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Mobile Devices and Communication: An Analysis

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Abstract

Communication through mobile devices is no longer treated as a new phenomenon. Nevertheless, consumers' attitude towards electronic marketing applications is still vague from the perspective of acceptance. Text messaging is currently the best way to keep in touch when the environment is not conducive to talk which includes being in a noisy bar, on a crowded train, in a meeting or just do not want to be overheard. The purpose of this paper was to determine factors that influence consumer behaviour (mobile phone owners) in communicating via SMS services. Indirectly, this research will contribute to the mechanism used by telecommunication service companies to communicate about their services. By identifying the influential factors and isolating approaches that will not attract consumer, this can eventually contribute to the success of introducing new or modified products and services.

Keywords: **Communication, Electronic Marketing Application, Short-Messaging-System (SMS)**

INTRODUCTION

Communication is a dynamic mechanism, which may be engaged by at least two parties with a common objective to understand and relate issues pertaining to their needs and satisfaction. There are many of communication models introduced by previous researchers. One of the communication models was by Shannon and Weaver (1949) who listed the elements in the communication processes (Figure 1.0).

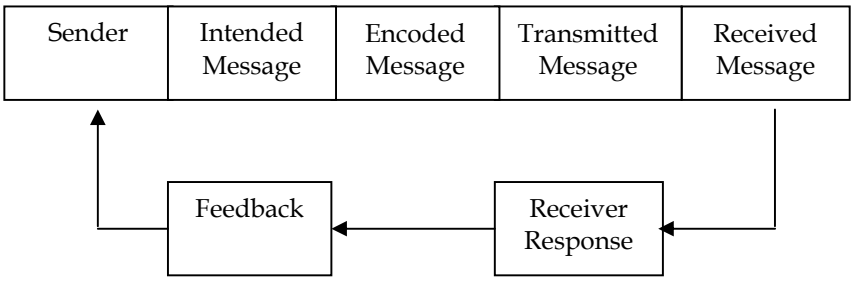

Figure 1: Elements in the Communication Process
Source: Shannon, G. and Weaver, W. (1949): *The Mathematical Theory of Communication*, University of Illinois

Even though, the process of communicating the message is simple, the way audience receives the message may vary from one audience to another. Nevertheless, consumers' attitude towards electronic marketing applications is still vague from the perspective of acceptance. SMS allows text messages to be sent and received to and from mobile telephones. SMS was created as part of the Global system for mobile communications (GSM). Global system for mobile communications is a second-generation digital technology, which was originally developed for Europe but now has in excess of 71 per cent of the world population. According to an article in www.gsmworld.com, there were some interesting statistics demonstrating the impact of SMS throughout the world as follows:-

- Number of countries/area with GSM system (as at March 2004) – 207
- GSM total subscribers (worldwide as at end of March 2004) – 1046.8 million
- Short message messaging (SMS) sent per month – 45.6 billion

Malaysian Communication and Multimedia Commission (MCMC) (2004) reported that mobile phone is an essential item of communication. The research indicated 31.7 per cent of mobile phone user sends more than 5 SMS daily. Based on the statistic provided by MCMC (www.mcmc.gov.my, 10/6/2005) a total of 3.6 billion SMS were sent in 2002, followed by an increase of 69 per cent (6.1 billion) in 2003 and 9.5 billion in 2004. This year (January – June) of 2005, a total of 7.4 billion SMS have been sent via mobile phones.

Table 1: Mobile Phone Penetration Rate

Year	Quarter	Post Paid	Pre paid	Total ('000)	Growth Rate (%)	Penetration
2005	1	2628	13201	15829	8.3	60.9
	2	2787	13764	16551	4.6	63.3
	3	2896	14655	17551	6.0	66.8
	4	2925	16620	19545	11.4	74.1
2006	1	2983	17607	20590	5.3	77.7
	2	3162	18358	21520	4.5	80.8
	3	3292	18561	21853	1.5	81.6

Source: Malaysian Communication and Multimedia Commission

As a direct marketing tool, electronic Short Message Services (SMS) is likely to surpass internet-based advertising before the end of 2006. Younger consumers higher in social class are the most willing to accept SMS direct advertising text and respond favorably to SMS-TV integrated marketing communications (Iii and Woodside, 2006). On the same note, online banking is starting to gain its momentum via the internet. Nonetheless, effort has been made to ensure online banking flexibility walks hand in hand with the

convenience factor, therefore introducing banking via mobile phone (with GPRS interface). Understanding how companies should interact with their customers and deliver services in electronic environments is of decisive importance (Parasuraman and Zinkhan 2002). Nevertheless, despite these advantages, the consumer uses mobile devices mainly for simple services, such as voice services and text messaging. Based on this factor, it is important to understand the driving forces of consumers' intentions to use mobile services and to adapt the services to fulfill consumers' motives for using them (Nysveen et al., 2005).

JUSTIFICATION OF THE RESEARCH

Communication via SMS is a global phenomena and still growing. The thought of sending and receiving text messages never seem to be easier. Nevertheless, there is a need to identify the main reason that influences consumers (mobile phone owners) to be engaged in this new stream of communication. According to a report entitled "*British SME's Lead UK Text Boom"* (June, 2005), Communicating with friends and families by text has long been established as a valuable communication tool and the SMS market has shown massive growth in recent years often with spikes of traffic over seasonal occasions such as New Years Eve and Valentine's Day.

The report also stated that in 2000, the Mobile Data Association found that 19 million messages were sent daily in the UK. In February 2005, those figures had reached an average of 75 million a day, a massive increase that can be attributed in part to increasing take up of SMS for business purposes (www.text.it/mediacentre, 4 Oct 2005). Knowles, Grove, and Pickett (1999) in their study on consumers' moods either it is positive or negative and various conditions of service excellence (positive, neutral, negative or mixed) on recall, evaluate and behavioural intentions regarding a service provider found that moods play a less significant role than the nature of the service encounter itself.

Through the study, Knowles, et al., (1999) recommend that service provider should; (a) pay close attention on service quality; (b) realize that performing well on some dimensions of the service encounter may overcome more performance on others; (c) work to create more neutral rather than positive mood-evoking condition in their customers; and (d) actively promote the positive aspects of service encounters to the customers.

Most importantly, the telecommunications providers as one of service providers should emphasis on their customer quality and try to create a natural mood in their services, in order to get a positive response from their customers. This will help the company to retain their customers or to minimize the switching behaviour among their customers. Switching behaviour occurs when customers are not satisfied with company's offers or products.

RESEARCH METHOD

The research was carried out in Universiti Malaysia Sabah, Labuan International Campus which has a total population of 1944 students. The study adopted data collection procedure used by Mittal (1999), where it needs to be done in a predetermine area. A total of 150 questionnaires were distributed and 100 usable questionnaires were collected. Convenient sampling method was used where respondents were given the questionnaire before a particular lecture began and collection of questionnaire was done after the lecture concluded. Statistical analysis was done using SPSS11.0 focusing on the use of descriptive analysis and factor analysis.

RESULTS AND DISCUSSIONS

A total of 100 respondents participated in the research survey comprising of 79 per cent female and 21 per cent male. Majority of the respondents (70 per cent) were between 21 -22 years old followed by 23 per cent in the age group of 23 – 24 years old. In terms of race distribution, 51 per cent were Malay, 21 per cent Bumiputera Sabah/Sarawak, 17 per cent Chinese and 8 per cent Indian. When asked about the main reason for having a mobile phone, 75 per cent stated for communication purpose, 19 per cent stated it was a basic need, 3 per cent for getting information and only 1 per cent for style/fashion. Respondents were also asked the average number of times they use SMS services per day and 49 per cent indicated an average of 4 – 9 times daily, 17 per cent for 10 – 15 times daily, 12 per cent for more than 27 times daily and for category 16 – 21 times daily and 22 – 27 times daily, 10 per cent respectively. Only 32 per cent stated that they cannot communicate through mobile phone without using SMS features, whereas 65 per cent stated other wise. A total of 43 per cent of the respondents can only stand less than 30 minutes communicating without using SMS services, 17 per cent between 1 – 1 ½ hour and 18 per cent can stand more than 3 hours. In terms of waiting time for replying SMS from friends, 78 per cent stated they can only wait less than 30 minutes before replying SMS from their friends, 6 per cent for the timeframe of 1 hour – 1 ½ hour and 4 per cent indicated that they can wait for more than 3 hours before replying the SMS.

Table 2: Cronbach Alpha

No.	Items	Alpha
1.	Interactive	0.8957
2.	Benefits	0.8819
3.	Reliability	0.8654
4.	Protection	0.8052
5.	Convenient	0.6941
6.	Features	0.4098

Furthermore, this study is also testing for reliability of used items. One aspect of reliability is internal consistency, which is an indicator of the level of homogeneity of a measuring scale (Cronbach, 1951). One criterion that has been widely used to assess

the reliability of a multi-item measurement scale is Cronbach's (1951) coefficient alpha. Based on the reliability analysis result, four of the six constructs had coefficient alpha exceeding 0.7.

As displayed in **Table 2**, the alpha results indicated interactive, benefits, reliability and protection found to be reliable. On the other hand, construct *convenient* and *features* had coefficient alpha of .69 and .41 respectively. Nunnally (1978) suggested that a set of items with a coefficient alpha greater than 0.7 is considered internally consistent. Because the *Convenient construct* and *Features construct* have coefficient alpha of 0.69 and 0.41 respectively, which is less than the recommended level of 0.7, its internal consistency were weak. Therefore, both constructs were not used in subsequent analysis.

In the process of identifying factors that influences consumer attitude (mobile phone owners) to communicate via SMS services, an exploratory factor analysis was used to help assess the unidimensionality of the multi-item scale. A principle components factor analysis using Varimax rotation was performed using the 40 items proposed for criteria or features that influence the usage of SMS services. The criteria used to determine the number of factors to extract was an eigenvalue that was greater than equal to one (Zeller and Carmines, 1980). The results indicated that six factors had eigenvalues exceeding 1.00. Based on Total Variance Explained, the 40 items can be grouped into 6 significant categories which represent 59.501 per cent of cumulative eigenvalues.

Dimensionality of each of the factors was assessed by examining the factor loadings. Items with factor loadings of greater then 0.5 were consider adequate indicators for of that factor (Hair et al., 1995). As displayed in **Table 3**, all of the factor loadings of the items in this study were greater than 0.50, with most of them above 0.70. Also, squared multiple correlations between the individual items and their a priori factors were high (above 0.50 in all cases). Thus, all factors in the measurement model had adequate reliability and convergent validity (Wang et al., 2003). However, items with values less than 0.50 consider had insufficient reliability and convergent validity. Items such as 'games messages', 'long messages', 'word message', forwarding of messages', 'deleting messages', 'confidentiality of message', 'messages must be in short form', 'short messages', and 'colourful display screen on mobile phone' are considered as weak factors.

Table 3: Factor Loadings

Measurement Variable and Dimension	Factor Loadings
Factor 1: Interactive	
Moving picture messages	.742
Moving word messages	.717
Picture with sound messages	.699
Colorful messages	.674
Interactive messages	.572
Signature messages	.565
Personalized messages	.545
Picture message	.544
Graph messages	.515

Games messages	.484^
Long messages	.443^
Factor 2: Benefits	
Free messages	.779
Replying messages	.726
Free gift from service provider	.710
Free credits by service provider	.694
Minimum cost per message	.681
Saving messages	.618
Word message	.473^
Forwarding of messages	.461^
Deleting messages	.429^
Factor 3: Reliability	
Storage bank for received messages	.791
Prompt reception period of message	.724
Storage bank for sent messages	.656
Reliable service provider	.643
Promotion by service provider	.626
Delivery time on schedule	.529
Confidentiality of message	.450^
Factor 4: Protection	
Spam message protector	.766
message filter	.709
Cancellation of messages sent	.671
message bin	.623
Unanimous message sender	.596
Recovering of messages	.573
Factor 5: Convenient	
Universal messages jargon	.692
Promotion messages	.685
Group messages jargon	.683
Messages must be in short form	.441^
Short messages	.415^
Factor 6: Features	
Maximum number of character per message	.563
Colorful display screen on mobile phone	.453^

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a Rotation converged in 10 iterations.
^ *denotes insignificant factors*

The first construct (eigenvalue=12.949) consist of “Moving picture messages”, “Moving word messages”, “Picture with sound message”, “Colourful messages”, “Interactive message”, “Signature message”, “Personalised messages”, Picture message”, “Graph message” “Games message” and “Long messages”. This factor will be known as “**Interactive**”. The second construct (eigenvalue = 2.967) consist of “Free message”, “Replying messages”, “Free gift from service provider”, “Free credits by service provider”, “Minimum cost per message”, “Saving message”, “Word message”, “Forwarding message”, and “Deleting message”. This factor will be known as “**Benefit**”.

The third construct (eigenvalue = 2.460) comprised of “Storage bank for received message”, “Prompt reception period of message”, “Storage bank for sent messages”, “Reliable service provider”, “ Promotion by service provider”, “Delivery time on schedule”, and “Confidentiality of message”. This factor will be address as “**Reliability**”. The fourth construct (eigenvalue = 2.008) is represented by “Spam message protector”, “Message filter”, “Cancellation of message”, “Message bin”, “Unanimous message sender”, and “Recovering of messages”. This factor will be known as “**Protection**”. The fifth construct (eigenvalue = 1.854) consist of “universal messages jargon”, “Promotion messages”, “Group message jargon”, “Messages must be in short-form”, and “Short messages”. This factor is refereed to as “**Convenient**”. The final construct (eigenvalue = 1.563) have only two items namely “Maximum number of character per message” and “Colourful display screen on mobile phone”. This factor will be known as “**Features**”.

CONCLUSION AND FUTURE RESEARCH

The objective of this paper was to determine factor that influence consumer behaviour (mobile phone owners) in communicating via SMS services. Indirectly, this research will contribute to the mechanism used by telecommunication service companies to communicate about their services. Factor analysis was used to group and minimized 40 variables into 6 constructs for easier management. By identifying the influential factors and isolating approaches that will not attract consumer, this can eventually contribute to the success of introducing new or modified products and services. Based on this research, six constructs were identified namely *Interactive, Benefits, Reliability, Protection, Convenient* and *Features*. Respondents of this research placed a significant importance on the first construct. Attention should be given to the 11 items in this construct in order to gain an advantage on *interactivity* between mobile phone owners and their mobile phone while using SMS services. Service provider should also take into consideration the *benefits* that will be given to mobile phone user subscribing to SMS services. Promotions of freebies and the manipulation advantage towards messages will drive users to be hooked to the services. The *reliability* of the services provider depends on the confidence of users towards the storage capacity allowed, delivery and reception of messages. *Protection* of users should also be an important agenda due to spam activities, cancellations and recovering of important messages through message filter and message bin.

Further research should focus on loyalty and satisfaction of consumers towards SMS service provider based on the platform of *Interactive, Benefits, Reliability* and *Protection* received by consumers. Apart from the above, future research should also cover the issue of SMS between countries, the amount of cost involved for SMS services both from the perspective of consumers and service providers.

References

British SME's Lead UK Text Boom (n.d) Retrieve October 6, 2005, from www.text.it/mediacentre/default.asp?intPageID=96 - 32k - 4 Oct 2005

Cronbach Alpha Retrieved October 7, 2005 from http://en.wikipedia.org/wiki/Cronbach's_%CE%B1

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*, 297-333.

Hair, J.F., Anderson, R.E., Tatham, R.L., & Black, W.C. (1995). Electronic data interchange and small organizations: Adoption and impact of technology. *MIS Quarterly,* 416 – 485.

Iii, R. J. T., &Woodside, A. G. (2006). Consumer responses to interactive advertising campaigns coupling short-message-service direct marketing and TV commercials. *Journal of Advertising Research,* 45, pp 382-401.

Knowles, P. A., Grove, S. J., & Pickett, G. M. (1999). Mood versus service quality effects on customers' responses to service organizations and service Encounters. *Journal of Service Research*, *2*,187-199.

Lawlor, K., (1995). *Advertising as Communication.* In Meenaghan, T. and O'Sullivan, P. (eds). Marketing Communications in Ireland. Dublin: Oak Tree Press.

Mittal, B. (1999). The advertising of services. *Journal of Service Research*, *2*, 98-116.

Nysveen, H., Pedersen, P. E. and Thorbjørnsen, H. (2005) Intentions to use mobile services: Antecedents and cross-service comparisons. *Journal of the Academy of Marketing Science, 33*, 330-346.

Nunnally, J.C., (1978). *Psychometric theory*. New York. McGraw-Hill

O'Connor, J., Galvin, E. & Evans, E (2004) *Electronic marketing. Theory and practice for the twenty-first Century*. Prentice Education Limited.

Parasuraman, A., & Zinkhan, G.M. (2002). Marketing to and serving customers through the internet: An overview and research agenda. *Journal of the Academy of Marketing Science, 30*, 286-295

Shannon, C., & Weaver, W. (1949) *The mathematical theory of communication,* The University of Illinois.

Statistic and Records of Cellular Data - Malaysian Communication and Multimedia Commission (MCMC) Retrieved October 6, 2005, from www.cmc.gov.my/Admin/FactsAndFigures/13207645celulardata-q2-05.JPG

Wang, Y.S., Wang, Y.M., Lin, H.H., & Tang, T.I. (2003). Determinants of user acceptance of internet banking: an empirical study. *International Journal of Service Industry Management*, *14*, 501-519.

Table 4: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.803
Bartlett's Test of Sphericity	Approx. Chi-Square	2407.577
	df	780
	Sig.	.000

Table 5: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12.949	32.372	32.372	12.949	32.372	32.372	5.154	12.885	12.885
2	2.967	7.416	39.789	2.967	7.416	39.789	4.971	12.429	25.314
3	2.460	6.150	45.939	2.460	6.150	45.939	4.445	11.113	36.427
4	2.008	5.020	50.959	2.008	5.020	50.959	4.357	10.893	47.319
5	1.854	4.635	55.594	1.854	4.635	55.594	3.253	8.131	55.451
6	1.563	3.908	59.501	1.563	3.908	59.501	1.620	4.051	59.501

Extraction Method: Principal Component Analysis.

Table 6: Rotated Component Matrix

	Component					
	1	2	3	4	5	6
Moving picture messages	.742					
Moving word messages	.717					
Picture with sound messages	.699					
Colourful messages	.674					

Interactive messages	.572		.505			
Signature messages	.565					
Personalised messages	.545					
Picture message	.544	.449				
Graph messages	.515					
Games messages	.484			.436		
Long messages	.443					
Free messages		.779				
Replying messages		.726				
Free gift from service provider		.710				
Free credits by service provider		.694				
Minimum cost per message		.681				.401
Saving messages		.618		.430		
Word message	.423	.473				
Forwarding of messages		.461				
Deleting messages		.429				
Storage bank for received messages			.791			
Prompt reception period of message			.724			
Storage bank for sent messages			.656			
Reliable service provider			.643			
Promotion by service provider			.626		.523	
Delivery time on schedule			.529			
Confidentiality of message			.450	.449		
Spam message protector				.766		
message filter				.709		
Cancellation of messages sent				.671		
message bin				.623		
Unanimous message sender				.596		
Recovering of messages				.573		
Universal messages jargon					.692	
Promotion messages					.685	

Group messages jargon					.683	
Messages must be in short form					.441	
Short messages					.415	-.403
Maximum number of character per message		.451	.402			.563
Colourful display screen on mobile phone				.422		.453

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.a Rotation converged in 10 iterations.