to perceive operating platform as an important criterion to be taken into account, than their female counterparts. This assertion is supported by the result that demonstrates the respondents who agreed that operating platform is important constitute 70% male respondents, whereas only 30% are female.

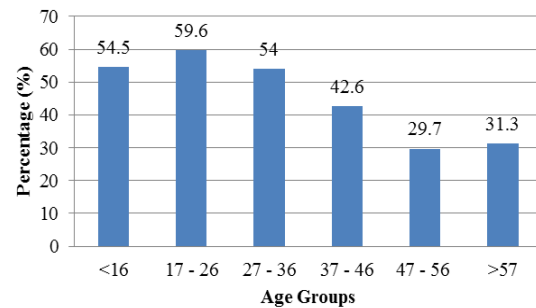


Fig. 3. Crosstab Analysis of Design by Age

Fig. 4 indicates a visible pattern that computing power of the Smartphone is perceived to be more important by younger age groups, compared to their older counterparts. This might imply that younger adults are particular about the computing power of smartphone as they are heavy users of applications, games, flash contents, and media. Thus computing power is pertinent for them to ensure smooth and pleasant browsing experience. On the other hand, older consumers are less likely to use their smartphone for gaming, flash contents, and other CPU-hungry applications. Therefore, computing power of the smartphone is less critical to them.

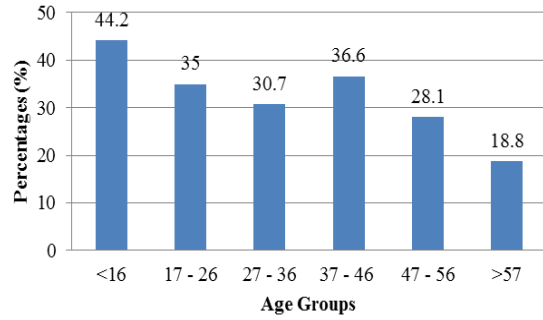


Fig. 4. Corsstab Analysis of Computing Power by Age

According to Table 4, the most common usage of smartphone is still related to its core functionalities which are to make phone call, and SMS. Interestingly, the 40 % of the respondents have reported that they use smartphone for instant messaging daily. This would imply that consumers no longer solely depend on computer to send instant messages, but smartphone is another important platform for the consumers to interact with others through instant messaging. As sending instant message is commonly free of charge, whereas sending ordinary SMS will incur communication fee

for the consumers, this could be one of the reasons why instant messaging has become increasingly popular. Nonetheless, instant messaging is more likely to act as complimentary to conventional SMS, instead of substitution of the SMS. This is because incompatibility issues may occur among different instant messaging clients such as MSN, WhatsApp, and TalkBox. Users may face difficulties to send instant message to users that use different client applications. More importantly, instant messaging is only feasible and practical if the user has subscribed for unlimited data plan, or has access to the Wi-Fi connection. Otherwise, the expensive data charge would outweigh the cost benefit of instant messaging.

According to the data analysis, entertainment is another major type of smartphone usage. Entertainment refers to the usage of music playing, movies, and games. Hence, the finding suggests that other than as a means of communication, smartphone is perceived by consumers as a source of entertainment or media.

Table 4. Usage Patterns of Smartphone

Usage	Daily	Few Times a week	Weekly	Rarely	Never
Make a phone call	82.45%	12.10%	2.05%	2.83%	0.55%
Check e-mail	21.43%	17.32%	7.88%	17.05%	36.31%
Business	15.77%	11.94%	10.16%	21.32%	40.81%
Entertainment	26.54%	23.82%	12.49%	20.04%	17.10%
Studying	18.54%	21.99%	12.27%	22.10%	25.10%
Browsing Web page	23.26%	18.38%	11.10%	20.77%	26.49%
SMS	85.23%	8.44%	2.44	2.11%	1.78%
Instant messaging	40%	16.55%	6.44%	14.27%	22.71%
GPS	11.16%	12.60%	8.55%	24.04%	43.64%
Read PDF/Word	10.77%	12.49%	8.72%	21.32%	46.70%
Others	14.32	3.22%	2.72%	7.61%	72.12%

Interestingly, the finding indicates that about 74% of the respondents have experience of using their smartphone to browse webpage, while 53% of the respondents have use smartphone to browse webpage at least once a week. This number shows that mobile web browsing is relatively common among the smartphone users.

Furthermore, about half of the consumers have never read documents or PDF file on their smartphone. This may imply that although reading document is technically feasible on smartphone, it is not practical enough to do so due to inefficiency and readability of the document due to the limited screen space. It could suggest that more efforts are needed to make the document reading and editing task more practical, effective, and efficient on the smartphone device.

5.8 Specific Usage

As aforementioned, the understanding of the consumers' usage behaviors towards various types of smartphone applications is important as a yardstick to gauge the actual utilization of these applications by the consumers. This section presents the respondents' attitude and behavior towards Internet browsing, e-mail, games, and blogging through smartphones.

5.8.1 Internet Browsing

Fig. 5 illustrates the frequency of using smartphone to access the Internet. Overall, about 75% of the respondents have experiences of browsing the Internet using their smartphones. This implies that consumers in Malaysia are considerably opened to accept mobile Internet browsing. Additionally, the crosstab analysis shows that more male respondents (about 61%) browse the Internet via smartphone than their female counterparts (about 39%).

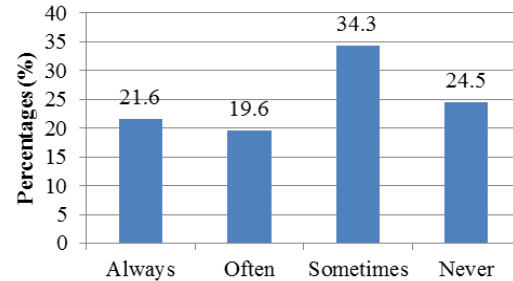


Fig. 5. Frequency of Accessing Website via Mobile

5.8.2 Blogging

Blogging have become a widely accepted communication means in the context of Internet usage. With regard to this, it is interesting to find out the acceptance of blogging using smartphone. The finding as shown in Fig. 6 indicates that blogging through smartphone is yet a common practice for users. About half (47%) of the respondents have not tried to blog by using their smartphones, whereas only 21 percent of respondents do so on regular basis. The considerably low acceptance of this practice may be due to inconvenience and inefficiency in utilizing smartphone to write a blog. Blogging can be done faster and easier by using a computer. Previous study has found that ease-of-use and usefulness are the main factors that affect the utilization of certain technologies [21, 22]. This study extends the finding to the context of smartphone application software.

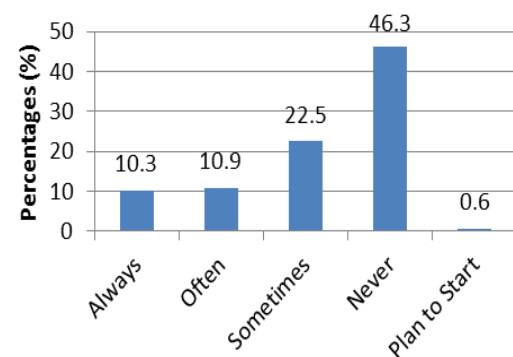


Fig. 6: Frequency of Blogging via Smartphone

5.8.3 Gaming

As mobile games are one of the major market opportunities, it is paramount to see the way consumers react and utilize the mobile games. Fig. 7 shows that mobile games have a higher acceptance level among the respondents compared to e-mail, in which approximately 84% of the respondents have experience of gaming via their smartphones. Furthermore, as similar to the trend in Internet browsing, the analysis also indicates that male respondents play mobile games slightly more frequent than their female counterparts.

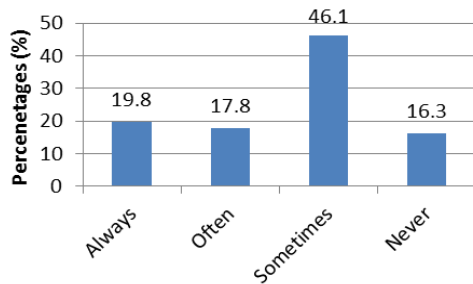


Fig. 7 Frequency of playing game via Mobile

6. DISCUSSION

This study has revealed that selling price is not the most important factor that affects smartphone purchasing decision, whereas the consumers perceive other factors such as design, connectivity, and performance to be more important than the price. This study posits that smartphone is perceived by consumers as durable item, which the price sensitivity is lower. Hence, the consumers are willing to pay more in the exchange of better product quality and features. The manufacturer of smartphone should give more attention to the finest quality and features on their smartphone, while maintaining their selling price at a reasonable level in order to be ahead in the smartphone market. This is much reflected through the fact that nowadays it is common

that the best-selling smartphone of a brand is their high-end smartphones that are outstanding in their quality and specifications.

Interestingly, the report shows that trends in the society have more influence than the actual needs in the purchasing decision of a smartphone. In other words, smartphone is not merely a commodity to fulfill the communication requirements, but smartphone would be an indicator of status, prestige, and lifestyle. For instance, there are great proportions of iPhone buyers who are motivated by trend in the market, the influence of friends and colleagues, and marketing efforts; instead of actually purchasing the device because of they need for such applications, functions, and features. It is important to emphasize the importance of marketing strategy and influences to the purchasing decision of consumers in the context of smartphone market.

This section discusses the main findings of this study. The statistics show that consumers from older age groups tend to be not particular about the technical specification of smartphone such as operating platform, computing power, and design. The plausible explanation would be, older consumers focus on the core functions of mobile phone such as making phone call and SMS. As long as the mobile phones support the basic usage and priced reasonably, they will go for the choice. Hence, it is suggested that the mobile phone targeted for older consumers can focus on the core functionality and concentrate less on the unnecessary features and frills. This would enable the product to be cost effective and affordable to most of the consumers.

Moreover, the result of this study suggests that the most attractive market for smartphones is consumers from younger age groups with purchasing power. Additionally, younger consumers, especially male would pay more attention on the technical aspects of the smartphone such as computing powers, operating platform, and software applications. This is reasonable as younger smartphone users are often the consumers of

media and entertainment applications. Since these usages require high demand on computing power, the younger consumers will pay attention to the performance of the smartphone, in order to ensure smooth and delightful experience.

In terms of the usage, the findings indicate that the “smartness” of smartphone is yet to be fully exploited by the consumers. Most of the usages are entertainments, instant messaging, Internet browsing, and email. Other functions of the smartphone such as GPS, document editing, and business related functions are not commonly utilized. It is suggested that proper redesign of the applications, user training, and user supports should be more prevalent in order to improve the usability and acceptance of these functions.

7. DISCUSSION

This study has provided insightful overview of the smartphone trends and usage behaviors in Malaysia, which could also be applicable to other developing countries in similar region. This exploratory study serves as a foundation for future work in refining the specific domain of the smartphone study. For instance, empirical research can be conducted to systematically test and identify the determinants of smartphone purchasing decisions, or study influences of marketing strategies on the smartphone demands and usages. Furthermore, this study has revealed that various factors that are pertinent in the context of smartphone purchasing decision such as design, performance, connectivity, price, and influences from market and social trend. The future works can adopt specific theory or concept to conceptualize these smartphone-related factors and empirically test their relationships. These specific factors could provide better explanation capability in terms of granularity and specificity to the study of smartphone, than those general constructs such as ease-of-use, compatibility, and usefulness. In other words, with the factors revealed in this study, academics could develop a context-

specific research framework to empirically examine the smartphone adoption or usage. For practitioners, the information provided here would be useful for them to have a better sense of the smartphone market in Malaysia and the region, and to inspire them to come out with effective commercial strategy.

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