The Social Sciences 11 (21): 5256-5259, 2016
ISSN: 1818-5800

Mobile Internet Service Quality and the Technology Cluster Effects in Mobile Commerce Adoption

Mohd Rizal Abdul Razak, Hishamuddin Ismail and Zauwiyah Ahmad
Faculty of Business, Multimedia University, 75450 Melaka, Malaysia

Abstact: Given the strategic position of mobile internet in the mobile commerce space, this study set out to investigate the role of mobile internet service quality in influencing consumers' mobile commerce adoption. Sample was drawn from households selected using multistage cluster sampling technique from four states with the highest mobile device penetration rate in Malaysia. The data was analyzed using structural equation modelling technique. The study found the technology cluster effect such that the adoption of mobile internet for communication and content influenced consumers' decision to adopt mobile commerce. This effect is habitual or automated among innovators and early majority but indirect or rather through the evaluation of mobile internet service quality among the late majority and laggards.

Key words: Mobile internet, mobile commerce, service quality, technology cluster effects, Malaysia

INTRODUCTION

The 21st century is marked by rapid technological advancement of the telecommunication industry through the convergence of various media enabling communication, interaction, trade and commerce to take place in cyberspace. The position of mobile internet is very strategic since it acts as a gateway to this new mobile commerce space. The viability of businesses in it depends much on the required network access to facilitate customer visits and purchases. The key proposition of this study is that mobile commerce requires consumption of complementary and interdependent goods and services such that any dissatisfaction (or satisfaction) of customers on the mobile internet could influence the willingness of customers to adopt mobile commerce, thus the technology cluster effects.

The technology cluster theory of Rogers (2003) asserts that the quality of experience in the adoption of one technology will trigger the adoption of another similarly functional technology. Technologies are deemed to be clustered together when they have overlapping functions, functional interdependencies and shared base technology (Rijnsoever and Castaldi, 2009). The technology cluster effects can be explained in a number of ways. First, consumers may adopt a successive generation to replace or obtain functional enhancement for the earlier technology generation (Saaksjarvi and Lampinen, 2005). Second, familiarity with a technology which is functionally similar means consumers are able to utilize their existing knowledge to use the following technology (Sujan, 1985). Finally, using the technology, i.e., the mobile internet may have become an integral part of the consumer's lifestyle and identity (Boyd and Mason, 1999; Leung, 1998).

This study attempts to identify such effect and hypothesizes that the use of internet enabled mobile devices for communication and content has influence on mobile commerce adoption and the use of internet enabled mobile devices for communication and content has an influence on future mobile commerce adoption intention via evaluation of mobile internet service quality. The assessment of such effects underlies the strategic importance of mobile internet service quality (therefore the role of mobile internet service providers or mobile network operators) within the larger mobile ecosystem in enabling improvements and encouraging mobile commerce adoption.

In the context of this study such effect could exist when the adoption of mobile internet for communication and content leads to its adoption for commerce related purposes. When such progression is direct (automatic) then perceptions of service quality matter less thus weakening the evaluation-intention function. This is the case for innovators and early majority of adopters. For the late majority and laggards such subsequent adoption of commerce related usage is likely to occur through evaluation of mobile internet service quality from earlier use for communication and content, in which the evaluation-intention function becomes significant. The two contrasting perspectives which underlies the hypotheses were advocated by Kim (2005) in their

Corresponding Author: Mohd Rizal Abdul Razak, Faculty of Business, Multimedia University, 75450 Melaka, Malaysia

Habitual/Automaticity Perspective (HAP) versus the Instant Activation Perspective (IAP). HAP contends that there is no reasoning process or intentions before action. IAP argues that automatic use occurs effortlessly but is still a function of evaluation-intention.

MATERIALS AND METHODS

This study adopts a non-experimental, correlational research design with the objective to confirm a model that can be used to predict the adoption of mobile commerce with a service evaluation constructs of mobile internet as antecedents. Technology clusters were defined and measured with items derived from (Chae *et al*., 2002) that proposed the categorization of various products and services which could be made available through the wireless internet into three domains of commerce communication and content. The items were presented on a scale of zero (never use) to 6 (use frequently). The composite score (Eastin, 2002; Wolfinbarger and Gilly, 2003) from the communication and content domains representing the technology cluster construct and the commerce domain representing mobile commerce adoption were then computed. The composite score for mobile commerce adoption intention (represented by 3 items with 1-6 Likert scale) was also computed.

Mobile internet service quality in this study is based on the work of Chae *et al*. (2002), Wolfinbarger and Gilly (2003) and Vlachos and Vrechopoulos (2008). These were then reduced to four final dimensions consisting information quality, connection quality, interaction quality, content quality, and contextual quality. Three dimensions of privacy, device and customer service were dropped from the final analysis based on the screening procedures consistent with SEM. All items required a six point Likert Scale responses from (strongly disagree) to 6 (strongly agree). These were then triangulated with mobile internet service quality in a mediation test to measure any direct or indirect effects (Fig. 1).

Sample selection and description: Using a 3-tiered multistage cluster sampling, questionnaires was distributed to 1000 households in selected districts and housing areas of Kuala Lumpur (Federal Territory), Selangor, Negeri Sembilan and Melaka. The four states were selected as they had the highest mobile phone penetration rates in Malaysia.

Data collection and analysis: The data for this study was collected through survey method using standardised self-administered questionnaire. The questionnaire was written in English and translated into the Malay language to improve reliability of responses. A total of 275 completed questionnaires were collected representing a response rate of 27.5% (Table 1). Structural Equation Modelling was employed for testing the hypothesis. Confirmatory Factor Analysis (CFA), measurement model and structural model were developed to test model fit. From Table 2, the study also observed that the main use of the internet enabled mobile devices among consumers is still primarily for communication, followed by content and lastly commerce.

Table 1: Distribution of respondent

Variables	Frequency (n = 275)	Percentage
Gender		
Male	107	39.0
Female	168	61.0
State		
Kuala Lumpur/W.P	93	33.8
Selangor	76	27.6
Negeri Sembilan	58	21.1
Melaka	48	17.5

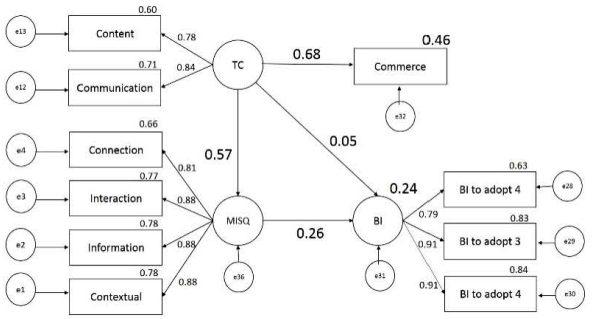

Fig. 1: Direct Effect of Technology Cluster (TC) on Mobile Commerce Adoption (Commerce) and Indirect Effect on Future mobile commerce adoption intention (BI) through Mobile Internet Service Quality (MISQ)

The result (upper part of Fig. 1 and Table 3) suggests that the use of internet enabled mobile devices for communication and content (TC) drive its use for commerce related or mobile commerce (Commerce) purposes ($\beta = 0.68$, CR = 10.476, Sig. = 0.000) explaining 46% of variance in the adoption of mobile commerce.

The usage of internet enabled mobile devices for communication and content was also found to have positive significant effect on evaluation of mobile internet service quality with regression weight of 0.57 ($\beta = 0.57$, CR = 8.166, Sig. = 0.000) and explained 32% of variation in mobile internet service quality (left part of Fig. 1 and Table 4).

Table 5 illustrated the result for the relationship between mobile internet usage for communication and content on the future mobile commerce adoption intention which was found to be insignificant at 0.045 ($\beta = 0.045$,

Table 2: Usage of mobile internet

Domain	Freq. (n = 275)	%	Mean	SD
Communication (data)			3.11	1.32
Laggards-don't use (0)	8	2.9		
Late majority-low usage (1-2.67)	116	42.2		
Early majority-medium usage (2.68-4.34)	131	47.6		
Innovators-high usage (4.35-6)	20	7.3		
Content			2.56	1.37
Laggards-don't use (0)	38	13.8		
Late majority-low usage (1-2.67)	123	44.7		
Early majority-medium usage (2.68-4.34)	103	37.5		
Innovators-high usage (4.35-6)	11	4.0		
Commerce			1.62	1.31
Laggardsdon't use (0)	99	36		
Late majority-low usage (1-2.67)	124	45.1		
Early majority-medium usage (2.68-4.34)	48	17.5		
Innovators-high usage (4.35-6)	4	1.5		

Table 3: Results of SEM on Effect of Technology Cluster (TC) on Mobile Commerce Adoption (Commerce)

Construct	B	SE	Beta	CR	p-value
Technology Cluster (TC)	1.007	0.096	0.68	10.476	0.000

$R = 0.68$; $R^2 = 0.46$

Table 4: Results of SEM on Effect of Technology Cluster (TC) on Mobile Internet Service Quality (MISQ)

Construct	B	SE	Beta	CR	p-value
Technology cluster (TC)	0.604	0.074	0.57	8.166	0.000

$R = 0.57$; $R^2 = 0.32$

Table 5: Results of SEM on Effect of Technology Cluster (TC), Mobile Internet Service Quality (MISQ) on Future Mobile Commerce Adoption Intention (BI)

Construct	B	SE	Beta	CR	p-value
Technology cluster (TC)	0.061	0.107	0.045	0.564	0.573
Mobile internet service quality (MISQ)	0.328	0.152	0.260	2.157	0.031

$R = 0.49$; $R^2 = 0.24$

Table 6: Result of test of indirect effect of Technology Cluster (TC) on future mobile commerce adoption intention (BI) through Mobile Internet Service Quality (MISQ)

			95% CI bootstrap BC		
Construct	SIE	SE	Lower bound	Upper bound	p-values
Technology Cluster (TC)	0.252	0.052	0.163	0.367	0.000

CR = 0.564, Sig. = 0.573) while mobile internet service quality was found to have significant influence on behavioral intention to adopt mobile commerce (BI) ($\beta = 0.26$; CR = 2.157; $p<0.05$). Mobile internet service quality also jointly explained 24% of variation in behavioral intention to adopt mobile commerce.

Since, the direct relationship between mobile internet use (communication and content) and future intention to adopt mobile commerce was found not significant but showed significant result with mobile internet service quality, the test for the indirect effect was then performed. A bootstrap procedure at 95% confidence with 5000 resampling request (Table 6) was conducted to test the indirect effect between mobile internet use for communication and content on the future mobile commerce adoption intention through mobile internet service quality. It was found that such indirect effect was significant.

RESULTS AND DISCUSSION

The result showed the first hypothesis is supported in that the actual use of internet enabled mobile devices for communication and content purposes had significant positive influence on mobile commerce adoption. It therefore established the presence of technology cluster effects notably among innovators and early adopters. Most participants' use of mobile commerce had been preceded by an earlier use of other mobile services in the communication and content domains. The result therefore was consistent with the findings of (Rijnsoever and Castaldi, 2009) who found a direct positive relationship between prior adoption and the adoption of another functionally similar technology. This is also consistent with the assertion made by Rogers that "innovations are often not viewed singularly by individuals but they may be perceived as an interrelated bundle of new ideas". This is also with Habitual/Automaticity Perspective (HAP) that contends that there is no reasoning process or intentions before action (Kim *et al*., 2005).

The second hypothesis was also supported since the progression from mobile internet use of communication and content to future mobile commerce adoption was not automatic but rather the result of mobile internet service quality evaluations. Again the technology cluster effect was found to exist albeit indirectly through service quality, lending further support to Rogers assertion and consistent with the Instant Activation (IAP) perspective (Kim *et al*., 2005) which proposed automatic use was simply an expedited form of conscious use and is still a function of evaluations/intention. Therefore past use influence did not weaken the evaluations-intention-usage relationship. This highlighted the importance of mobile

internet service quality in influencing future mobile commerce adoption among the late majority and laggards.

CONCLUSION

Technology cluster effects do exist when applied to adoption of mobile internet for communication, content and commerce. For innovators and early adopters, adoption of mobile commerce resulting from the use of mobile internet for communication and content happened effortlessly. For the late majority and laggards however, their decision to eventually adopt mobile commerce must be preceded with positive evaluation of mobile internet service quality as a result of using it for communication and content.

Mobile commerce has been touted as the new frontier of business with huge estimated potentials and virtually limitless markets. Mobile internet service quality therefore is an important variable in explaining the variation in mobile commerce adoption. It is therefore imperative that the quality dimensions of the mobile internet (connection, interaction, information and contextual) received increased focus not only from the service providers but the regulator as well to translate the huge potential of mobility into real mobile commerce gains. Among the four dimensions, information quality emerged to be the most important. As such service providers should ensure they provide understandable, sufficient, complete and objective information about their service. The second most important dimension is the connection quality. Connection should be responsive to inputs or clicks, stable, fully functional and allow speedy downloading. Third is interaction quality, needing providers to ensure portals are harmoniously designed, consistently represented, clearly organised and categorised for information on services to be located and allow easy movement from one display to another. Fourth, to improve contextual quality, attention should be given to simplify input process, ensuring access and coverage whenever and wherever, making the use of mobile internet more interesting and automatic recognition of the users.

IMPLICATIONS

The implication for service providers or Mobile Network Operators (MNO) is that these aspects of quality must be carefully monitored and improved by taking into ccounts not only the standards set by regulators (Quality of Service or QoS) but also the view and opinion of customers.

REFERENCES

Boyd, T.C. and C.H. Mason, 1999. The link between attractiveness of extrabrand attributes and the adoption of innovations. J. Acad. Marketing Sci., 27: 306-319.

Chae, M., J. Kim, H. Kim and H. Ryu, 2002. Information quality for mobile internet services: A theoretical model with empirical validation. Electron. Markets, 12: 38-46.

Eastin, M.S., 2002. Diffusion of e-commerce: An analysis of the adoption of four e-commerce activities. Telemetric Inform., 19: 251-267.

Kim, S.S., N.K. Malhotra and S. Narasimhan, 2005. Two competing perspectives on automatic use: A theoretical and empirical comparison. Inform. Syst. Res., 16: 418-432.

Leung, L., 1998. Lifestyles and the use of new media technology in urban China. Telecommunications Policy, 22: 781-790.

Rijnsoever, F.J.V. and C. Castaldi, 2009. Perceived technology clusters and ownership of related technologies: The case of consumer electronics. J. Am. Soc. Inf. Sci. Technol., 60: 381-392.

Rogers, E.M., 2003. Diffusion of Innovations. 5th Edn., Free Press, New York, USA., pp: 27-30.

Saaksjarvi, M. and M. Lampinen, 2005. Consumer perceived risk in successive product generations. Eur. J. Innovation Manage., 8: 145-156.

Sujan, M., 1985. Consumer knowledge: Effects on evaluation strategies mediating consumer judgments. J. Consumer Res., 1: 31-46.

Vlachos, P.A. and A.P. Vrechopoulos, 2008. Determinants of behavioral intentions in the mobile internet services market. J. Serv. Market., 22: 280-291.

Wolfinbarger, M. and M.C. Gilly, 2003. ETailQ: Dimensionalizing, measuring and predicting etail quality. J. Retailing, 79: 183-198.