World Academy of Science, Engineering and Technology
International Journal of Economics and Management Engineering
Vol:1, No:11, 2007

Diffusion of Mobile Entertainment in Malaysia: Drivers and Barriers

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***Abstract*—**This research aims to examine the key success factors for the diffusion of mobile entertainment services in Malaysia. The drivers and barriers observed in this research include perceived benefit; concerns pertaining to pricing, product and technological standardization, privacy and security; as well as influences from peers and community. An analysis of a Malaysian survey of 384 respondents between 18 to 25 years shows that subscribers placed greater importance on perceived benefit of mobile entertainment services compared to other factors. Results of the survey also show that there are strong positive correlations between all the factors, with pricing issue—perceived benefit showing the strongest relationship. This paper aims to provide an extensive study on the drivers and barriers that could be used to derive architecture for entertainment service provision to serve as a guide for telcos to outline suitable approaches in order to encourage mass market adoption of mobile entertainment services in Malaysia.

***Keywords*—**Barriers, Correlations, Diffusion, Drivers, Mobile Entertainment.

I. Introduction

MOBILE commerce is defined as transactions using a wireless device and data connection, which result in the transfer of value in exchange of information, services, or goods [1]. Mobile entertainment is a subset of mobile commerce [2].

According to Moore and Rutter [3], a primary difficulty when researching mobile entertainment is that of definition. It is not always apparent to consumers precisely what 'mobile entertainment' is. The problem of producing common understandings of mobile entertainment has been previously highlighted by the Mobile Entertainment Forum (MEF) when stating that two different industries make up the mobile entertainment industry: entertainment and telecommunications [4]. The authors define mobile entertainment as any type of leisure activity which utilizes the wireless telecommunication networks, interacts with service providers and incur a cost upon usage. Example includes downloading ring tone, sending SMS/ MMS, mobile games, mobile TV, mobile Internet, mobile gambling and so forth. The list is constantly expanding. Prior study pertaining to the confusion in mobile entertainment definitions and discussion with regards to reviewing and redefining the definition can be found in [2].

It is only recently that industry has begun to broaden its views of the mobile consumers to include deeper understanding of users' behavior [5]. Predictions of increasing revenue from mobile entertainment services in the future depend ultimately on the successful development and the satisfaction of an end-user market rather than technical development [5]. The youth are the most fertile groups for absorbing and incorporating the changes in mobile communications development [6]. Prior research [7] reports on the current state of telcos in Malaysia.

To study the diffusion of mobile entertainment in Malaysia, it is therefore essential to conduct a survey to look at factors affecting the diffusion from consumers' perspectives and to explore the correlation between these drivers and barriers. Survey is conducted across three urban areas of Peninsula Malaysia with highest rate of mobile penetration. In the next section, the authors describe the research approach taken. The result of the survey is presented in section three. The study involves multiple regression analysis, which produces the basic pattern of likely causality. The authors also present some insightful observations of the association (without causal implications) between the factors affecting the diffusion of mobile entertainment in Malaysia. In the last section, the authors further reiterate on the key findings in this study.

II. Research Approach

A. Sample

In this research, the sampling technique used is known as purposive sampling. Purposive sampling is appropriate because it involves the choice of subjects who are in the best position to provide the information required [8]. Although it may restrict the generalisation of the findings, it is the only viable sampling method to obtain information from a specific group of people [8]. The targeted population is the youth aged between 18 to 25 years' old. The population is limited in terms of age and to urban area as it has been found that the youth is the lead segment in the adoption of mobile entertainment services [9]. Survey is conducted in the three major cities in Malaysia, namely Klang Valley (Kuala

Manuscript received April 17, 2005. Paper entitled "Diffusion of Mobile Entertainment in Malaysia: Drivers and Barriers".

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Lumpur/ Selangor) (34.5%[1]), Johore (13.2%[1]) and Penang (6.9%[1]), corresponding to the northern, central and southern region of the peninsula of Malaysia (West Malaysia) with the highest number of subscribers [9]. East Malaysia (Sabah, Sarawak and Labuan) is not covered due to limited coverage and low number of subscribers as shown in Figure I. Sample size is estimated approximately 384 respondents, with confidence interval of ±4.9% at 95% confidence level. The questionnaire was developed in English and was pre-tested before being distributed to the respondents.

The total sample of the survey consists of 384 respondents of which 54.4% is female and 45.6% is male. The authors expect highly educated students to be over-represented in the sample as 63% of the sample indicates that they use their mobile devices exclusively for private purposes, 27.6% indicated their usage more for private, than for business purposes, 8.3% indicated about 50/ 50 private and business, as well as merely 1.1% of the sample indicated their purpose of using mobile devices is more for business purposes or exclusively for business purposes.

In the sample, 24% is Celcom subscribers, 51.3% is Maxis subscribers, 24.2% is DiGi subscribers and 0.5% of the sample is subscribers of other telcos. 72.7% of the respondents are on prepaid plan compared to 27.3% on post-paid plan.

FIGURE I
CELLULAR PHONE COVERAGE MAP OF MALAYSIA [10]

B. *Research Questions and Methods of Analyses*

The questionnaire is divided into two sections. The first section contains questions which gather respondents' opinions with regards to the factors hypothesized. Thirty questions are included in this section and respondents are requested to indicate their agreement/ disagreement to the statement using a scale of 0 to 7 where 0 means "Not Applicable/ Don't Know"; 1 means "Strongly Disagree" and 7 means "Strongly Agree". The second section is the demographic section and consists of four questions aimed to gather information on respondents' demographics.

Research Question 1: How much do the hypothesized factors influence the diffusion of mobile entertainment in Malaysia?

[1] Percentage share of subscriber base in Malaysia

In order to investigate the factors influencing the diffusion of mobile entertainment in Malaysia, standard multiple regression analysis is used to test the research framework. The independent variable (A) is respondents' self reported acceptance or adoption of mobile entertainment services. Five dependent variables were hypothesized as the explanations to adoption. Equation (1) of the regression model is shown as follow:

$$A = \beta_0 \pm \beta_1(B) \pm \beta_2(C) \pm \beta_3(D) \pm \beta_4(E) \pm \beta_5(F) \pm \varepsilon \quad (1)$$

A – Adoption of Mobile Entertainment
B – Pricing issues
C – Perceived benefit
D – Influence from peers, community and the media
E – Products and technological standardization issue
F – Privacy and security issues

Research Question 2: Is there a relationship between the factors influencing the diffusion of mobile entertainment in Malaysia?

In order to investigate the relationships between factors influencing the diffusion of mobile entertainment in Malaysia, Pearson correlation analysis is used to test the research question. According to Pallant [11], correlation analysis is used to describe the strength and direction of the linear relationship between two or more variables. This analysis can only take on values from -1 to +1, which measures the strength of the relationship between the variables. The sign out the front indicates whether there is a positive or a negative correlation.

III. RESULTS

The sample was first tested for reliability. It was found that the survey has good internal consistency, with a Cronbach alpha coefficient reported of 0.86. According to Pallant [11], the value above 0.7 indicates that the scale is reliable with the sample. Multiple regression was conducted to ascertain how well the set of variables is able to forecast the particular outcome. The research makes use of the formula provided by Tabachnick and Fidell [12] for calculating sample size requirements, taking into account the number of independent variables to be used: **N > 50 + 8m** (where m = number of independent variables). Given that the research involved five independent variables, the number of required cases, according to the above formula is greater than 90. In this research, the survey covered 384 cases.

Based on the results, it was revealed that perceived benefit has the most significant impact on the diffusion of mobile entertainment in Malaysia. In this case the biggest beta coefficient is 0.303, which points to the driver – perceived benefit; followed by pricing issues with beta coefficient of 0.088; influences from peers, community and media with 0.083; privacy and security issues with 0.057; as well as product and technological standardization with 0.039.

Perceived benefit is making a noteworthy unique contribution to the prediction of the diffusion of mobile entertainment by showing significant value of less than 0.05.

This finding varies with a number of literatures. In spite of the fact that consumer behavior research in the diffusion of mobile services is on its infancy [13], lately, a number of researchers have made an effort to offer a preliminary understanding regarding consumer behavioral patterns and attitudes in this field. Goodman [14] states, that slow transmission rates, inadequate mobile interfaces, high cost and power consumption of devices form the major obstacles towards mobile commerce diffusion. Along the same lines, Vrechopoulos et al. [15] found that lower prices, improved security, improved devices and effective customer support, constitute the critical success factors towards accelerating mobile commerce consumer adoption in Europe.

This could be attributed to the possibility that young Malaysian subscribers place more importance on the quality or perceived benefits of mobile entertainment services compared to other factors in the survey. This suggests that the diffusion of mobile entertainment in Malaysia is driven by the attributes of mobile services, which include ubiquity, personalization, localization, timeliness, network stability, and mobility. This supports the widely accepted wisdom that potential adopters will only be attracted to mobile entertainment if there is a clear perceived benefit of the services from their perspective.

In addition, Pearson correlation analysis was conducted to examine the relationships between factors affecting the adoption of mobile entertainment. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity[2]. The significance level (shown as Sig. in Table II) indicates whether the result is statistically significant. In this study, all results reach statistical significance at the $\underline{p} < 0.0005$ level.

Cohen [16] suggests the following guidance for interpreting the values:

TABLE I
GUIDELINES FOR INTERPRETING VALUE OF CORRELATION ANALYSIS

$\underline{r}$ = 0.10 to 0.29 or $\underline{r}$ = -0.10 to -0.29	Weak
$\underline{r}$ = 0.30 to 0.49 or $\underline{r}$ = -0.30 to -0.49	Medium
$\underline{r}$ = 0.50 to 1.0 or $\underline{r}$ = -0.50 to -1.0	Strong

Referring to Table II, there is a strong, positive correlation between the variables [$\underline{r}$ = 0.266 to 0.575, $\underline{n} \approx 384$, $\underline{p} < .0005$], with high levels of perceived benefit associated with high levels of pricing sensitivity [$\underline{r}$ = 0.575]. According to Landor [17], if a product or service is fit for use, or it conforms to end users' requirements, hence, it is dealing with something that is value adding to consumers. The assumption of equality between value-addition and good quality is strongly supported by Juran [18] who states that the fitness for use of an acquisition can only be assessed based on a thorough understanding of the relevant consumers and their requirements. Value is the relative cost of acquiring quality [18]. If two different supply chains are able to produce a product or service with identical fitness for use, the chain, which can achieve the required fitness for use at the lower total cost of ownership, is the one with the greater value [18]. Juran [18] also elucidates that there is an optimum point of quality, beyond which conformance is more costly than the perceived benefit. The same explanation can be applied to the mobile entertainment scenario in Malaysia. Ergo, this strongly supports the strong correlation between perceived benefit and pricing issues. In another literature, Chae et al. [19] conclude that providing customers with high-quality information is a key determinant for the success of the mass market adoption of mobile services.

TABLE II
PEARSON PRODUCT-MOMENT CORRELATION COEFFICIENT BETWEEN FACTORS INFLUENCING THE DIFFUSION OF MOBILE ENTERTAINMENT IN MALAYSIA

		B	C	D	E	F
A	$\underline{r}$	0.344	0.444	0.339	0.283	0.266
	Sig.	0.000	0.000	0.000	0.000	0.000
	N	384	384	384	384	382
B	$\underline{r}$		**0.575**	**0.541**	0.359	0.392
	Sig.		0.000	0.000	0.000	0.000
	N		384	384	384	382
C	$\underline{r}$			**0.567**	**0.505**	0.417
	Sig.			0.000	0.000	0.000
	N			384	384	382
D	$\underline{r}$				0.405	0.365
	Sig.				0.000	0.000
	N				384	382
E	$\underline{r}$					0.456
	Sig.					0.000
	N					382
F	$\underline{r}$					
	Sig.					
	N					

Legend:
$\underline{r}$ = Pearson correlation
Sig. = Significance level (2-tailed)
N = Number of respondents

The top four strongly associated pairs of factors in this paper are listed as follow:

- (B) Pricing issue – (C) Perceived benefit [$\underline{r}$ = 0.575]
- (C) Perceived benefit – (D) Peers, community and media [$\underline{r}$ = 0.567]
- (B) Pricing issue – (D) Peers, community and media [$\underline{r}$ = 0.541]
- (C) Perceived benefit – (E) Product and technological standardization [$\underline{r}$ = 0.505]

Based on both of the analyses in this study, it is believed that merely educating consumers of the perceived benefits of consuming mobile entertainment services may not be sufficient to encourage mass market adoption of such services in Malaysia. By using derived importance in correlation

[2] Constancy of the variance of a measure over the levels of the factor under study

analysis, players in the mobile entertainment value web can avoid focusing on improvements to attributes that will not have a positive impact on overall satisfaction. For example, privacy and security issues have a relatively low "agreement" score. Ergo, this factor forms a barrier in driving the diffusion of mobile entertainment in Malaysia. However, telcos would not want to do much about it since it has a low correlation to overall satisfaction.

IV. Conclusion

The mobile revolution is changing the way people live and work. Mobile phones are already pervasive in all major developed economies and in an increasing number of developing ones as well. The mobile market in Malaysia continues to grow increasingly competitive. Falling ARPUs are pressuring the operators to source for other means of revenue. Value-added mobile data services were expected to make the industry grow, after the wireless industry started to feel the pinch of stagnant, if not for the falling voice ARPUs. This has resulted in the urgency to introduce mobile data services to increase ARPU [20].

Based on available statistics, in order for local telcos to be successful, a substantial end user market needs to be created. For this to occur, current (and potential) users of mobile devices not only need to be persuaded that the new applications and services on offer are useful and relevant to their lives; suitable pricing scheme must be adjusted in order to encourage mass market adoption of mobile entertainment services in Malaysia. The success of mobile services deployment in the future depends ultimately on the successful development and the satisfaction of an end user market rather than technical development.

Further research [21] has been carried out involving T-tests and one-way analysis of variance (ANOVA) to compare the variance between the different groups (gender, telco, plan) with the variability within each of the groups.

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