Consumer Behavior on Internet Technology Adoption

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Abstract: - The user friendliness of the Internet has captured the interests of many individuals. Today, the use of Internet is not limited to information searching but also expands to other daily activities such as online banking and shopping. However, reports indicate that consumers vary in their levels of Internet adoption mainly due to perceived risk associated with online transactions. This study explores the roles of perceived risk in determining the types of online activities which consumers prefer. In addition, the effect of consumers' level of experience on perceived risk is examined. The results show that transaction features are less preferable when consumers perceived risks levels are higher. Consumers experience using a technology moderates perceived risks resulting in higher levels of adoption. We discuss the implications and some future directions of research.

Key-Words: - Perceived risk, experience level, Internet, e-commerce, consumer behavior, technology adoption.

1 Introduction

Information technology has significant roles to play not only in businesses but also in daily activities of individuals. User-friendly technology, for example the Internet has changed the way people communicate, work and perform commercial activities. The emergence of Internet technology, particularly the World Wide Web, as an electronic medium of commerce offers new opportunities to industries to adopt the Internet as their alternative marketing tools (or as the only marketing channel). From a consumer's perspective, Internet technology provides faster access to information, widens the selection of service providers as well as increased convenience.

At an individual level, one's decision to use information technology such as the Internet involves several considerations. Clearly, the Internet alongside its advantages as an electronic marketing channel has its potential drawbacks. For example, lack of sound security measures at service providers transaction systems have caused many consumers hesitant to perform online activities which involved the disclosure of financial information. In other words, the extent to which consumers perceive risk associated with the use of Internet would determine their levels of adoption. Drawing from Technology Acceptance Model (TAM) theory, this study therefore, aims to investigate the effect of consumer levels of perceived risk and experience with the Internet on their usage of the technology. It is vital for companies to understand consumer adoption behaviour, as their investment decisions in technology infrastructure should be driven by consumer value and long-term profitability.

1.1 Internet usage and E-commerce in Malaysia

However, although the Internet is gaining popularity, Malaysian consumers have yet to embrace electronic commerce. A study conducted by TNS Interactive revealed lack of trust in the online payment system as a major factor in hindering consumers to shop online [1]. This finding is parallel to that of Yee [2] and Suki et al.'s [3] study. The survey shows that 38 per cent from the respondents felt that online shopping was not safe and 36 per cent others were reluctant to reveal their credit card details. Unable to inspect a product prior to purchase was also cited as one of the factors hampering e-commerce adoption. The consumers who shopped online were mainly

those who have conducted online transactions before and consumers who are technology literate. However, first time buyers would prefer to 'feel and test' the physical products prior to making purchases [4].

TNS report on the trend in Internet shopping behaviours among Malaysians highlights that only 3 per cent of Internet users shopped online in year 2002. The majority, that is 76 per cent were using the Internet for non-shopping activities such as seeking information, playing games, entertainment, or communicating with friends etc. The number of Internet shoppers had declined from year 2000 to 2002 and this phenomenon was linked to an economic downturn in Malaysia.

Nevertheless, there seems to be a positive outlook for the adoption of e-commerce in Malaysia particularly in the forthcoming years. Between 2002 and 2003 there has been a 60 per cent growth in the number of Internet users, and in 2004 there were 8.6 million users nationwide – 35 per cent of the entire population [5]. This growth can be primarily attributed by the government's increased campaigns and incentives as well as the telecommunication companies offer to reduce the cost of Internet access [6]. With this phenomenon, IDC projects a compound annual growth rate of 19.9 per cent from 2002 and 2007 in Internet market [7] and a 93 per cent increase in e-commerce market which includes business-to-business and business-to-consumer for 2004 [8].

2 Theoretical framework

This study is premised on the belief that user acceptance of information technology (Internet) depends on his/her perception and attitude towards a particular technology. Therefore, this study adapts the TAM theory that underpins the understanding of user acceptance behaviors.

2.1 Technology Acceptance Model (TAM)

TAM, first introduced by Davis [9] is concerned with the determinants of computer acceptance. That is, "in general, TAM is capable of explaining user behaviour across a broad range of end-user computing technologies and user populations" [10]. In adaptation to an earlier Theory of Reasoned Action (TRA) which accentuates that an individual behaviour is an outcome of attitudes that is formed by perceptions or norms [11], TAM proposes that attitude towards using a system is influenced by perceived usefulness and ease of use. Specifically, TAM argues that the use of IT is determined by individual's intention to use the technology and that one's intention is determined by the person's attitude as well as perceived usefulness and ease of use [12]

However, Thomson et al. [13] suggest excluding the intention to use variable in studies that are interested to measure actual behaviour, that is, Internet usage. Since the purpose of this study is to examine consumer perception and its effect on the use of Internet technology as a marketing channel, we then follow Thomson et al.'s suggestions.

2.2 Perceived risk

As users interact with a new technology, they will learn the usefulness as well as the risks associated with the technology. Technology Acceptance Model (TAM) proposes that an increase in perceived usefulness leads to a greater intention to use [14]. This study extends this proposition to infer that perceived risk influences the actual usage of the Internet. While there are other factors affecting consumers' adoption behaviour on the Internet, perceived risk is an impediment to the repatronage and purchase on the Internet [15]. In brief, perceived risk may influence the attitude and behaviour of consumers towards the Internet services [16].

Perceived risk is defined as an assessment of uncertainties or lack of knowledge about the distribution of potential outcomes [17] and the uncontrollability of outcome attainment [18]. In the case of purchasing on the Internet, it is possible that consumers may perceive disclosing their credit card information as risky, and they have no control over this [19]. Chellappa and Pavlou [20] describe information security as the subjective probability with which consumers believe that their personal information will not be viewed, stored or

manipulated during transit or storage by inappropriate parties, in a manner consistent with their expectations.

Indeed, uncertainties about how their financial information is treated by merchants will increase perceived risk associated with online transactions. This study adapts the notion proposed by TRA and TAM and suggests that the higher the perceived risk (perception) the lower the adoption level. Given the likelihood that perceived risk is associated with transactional information [21], this study measures consumers' perceived risk by their behaviour towards transactional activities such as online banking and online reservations.

Perceived high-risk activity includes online banking where consumers assume greater risk transferring funds from their bank accounts to third party accounts, pay their utility bills or make inter-bank loan repayments and so forth. A medium-risk activity includes online reservation, which involves the disclosure of consumers' financial account or credit card information, but no transaction will take effect unless one appears physically before the service provider in order to confirm a purchase. On the other hand, information searching is considered as low risk activity since it does not involve any disclosure of financial related information. Hence, consumers who adopt high-risk activities (for example, online banking) can be considered as having higher risk tolerance than those who use the Internet for online reservation and information search. Therefore, the first hypothesis is proposed:

H1: The higher the risk tolerance the higher acceptance level towards high-risk Internet activities.

2.3 Experience level

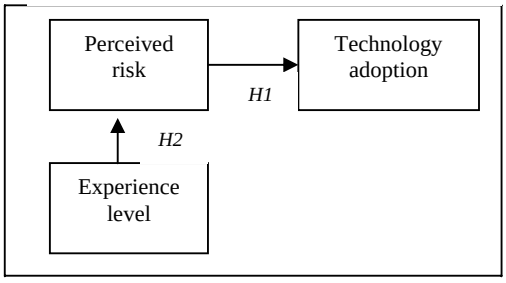
When users gain more experience using the Internet they tend to learn the usefulness as well as the disadvantages of the technology [22]. For example, experienced users may find the process of information search becomes much easier the next time they use a search engine. As a result, information searching becomes common and users tend to explore other capabilities of the Internet .

Relevant to TAM is the consumers' attitude towards a particular adoption and extending on this notion, is the usage of Internet technology. According to Danaher and Haddrell [23], attitude is an outcome of cognitive evaluation, which is based on consumers' expectations and experience. Thus, consumers' *level of experience* with Internet activities will have an impact on perceived usefulness, which in turn influences the adoption level. When users gain more knowledge about Internet transaction they tend to be more aware of sound security features leading to reduce uncertainties. Hence, the level of perceived risk would be lower resulting in higher adoption level, for example using the Internet to perform online transaction. Our second hypothesis follows:

H2: Consumer's level of experience with the Internet activities reduces perceived risk thus affecting his/her adoption of Internet technology.

Figure 1 displays the proposed framework for this study.

Fig. 1 : Summary of research hypotheses



3 Research method

The main source of the individual users' list came from various education, government and corporate institutions. Due to the nature of work that people do in these institutions, which requires the use of the Internet, most users can be found in these institutions in Malaysia. Letters seeking permission to access the institution's list of users' database were sent out to 15 universities and colleges, 10 government and 50 corporate institutions.

A personally administered survey was employed in this study so as to obtain a higher response rate (since the questionnaires were collected immediately once they were completed) [34]. The questionnaire consisted of three sections.

Section A consisted of demographic information such as respondent's age group and income level. Section B consisted of general information about respondent's Internet activities : types of activities conducted and years of experience while Section C was designed to assess consumer opinions about Internet usage. Using a 5-point Likert scale (1 = 'Strongly disagree' to 5 = 'Strongly agree') respondents were asked respond to questions such as 'I use the Internet to communicate with friends and others', 'I prefer to be able to personalize a Web page' and 'I like to purchase product/service on the Internet'.

4 Analysis and results

4.1 Respondent profile

A total of 626 (62.6%) responses were collected, however due to invalid and missing responses only 547 (54.7%) were usable for analysis. Respondents were almost evenly split by gender (50.1% were male and 49.9% female). Most of the respondents were 21 to 30 years of age (51.4%), followed by the age groups of 31 to 40 and below 20 years at 28.5% and 10.2%, respectively. 48.6% of the respondents had spent at least 15 years in education. As to the Internet usage profile, majority of the respondents spent less than 30 hours per week (56.9%) while 26.9% of the respondents spent more than 40 hours per week on the Internet. Most of the respondents were experienced users who have been using the Internet for more than 5 years (55.4%).

4.2 Hypotheses testing

MANOVA is useful to assess group differences of effects of categorical variables (for example, age, experience level, type of activities) on multiple interval dependent variables (information search, online reservation nad online banking). Hence MANOVA was used to test the hypotheses of this study.

4.2.1 Perceived risk and Internet usage

This study proposes that consumers who are engaged in higher risk activities have higher acceptance towards the technology. Table 1 displays the items used for the tests while the results of the first hypothesis are shown in Table 2.

Table 1 : Summary of items used for perceptions towards Internet activities

Items/Activities	Cronbach Alpha
Communication tool	0.84
Email	
Customer service helpdesk	
Online chat room	
Bulletin board	
Check product/service availability	
Web form	
Transactional tool	0.79
Make online payment	
Purchase product/service online	
One-stop shopping	

Table 2: Results of hypothesis 1 test

Effect	Wilks Lambda	F	p-value	Power[a]
Main Effects				
Info search	0.858	0.948	0.137	0.999
Reservation	0.849	1.095	0.944	0.999
Banking	0.931	1.167	0.083	0.940

Note : p value is significant at p<0.05

The results indicate that consumers who use the Internet for information searching, online reservation and online banking are not significantly different in their perceptions towards Internet activities. Ironically, although consumers who perform online banking are actively using the Internet to transfer money and make online bill payments they tend to be less willing to purchase product/service. Hence, H1 cannot be safely accepted.

4.2.2 Users level of experience and perceived risk

Table 3 illustrates the results of H2 testing. In this hypothesis, Internet activities (information search, online reservation and online banking) are the dependent variables while the numbers of years using the Internet (ranges from 6 months to more than 5 years) are the independent variables. From the table, online banking consumers are significantly (p-value <0.05) different from other groups of users. Hence, it is evident that as consumer gains more experience using a technology, his knowledge about the technology capabilities and potential harm arising from its usage helps to reduce ambiguity and removes

unnecessary fear. The results suggest more experienced consumers tend to maximize the use of Internet technology, that is, to perform a more risky activity such as online banking. Hence, H2 is supported.

Table 3 : Results from H2 testing

Effect	Wilks Lambda	F	p-value	Power[a]
Main Effects				
Info search	0.858	0.889	0.618	0.988
Reservation	0.849	1.053	0.270	0.998
Banking	0.931	1.701	**0.011**	0.999

Note : p value is significant at p<0.05

5 Discussion and conclusion

Our study reveals the important roles of consumer perception in relation to IT adoption such as the Internet. Extending on TAM theory we conclude that perceived risk determines consumer level of technology adoption. Technology usage experience is imperative in shaping and to some extent reduces perceived risk. Certainly, as consumers interact with the Internet over time, knowledge about the advantages as well as disadvantages of the technology accumulates and 'educates' the consumer about the quality of Internet service. This creates awareness particularly of the performance criteria and what the technology can and/or should do: if Internet technology is adopted as a marketing channel then the technology should be reliable and safe to support commercial uses.

The respondents of this study were mainly those who have more than five years experience using the Internet technology. At a general level, the Internet has been in the market for many years and Internet technology literacy among consumers improves over time. Users who are more familiar with a technology tend to have more accumulated knowledge of technology standards currently available in the market. Comparing the levels of service quality may be easier for this consumer group. However, if a site can assure that the firm's services are highly reliable and consumer data is strictly protected, then the site may have an edge over its competitors.

Interestingly, this study reveals that consumers who are engaged in high-risk activities such as online banking are not necessarily willing to purchase product/service on the Internet. Most online banking firms are companies who established their brand names in the offline market prior to venturing into the electronic market. For example, in Malaysia all online banking service providers are those who have been in the physical market for more than 15 years. In this instance, consumers who have some prior knowledge about the company's reputation may readily "switch' to the online channel. On the contrary, most online purchases are offered by pure dotcoms whom their presences are relatively 'new' and may use only the Internet platform as their marketing medium. Lack of trust and buyer-seller physical interaction prior to a purchase may reduce consumers' willingness to perform online purchases. Therefore, branding and trust may be other critical factors affecting consumers' technology adoption.

In brief, firms offering higher risk activities, which involve the disclosure of consumers' financial information, should focus on earning consumers' trust and confidence by improving the security measures as well as fulfillment quality. This study is subject to several limitations. Firstly, the respondents were mainly well educated and above 30 years of age. Further research is needed to generalize the results across demographics of Internet users. Trust may play an important role in perceived risk and consumer experience as illustrated in the finding of H1 above. Hence, further research is required to examine the relationships between trust and perceived risk as well as technology adoption level. Perceived value may be another moderating factor which influences consumer perceived risk and merits further investigation.

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