

# Adoption of Short Messaging Service (SMS) in Malaysia

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## Abstract

*SMS being an almost instantaneous communication medium that connects people, is now a phenomenon that has grown and spread around the globe at an amazing speed. Given the current trend of SMS usage and its potential growth, this paper will provide an insight of SMS adoption in Malaysia. The study attempts to delineate the demographics and usage profile of SMS users in Malaysia, as well as explaining the factors influencing SMS adoption in Malaysia by using a modified version of Technology Acceptance Model (TAM) originally introduced by Davis (1989). The study presented the demographic and usage profile in terms of gender, age, occupation, monthly personal income, extent of SMS usage and so forth of 489 SMS users from four institutions of education in the Klang Valley and Selangor. The present research used and validates the scales for variables developed by earlier studies, namely perceived usefulness, perceived ease of use, perceived enjoyment, and perceived fees which are hypothesized to be fundamental determinants of behavioral intention. The scale items for the said variables were tested for reliability, correlation and regression. The application of correlation analysis revealed a significant relationship among the independent variables namely perceived usefulness, perceived enjoyment, perceived ease of use with the dependent variable that is behavioral intention. With regards to the level of importance derived from regression analysis, usefulness ranks the highest, followed by ease of use and enjoyment in explaining SMS adoption in Malaysia. Perceived fees do not seem to have a significant relationship with behavioral intention. Some implications, limitations and recommendations for future research were also discussed.*

## Field: Management Information System

### Introduction

M-commerce, a natural extension to electronic-commerce, includes any business activity conducted over a wireless telecommunication network, which includes B2C and B2B commercial transactions as well as the transfer of information and services via wireless mobile devices especially in intra-business (Turban, 2006). Similar to other e-commerce applications, m-

commerce can be done via the Internet, via private communication lines or over other computing networks.

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Currently, wireless devices used in mobile commerce include two-way pagers/short message system (SMS), wireless application protocol (WAP)-equipped cellular phones, personal digital assistants (PDA), internet-enabled laptop computer with wireless access capacity and so forth.

Comparing the three platform of m-commerce namely WAP, GPRS and SMS, SMS is the most popular platform and it was discovered that the use of short messaging services (SMS) has exceeded all initial expectations (Bauer et al., 2005). This has indirectly resulted in mobile phone being used as an important market instrument compared to other mobile devices. SMS's popularity was mainly due to its cost as it is the cheapest information delivery mode. Studies by Malaysian Communications and Multimedia Commission (MCMC) found that in Quarter 1, 2006, Malaysia ranked second with 56.6 persons owning a mobile phone per 100 inhabitants in comparison to other ASEAN countries (Communication and Multimedia, 2006). The growth of SMS-related services over the past several years reflected the enormous potential of the Malaysian wireless data communication market. It is therefore timely for this study be undertaken to elucidate the rationale behind the adoption of SMS as a form of communication.

Short Messaging Services (SMS) are generally understood as texts read on small mobile phones screens typically capable of presenting 15 to 20 characters per line. The messages are written with numeric keypad on the phone, normally requiring more than one key press per character, with messages restricted to 160 characters in length (Svendsen et al., 2006). It has been classified as a form of communication services within mobile commerce, grouped together with voice call, MMS, video and e-mail (Harris et al, 2005) that allows people and organization to send and receive short text messages from a mobile phone in near real time. SMS, an almost instantaneous communication medium that connects people, is now a phenomenon that has grown and spread around the globe at an amazing speed compared to other types of mobile commerce services. SMS is extensively used not only for communication purposes but also as a major marketing effort due to its low cost. As a highly interactive medium, SMS enables the

recipient of the message to reply to it immediately, which establishes a direct dialogue between the advertiser and the potential customer. This enables companies to offer personalized, timely and relevant information, which in turn strengthen the customer relationship and strengthen the emotional relationship between a brand and its customers (Nysveen et al., 2005). SMS owes its popularity to its low cost mode of information delivery and its instantaneous communication medium which operates on a "store and forward concept". With the increased number of mobile subscribers in the world, SMS has gained its popularity and has become an integral part of people's lives (Pastore, 2002 quoted in Lai, 2004) and has significant implications for communication and information transmission.

The study will attempt to answer the following research question. What are the factors that influence the adoption of short messaging services Malaysia? Based on the aforesaid research question, the following objective is developed; to determine factors influencing the adoption of short messaging services.

## **Adoption of SMS**

Previous studies have examined ways in which everyday life activities influence mobile phone use and to a certain extent SMS usage (Harris et al., 2005; Gilligan and Heinzmann, 2004; and Davis, 1989). Drawing on this body of research a number of factors affecting SMS usage have been extracted.

First, cost of mobile telephone calls and SMS messages is likely to affect the adoption of SMS. Harris et al (2005) discovered that a relatively low level of SMS usage in Hong Kong as the cost of calls beyond the free allowance are about 7.5 times cheaper in Hong Kong than in the UK.

Second, the adoption phase of mobile phone according to Gilligan and Heinzmann (2004) could also be one of the factor affecting SMS usages. In the early phases of mobile phone take-up, the mobile phone may be used more for voice communication rather than for SMS, as the users become more familiar with using the phone, he/she also becomes more familiar with other functions/services available on the phone, such as SMS. Therefore, SMS usage could be influenced by the length of time of ownership of mobile phone.

Third, apart from using SMS as a communication tool for sending and receiving messages, as the vast majority of SMS users do (Gilligan and Heinzmann, 2004), there is an increasing number of SMS commercial services such as Voting (e.g. Malaysia reality show's such as Akademi

Fantasia, Malaysian Idols and so forth), news alerts, sports results and ringtones/logos. The use of SMS in conjunction with TV in the last couple of years has undoubtedly promoted the use of SMS in many countries including Malaysia (Gilligan and Heinzmann, 2004). Hussin (2005) reported that the third season of Akademi Fantasia, created such a fad among the Malaysian public especially the youth that it raked in RM1.7 million through audience SMS responses for the final round. Thus, this type of TV program which employs SMS services coupled with the collaboration of mobile operators through a single shortcode to access the SMS voting, irrespective of network operator, encourages SMS usage.

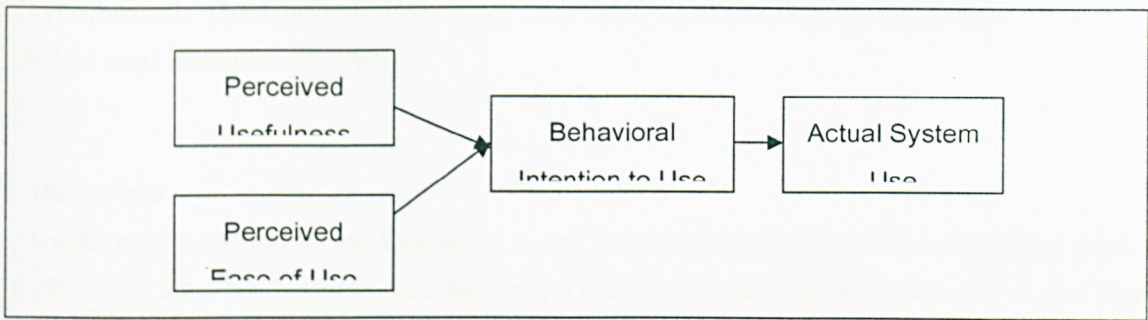
Fourth, SMS usage can also be influenced by cultural factors such as modes of commuting, sensitivity to privacy and cultural events. Modes of commuting to work and the related free time available to key in messages can influence SMS usage, for instance, public transport commuters have more time available to send SMS than people driving to work. Hence groups or countries with more of a commuter culture may have more opportunity to send messages when traveling. Another potential cultural factor may be that in some countries or areas where people are less sensitive to privacy and willing to make voice calls in public, people may rather use their mobile more for voice communication than SMS.

The fifth factors are the two prominent constructs that embodied the TAM, namely perceived usefulness and perceived ease of use. TAM was originally developed by Davis (1989) to explain the individual's adoption of traditional technology (e.g. spreadsheet, email and software development tools) in an organization setting (Davis, 1989) and has since become the most prominent model employed to explain the adoption and usage of technology by individuals.

As mentioned earlier, TAM focuses on 2 theoretical constructs; *Perceived Usefulness* (PU) and *Perceived Ease Of Use* (PEOU). PU is the degree to which a person believes that using a particular system would enhance his or her performance. A system high in perceived usefulness is one, which a user believes in the existence of a positive performance relationship. PEOU in contrast refers to "the degree to which a person believes that using a particular system would be free of effort". These constructs are of significant importance as proposed by Davis (1989) since people tend to use or not use an application depends on the extent to which they believe it will help them perform their job better.

The central idea underlying TAM is that a person's behavioral intention (BI) to use a 'system' is determined primarily by its two constructs i.e. PU and PEUO. The model can be further illustrated by the following figure.

Figure 1 – Technology Acceptance Model



Source: Davis et al. (1989)

Davis (1989) found that ease of use is an antecedent to usefulness *rather than a parallel, direct* determinant of usage and confirmed the causality of which can be shown as follows: ease of use → usefulness → usage chain. This means that the easier a system is to interact with, the less is the effort needed to operate it, and the more is the effort one can allocate to other activities contributes to overall job performance.

This model has been tested for reliability and validity by Adam et al. (1992) who had replicated this model and confirmed the reliability as well as the validity of the constructs used for both usefulness and ease of use scales. The applicability of TAM has been applied in several countries like United Kingdom (Al-Gahtani, 2001) and Hong Kong (Chan and Lu, 2004) and was used to explain several perspectives ranging from the adoption of wireless internet (Yu, Liu and Yao, 2003), online shopping (Gefen, 2003; Gefen, Karahanna and Straub, 2003;), web-based learning (Gong, Xu and Yu, 2004), ERP implementation (Amoako-Gympah and Salam, 2004), internet banking (Wang, Wang, Lin and Tang, 2003; Chan and Lu, 2004) and as well as instant messaging services (Wang, Hsu and Fang, 2004).

### Extent of Usage

Extent of usage as defined by Lai (2004) is “the number of SMS sent monthly, the frequency of SMS sent and customer’s self-categorization of his or her own usage of SMS”. Hence the questions asked in determining the extent of usage are, i) The numbers of SMS sent monthly, ii) The frequency of SMS sent, and iii) Customer s’ self-categorization of his or her own usage of SMS. The positive influence of behavioral intentions on extent of usage have been proven by Parasuraman et al. (1988) and Brady et al. (2002). It is hypothesized that behavioral intention is positively correlated with extent of usage hence the first hypothesis is:

Hypothesis 1: The frequency or extent of SMS usage is positively related to behavioral intention of SMS.

### **Usefulness**

Usefulness is defined as the total value a user perceives from using a new technology (Kim et al. 2005) i.e. the user believes that the device has some desirable functions that it can perform. Individuals evaluate the consequences of their behavior in terms of perceived usefulness and base their choice of behavior on the desirability of the usefulness. The usefulness construct has been used extensively in information systems and technology research, and has strong empirical support as an important predictor of technology adoption (Matheison, 1991). It is then hypothesized that:

*Hypothesis 2: Usefulness is positively related to behavioral intention of SM*

### **Enjoyment**

Individuals, who experience immediate pleasure or joy from using the technology and perceive any activity using the technology to be personally enjoyable in its own right aside from the instrumental value of the technology, are more likely to adopt the technology and use it more extensively than others (Davis et al., 1989). Enjoyment refers to the extent to which the activity of using a product is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated (Davis et al, 1992). Since enjoyment and fun has a significant effect on technology acceptance, it is therefore hypothesized that:

Hypothesis 3: Enjoyment is positively related to behavioral intention of SMS.

### **Ease of Use**

Even if potential users believe that SMS is useful, they may, at the same time believe that SMS is too hard to use and that the performance benefits of usage are outweighed by the effort of using it. In addition to usefulness and enjoyment, SMS is theorized to be influenced by perceived ease of use. This variable has been adopted from Davis (1989), which refers to the degree to which an individual believes that using a particular system would be free of physical and mental effort. This follows from the definition of "ease" which is the freedom from difficulty or great effort. Davis (1989) claimed that an application which is perceived to be easier to use than another is more

likely to be accepted by users. Therefore, the next hypothesis is as follows:

Hypothesis 4: Ease of use is positively related to behavioral intention of SMS.

### **Perceived Fee**

Technology users in organizational setting use technology for work purposes and the cost of mandatory adoption and usage is borne by the organization. However, SMS adopters are individuals who play the dual roles of technology user and service consumer. Most of them adopt and use SMS for personal purposes, and the cost of voluntary adoption and usage is borne by the individuals. Potential adopters of SMS are mobile service consumers who will consider prices and evaluate SMS usage based on its benefits and costs. Since the fees or charges structure of SMS is either of *pay-as-you-use* (prepaid) and subscription-based pricing (post-paid), cost is an important factor to the consumers. According to the Adaptation Level Theory, instead of having perfect information about prices, customers possess internal reference prices and make comparison with these prices (Grewal et al., 1998). In the case of SMS, one would probably compare with the prices of mobile phone calls and stationary internet usage. The result of this comparison forms one's perception of the fee. It is therefore proposed that perceived fee directly influence behavioral intention thus the following hypothesis is:

Hypothesis 5: Perceived fee is positively related to behavioral intention of SMS.

## **Research Methodology**

A convenience sampling was employed for the study. The sample was confined to students from four institutions of education in the Klang Valley and Selangor who are hand phone users. The above geographical areas were chosen due to the fact that subscriber base of Klang Valley and Selangor accounts for 34.5 percent of the total hand phone user in Malaysia (Hand phone User Survey, 2004). Furthermore, 81.9 percent of the hand phone subscribers are from urban sector. Students were chosen as respondents because young adults have been found to be faster adopters of mobile commerce in general (Lee *et al.*, 2002).

This study used questionnaire survey as the primary form of calling responses from hand phone

users in Klang Valley and Selangor about their perception of SMS adoption. Survey approach was chosen because it provides quick, inexpensive, efficient and accurate means of assessing information about the population. Other research designs were not adopted because, first, manipulation of variables was not required as such experiment method was not appropriate. Second, there were not many studies have been done related to the research area, thus, secondary data approach alone was not sufficient. Third, observation approach was not viable as there are many things that cannot be observed. Attitudes, opinions, motivations and other intangible states of mind of people cannot be recorded by observation.

The questionnaire was designed to measure the SMS behavior of hand phone users in Malaysia. A 5-point Likert scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree) were used. For each statement, respondents were required to indicate their level of agreement to the statements. The statements measured constructs that were deemed relevant in measuring SMS adoption. Amongst the construct measured were 'behavioral intention', 'perceived usefulness', 'perceived ease of use', 'perceived enjoyment' and 'perceived fees'. The input for the SMS behavior statements was derived from Brady et al., 2002; Lai, 2004 and Kim et al., 2005. Again, a few adjustments were made to the original questions to suit the research context, for example, Kim et al., 2005 were using the same constructs to measure the adoption of mobile internet and not SMS.

In order to provide an adequate level of confidence in the study, a sample size of 300 was targeted. 1,000 questionnaires were distributed with the hope of obtaining at least 300 usable responses for analysis. The survey was conducted over a six-week period using self-administered drop-off method. This method was chosen because it was less expensive in terms of manpower as well as time needed. A key person in each of the education institutions was engaged to act as the contact person and the distributing agent. A total of 510 responses were obtained from the fieldwork. Out of the total responses received, 21 were invalid or were incomplete and as such were rejected. 489 responded questionnaires were used for the final analysis.

Behavioral intention which is a component of theory of reasoned action developed by Martin Fishbein and Icek Ajzen (1980) refers to a function of both attitudes toward a behavior and subjective norms towards the behavior, which has been found to predict actual behavior. For instance, one's attitude about SMS combined with the subjective norms about SMS, each with



their own weight, will lead to one intention to use SMS (or not), which will then lead a person to the actual SMS usage. Parasuraman et al. (1988) suggested that favorable behavioral intentions are associated with the service provider's ability to get its customers to remain loyal to them and to recommend the service to other customers. As such behavioral intention in the context of this study was regarded as, and as defined by Lai (2004), "the use of more SMS in the future and recommending other people to use it".

## Research Findings

To test the hypotheses proposed earlier, correlation analysis and multiple regression analysis were conducted. The correlation analysis and multiple regression analysis are shown in table 1 and 2 respectively.

Table 1  
Correlation Analysis Between the Variables

	Factor I	Factor II	Factor III	Factor IV	Factor V
Factor II	0.578(**)				
Factor III	0.473(**)	0.515(**)			
Factor IV	0.463(**)	0.559(**)	0.470(**)		
Factor V	0.135(**)	0.236(**)	0.356(**)	0.130(**)	
EU	-0.067	-0.126(**)	-0.015	-0.184(**)	0.031

- Factor I · Behavioral Intention
- Factor II · Usefulness
- Factor III · Ease of Use
- Factor IV · Enjoyment
- Factor V · Perceived Fees
- EU · Extent of SMS usage

\*\* Correlation is significant at the 0.01 level.

From the table above, there are statistical significant relationship among all the variables except for the relationship between behavioral intention (Factor I) and extent of usage (EU), ease of use (Factor III) and extent of usage (EU), and perceived fees (Factor V) and extent of usage (EU).

The strongest relationship, in order of sequence, were between behavioral intention (Factor I) and usefulness (Factor II) ( $r = 0.578$ ), usefulness (Factor II) and ease of use (Factor III) ( $r = 0.515$ ), and usefulness (Factor II) and enjoyment (Factor IV) ( $r = 0.559$ ). The relationship with medium strength were between behavioral intention (Factor I) and ease of use (Factor III) ( $r = 0.473$ ), behavioral intention (Factor I) and enjoyment (Factor IV) ( $r = 0.463$ ), ease of use (Factor III) and enjoyment (Factor IV) ( $r = 0.470$ ), and ease of use (Factor III) and perceived fees (Factor V) ( $r = 0.356$ ). Lastly, the relationship with the lowest strength were between behavioral intention (Factor I) and perceived fees (Factor V) ( $r = 0.135$ ), usefulness (Factor II) and perceived fees (Factor V) ( $r = 0.236$ ), enjoyment (Factor IV) and perceived fees (Factor V) ( $r = 0.130$ ), usefulness (Factor II) and extent of usage (EU) ( $r = -0.126$ ), and enjoyment (Factor IV) and extent of usage (EU) ( $r = -0.184$ ). All the statistically significant relationships were positively related (for example an increase in one variable is associated with an increase in another variable) except for the relationships between usefulness (Factor II) and extent of usage (EU) and between enjoyment (Factor IV) and extent of usage (EU) which were negatively related (an increase in one variable is associated with a decrease in other variable).

Table 2  
All Variable Regression

Model	Predictors (Independent Variables)	Standardized Coefficients Beta	Sig.
1	Usefulness	0.390	0.000
	Ease of Use	0.223	0.000
	Enjoyment	0.169	0.000
	Perceived Fees	-0.061	0.114
	Extent of SMS usage	0.000	0.990

Dependent Variable: Behavioral Intention (Factor I)

Adjusted  $R^2 = 0.386$

According to the table 4.5 above, only Factor II, Factor III and Factor IV had significance level of 0.000 which were less than the selected significance level of 0.05. These indicated that there were significant relationships between the dependent variable Factor I and the predictors Factor II, Factor III and Factor IV. The Adjusted  $R^2$  figure inferred that 38.6% of the variance in the dependent variable could be explained by the predictors, while the remaining 61.4% was

explained by other factors.

The standardized coefficients value for Usefulness ( $\beta = 0.390$ ) was the highest among the predictors, which indicated that usefulness was the most important variable in predicting behavioral intention. This was followed by ease of use ( $\beta = 0.223$ ) and enjoyment ( $\beta = 0.169$ ). Surprisingly, perceived fee was not statistically significant in explaining the variance in behavioral intention despite the correlation analysis results that showed positive relationship between the two variables. Similar to correlation result, frequency or extent of usage did not show any statistical significance when it was regressed with behavioral intention.

The results have successfully tested and supported the hypotheses except for H1 and H5. The first hypothesis, H1: The adoption of SMS usage is related to behavioral intention of SMS was not supported since its correlation and regression significance levels were more than the selected significant level of 0.05. There was lack of support for H5: Perceived fee is related to behavioral intention of SMS as the correlation analysis showed a weak positive relationship between the two variables ( $r = 0.135$ ). Further analysis to test H5 using multiple regression indicated an insignificant relationship between perceived fees and behavioral intention (significance value was 0.114 which is more than  $p = 0.05$ ). The other three hypotheses namely H2: Usefulness is related to behavioral intention of SMS; H3: Enjoyment with regards to the use of SMS is related to behavioral intention of SMS; and H4: ease of use of SMS is related to behavioral intention of SMS; were all supported as the relationships between the variables were statistically significant (significance level lesser than  $p = 0.05$ ). The Pearson Correlation Coefficients ( $r$ ) and Standardized Coefficients Beta ( $\beta$ ) for the three hypotheses were as follows, H2:  $r = 0.578$ ,  $\beta = 0.39$ ; H3:  $r = 0.463$ ,  $\beta = 0.169$ ; and H4:  $r = 0.473$ ,  $\beta = 0.223$ .

## Discussion & Conclusion

The results assert that SMS adoption is determined by the perception of usefulness, ease of use, enjoyment, and perceived fee. The more the users believe that SMS has some desirable functions that it can perform the more they would use SMS in the future and the more they would recommend others to use SMS (behavioral intention). Usefulness appeared to be the strongest determinant for behavioral intention of SMS with  $r$  equal to 0.578 ( $\beta = 0.390$ ), which strongly supported H2. This result further supported the reason of usefulness construct being used extensively in information systems and technology research, and has strong empirical support as

an important predictor of technology adoption (e.g. Matheison, 1991).

The second strongest determinant of SMS adoption is ease of use with  $r$  equal to 0.473 ( $\beta = 0.223$ ). Ease of use is determined by users' perceptions as to whether using SMS is free from physical, mental and learning effort. The greater the perception of ease of use by the users about SMS, the greater the behavioral intention is, thus, supported H4 and reinforced earlier studies (Kim et al. 2005). Other than factors like low cost, easy manipulation and navigation, ubiquity and instantaneous response, SMS ease of use has been greatly enhanced by the cooperation between mobile phone service providers after 1998 that permits SMS centers to send messages to each other as illustrated by Doyle (2000).

Support for H3 validated the hypothesis that enjoyment with regards to the use of SMS is related to behavioral intention of SMS ( $r = 0.463$ ,  $\beta = 0.169$ ). This is in congruent with the findings by Davis et al. 1992, whereby, individuals, who experience immediate pleasure or joy from using any technology (including SMS) are more likely to adopt the technology and use it more extensively than others. Enjoyment is, as expected, a motivator and an effective determinant of behavioral intention.

Surprisingly, perceived fees emerged as the independent variable with the weakest relationship with behavioral intention with  $r$  equal to 0.135 which was below 0.290 (low relationship as defined by Cohen, 1998). The weak relationship perhaps explained its statistically insignificant predictor for SMS adoption when it was regressed with behavioral intention. This finding suggested that monetary cost did not serve as a barrier to adoption. Further, it was incoherent with Kim et al. (2005) in which perceived fees was the top concern for M-internet adoption, as users are deterred more by the costs than they are attracted by benefits (usefulness and enjoyment). Perhaps, SMS in Malaysia is in the early stage of adoption whereby usefulness is still the top concern, unlike Singapore, the consumers would already have deemed the service useful, as such other factors like usage fee therefore become significant.

The absence of a significant effect of the adoption of usage on behavioral intention was rather surprising and warrant further investigation in light of the importance of this variable in prior studies (e.g. Davis *et al*, 1989). This might be due to the reclassification of usage categories in order not to violate the assumptions of chi-square analysis or it may be simply difficult for users to accurately report the number of time they send messages. Ideally, future research will take measures of actual usage, for instance, obtaining access to the user's mobile phone bills; however, such an approach is often impractical because it is burdensome for and encroaching

the privacy of the respondents. Notwithstanding the above, there was a weak relationship between adoption of usage and usefulness and enjoyment. One possible explanation was that users develop their attitudes about SMS usefulness through prolonged usage.

The findings also held many practical implications. This research has served to broaden our understanding of the factors influencing SMS adoption from the perspective of users or customers. The benefits such as usefulness and enjoyment would be the most important driver of SMS adoption and should not be neglected in the development of new functions and enhancement of service features. Rather than creating services based on expert's perception of usefulness and demand, service providers should conduct regular market research to discover consumer needs and wants and transform the findings into services useful to consumers. Findings from this study offered empirical support that pricing strategy / manipulating perceived fees is clearly not the only means of increasing behavioral intent, ease of use and enjoyment are equally essential. This can be an important consideration when developing pricing policies and marketing strategies for more innovative and value-added SMS.

While multi-media mobile messaging services are emerging, understanding the current SMS users' behavior towards the current SMS service is important to the telecommunication service providers given the similarity between new mobile messaging services and current short messaging services, customers would probably use the SMS quality to judge and form expectation of the new mobile messaging services. As such, the service providers may use the quality of SMS services quality as a benchmark in order to meet the customers expectation in delivering the new mobile messaging services.

Nevertheless, there are limitations in this study which may restrict the generalizability of the findings, and these could be addressed in future studies. First, the samples were students. The study was confined to students who are handphone users residing in Kuala Lumpur and Selangor. Hand phone users from other parts of the country were excluded from the research due to time and cost constraints. Consequently, the study is subject to the limitations and possible biases that exist when only one geographic area, which may not be representative of the total handphone users. Moreover, most of the respondents in this study are highly educated, as such they may not be representative of the Malaysian society. Future research on less educated users will offer further insights into the adoption of SMS.

Despite these limitations, this research paper serves as an important pilot study into the potential of SMS usage in Malaysia. It is hoped that businesses keen on entering the wireless marketplace will find this preliminary research useful in establishing business models and understanding the

nature of the industry in Malaysia. Further research can be conducted over a more heterogeneous sample of Malaysians with a better formulated and in depth survey so as to yield more representative results.

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