

THE EXTENT OF INTERNET BANKING SERVICES USAGE IN RELATION WITH CUSTOMERS' PERCEIVED E-SERVICE QUALITY (PeSQ) OF MALAYSIAN BANKS IN PENANG: THE MODERATING ROLE OF ADOPTERS RISK PROFILE

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ABSTRAK

Studi ini mengkaji perilaku penggunaan jasa Internet banking lanjutan dalam konteks nasabah tetap pada Bank nasional Malaysia di Penang. Kerangka penelitian berasaskan Technology Acceptance Model (TAM) dan modifikasi model Perceived e-Service Quality (PeSQ) untuk mengidentifikasi faktor yang mempengaruhi penggunaan jasa Internet banking lanjutan. Variabel penelitian diantaranya profil risiko pengguna, kegunaan yang diterima, kemudahan dalam penggunaan, kebolehpercayaan, ketanggapan, keselamatan, dan kemajuan berkelanjutan. Mahasiswa S2 pada Universiti Sains Malaysia telah digunakan sebagai sampel penelitian. Hierarchical Regression Analysis digunakan untuk menguji pengaruh antar hubungan antar ke-7 sub-variabel yang diusulkan dan untuk memastikan proposisi berkait secara empiris. Kegunaan yang diterima, kemudahan dalam penggunaan, kebolehpercayaan, ketanggapan, keselamatan, dan kemajuan berkelanjutan mempunyai suatu pengaruh tidak langsung terhadap tingkat penggunaan jasa Internet banking lanjutan melalui profil risiko pengguna. Sebaliknya tiada pengaruh langsung dalam kajian empirik ini. Dengan demikian, dapat disimpulkan bahwa pelanggan Internet banking pada bank-bank nasional di Pulau Pinang, Malaysia berada pada kategori memiliki minat/ ketertarikan pada suatu teknologi, tetapi tidak berani mengambil risiko (early majority).

Kata kunci: Penggunaan lanjutan, jasa Internet banking, kualitas jasa online yang diterima, model penerimaan teknologi, profil risiko.

ABSTRACT

This study investigates extent of Internet banking services usage behavior of customers' within the context of National Internet banking services in Penang-Malaysia. A research framework based on the Technology Acceptance Model (TAM) and the modified Perceived e-Service Quality (PeSQ) Model to identify factors that would influence the extent of Internet banking services usage. The framework includes adopters risk profile, perceived usefulness, ease of use, reliability, responsiveness, security, and continuous improvement. Postgraduate students in Universiti Sains Malaysia were used as research sample to test the models. Hierarchical Regression Analysis was used to examine the entire pattern of intercorrelations among the 7 proposed constructs and to test related propositions empirically. Perceived usefulness, ease of use, reliability, responsiveness, security, and continuous improvement has significant indirect effect on the extent of Internet banking services usage through adopters risk profile, while its direct effect to the extent of Internet banking services usage is not significant in this empirical study. Therefore, it can be conclude customers of Malaysian Internet banks in Penang are in early majority categories who are interested in technology itself and not willing to take risks (risk adverse).

Keywords: The extent of usage, Internet banking, Perceived e-Service Quality (PeSQ), Technology Acceptance Model (TAM), risk profile

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INTRODUCTION

Background to the Study

The rapid growth and popularity of the Internet has created great opportunities as well as threats to companies in various business sectors, to endorse and deliver their products and services using Internet as a distribution channel (Chau&Lai, 2003). Researchers have emphasized the importance of the Internet for financial services more than other industries (Mukherjee&Nath, 2003; Tan&Teo, 2000). Besides opportunities of this channel, banks and financial institutions across the world face new challenges to the ways they operate, deliver services and compete with each other in the financial sector. Driven by these challenges, banks and financial institutions have implemented delivering their services using this channel (Chan&Lu, 2004; Cronon, 1997). Internet banking refers to the use of the Internet as a delivery channel for banking services, which include all traditional services such as balance enquiry, printing statement, fund transfer to other accounts, bill payment, and so on, and new banking services such as electronic bill presentment and payment (Frust, Lang&Nolle, 2000) without visiting to bank branch (Mukherjee&Nath, 2003; Sathye, 1999).

Many commercial banks and financial institutions have implemented Internet banking services over the past decade. Compared with traditional over the counter banking, Internet banking does not offer face-to-face contact in what is essentially a one-to-one service relationship with the individual. As a result, Internet banking must deliver higher quality in order to compete. Understanding customer's expectations and how they feel about their perceived services is becoming a very serious concern. Internet banking continuous success comes from two groups: new customers and repeat customers. Since it always costs more to attract new customers than to retain current

customers, so that customers retention more critical than customer attraction. The key to customer's continual usage in Internet banking services is with good service quality (Zuliarni, 2008).

Banks with the most experience and success in using Internet channel are beginning to realize that the key determinants of success or failure are not merely website presence and cost but also include the electronic service quality or e-SERVQUAL (Yang, 2001; Zeithaml, et., al., 2002; Courtier and Gilpatric (1999) recommended that banks and financial companies must survey customers' requirements on a regular basis in order to understand focus on the customer's real needs that can affect intention to extent their Internet Banking usage.

Recently, many banks have launched and developed such services (Booz Allen&Hamilton, 1996). Internet banking is not only gaining ground in Europe and in the United States, but also in developing countries such as Thailand, Oman, India (Singh&Malhotra, 2004) and South Africa. Malaysian banks for instance, have been offering Internet Banking since 1st June 2000 when domestic banking institutions were allowed to provide a full range of banking products and services over the Internet. Locally incorporated foreign banks were allowed to set up communication websites with effect from 1st January 2001 and transactional websites from 1 January 2002 (BNM, 2001). On June 15, 2000, Maybank (www.maybank2u.com), one of the largest banks in Malaysia, launched the country's first Internet Banking services. The bank employs 128-bit encryption technology to secure its transactions. Other local banks in Malaysia offering Internet Banking services are Hong Leong Bank Berhad (<http://www.hlb.com.my>), CIMB Bank Berhad (<http://www.cimbbank.com.my>), EON Bank Berhad (<https://ebank.eonbank.com.my>), Bank Islam Malaysia Berhad (<http://www.bankislam.com.my>), Public

Bank Berhad (<http://www.pbebank.com>), Alliance Bank Malaysia Berhad (<http://www.alliancebank.com.my>), AmBank (M) Berhad (<http://www.ambg.com.my>), and RHB Bank Berhad (<http://www.rhb.com.my>). The relative success of Internet banking to date can be gauged by identifying the number of active customers and anticipated future adopters. All major banks have introduced their Internet banking services and are constantly investing and expanding their products and services in Malaysia.

In general, new innovations particularly technological ones are not readily accepted and adopted by everyone because Internet banking risk might greater than branch-bank. Risk implies that there is some degree of uncertainty about the outcome of an action which carries the possibility of physical harm or some other damage. The perception of riskiness may vary from person to person and from product to product, or service to service (Stone and Gronhaug, 1993), in short a very personal thing, related to specific circumstances. Past research has investigated a wide variety of factors influencing Internet adoption and usage such as demographic characteristics; demographic and motivation variables; attitude and age variables; demographic, social economic and technological capacity variables (Cheah, et al., 2005). In contrast, research in the context of adopters risk profile influencing customers extent of usage in relation with service quality is relatively limited.

However, customers' responses and readiness to use Internet banking is most probably the key to the decision of a bank to provide Internet banking services. Courtier & Gilpatrick (1999) recommended that financial institutions should regularly survey or gauge customers' needs and desires before setting up any banking strategies on the Internet, thus will directly affect to the success of the adoption of Internet

banking. Moreover, perceived Internet banking service quality and their risk profile will influence the extent of Internet banking service usage among Malaysian banks customers is the primary focus of this research.

PROBLEM STATEMENTS

There is a growing body of academic research that has focused on examining the factors that have influenced user behavioral intention to accept/ adopt or use innovations in information technology, the temporal dimension of the adoption process (that is, the sequence of activities that lead to the initial adoption and subsequent extent of usage of an IT innovation at the individual adopter-level) has been ignored in most empirical studies investigating user beliefs and attitudes (Compeau, Hinggin, & Huff, 1999; Davis, 1989; Davis, Bagozzi & Warshaw, 1989; Davis & Venkatesh, 1996). Among the different models that have been proposed, the Technology Acceptance Model (TAM) suggested by Davis (1989) is the most widely accepted model because of its specific focus on Information system (IS) use, its basis in social psychology theory, its parsimony and empirical support from various studies. According to TAM, adoption behavior is determined by the intention to use which is turn determined by the perceived usefulness and perceived ease of use traits of the system, their findings have enhanced the understanding of determinants of initial usage and extent of usage.

In studying the extent of usage of Internet banking, Moon & Kim (2001) argue that the original TAM's constructs are not sufficient because technology setting and transaction environment are different from conventional information system studies such as adopting software packages or tools, thus necessitating a search for additional variables that better explain extent of Internet banking services usage. Moreover, researchers (Plouffe, Hullan & Vandenbosch, 2001) commented

that TAM's parsimony can be trade-off by adding richer set of constructs that enhances the prediction ability of the model. Therefore, this research proposes constructs from 2 standard paradigms – Technology Acceptance Model (Davis, et al., 1989) and modified PeSQ (Zeithaml, Parasuraman & Malhotra, 2001) with two additional variables, *security* and *continuous improvement* to enhance understanding of extent of Internet banking usage with mediating role of *adopters risk profile*. *Security* found to be a widely recognised obstacle to Internet banking adoption in prior studies and thereby any commercial transaction over Internet is viewed as a risky undertaking. As for Internet banking, Sathay (1999) with respect to the adoption of Internet banking by Australian consumers' found that *security* is important reasons that customers do not want to use the service, beside *difficulty in use*. On the other hand, *continuous improvement* is found to influence adoption and extent of usage decisions of Internet banking services. This may because customers often favor companies that are devoted to improving their weaker activities, and that meet customer changing needs and preferences.

Motivated by two models (i.e. TAM and modified PeSQ), this study proposes to apply them together to identify factors that influence extent of Internet banking services usage in Malaysian Banks in Penang with mediating role by adopters risk profile.

LITERATURE REVIEW

Internet Banking

The incredible growth of the Internet is changing way corporations conduct business with consumers. The banking industry is no exception. Internet banking refers to the delivery of banking services over the Internet. Such services are advantageous as no transfer of physical goods are involved, any transactions can be processed electronically that includes

balance enquiry, transferring funds to other accounts, bill payments, and so on.

The objective of Internet banking services is to provide financial services to consumers with a fast and convenient way to undertake various banking transactions during and after banking hours. Most of Internet banking institutions offers the service 24 hours a day, 7 days a week (www.bankinginfo.com.my). Apart from *fast* and *convenient*, consumers can have better control on their banking transactions. On the other side, banks expect to reduce operating costs, enhance customer reach, enable business diversification, such as providing non-financial services, increase volume of business, provide better services, form alliances with other industries and retain market share by implementing Internet banking services (Carlson et al., 2001).

Perceived e-Service Quality (PeSQ)

SERVQUAL has been applied by various researchers to numerous service industries as a means of gauging service quality. The primary value of SERVQUAL in its powerful benchmarking, diagnostic, and prescriptive tools. A standard approach to measure customers perceived service quality is to measure the gap between what customer expected and their perceived of the service provided in a service encounter. Perceived e-service quality related to persons initial expectations. It is important to understand how customers form expectations (Zeithaml, et al., 2001), they are word of mouth communications, personal needs, and past experience.

A new version of SERVQUAL, e-SERVICE QUALITY (e-SQ), has been developed to evaluate service on the Internet, defined as the extent to which a Website facilities efficient and effective shopping, purchasing, and delivery (Zeithaml et al., 2001).

Reliability

In the present case, individual concern would particularly focus on whether banks are able to perform services and to function dependably and accurately online (Aladwani, 2001; Jun & Cai, 2001; Yang & Jun, 2002; Zeithaml et al., 2002). Availability and accessibility when help is required would affect individual perceptions about how reliable is a bank's online delivery channel (Devaraj et al., 2002). Finally, reliability in the sense of credibility has been suggested to enter through the bank's reputation for trustworthiness, believability, and honesty (Jun & Cai, 2001, Yang & Jun, 2002).

Responsiveness

Responsiveness is generally understood in terms of ability on the part of vendors to supply appropriate information to customers with minimal time lag when problems occur, to make available mechanisms for handling returns, and to provide guarantees to meet popular requests (Zeithaml, et al., 2002). As applied to service quality in e-banking, responsiveness can be measured in terms of speed or promptness (Yang&Jun, 2002), timeliness and convenience of access (Jun&Cai, 2001; Davis et al., 1989).

Security

Recent research has suggested that the majority of Internet users harbor strong concerns regarding security and privacy, especially with regard to the acquisition and dissemination of personal data and transactions information (Yang&Jun, 2002). In general, security is understood in terms of physical security, financial security and privacy (Parasuraman et al., 1988) and the protection of data against unauthorized disclosure or unauthorized modification or destruction, while privacy refers to the rights of individuals and organizations to determine for themselves when, how, and what extent personal information is to be transmitted to others (Undo, 2001). As applied to Internet

banking, these concerns are usually summarized by the idea of transaction security, directly in the form of safe and accurate transfers of money or payment-credit information, and indirectly in the form of transaction risk (Liao&Cheung, 2002).

Continuous Improvement

The idea of continuous improvement in service quality refers to the vendor's ability to meet the changing needs and requirements of customers over time (Yang et al., 2001). In Internet banking, continuous improvement is important with regard to product enhancement and customer relations (Jun&Cai, 2001).

Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM), introduced by Davis (1989). Among the many variables that may influence system use, previous research suggests two determinants that are especially important. First, people tend to use or not use an application to the extent they believe it will help them perform their job better. Davis (1989) refers to this first variable as *perceived usefulness*. Second, even if potential users believe that a given application is useful, at the same time they may also believe that the systems is too hard to use and that the performance benefits of usage are outweighed by the effort of using the application. Perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance." Perceived ease of use, in contrast, refers to "the degree to which a person believes that using a particular system would be free of effort."

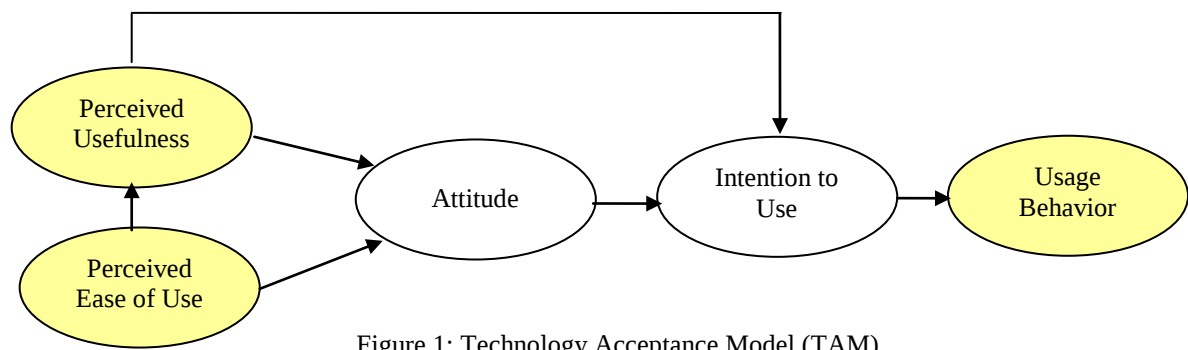


Figure 1: Technology Acceptance Model (TAM)
(Source: Davis et al, 1989)

In January 2000, the Institute for Scientific Information's *Social Science Citation Index* listed 424 journal citations of the two journal articles that introduced TAM (i.e., Davis 1989, Davis et al. 1989). In the past decade, TAM has become well established as a robust, powerful, and parsimonious model for predicting user acceptance.

In Malaysia, many researchers have conducted studies to examine the relationships among perceived ease of use, perceived usefulness, attitude, and the use of Internet. Teck (2002) used TAM model to study the impact perceived web security, perceived privacy, perceived usefulness, and perceived ease of use on the web based online transaction intention. Therefore, there is a positive and direct relationship between intention and continual usage behavior of Internet banking (Cheung, 2001).

Risks in Internet Banking

The established dimensions of risk (i.e. financial, social, time, performance, psychological and physical) encompass both the online and offline environments (Beardon&Mason, 1978). Because Internet banking is a new form of financial activity, which tends to involve higher degree of uncertainty and risk when compared with branch banks. As cited by Riegelsberger, Sasse&McCarthy (2003) users of the Internet encounter more risks than they do in face-to-face transactions. Risk is a critical factor affecting the rate of adoption and extent of usage.

The degrees of risk that consumers perceive and their own tolerance of risk taking are factors that influence their extent of usage strategies. It should be stressed that consumers are influenced only by risk that they perceive, whether or not such risk actually exists. Risk exists when there is a less than 100 per cent probability that things will turn out as expected. As Bauer (1967) said consumer behavior involves risk in the sense that any

action of a consumer will produce consequences which he/ she cannot anticipate with anything approximating certainty, and some of which are likely to be unpleasant.

Internet banking is both a process and product electronic innovation which enables customers to handle their banking transactions online, without physical visits to the bank. In general, however, new innovations particularly technological ones are not readily accepted and adopted by everyone. Rogers (1995) classifies innovation adopters into five broad categories:

1. Innovators,
2. Early adopters,
3. Early majority,
4. Late majority, and
5. Laggards.

Innovators are the first adopters, who are interested in technology itself and possess positive technology attitudes. On the other hand, early adopters are also interested in technology and are willing to take risks. The International Data Corporation investigated urban Internet users in six Asian countries (IDC 2002) and found some important profiles of Internet adopters. Early adopters of wireless Internet were usually young and male tech-savvy users at an average age of 28 years. 64% of them were male. In contrast, the early majority category consisted of mainly young working adults. There was a larger proportion of females and working population within the late majority category. Finally, laggards were found to be predominantly older people.

CONCEPTUAL FRAMEWORK

This study proposes to combine Theory of Acceptance Model (Davis, 1989) and modified Perceived e-Service Quality (Zeithaml, Parasuraman & Malhotra, 2001) to investigate customers' extent of Internet banking services usage.

According to Riegelsberger, Sasse & McCarthy (2003) users of the Internet encounter more risks than they do in face-to-face transactions. *Security* is employed to the model since it is a found to be significant concern for Internet banking users while conducting banking transactions over Internet (Jun&Cai, 2001). The construct of *continuous improvement* are dropped from Jun&Cai (2001) in their key determinants of Internet banking service quality: a content analysis research. Different with original TAM, actual usage behavior is not used as a dependent variable in the research model

because Internet banking in Malaysia is still in its introductory stage. The number of Internet banking adopters has not yet reached a critical mass and thus it is difficult to measure for usage behavior. The other reason is path from intention to actual usage behavior had been widely validated in many prior researches. Therefore, a positive and direct relationship between extent of usage and actual usage behavior of Internet banking is expected. Thus in this research, *extent of Internet banking services usage* used as dependent variable, instead of actual usage behavior in TAM.

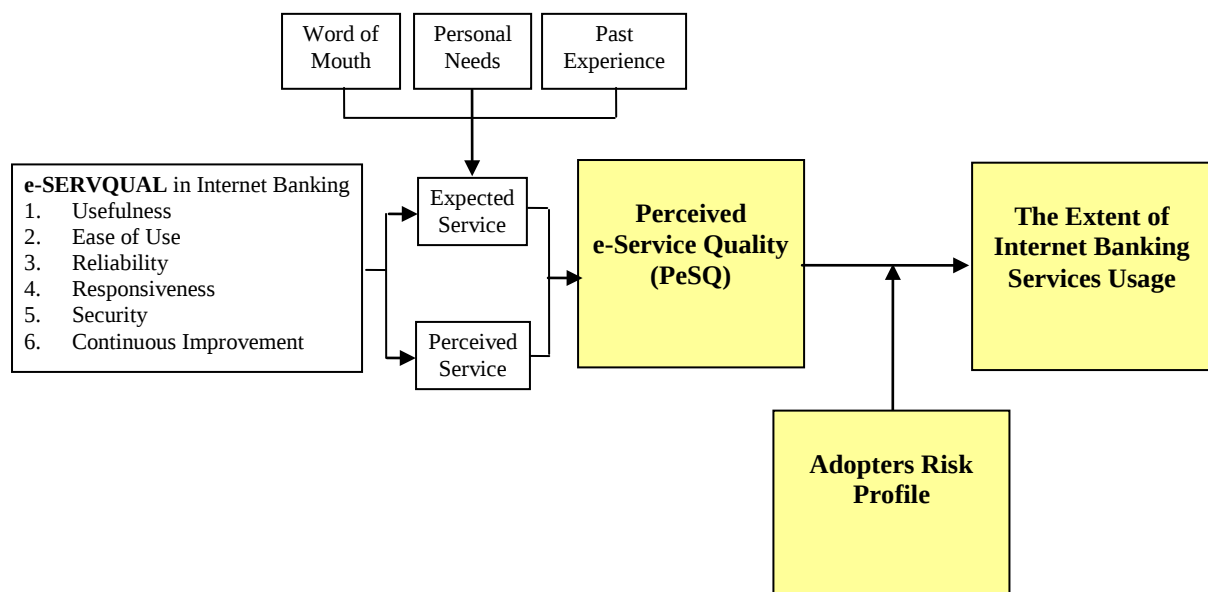


Figure 2: Proposed Extent of Internet Banking Services Usage Model

DEVELOPMENT OF HYPOTHESIS

H1: Perceived usefulness will have a positive effect on the extent of Internet banking services usage.

H2: Perceived ease of use will have a positive effect on the extent of Internet banking services usage.

H3: Perceived reliability will have a positive effect on the extent of Internet banking services usage.

H4: Perceived responsiveness will have a positive effect on the extent of Internet banking services usage.

H5: Perceived security will have a positive effect on the extent of Internet banking services usage.

H6: Perceived continuous improvement will have a positive effect on the extent of Internet banking services usage.

H7: Adopters risk profile fully mediates the influence of overall perceived service quality on the extent of Internet banking services usage.

RESEARCH METHOD

Email-based surveys are popular because information can be obtained quickly and no cost or minimal cost since postage and stationery cost are eliminated. Since, 60.0% of Malaysia population or 14,904,000 Internet users of 24,821,286 Malaysia populations have access to the Internet and Malaysia become number 28 of Top 43 Countries with the Highest Internet Penetration Rate; over 50% of the population using the Internet in June 2007 (<http://www.Internetworldstats.com/top25.htm>) or number 8 of Asia Top 10 Internet Countries in December 2007 (<http://www.Internetworldstats.com/stats3.htm>), it can be assumed that everyone have access to Internet or have email address. Some disadvantages of this survey mode are recipients may delete messages from unknown recipients without even reading them, considering them as junk mail (Dillman, 2000).

In a directly administered survey, information is collected by distributing a survey questionnaire to students in a classroom, library, hostel, or at a meeting of a group of the population. Shaefer&Dillman (1998) cited several studies that have not found any significant difference in response rates that used a mixed-mode survey strategy. Email-based survey and directly administered survey (mixed-mode) was found appropriate mode of data collection for this study.

Each individual was asked to complete a questionnaire through email and self-administered questionnaire. A set of questionnaires were sent to USM Student Webmail (<http://stud.usm.my/>). Each individual was invited to complete a questionnaire and returned to researcher email address. Since some students did not respond to the invitation for some reasons, self-administered questionnaire was distributed to target respondents directly who meet at library, international house, schools, or classroom. The researcher was

standing somewhere near the subjects in case there is a need for explanation of the items on the questionnaire. Survey distribution was started in third-week of April 2008 and was completed in two weeks. A total of 4,108 sets of questionnaires were distributed to the targeted respondents (all of Postgraduate Students at Universiti Sains Malaysia which studying in Master's of Ph.D Degree). Finally, 117 postgraduate students had finished and returned the questionnaire. Those numbers indicate that the questionnaires response has exceeded a minimum acceptable sample requirement of 110 questionnaires.

The instrument used for TAM and e-SERVQUAL have been applied in several studies. As Luam&Lin (2004) said items used for the constructs were adapted from prior research in order to ensure the content validity of the scale used is possible. The scales for *usefulness* and *ease of use* were measured using items adapted from the original TAM instrument (Davis, 1989) and subsequent applications of TAM to Internet banking and other technology acceptance studies (Sulaiman, Hee&Wee, 2005; Juruwachiratuhanakul&Fink, 2005; Karami, 2006; Yang & Fang, 2004; Yang, Peterson, & Cai, 2003; Yang, Jun, & Peterson, 2004; Jun & Cai, 2001) and adapted from studies on e-Learning (Liao, Chen, & Yen, 2006). Items for the continuous improvement construct were adapted from an original instrument developed by Jun&Cai, 2001; Yang&Fang, 2004 and from Yang et al. 2003. Items for *reliability* and *responsiveness* constructs were adapted from other studies that have used reliability as a constructs (Yang&Fang, 2004; Jun&Cai, 2001; Yang et al., 2003; Santos, 2003; Yang et al. 2004; Jabnoun&Al-Tamimi (2003). Measures of security were adapted from studies on Internet banking (Jun&Cai, 2001; Yang, et

al., 2003) and e-Learning context (Yang& Fang, 2004). Whereas some appropriate revisions were applied to make the construct fit the research context.

ANALYSIS

Demographic Profile of Respondents

The Statistical Package for Social Science (SPSS version 12.0) was used to process and analyze the collected data. Male respondents account for 48.7% of the sample, while female account for 51.3% (60 respondents). The younger generations relatively of lesser age are more computer savvy and thereby are more likely to adopt Internet banking. Most of the respondents were aged between 20<30 years old (70.9%); only 5.1% were in 40<50 years old category. However, 94.9% of the total respondents aged in 20<40 years old category.

More than half of total respondents are unemployed/ student (50.4%), and the

second highest percentage of current employment category fall under professional staff/ supervisor/ leader/ engineer (23.1%). This followed by middle management (13.7%), Findings also indicate that monthly Income varied from less than RM 2,000 to over RM 6,000 per month.

Factor Analysis and Reliability Analysis

Factor analysis is often performed when researcher wants to understand the underlying structures or factors of his or her studied variables. The following assumptions were observed to ensure that the items included in this study are appropriate for factor analysis. The criteria used were (1) the correlation matrix for the items contained two or more correlations that are greater than 0.30, (2) the measure of sampling adequacy (MSA) for individual items and Kaiser-Meyer-Olkin (KMO). and (3) the value of Bartlett's test of sphericity.

Risk	Factor Loading	KMO	Cronbach's Alpha
Risk 4: If a company doesn't jump into the service sector of its market, it will miss a golden opportunity	0.660	0.578	0.533
Risk 5: One health-insurance policy would cost me less in premiums but charges deductible; another policy has higher premiums but a lower deductible. Since I'm generally healthy, I will buy the first policy	0.792		
Risk 6: Switching to environmentally responsible packaging will appeal to our customers, even though the packaging is not as attractive, so we should switch	0.710		

Table 1: Factor Analysis and Reliability of Adopters Risk Profile (Mediators)

Firstly, researcher run all 6 items in mediating variable (i.e. risk 1, risk 2, risk 3, risk 4, risk 5, and risk 6), and got KMO value less than 0.5 (0.413). Then, re-run factor analysis without the lowest anti image item (i.e. risk 3), and got KMO value greater than 0.5 (0.508). Loading factor for 2nd item (risk 2) is lower than 0.5, in this case risk 2 should be deleted. Remaining 4 items included in factor

analysis. Factor two consist of 1 item, thus factor two should be deleted. Finally, risk is measured by remaining 3 items (i.e. risk 4, 5 & 6).

Table1 displays the results of the factor analysis and reliability analysis for adopters risk profile (as mediators variables). The result provided a three factor solution (i.e risk 1, risk 2, and risk 3). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.578

(greater than 0.5) The criteria used by Igbaria, Livari, and Maragahh (1995) to identify and interpret factors were: each items should load 0.50 or greater on one factor and 0.35 or lower on another factor; also there should be at least two items accepted for one factor. As revealed in

table 4.8, coefficient alphas for the independents variables were 0.533 above the acceptable level of 0.50.

Customers' Perceived e-Service Quality (PeSQ)

Table 2: The difference between Expected and Perceived Internet Banking Service Quality

Variables	Mean		Difference of mean	t-statistics
	Expected	Perceived		
Usefulness	4.4308	4.0906	.34017	6.876***
Ease of Use	4.2513	4.0718	.17949	3.551***
Reliability	4.0085	3.6256	.38291	6.620***
Responsiveness	4.3013	3.4316	.86966	5.639***
Security	4.7419	3.9607	.78120	5.499***
Continuous improvement	3.8410	3.4769	.36410	5.042***

*** Correlation is significant at the level 0.01 (1%).

As shown in Table 2 above, mean of expected and perceived usefulness are 4.4308 and 4.0906. Thus, the difference between customers expected and perceived usefulness of Internet banking service quality is 0.34017 with statistically significant at the level 1%. For ease of use, the difference between expected and perceived is 0.17949 with statistically significant at the level 1%. The mean value for expected and perceived reliability variable are 4.0085 and 3.6256, with statistically significant difference at level 1%, the difference of is 0.38291. Mean of expected and perceived responsiveness are 4.3013 and 3.4316. Thus, the difference between customers expected and perceived responsiveness of Internet banking is 0.86966 with

statistically significant at the level 1%. For security variable, the difference between expected and perceived is 0.78120 with statistically significant at the level 1%. The mean value for expected and perceived continuous improvement variable are 3.8410 and 3.4769, with statistically significant difference at level 1%, the difference of expected and perceived mean is 0.36410.

Correlation Analysis

Pearson correlation coefficient (r) was used to test and reveal the intercorrelations among study variables (usefulness, ease of use, reliability, responsiveness, security, continuous improvement, and extent of usage).

Table 3: Correlation Analysis between Study Variables

Variables	Correlation						
	PerUse	PerEase	PerReliable	PerRespons	PerSec	PerCon't	EIBSU
PerUse	1						
PerEase	117 .655(**) .000	1					
PerReliable	117 .653(**) .000	117 .522(**) .000	1				
PerResponse	117 .394(**) .000	117 .234(*) .011	117 .480(**) .000	1			
PerSec	117 -.144 .123	117 -.046 .622	117 -.002 .979	117 -.201(*) .030	1		
PerCon't	117 .206(*) .026	117 .206(*) .026	117 .579(**) .000	117 .280(**) .002	117 .103 .270	1	
EIBSU	117 -.050 .593 117	117 .034 .716 117	117 -.083 .373 117	117 -.201(*) .030 117	117 .147 .115 117	117 -.099 .287 117	1 117

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

From table 3 above summarizes the correlation between the major variables of the study. Though the correlations are statistically significant, the values are at moderate levels. The correlation between independent variable (perceived usefulness, perceived ease of use, perceived reliability, perceived responsiveness, perceived security, and perceived continuous improvement) and dependent variable (extent of Internet banking services usage) is negative except perceived ease of use and perceived security. It indicated that the higher gap will be followed by the lower extent of service use. However, those correlations are statistically not significant except for perceived responsiveness. Although, the correlation among independent variables relatives high and was statistically significant, but this correlation is not

indicate that multicollinearity problem present. This is because the coefficient correlation is not higher than 0.9.

Multiple regressions for direct relationship

This study was run the multiple regressions for testing the direct relationship between perceived service quality and the extent of Internet banking services usage. The result (table 4) showed that there were no relationship between all side dimensions of perceived of service quality and the extent of Internet banking services usage. Then only 6.5% percent of variation of the extent of Internet banking services usage was explained by perceived service quality. However, the overall model did not fit, where F-value was low. Therefore, Hypothesis 1-6 that state relationship

between perceived usefulness, perceived ease of use, perceived reliability, perceived responsiveness, perceived security and

perceived continuous improvement and the extent of Internet banking service usage was not supported.

Table 4: Multiple Regressions for Direct Relationship

Independent Variables	Beta	t-Statistics	VIF
Perceived usefulness	-.023	-.155	2.530
Perceived ease of use	.108	.871	1.816
Perceived reliability	.008	.051	2.991
Perceived responsiveness	-.173	-1.585	1.395
Perceived security	.122	1.270	1.094
Perceived continuous improvement	-.086	-.725	1.649
R Square	.065		
F	1.281		
Sig.	.272(a)		
Durbin-Watson	1.960		

Hierarchical Regression Analysis

This study run the hierarchical regression for testing moderating role of risk on the relationship between perceived

service quality and the extent of Internet banking service usage.

Table 5: Hierarchical Regression Analysis

Independent Variables	M O D E L					
	1		2		3	
	Beta	t-Stat	Beta	t-Stat	Beta	t-Stat
PerUse	-.023	-.155	-.021	-.141	-.033	-.022
PerEase	.108	.871	.107	.866	.493	.731
PerReliable	.008	.051	.022	.135	-2.653	-1.883
PerResponse	-.173	-1.585	-.161	-1.476	-.257	-.168
PerSec	.122	1.270	.132	1.372	-1.403	-.691
PerCon't	-.086	-.725	-.100	-.841	2.128	2.866
Risk			.121	1.301	.125	.957
RiskxPerUse					.067	.045
RiskxPerEase					-.333	-.492
RiskxPerReliable					2.620	1.829
RiskxPerResponse					.084	.054
RiskxPerSec					1.546	.766
RiskxPerCon't					-2.300	-2.949
R Square	.065		.080		.186	
R Square Change	.065		.020		.107	
F-test	1.281		1.346		1.815	
Sig.	.272		.236		.050	
Sig. F change	.272		.196		.044	
Durbin-Watson	1.929					

** significant at 5% level

*** significant at 1% level

The results (table 5) showed that in model 1 all dimensions of perceived service quality was not related to the extent of Internet banking service usage with explanation power 6.5%. Then when this study explored the moderating variable (risk) R-square increased by 2% (model 2). In model three, the interaction variables were included in the multiple regression analysis; this study found that the explanation power was increased by 10.7%. The overall model fitted and two of six interaction variables were statistically significant. It indicated that risk fully mediate the relationship between perceived reliability and continuous improvement and extent of Internet banking service usage. Therefore, hypothesis 7 was supported.

DISCUSSION

In examining the impact of independent variables and extent of Internet banking services usage, it is found that perceived usefulness, perceived ease of use, perceived reliability, responsiveness, security, and continuous improvement is insignificantly related to extent of Internet banking services usage as dependent. It is found the associated beta values are low, indicating the independent variables make less unique contribution to dependent variables. This may because overall customers of Malaysian Internet banks gave the highest expectations score for the quality of Internet banking services provided. Expectation response were higher than the perception response indicated the existence of a service quality gap, means Malaysian Internet banks did not meet the customers expectations. Customers of Malaysian Internet banks in Penang are not really satisfied because they are not convinced enough with Internet banking services offered, which make things worse.

LIMITATIONS

Concerning the research, limitations cannot be totally avoided. Firstly, although Internet banking in Malaysia is not a brand new innovation, it is still in its infancy. During the collection of literature, the author found that there was a lack of relevant information. The origins of information inevitably come from other countries, like the United States, England, and Hongkong. This may not accurately describe the phenomenon and situation in Malaysia, especially with the cultural differences. In terms of the extent of Internet banking services usage, researcher has found very limited literature. Second, the use of an email survey couldn't have been a good tool for gathering responses to this study in terms less response rate. Third, adopters of Internet Banking should have been surveyed rather than having their "Intention to extent of usage" measured. Furthermore, since Internet Banking is relatively new in Malaysia, the pool of adopters may not be quite big during the period of this study. For example, total numbers of respondents were used Internet banking services very less. Last but not least, the survey is not representative of the whole customers in Penang-Malaysia, the sample was collected only from postgraduate students in Universiti Sains Malaysia. In this study the collection of data is mainly Internet banking customers or Internet banking adopters in the category of B2C environment, which excludes business customers of Internet banking.

CONCLUSION

As more and more banking and financial institutions' in Penang Malaysia, implement Internet banking services is paramount importance for those financial institutions' to identify factors that influence customers perceived Internet banking services usage to extent their usage. In conclusion, all the objectives of this study are achieved.

With respect to research objective, influencing of perceived usefulness, ease of use, reliability, responsiveness, security, and continuous improvement on the extent of Internet banking services usage are examined in the Malaysian banks in Penang context. Further all of them were found insignificant for Internet banking services context, although this was out of researcher expected.

For Research Objective 7, using the hierarchical regression analysis, the degree of mediating effect of adopters risk profile is very high in relationship between perceived Internet banking service quality and the extent of Internet banking services

usage, whereas it is very strong when explaining perceived reliability and continuous improvement. This research is especially valuable for extending TAM and applying e-SERVQUAL beyond the organizational limit. It should be an example for future research on Internet Banking to address the role of other direct determinants of the extent of Internet banking services usage.

Findings in the study shed some lights for Malaysian banks in Penang interested in implementing Internet banking strategies by emphasizing the relevant criteria at each phase necessary for a successful adoption process.

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