



ICT acceptance among Malaysian urbanites: A study of additional variables in user acceptance of the new media

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Abstract

The dawn of the internet has brought about many implications to the already existing media and the way we communicate to one another and do things. Several scholars have conducted studies to understand the factors responsible for technology acceptance. The Technology Acceptance Model (TAM) is one of the much referred models for technology acceptance where perceived ease of use and perceived usefulness are recognised as the two main factors that influence computer usage behaviour. Subsequently, there have been several studies aiming at extending and modifying the TAM by proposing additional variables believed to contribute to technological innovation acceptance. This study aims at exploring and testing other factors that have not been explained by Technology Acceptance Model (TAM) in determining the acceptance of communication and information technology (ICT) by focussing on factors which may be unique to Malaysia. A survey was conducted to obtain the necessary primary data from 300 respondents in the Klang Valley, a metropolis consisting of the federal territory of Kuala Lumpur and the state of Selangor. Using SPSS 20.0., both descriptive and inferential statistical analysis were used to analyse the data. For the inferential statistics, multiple regressions were adopted to test the variables. The findings reveal that in the case of effects and influence on actual usage, beside the TAM's *perceived usefulness*, additional variables, in particular, *personal factors*, *communication channels* and *behavioural intentions* have indeed contributed to the variations in the actual usage and acceptance of the internet. The findings thus have added more knowledge to the literature of technology acceptance while rendering practical implications to policy makers and technology providers, especially the new media, with regard to acceptance.

Keywords: ICT actual usage, ICT acceptance variables, internet, new media, TAM, technology acceptance

Introduction

The dawn of the internet has brought about many implications to the already existing media and the way we communicate to one another and do things. The Internet is seen as the most vibrant mass media in this century and its interactive nature has attracted people from all walks of life. Unlike its predecessors, the TV and radio, the Internet is also a storehouse of knowledge providing access to vast pile of information. The society can derive a lot of benefits from the Internet ranging from communication to education, entertainment, business and what have you (Salman, 2010; Hashim, R., & Becker, G. 2001). Hence, the Internet provides benefits which impact the life of the users or community (Singh & Domatob, 2004).

On the global and local level, the growth in internet acceptance and usage throughout 2012 has not shown signs of slowing down. According to Internet World Stats (2012) the total number of Internet users in Malaysia reached 17,723,000 with the penetration rate of 60.7% of the population and among them are

social media users. Facebook users still dominate with 13,544,600 and grew by more than 1,387,460 in the first 6 months of 2012 (Socialbakers, 2012).

Several scholars have conducted studies to understand the factors responsible for technology acceptance. The Technology Acceptance Model (TAM) is one of the much referred models for technology acceptance. There are several studies aiming at extending and modifying TAM by proposing additional variables believe to contribute to acceptance of technological innovation.

This study aims at testing other factors that have not been explained by Technology Acceptance Model (TAM) in determining the acceptance of communication and information technology (ICT). This study therefore explores other variables which may also influence user acceptance towards internet. Hence, the objective of the present study is to investigate the influence of factors which may be unique to Malaysian situation, on the acceptance and usage of information and communication technology, specifically the new media (The Internet).

Technology Acceptance Model (TAM)

The acceptance and use of social media can be predicted by Technology Acceptance Model (TAM) proposed by Davis in 1989. TAM was rooted in the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975). Although many theories have been proposed to explain and predict of a system, the Technology Acceptance Model (TAM) has been the only one which has captured the most attention in the information systems fields (Chuttur, 2009). TAM is generally considered as the most influential and plays a signified issue in the area of information systems since this theory was introduced by Davis in 1989 (Lee et al., 2003; Silva & Dias, 2007; Alshare & Alkhateeb, 2008; Chang et al., 2010).

TAM introduced perceived ease of use and perceived usefulness as the two main factors that influence computer usage behaviour. These two determinants serve as the basis for attitude towards using a particular system, which in turn determines the intention to use and then generates the actual usage behaviour (Davis, 1989). According to TAM, perceived ease of use refers to the extent to which a person feels that using a particular technology would be free of effort. With regard to social media, PEOU is defined as the degree to which a student believes that using social media would be free of effort. On the other hand, perceived usefulness refers to the degree to which a student believes that using social media will be useful for him/her.

TAM has been applied in many studies and found that perceived ease of use and perceived usefulness were significantly related to computer usage (Lee et al., 2003; Tengku Siti Aisha et al., 2005). TAM has been utilized to different technologies for instances word processors, e-mail, WWW, hospital information systems under different situations such as time and culture with different control factors like gender, organizational type and size and different subjects like undergraduate students, MBAs, and knowledge workers which leading its proponents to believe in its robustness (Lee et al., 2003). TAM already becomes an interdisciplinary theory. Currently, the main concerned area of TAM are computer science, information systems, management, information science & library science, business and also cybernetics (Chang et al., 2010).

Literature review

TAM has been tested and replicated by several studies. Venkatesh and Davis (2000) develop and test a theoretical extension of the Technology Acceptance Model (TAM) that explains perceived usefulness and usage intentions in terms of social influence and cognitive instrumental processes. The extended model, referred to as TAM2, was tested using longitudinal data collected regarding four different systems at four organizations ($N = 156$), two involving voluntary usage and two involving mandatory usage. The extended model was strongly supported for all four organizations at all three points of measurement. Both social influence processes (subjective norm, voluntariness, and image) and cognitive instrumental processes (job

relevance, output quality, result demonstrability, and perceived ease of use) significantly influenced user acceptance.

Drawing on the UTAUT model and Flow Theory, Alwahaishi and Snasel (2013), composes a new hybrid theoretical framework to identify the factors affecting the acceptance and use of Mobile Internet - as an ICT application- in a consumer context. The proposed model incorporates eight constructs: Performance Expectancy, Effort Expectancy, Facilitating Conditions, Social Influences, Perceived Value, Perceived Playfulness, Attention Focus, and Behavioral intention. Data collected online from 238 respondents in Saudi Arabia were tested against the research model, using the structural equation modeling approach. The proposed model was mostly supported by the empirical data. The findings of this study provide several crucial implications for ICT and, in particular, mobile Internet service practitioners and researchers

Porter and Donthu (2006) claim that despite the fact that most Americans use the Internet, those who are older, less educated, minority and lower income have lower usage rates than younger, highly educated, white and wealthier individuals. They develop and test an extended version of the technology acceptance model (TAM) to explain these differences. They found that age, education, income and race are associated differentially with beliefs about the Internet, and that these beliefs influence a consumer's attitude toward and use of the Internet. Further, they found that although access barriers have a significant effect in the model, perceptions regarding ease of use and usefulness have a stronger effect. Their results suggest that by extending the TAM, to include perceived access barriers helps to explain demographic-based differences in Internet use. They also provide key insights for both managers and policymakers. In sum, Porter and Donthu (2006) study not only confirms the theoretical importance of perceived ease of use and perceived usefulness in the basic TAM, but also demonstrates that, in the context of Internet use (1) other beliefs (i.e., perceived access barriers) can significantly influence consumer attitudes and (2) particular beliefs about a technology differently affect consumers representing diverse segments of the population.

Ha and Stoel (2009) study integrates e-shopping quality, enjoyment, and trust into a technology acceptance model (TAM) to understand consumer acceptance of e-shopping. Online surveys with college students (n = 298) were conducted. E-shopping quality for apparel products consists of four dimensions: web site design, customer service, privacy/security, and atmospheric/experiential. A structural equation model reveals that e-shopping quality determines perceptions of usefulness, trust, and enjoyment, which in turn influence consumers' attitudes toward e-shopping. Consumer perceptions of usefulness and attitude toward e-shopping influence intention to shop online, while perceived ease of use does not influence attitude towards e-shopping. Shopping enjoyment and trust play significant roles in consumers' adoption of e-shopping. Their study provides important implications for e-tailers whose web site developers must keep in mind that customers are not only web users with trust/safety and information needs, but also shoppers with service and experiential needs. Ha and Stoel (2009) study proposes trust and enjoyment as critical beliefs about online shopping and e-shopping quality as an antecedent to beliefs about online shopping, and tests the impact of these concepts using a modification of the TAM. Results of the study suggest that web site quality consists of four dimensions: (1) web site design, (2) customer service, (3) privacy/security, and (4) atmospheric/experiential. The explained variance of the first factor, web site design (51.51 percent), is greater than the other three factors, accounting for the greatest proportion of variation in overall perceptions of e-shopping quality.

In expanding Davis et al.'s technology acceptance model (TAM), Yang and Yoo (2004) consider both the affective and the cognitive dimensions of attitude and the hypothesized internal hierarchy among beliefs, cognitive attitude, affective attitude and information systems (IS) use. While many of the earlier findings in TAM research were confirmed, the mediating role of affective attitude between cognitive attitude and IS use was not supported. Their results cast doubts on the use of the affective attitude construct in explaining IS use. Meanwhile, they found that cognitive attitude is an important variable to consider in explaining IS usage behaviors. Their results suggest that attitude deserves more attention in IS research for its considerable influence on the individual and organizational usage of IS. First, they found

that, in the context of technology acceptance, affective and cognitive attitudes are two separate socio-psychological constructs.

Based on the belief–attitude–performance chain, Shih (2004), combines Davis’s technology acceptance model (TAM) and the information behavior model to develop an extended TAM for Internet use. The theoretical model was tested via a questionnaire survey of 203 Taiwanese office workers. The empirical results not only confirmed TAM, but also showed that the relevance of information needs strongly determines perceived usefulness, perceived ease of use, and user attitudes toward Internet use for information seeking, as well as strongly influencing individual performance during the information use stage. More importantly, relevance has greater positive effect on perceived performance and perceived usefulness for enterprise Intranet users than for simple/interactive Intranet users. Enterprise Intranet users have more positive attitudes toward the Internet and more positive perceptions of system effectiveness for supporting office tasks than simple/interactive Intranet users. Furthermore, perceived ease of use is the strongest determinant of user attitude toward Internet use in both enterprise Intranet and simple/interactive Intranet applications. Overall, the extended TAM explains the behavior of enterprise Intranet users better than that of simple/interactive Intranet users.

Viswanath and Goldhaber (2003) propose the inclusion of other variables from diffusion of innovation theory by Rogers into TAM. Hence, based on the diffusion of innovations theory, Viswanath introduced three new constructs in place of perceived usefulness, namely perceived convenience, perceived costs/risks of adoption, and perceived observable benefits. The findings suggest that controlling for other factors, the attitude towards technology is determined by the perceived ease of use, and the potential costs or risks involved in adopting the innovation.

Venkatesh et al (2003) Information Technology (IT) acceptance research has yielded many competing models, each with different sets of acceptance determinants. In their paper, they review user acceptance literature and discuss eight prominent models, empirically compare the eight models and their extensions, formulate a unified theory that integrates elements across the eight models, and empirically validate the unified model. The eight models reviewed are the theory of reasoned action, the technology acceptance model, a motivational model, the theory of planned behaviour, a model combining the technology acceptance model and the theory of planned behaviour, a model of PC utilization, innovation diffusion theory, and social cognitive theory. Using data from four organizations over a six-month period with three points of measurement, the eight models explained between 17 percent and 53 percent of the variance in user intentions to use information technology. They then formulated a unified theory, called the Unified Theory of Acceptance and Use of Technology (UTAUT), with four core determinants of intention and usage, and up to four moderators of key relationships. They make several recommendations for future research including developing a deeper understanding of the dynamic influences studied here, refining measurement of the core constructs used in UTAUT, and understanding the organizational outcomes associated with new technology use.

Zarehan Selamat and Nahariah Jaffar (2011) examine the adoption and acceptance of information technology from the perspective of Malaysian bankers. Among others, the regression result of the study appeared to suggest that perceived usefulness, management support and external computing support were found to be the most influential factors in determining microcomputer usage among bankers in Malaysia.

Hamner and Qazi (2008) assessed the use of personal computer technology (PCT) in public organizations of developing countries in South Asia, particularly in Pakistan. The study propose additional external factors such as organizational culture and individual factors (e.g. ‘Level of Education’ and ‘Duration of Training’), and belief factors such as perceived personal utility.

A study related to the acceptance of new technology has been done by D’silva (2007), which found that perceived usefulness, perceived ease of use, job relevance, and computer compatibility showed significant positive relationship with the actual usage of the computer. This leads to the tremendous adoption of new media technology in recent years and even workplaces are increasingly adopting such tools in the business environment (Peh, 2012). From the study commissioned by Microsoft in Malaysia, which polled 352 respondents, unsurprisingly, the key drivers behind this new wave are a young workforce, early adoption of gadgets and social media, as well as cultural trends such as relationship-

focused business dealings (Peh, 2012). What this shows is that technology is quickly accepted as a business and work culture in Malaysia and most parts of the world.

Furthermore the rise of new media and technology has allowed many industries such as banking to consider mobile-based technologies as improving the banking services through the introduction of new banking facilities. In the case of mobile phones, a credit card function can be integrated into a bank customers' mobile phone by including multi-application of a smart card for a particular credit card. The study by Hanudin Amin (2007) found that perceived usefulness, perceived ease of use, perceived credibility and the amount of information on mobile credit cards are important determinants to predict Malaysian bank customers' intentions to use mobile credit card as an innovation of the technology.

In addition to that, Lean et al. (2009) found that factors influencing intention to use e-government services among citizens in Malaysia are varied. The result of their analysis showed that trust, perceived usefulness, perceived relative advantage and perceived image, respectively, has a direct positive significant relationship towards intention to use e-government service and perceived complexity has a significant negative relationship towards intention to use e-government service. Meanwhile, perceived strength of online privacy and perceived strength of non-repudiation have a positive impact on a citizen's trust to use e-government service. By the same token, Narayanasamy et al. (2011) in their study on the adoption and concerns of e-finance in Malaysia found that e-finance was affected by security, revenue and cost dimensions, and technology architecture with the adoption of global technology.

As distinct from the above studies, in addition to the variables in TAM, the present study aims to measure and test the influence of personal and environmental factors on the acceptance and use of ICT in a local context.

Materials and method

A survey using questionnaire was used to obtain data from 300 respondents in the Klang Valley, a metropolis consisting of the federal territory of Kuala Lumpur and the state of Selangor. Base on the population of the major ethnic groups in Malaysia, a large number of the respondents comprised of the Malays, followed by the Chinese and Indians. Data was collected with the help of undergraduate and graduate enumerators. Hence the time taken to collected data was short. Prior to the field work the enumerators were briefed on the technicalities of data collection using survey including aspects of gender, age, and ethnicity among others. Using SPSS 20.0, both descriptive and inferential statistical analysis were used to analyse the data. Means and Standard Deviations were used to gauge agreement to the items under the variables. For the inferential statistics, multiple regressions are used to measure effects of the variables on acceptance and use of internet. Reliability of the main variables were measured using Cronbach Alpha. The Cronbach Alpha for the main variables of the study is thus presented in Table 1. Cronbach's alpha reliability coefficient normally ranges between 0 and 1. The closer the Cronbach's

Table 1. Reliability level of the main variables

Variables	Cronbach Alpha	Items
Perceived ease of use	0.93	6
Perceived usefulness	0.92	7
Relevance	0.90	7
Interpersonal / social network	0.85	7
Public sector policy	0.92	5
Personal factors / characteristics	0.87	10
Communication channels	0.91	10
Actual use	0.92	13

alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale. George and Mallery (2003) provide the rules of thumb where “ $\alpha > .9$ – Excellent, $\alpha > .8$ – Good, $\alpha > .7$ – Acceptable, $\alpha > .6$ – Questionable, $\alpha > .5$ – Poor, and $\alpha < .5$ – Unacceptable” (p. 231). Base on the above, the reliability coefficient of all the main variables in Table 1 ranges from good to excellent meaning the variables are reliable.

Findings

Both the descriptive and inferential findings are presented in this section. The descriptive findings include frequency, percentages, means and standard deviations, whereas multiple regression is used for the inferential statistics.

Descriptive statistics

Data in Table 2 showed that there are about equal number of male and female respondents in the study. For the age component, half of the respondents comprise the 18 – 25 age group. This group form the largest due to the fact that they belong to the Y generation and use ICT more in their daily lives as compared to the other age groups. On the premise that the Malays form the majority in Malaysia, 60% of the respondents were Malays.

Table 2. Demographic profile (N=300)

	F	%
Gender		
Male	149	49.5
Female	151	50.3
Age		
18-25	152	50.6
26-30	70	23.3
31-39	48	16.1
40 and above	30	9.8
Ethnic		
Malay	180	60.0
Chinese	75	24.9
Indian	45	15.0

Data from Table 3 revealed that majority of the respondents (81.3%) subscribed to the Internet. The data also showed that majority of the respondents, 36.9%, have used internet for more than 5 years. Meanwhile some 51.4% of the respondents used the Internet for more than 15 hours a week, reaching 25 hours a week. In terms of usual places of using internet and base on the rating of 1 to 5 from never to very often, most of the respondents use internet at university/college/place of work and in their homes.

From Table 4, the actual usage or purpose of usage of the Internet revealed that social communication (m=5.46, SD=1.66) is the main usage of the internet by the respondents followed by e-mail communication (m=5.21, SD=1.85) and information search (m=5.06, SD=1.80). The least usage of the Internet is e-shopping/e-commerce (m=2.99, SD=2.01)

Table 3. Internet usage (N=300)

	F	%
<i>Internet subscription</i>		
Yes	244	81.3
No	56	18.6
<i>Years of Using Internet</i>		
Less than 1 year	20	6.6
1 – 2 years	42	14
2 – 3 years	45	15
3 – 4 years	44	14.6
4 – 5 years	37	12.3
More than 5 years	111	36.9
<i>Hours of using internet per week</i>		
Less than 7 hours	70	23.3
7 – 14 hours	75	24.9
15 – 21 hours	69	22.9
22 – 25 hours	32	10.6
More than 25 hours	54	17.9
	Means*	SD
<i>Places of using internet</i>		
University/college/place of work	3.65	1.50
Home	3.50	1.43
Restourant/cafe	2.38	1.35
Family outside home	2.03	1.26
Cyber cafe	1.89	1.17
Friends' place	1.89	1.17
Neighbours' house	1.36	0.90

*On a Likert rating of 1 – 5

Table 4. Actual usage of internet (Means and Standard Deviation)

Items	Means*	SD
Social communication	5.46	1.66
E-mail communication	5.21	1.85
Information search	5.06	1.80
Hobby/games/entertainment	4.96	1.92
Work related	4.83	2.02
Education and learning	4.76	2.21
Downloading of software/apps	4.54	2.15
Religious activities	4.53	2.06
E-government	4.51	1.93
Health information	4.45	1.90
Holiday arrangement	4.27	1.98
Online banking	4.02	2.05
E-shopping/e-commerce	2.99	2.01

*On a Likert rating of 1 – 7

Inferential statistics

a. Regressions of Actual Usage with the main Independent Variables

Using Multiple Regressions (Stepwise method), Table 5 shows the model summary. From the table, in the case of effects and influence on *actual usage*, only *perceived usefulness*, *personal factors*, *communication channels* and *behavioural intentions* contributed to the variations in *actual usage* of the internet. The four variables caused 76.5% (R.Square = .765, sig = .000) in the variation of actual usage of the Internet as in model 4 of the Model Summary. Meanwhile the main contributor to the variations in actual usage is behavioural intention followed by communication channels.

Table 5. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.775 ^a	.601	.600	10.78064	.601	450.538	1	299	.000
2	.840 ^b	.706	.704	9.27268	.105	106.156	1	298	.000
3	.867 ^c	.752	.750	8.52655	.046	55.436	1	297	.000
4	.877 ^d	.768	.765	8.25690	.016	20.716	1	296	.000

a. Predictors: (Constant), BehIntentions

b. Predictors: (Constant), BehIntentions, CommChnls

c. Predictors: (Constant), BehIntentions, CommChnls, PcvdUsefulness

d. Predictors: (Constant), BehIntentions, CommChnls, PcvdUsefulness, PsnlFactors

The beta and t values of the variables are shown in table 6. In terms of beta values, *behavioural intentions* (beta=.280) has the highest beta followed by *communication channels* (beta=.269), *perceived usefulness* (beta=.267), and *personal factors* (beta=.220). With regard to the t values, the variable with the highest t value is *communication channel* (t=7.382) followed by *perceived usefulness* (t=6.751), *behavioural intentions* (t=5.612) and *personal factors* (t=4.551).

Table 6. Beta and t Values of the Independent Variables

	Beta	t	Sig.
Behavioural Intentions	.280	5.612	.000
Comm Channels	.269	7.382	.000
Perceived Usefulness	.267	6.751	.000
Personal Factors	.220	4.551	.000

Dependent Variable: Actual Usage

Discussion and implications

The findings reveal that in terms of effects and influence on *actual usage*, only *perceived usefulness*, *personal factors*, *communication channels* and *behavioural intentions* have contributed to the variations in *actual usage* of the internet.

The advent of ICT in Malaysia over the years has seen a meteoric increase in internet subscriptions and usage. As compared to an earlier study by Safar, Norizan and Salman (2008), in Malaysia, where only 46.2% of the respondents had internet subscription, the present study found that 81.3% of the respondents subscribed to the Internet. This reflects an improvement in the level of acceptance of internet among Malaysians which has increased many fold over the years.

From the findings, this study has revealed other factors which have influence on actual usage and acceptance of internet. The factors are *personal factors* and *communication channels* in addition to *behavioural intentions* and *perceived usefulness*. Thus this study has concurred with the findings by Davis (1989) that perceived usefulness has an effect and influence on actual usage and acceptance of ICT. Similarly, a study by D'silva (2007) on acceptance of new technology, found that perceived usefulness showed significant positive relationship with the actual usage of the computer.

Relying on the literature of user types outlined by Brandtzeg, Heim and Karahasanovic (2011), the respondents in this study can be categorised as ranging from sporadic to entertainment and instrumental users, but not advanced users of the Internet. A large number of the respondents as the study revealed belonged to the entertainment type of users. There were still few who were instrumental users.

From the findings, most of the respondents use internet at university/college/place of work and in their homes underlying the importance of internet access at work places and the diffusion of internet among the population. The findings are similar to that of Mohd Safar Hasim, Norizan Abdul Razak & Ali Salman (2008) where most of the respondents said they used the Internet at work places, universities/colleges/schools and at home.

The findings of the study have theoretical implications on Technology Acceptance Model (TAM). It has contributed to TAM by way of revealing more variables which have effect on actual usage and acceptance of internet. Practically, it will help inform all stakeholders of the need to consider many more variables and aspects when embarking on ICT projects so that the objectives of the projects will be realised. Since all the main variables have high reliability, the robustness of the survey instrument has been proven.

Acceptance of any innovation has to do with the added or relative advantage of the particular innovation. Internet is not absolve from this as well. From the findings the Internet has added and relative advantage. The findings imply, in addition to factors in TAM, there are also other factors that contribute to technology acceptance. The findings thus have added more knowledge to the literature of technology acceptance. It has practical implications to policy makers and technology providers, especially the new media, with regard to ICT and especially internet acceptance.

Conclusion

The study has achieved the objectives set by determining the factors that have effects on actual usage and acceptance of internet. The study has also revealed other factors which have not been explained or included in Technology Acceptance Model (TAM). An extended model of TAM is thus proposed by this study to include communication channels and personal factors. This has encouraged them to use ICT positively in their daily lives as the findings revealed. This study has some limitation where the number of respondents, 300, is not large enough due to financial, time and other constraints. Hence future studies could use a larger data covering the whole nation and should include the minority ethnics as this study only collected data from the three major ethnics – Malays, Chinese and Indians in the Klang Valley. More analysis could also be done in future studies. The findings of this study are crucial for the country in shaping future ICT policies and strategising the steps in improving ICT implementation and in revealing the challenges that need to be addressed.

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