

Factors affecting the adoption of Internet Banking in Hong Kong—implications for the banking sector

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Abstract

The rapid development of Internet and Electronic Business has stimulated the banking and financial sectors towards encouraging customers to bank on-line. This paper explores the adoption of Internet Banking by retail customers in Hong Kong. The paper attempts to make sense of Internet Banking in Hong Kong from three angles: (i) the current adoption rate of Internet Banking; (ii) the influences of perceived usefulness, perceived ease of use, perceived risk and personal innovativeness in information technology and (iii) the potential impacts on the strategic activity of banking organisations operating in the Hong Kong market.

The research constructs were developed based on the Technology Acceptance Model and incorporated two additional elements of personal innovativeness and perceived risk. Hypotheses were constructed and then tested using t-test and Pearson's correlation. It was found that certain factors did have a positive relationship with the adoption of Internet Banking and as such strategy in the banking services sector can be refined to better meet the demands and profile of the Hong Kong market.

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1. Background

The potential of on-line or Internet Banking was well recognised a decade ago (Booz & Allen Hamilton, 1997; Deloitte Consulting, 1998) when key institutions began to align the product delivery mix with new technology and explore and exploit new approaches to their business.

Internet Banking is multifaceted and impacted by changes in such technology, deregulation of many parts of finance, the emergence of new banking institutions and economic restructuring. Such environmental changes are forcing banks to reassess their costs and profit structures, in attempts to remain profitable, reduce operating expenses and maintain strict control of costs.

As such, many banking executives perceived technology as the key solution for controlling costs (Dannenberg & Kellner, 1998; Giannakoudi, 1999; Kalakota & Whinston, 1997). Traditionally this has been through “Extranet banking” i.e. access through a private network between the bank and customers and

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“Dial-up banking” where access to the bank’s server is by dial-up modem (Aladwani, 2001). However, these services require the installation of specific telecommunication networks or application software, e.g. Hexagon Banking used by HSBC, which can be costly and lack user accessibility and flexibility.

However, Internet Banking, defined as “the delivery of banking services through the open-access computer network (the Internet) directly to customers’ home or private address” (Lau, 1997) offers a wider range of potential benefits to financial institutions (Howcroft & Durkin, 2000; KPMG, 1998; Mols, 1998) due to more accessible and user friendly use of the technology, as the Internet does not restrict banks to physical locations or historical geographical areas. The technology therefore allows banks to think and operate in new geographical zones with new markets, market spaces and product scopes. New fee-based income generated from improved or new services such as advertising, bill presentment, alerts, and notifications and customised information is attractive to modern banks. Such activities provide added value for the customer and opportunities for banks to bolster income streams and secure longer term customer loyalty, through relationship management.

In addition to creating and sustaining a market advantage directed towards supplementary income, banks are also introducing new technology, to reduce costs of operations and administration. This includes the management of accounts, administration of statements, disclosures and other paper based transactions. Such developments can occur at various stages of the supply or value chain and may be customer focused or more back office or process focused. As such, many customer services can be delivered on-line at reduced cost and customised or personalised, using principles of information and knowledge management resulting in enhanced efficiency and effectiveness (Humphreys, 2000). While this is clearly a direct benefit there is also the additional benefit of building knowledge about the customer activity, automation of credit checks, and the potential to integrate a range of services, functions, technologies, concepts and even industries.

Internet Banking is therefore believed to improve customer satisfaction as it can provide faster, easier, and more reliable services through a single platform, if they access the bank’s web site. Indeed, research by Deloitte Consulting (2000) revealed that roughly one-half of consumers would first enquire with their existing banker if they needed a new financial product. Therefore, if correctly aligned, Internet Banking offers an excellent opportunity for cross-selling banking services and products and thus, enhances the banks competitive position; meets consumer demands better; creates new distribution channels; improves the business image, and reduces costs (Currie, 2000; Lam & Burton, 2005).

The banking sector and Internet Banking is clearly and attractively and potentially rich research context (see Al-Ashban & Burney, 2001; Black, Lockett, Winklhofer, Ennew et al., 2001; Gerrard & Cunningham, 2003; Jun & Cai, 2001; Lam & Burton, 2006; Ndubisi & Sinti, 2005; Polatoglu & Ekin, 2001; Sathye, 1999; Shanmugam & Guru, 2000). Several research projects have focused on the factors that impact on the adoption of information technology or Internet (Chan & Lu, 2004; Farhoomand, Tuunainen, & Yee, 2000; Lichtenstein & Williamson, 2006; Ndubisi & Sinti, 2006; Sachan & Ali, 2006; Walker & Johnson, 2005; Wan, Luk, & Chow, 2005) but there is limited empirical work which captures the nature and essence of Internet adoption in the banking sector in Hong Kong, nor analyse of success factors to help form a strategic agenda.

This study is focused on the Hong Kong domestic market as this allows focus and also explores a culture that is not only technologically competent and aware but also has a very high density of population with easy and convenient local mobility yet exhibits a Chinese culture which places an extra emphasis on the human relationships that exists when doing business (So & Speece, 2000). These features add an interesting dimension to the work and provide a unique insight into the nature and success factors of banking in such an environment.

2. Theoretical frameworks

The theoretical frameworks constructed adopted in this paper is grounded in four core principles, (i) perceived usefulness, (ii) perceived ease of use, (iii) personal innovativeness, and (iv) perceived risk. The logic for this is as follows.

2.1. Perceived usefulness and perceived ease of use

The technology acceptance model (TAM) is widely used by researchers and practitioners to help to predict and make sense of user acceptance of information technologies (Lederer, Maupin, Sena, & Zhuang, 2000; Lee

& Turban, 2001; Lee, Kozar, & Larsen, 2003; Venkatesh & Davis, 1996, 2000; Wang, Wang, Lin, & Tang, 2003). The main value proposition of using TAM is the ability to describe how individual customer beliefs and attitudes relate towards using ‘something’, in this case Internet Banking, and whether or not the system will be used as intended.

TAM helps senior managers responsible for offering and developing banking products on-line, and information systems developers, to predicate behavioural intentions of users. This can lead to actual changes and modifications in people’s behaviour when thinking about and using Internet Banking technologies. This knowledge, or at least additional insight, allows information systems developers to develop ways of making the system appear easy or easier to use, and allows banking and technology experts to develop new ways to support the needs and expectations of Internet Banking customers.

From its early application, (as developed from the theory of reasoned action (TRA) created by Fishbein and Ajzen (1975)) TAM, as illustrated in Fig. 1, posits that technology adoption decisions are driven by an individual’s affective response (attitude) towards the use of the innovation. Based on empirical evidence, Davis, Bagozzi, and Warshaw et al. (1989) have refined TAM to include attitudes towards using technology rather than just thinking about technology.

Over the years, TAM has been empirically tested, and given its empirical focus on the use of multiple-items scales, it continues to exhibit a high degree of convergent, discriminant, and nomological validity when looking at factors such as ease of use and perceived usefulness. Both of which may inform policy and practice of Internet Banks. TAM was considered as a robust instrument for studying and researching the adoption and usage of Internet Banking, by looking at the demand side issues of IT/IS usage (Agarwal & Prasad, 1998a; Davis, 1989; Hewer & Howcroft, 1999; Rogers, 1995), rather than the supply, or developer’s perspective, as is often the case. Overall, TAM can successfully guide technology implementation, developments and innovations within the area of Internet Banking.

TAM’s contemporary use in certain areas allied to Internet Banking, can be illustrated by recent research into web accessibility (Djamasbi et al., 2006), the use of web search engines (Tan & Chung, 2005), and internet shopping and retailing (O’Cass & Fenech, 2003). The reason why TAM is still being used is that it has stood the test of time, and its over arching value adding premise remains appropriate and relevant today, as it did in yesteryear, namely to, “provide an explanation of general determinants of computer acceptance” (Pijpers, Bemelmans, Heemstra, Van Montfort, 2001, p. 960).

The shift in more contemporary research has been a gradual movement away from using TAM to focus on extrinsic motivators of user acceptance, i.e. perceived ease of use and perceived usefulness (Lederer et al., 2000; Liaw, 2002; O’Cass & Fenech, 2003) towards more intrinsic motivators, such as ‘perceived playfulness’ (Moon & Kim, 2001). TAM’s ability to address both intrinsic and extrinsic factors, remains valid, even though this paper has concentrated on extrinsic factors. TAM provides an economical approach when seeking to examine and make sense of the factors that lead and cause users to accept certain technologies and not others. Internet Bankers, who know why certain technology functions and pathways, are not popular with customers, are able to modify and innovative to ensure that the extension of Internet Banking to their operations, does in fact support reach and richness to the consumer, as advocated by Evans and Wuster (2000).

As the Internet is now seen as an additional channel for branding, transactions and customer relationship management (Hackney, Grant, & Birtwistle, 2006) there is a need to think and act in a different way regarding

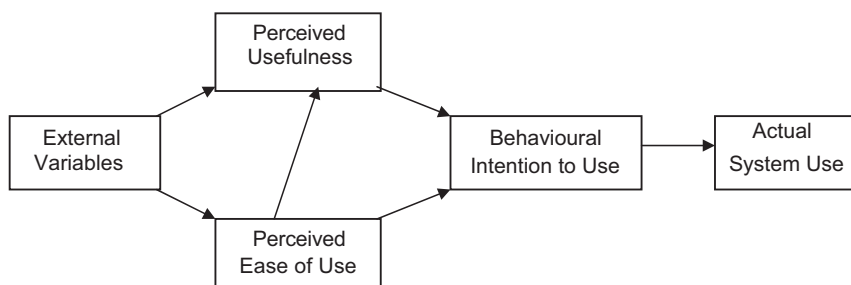


Fig. 1. Technology Acceptance Model (Davis et al., 1989).

Internet Banking. As such, conventional IT strategy becomes less effective. Knowing what is perceived to work and what is perceived not to work, by customers, allows Internet Banks to seek first-mover advantage via more ‘customer friendly’ systems. This in turn may create barriers to entry through establishing network effects and consumer lock-in to the services, which are difficult to replicate by competitors. Thus adopting TAM helps to provide some of the facts of what is perceived to work and what does not when informing the decision making processes of Internet Bankers.

Given the desire businesses have about remaining competitive or attaining some form of competitive advantage, from the use and application of information, systems and information systems, such as Internet Banking, then TAM is one of the few theories “owned” by the IS/IM research community, (Lee et al., 2003). As such it does not suffer from any grafting or embedding problems, when transplanting non IS/IM theories to the domain of IS/IM. Although useful, TAM does have some drawbacks. Firstly, the use of self-reporting by users and the tendency to only explore and make sense of users view surrounding only one particular information system. This paper, acknowledges these concerns, but it has taken steps to minimise their effect.

In summary for this section, supporting the work of Chang and Lu (2004), the intention to use the Internet for banking transactions can be considered the major construct of TAM, which theorises that perceived usefulness and perceived ease of use determine actual intentions and behaviour (Davis, 1989), which adds a useful contribution to the knowledge base pertaining Internet Banking in the far east.

2.2. *Personal innovativeness in information technology*

Innovativeness is the degree to which an individual is more or less receptive to adopting new ideas than the other members of a system (Rogers, 1995) or a community. Rogers (1995) suggests the characteristics of earlier knowers of innovation are similar to the characteristics of earlier adopters: more education; higher social status and the like. Nevertheless, this does not mean that earlier knowers are necessarily innovators. Individuals may know about a new idea but not regard it as relevant to his or her situation i.e. no usefulness. Rogers (1995) has created a classification for the members of a social system based on their innovativeness, called adopter categories. The five adopter categories are: innovators, early adopters, early majority, late majority, and laggards. He summarised the characteristics of earlier adopters under the headings of: socio-economic status, personality variables and communication behaviour, as shown in Table 1.

Since Internet Banking is a new technology in Hong Kong, the characteristics of current Internet Banking adopter should be similar to those described by Rogers (1995).

Although there is considerable theoretical, supported by several empirical studies from other disciplines (Barczak, Ellen, & Pilling, 1997; Ostlund, 1974; Parasuraman, 2000; Rogers, 1995; Tornatzky and Klein, 1982) the role of personal innovativeness as a key variable in innovation adoption, has not been included in any of the dominant technology acceptance models to date.

Agarwal and Prasad (1998a, b) thus proposed a new construct, personal innovativeness in information technology. They argue that personal innovativeness is an important concept for examining the acceptance of information technology innovations and focus on what they define as personal innovativeness in the domain of information technology (PIIT) i.e. “the willingness of an individual to try out any new information technology” (Agarwal & Prasad, 1998a, p. 206). The proposition is that PIIT can serve as a key moderator for the antecedents as well as the consequences of perceptions. These hypothesised relationships between PIIT and other technology acceptance constructs are depicted in Fig. 2.

PIIT can be used to evaluate the factors that may affect the adoption of new technology. Therefore, innovativeness is included in the study for factors affecting the Internet Banking adoption.

2.3. *Perceived risk*

The final element of the theoretical foundation is “perceived risk”. Based on Loh and Ong’s (1998) study, users’ concerns about security-related issues are, one of the key determinants for the widespread adoption of a new system. This makes sense intuitively as it is unlikely for users to accept a system if they have doubts and anxieties when using it. Indeed, in Aladwani’s (2001) study of online banking, potential customers ranked Internet security and customers’ privacy as the most important future challenges that banks are facing.

Table 1

Summary of the generalisations about the characteristics of adopter categories (Rogers, 1983)

Heading	Characteristics
Socioeconomic status	<ul style="list-style-type: none"> • Have more years of education • More likely to be literate • Have higher social status • Have a greater degree of upward social mobility • Have larger-sized units • More likely to have a commercial (rather than a subsistence) economic orientation • Have a more favourable attitude towards credit • Have more specialised operations
Personality variables	<ul style="list-style-type: none"> • Have greater empathy • May be less dogmatic • Have a greater ability to deal • Have greater rationality • Have greater intelligence • Have a more favourable attitude towards change • More able to cope with uncertainty and risk • Have a more favourable attitude towards education • Have a more favourable attitude towards science • Are less fatalistic • Have higher levels of achievement motivation • Have higher aspirations (for education, occupations, and so on)
Communication behaviour	<ul style="list-style-type: none"> • Have more social participation • Are more highly interconnected in the social system • Are more cosmopolite • Have more change agent contact • Have greater exposure to mass media communication channels • Have greater exposure to interpersonal communication channels • Seek information about innovations more actively • Have greater knowledge of innovations • Have a higher degree of opinion leadership • More likely to belong to higher interconnected systems

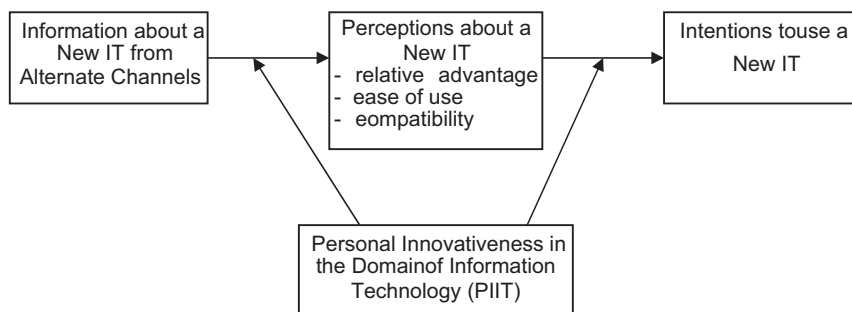


Fig. 2. Hypothesised Relationships between PIIT and Other Technology Acceptance Constructs.

Further studies support this observation (see Bensaou & Venkataman, 1996; Doney & Cannon, 1997; Lederer, Maupin, Sena, Zhuang, 2000; Ratnasingham, 1998; Suh & Han, 2002; Westland, 2002).

Since risk is difficult to capture as an objective reality (Dowling & Staelin, 1994), we interpret risk as the consumer's subjective expectation of suffering a loss in pursuit of a desired outcome. As the beliefs about the consequences of the behaviour, including the perceived risk, are key to the formulation of attitude towards the behaviour (Crisp, Jarvenpaa, & Todd, 1997; Jarvenpaa & Todd, 1997), the perceived risk on the use of

Internet Banking may impair customers' perception of the consequences of adopting Internet Banking, and thus negatively influence the adoption of such technology.

This section has established the four core areas for investigation and provided a theoretical framework to be applied to the research problem. The next section seeks to present hypotheses for testing.

3. Research design

A positivistic research paradigm was adopted for this research and as such, hypotheses were constructed for each of the four “areas” of analysis.

3.1. Hypothesis

3.1.1. Perceived usefulness

Empirical studies on TAM have suggested that perceived usefulness has a positive effect on the adoption of information technology (Davis et al., 1989). Of course, Internet Banking could bring much convenience and benefits to customers in terms of both financial and non-financial aspects e.g. convenience of 24/7 access. The first hypothesis is to test the relationship between perceived usefulness and the adoption of Internet Banking.

H1₀. *Perceived usefulness does not have a direct relationship with the adoption of Internet Banking.*

H1₁. *Perceived usefulness has a direct relationship with the adoption of Internet Banking.*

3.1.2. Perceived ease of use

The easier the users think Internet Banking is to use, the more likely they will be to adopt it. The second hypothesis is to test the relationship between perceived ease of use and the adoption of Internet Banking.

H2₀. *Perceived ease of use does not have a direct relationship with the adoption of Internet Banking.*

H2₁. *Perceived ease of use has a direct relationship with the adoption of Internet Banking.*

3.1.3. Personal innovativeness in information technology

PIIT is exhibiting a moderating effect on perceptions about a new information technology (Agarwal & Prasad, 1998a). The third hypothesis is to test the relationship between personal innovativeness in information technology and the adoption of Internet Banking.

H3₀. *Personal innovativeness in information technology does not have a direct relationship with the adoption of Internet Banking.*

H3₁. *Personal innovativeness in information technology has a direct relationship with the adoption of Internet Banking.*

3.1.4. Perceived risk

One of the most controversial issues for Internet Banking or web-based transactions is security. Therefore, the fourth hypothesis is to test the relationship between perceived risk and the adoption of Internet Banking.

H4₀. *Perceived risk does not have a direct relationship with the adoption of Internet Banking.*

H4₁. *Perceived risk has a direct relationship with the adoption of Internet Banking.*

3.2. Methods

Structured telephone questionnaires were conducted adopting a positivist paradigm and following a specific script of questions. The full survey was preceded by a pre-test phase to inform and refine the questionnaire design, format and timing.

3.3. Sampling

A probabilistic sampling strategy was adopted informed by the following premises: age 18 or above; maintaining a bank account for personal use and with personal computer at home or at the office.

Three hundred telephone numbers were selected randomly from the latest Residential Telephone Directory published by PCCW, the local telephone service provider in Hong Kong. Four interviewers telephoned potential respondents on Friday, Saturday and Sunday from 12:00 noon to 9:00 p.m. In each contacted residential unit, only one person who aged 18 or above was selected as the respondent. Those unsuccessful attempts were tried 3 times at different times before a non-contact status was assigned. The target was to achieve a 50% response rate, and obtain a sampling size of 150. This was achieved.

3.4. Data analysis technique

Once the telephone survey was completed, all raw data were edited, recorded and coded. Errors were filtered (Karweit & Meyers, 1983) and data input into SPSS for processing.

Respondents were classified into two groups: adopter or non-adopter of Internet Banking. Tabular summaries of data showing the relative frequency (i.e. the fraction, or proportion) in each class was generated for obtaining the qualitative details of the respondents' profile: sex, age, education level, income level and Internet Banking usage. The *T*-test was used for hypothesis testing and Pearson correlation calculated to determine data relationships.

4. Analysis of findings

4.1. Response rate and representativeness

Table 2 summarises the response rate. One hundred and fifty questionnaires were collected with valid data. The discard rate was very low.

The total population of Hong Kong by sex and age group were obtained from Hong Kong Census and Statistics Department. These were used to compare with the gender and age distribution of the sample in order to test its' representativeness.

In terms of gender, the distribution of the sample was 47.3% for male and 52.7% for female. According to the Government's latest census report, by end of 2001, the Hong Kong population's male and female ratio is 48.8% and 51.2% thus the sample was representative in terms of gender.

Table 2
Response rate of the telephone interview

Total telephone numbers selected		300
Unused numbers		6
Non-contact		
Invalid numbers	28	
Non-residential line	12	
No answer	18	
Busy line	3	
Fax line/answering machine	15	76
Successfully contacted		218
Refusal	58	
No qualified respondents	4	
Make appointment	3	65
Successful cases		153
Discarded cases		3
Successful sample		150

Table 3
Types of Banking Services being performed by Internet Banking Users

	No of user that have used this transaction	% on Internet Banking user
<i>Account transfer</i>	31	24.8
<i>Bill settlement</i>	23	18.4
<i>Account Balance inquiry</i>	40	32
Open account	1	0.8
Loan/OD/Mortgage application	2	1.6
Credit card application Usage	5	4.0
Property evaluation	4	3.2
Demand draft/cashier's order/TT application	1	0.8
Stock/Unit trust trading	12	9.6
Foreign currency deposits	10	8.0
<i>Interest rate/exchange rate/stock quote inquiry</i>	25	20
Insurance	—	—

Considering age groups, 35% of the respondents were aged 26–35. The next prominent group were the 36–45 s (27%) and the age range 46–55 (17%). The age range 18–25 represented 13% of the sample population and only 9% of the respondents were aged over 55. When compared with the Hong Kong Populations, the spread of age group sampled is comparable with the population profile.

From the former, we are content that the sample is representative of the “potential” Hong Kong Internet Banking population. The following section provides results relative to the current usage of Internet Banking before exploring the profile of users and then discussion across the four key hypothesis categories.

4.2. *Current usage of Internet Banking in Hong Kong*

4.2.1. *Rate of adoption of Internet Banking in Hong Kong*

The survey first enquired whether the respondents were Internet users and Internet Banking users in order to obtain the current rate of adoption of Internet and Internet Banking. The results showed a high adoption rate of internet usage (83%) but a relatively low adoption rate of Internet Banking (32%).

4.2.2. *Types of banking services performed through internet*

Table 3 listed the types of Internet Banking transaction being performed by the Internet Banking users. Account balance inquiry was the most commonly used banking services on the Internet with more than 30% users having performed this kind of transaction. Other commonly used transactions included accounting transfer, interest rate/exchange rate/stock quote inquiry, and bill settlement. These were also transactions most commonly performed through traditional banking channels.

4.2.3. *Accelerator of adoption of Internet Banking in Hong Kong*

Respondents who were Internet users were asked to rank five reasons that drove their use of Internet Banking. Results are shown in Table 4. It was obvious that the possibility of performing banking transaction anywhere, anytime and reduction in processing time are the utmost important reasons that were ranked by Internet Banking users. However, it cannot be overlooked that incentive programmes offered by the banks are also one of the drivers for the use of Internet Banking.

4.2.4. *Inhibitors of adoption of Internet Banking in Hong Kong*

The ranking on the inhibitors of Internet Banking adoption were also requested in the questionnaire. Table 5 shows the listing of those inhibitors and their frequency of the ranking. The inhibitor that concerned most non-adopter was the risks in using Internet Banking. In addition, the convenience of using ATM, phone banking, and even the traditional branch network to perform the banking transactions also prohibits the adoption of Internet Banking. Among the sample population, 21 respondents (14% of the sample) considered

Table 4
Accelerators of the adoption of Internet Banking in Hong Kong

	Rank				
	(1)	(2)	(3)	(4)	(5)
<i>I can perform my banking transactions anywhere in the world.</i>	10	4	7	9	4
It offers me a wider range of banking products, services and investment opportunities.	3	3	3	7	7
<i>It saves my time in performing banking transactions.</i>	10	12	6	4	3
It allows me to shop around for the best pricing.		3		4	1
<i>I can enjoy 24 hours banking services.</i>	9	10	10	1	4
Using Internet Banking gives me a more professional status.	2	1		2	1
I can have more prestige (e.g. preferential lending or deposits rates) than other bank customers if I use Internet Banking services.	1	2		2	3
I can enjoy other free services (e.g. e-mail, stock quotation, news) offered in the Internet Banking web site.	1	3	5	6	8
The Internet Banking web-site provides easy linkage to other e-commerce, business or information web sites.		2	2	5	3
<i>My banker offers incentive programme, e.g. higher deposit rate, reduction or waiver of handling fee, extra credit card bonus points, lucky draw, or joining gifts.</i>	4		7		6

Table 5
Inhibitors of the adoption of Internet Banking in Hong Kong

	Rank				
	(1)	(2)	(3)	(4)	(5)
<i>There are equal convenient channels for performing your banking transactions, like ATM and phone banking.</i>	26	29	16	8	18
<i>I foresee risks in using Internet Banking.</i>	33	18	27	14	4
I see no benefit or added value in using Internet Banking.	9	12	22	46	13
<i>I like to have personal service during my visit to the branch.</i>	16	21	28	21	9
<i>It is difficult to use the computer.</i>	21	9		2	5
It is difficult to process banking transaction through Internet .	3	15	14	10	41
There are additional handling fees or minimum deposits amount when using Internet Banking.		6	3	6	14
My banker has not yet provided Internet Banking services and I do not want to switch my accounts to another banker.		1	2	8	

it was difficult to use a computer and therefore found this as an inhibitor. These were the elderly who found it difficult to learn new information technology and were therefore reluctant to adopt Internet Banking.

4.3. Demographic data of the adopter of Internet Banking in Hong Kong

Rogers (1983) has identified the characteristics of earlier adopters of innovation as having higher levels of education, social status, and income. In addition, Gefen (1997) and Teo & Lim (2000) tested the gender differences affecting the perceptions of e-mail and the use of the Internet. They found similar results. Hence, this section compares the demographic data of adopter and non-adopter of Internet Banking in order to identify if the general beliefs on early adopters of Internet Banking hold.

When gender is compared, it is found that female respondents have a much lower adoption rate than males (female 19%, male 35%).

In terms of age, age (excluding the elderly i.e. over 55) adoption rates were similar across the whole sample, indicating that the elderly are more reluctant to adopt new innovations (a trend supported by other studies, see Morris & Venkatesh (2000)).

When exploring level of education, the findings highlighted that respondents with a Bachelor degree or above had a much higher adoption rate (44%) than those less qualified, and that the higher the level of qualification, the more engagement occurred i.e. MSc was 60%.

In a similar manner, the groups of higher income have much higher adoption rate of Internet Banking than the lower income respondents. In addition, the higher income groups were usually customers who required more sophisticated banking services. Indeed, only 3% of respondents with monthly income less than \$10,000 adopted Internet Banking.

In general, from the former it can be seen that the profile of users in Hong Kong overall reflect the nature of users or characteristics of earlier adopters of technology (Rogers, 1983). In essence, this implies that the Hong Kong market is of key significance as a test bed of research into Internet Banking and secondly the additional findings from the study are of significant value in understanding the nature of the emerging market and the opportunities for the banking sector. Before the opportunities or implications are discussed, the next section discusses the results relative to the hypothesis presented in each of the four criteria defined.

5. Discussion

This section discusses the results relative to the hypothesis formed for each of the four key areas of (i) perceived usefulness, (ii) perceived ease of use, (iii) personal innovativeness, and (iv) perceived risk.

5.1. *Perceived usefulness*

The first hypothesis:

H1₀. Perceived usefulness does not have a direct relationship with the adoption of Internet Banking.

H1₁. Perceived usefulness has a direct relationship with the adoption of Internet Banking.

With a *t*-value of less than 0.001, the results indicate that the difference in the means for Internet Banking adoption and perceived usefulness are not significant. The paired differences mean is well within a 95% confidence level, and therefore, hypothesis H1₁ is accepted and hypothesis H1₀ is rejected.

The Pearson's coefficient of Internet Banking adoption and perceived usefulness was 0.550, which means Internet Banking adoption has a positive and significant relationship with perceived usefulness.

Hence, we propose that the perceived usefulness of adopting Internet Banking has a direct relationship with the actual adoption of Internet Banking.

5.2. *Perceived ease of use*

The second hypothesis:

H2₀. Perceived ease of use does not have a direct relationship with the adoption of Internet Banking.

H2₁. Perceived ease of use has a direct relationship with the adoption of Internet Banking.

The *t*-value resulting from the *t*-test of Internet Banking adoption and perceived ease of use was also less significant than 0.001. Hence, the difference in the means for Internet Banking adoption and perceived ease of use is insignificant. Hypothesis H2₁ is accepted and hypothesis H2₀ is rejected.

The Pearson's coefficient of Internet Banking adoption and perceived ease of use was 0.474. This indicates that Internet Banking adoption has a positive and significant relationship with perceived ease of use.

We can therefore confirm that ease of use is a critical factor in the development and delivery of Internet Banking services.

5.3. *Personal innovativeness in information technology*

The third hypothesis:

H3₀. Personal innovativeness in information technology does not have a direct relationship with the adoption of Internet Banking.

H3₁. Personal innovativeness in information technology has a direct relationship with the adoption of Internet Banking.

Again, the difference in the means for Internet Banking adoption and personal innovativeness in information technology was less significant than 0.001. As such, hypothesis H3₁ is accepted and hypothesis H3₀ is rejected.

Of the same accord, the Pearson's coefficient of Internet Banking adoption and personal innovativeness in information technology was 0.380. This indicated that Internet Banking adoption has a positive and significant relationship with personal innovativeness in information technology.

5.4. *Perceived risk*

The forth hypothesis:

H4₀. Perceived risk does not have a direct relationship with the adoption of Internet Banking.

H4₁. Perceived risk has a direct relationship with the adoption of Internet Banking.

Finally, that the significant level of the difference between paired means of Internet Banking adoption and perceived risk is less than 0.001. As a result, hypothesis H4₁ is accepted and hypothesis H4₀ is rejected.

The Pearson's coefficient of Internet Banking adoption and perceived risk was 0.405 so a positive and significant relationship exists between Internet Banking adoption and perceived risk.

The *t*-test and Pearson's correlation on the survey data supported all four hypotheses. Therefore, the entire research construct, perceived usefulness, perceived ease of use, perceived risk on Internet Banking and personal innovativeness on information technology, have a positive relationship with Internet Banking adoption, but to different degrees. Perceived usefulness has the strongest correlation, followed by perceived ease of use and perceived risk. Personal innovativeness in information technology has shown the weakest correlation with Internet Banking adoption. Based on these findings the following conclusions can be drawn.

6. Conclusion: implications for retail banks in Hong Kong

The development of Internet technology is continuing to change the way business is done. This research has focused on the nature of Internet Banking in Hong Kong. Clearly, from the supply perspective, Internet Banking is becoming one of the most important delivery channels of banking products (Deloitte Consulting, 1998). However, the provision of Internet Banking in itself is no longer sufficient for competitive advantage, it has become the threshold standard for the industry. Therefore, in response to global trends brought about by using the Internet, banks have to better understand their clients and respond quickly and strategically to market developments in customer centric ways.

6.1. *Competition and competitive advantage*

In view of competition in this growing market, it is important for banks to get a critical market share in the early stage of the product lifecycle. It is therefore important to understand the current adoption of Internet Banking, in this case, in Hong Kong, and to identify the demographic profile of early adopters. Marketing plans are more effective when the major accelerators, inhibitors and drivers of adoption are understood. This research has attempted to provide such an insight.

The research concludes that Internet Banking in Hong Kong is still in its early adoption stage with only 27% of the sample population adopting Internet Banking indicating the market is not yet saturated, a fact

supported by the work of [Wan et al. \(2005\)](#) who also found that the market was developing but that there was still considerable development opportunities. Of those who adopted Internet Banking, the major services used are account transfer; bill settlement, account balance inquiry and interest rate/exchange rate/stock quote inquiry. The main reasons for bank customers adopting Internet Banking were seen to be the ability to perform banking transactions anywhere, anytime and quickly. On top of that, incentive programmes offered by the banks to promote Internet Banking were also seen as accelerators of the adoption.

The implications of these findings for the bank sector are significant in that, in order to survive banks will need to move away from traditional bases of retail bank competition i.e. fees, interest and customer loyalty, to a new internet based form of competition based on cost reduction; customer retention; responsiveness; credibility; security; ease of use; and wider scope of products and services ([Chang, 2006](#); [White & Nteli, 2004](#)).

As such, the findings highlight that there is still considerable market share to be gained and thus first mover advantage opportunities. This provides not only an incentive for bank strategists but also highlights sufficient slack to allow market growth and thus opportunities to shape the market and develop industry standards, management customer expectations and achieve customer lock-in. The nature of the use of Internet Banking by customers shows a preference towards relatively low risk activities, products and services, which use existing data held by the bank about customers and thus relatively simple lock-in opportunities. In this respect, banks need to exploit service quality, credibility, and confidence as competitive tools ([Lichtenstein & Williamson, 2006](#); [Siu & Mou, 2005](#)) and to ensure they communicate with and educate consumers about services that are quick and efficient to use ([IBM, 2006](#)).

Secondly, in terms of how Internet Banking is used, it is interesting to note that the main use is geared towards activities that reduce operating costs. One must wonder to what extent the nature of the use has been driven by the banks as opposed to delivering consumer centric value. If this is the case, it may prove to be a difficult legacy to overcome (see [Lowson & Burgess \(2003\)](#) for concepts relating to “clusters of value”). To exploit the high value end of the banking supply chain, banks will need to “boost confidence and enhance self-efficacy in using internet banking services” ([Chan & Lu, 2004](#)) rather than focus on purely cost reduction, perhaps seeing the active use of internet pods, blogs, demonstrations, or showcases in attempts to build customer relations. The key driver being to familiarise the consumer with the processes and benefits of the service and encourage usage as second nature. The result of this pervasive strategy may be a better-educated consumer, willing to make peer referrals and thus increase market share for banks. Such referrals could provide a strategic opportunity for banks should they decide to offer rewards in exchange. The referral approach also allows for the development of support communities, which can eventually lead to a consumer acceptance of reduced face-to-face contact and further cost savings ([Walker & Johnson, 2005](#)) but not at the expense of customer relations.

6.2. *Bank development and service*

When the area of bank development was explored, it was found that the majority of development lies within what may be termed traditional banking based methods and highlights the need to break such traditional “culture” if the full potential of Internet Banking is to be realised. In this sense, the banking sector will need to consider adopting concepts from other industries and lessons learned from other Internet evolving products and services. Such developments include the need to consider packaging products and services for consumers and personalising elements of the concepts ([Lowson, 2001](#)). This may take the form of pushing additional links or strategic networks onto customers to provide greater connectivity of the products and services and to create a more holistic buyer experience. This means co-operative developments where the strategic network is composed of a series of interlinked industries and organisations working to create added value in as seamless a way as possible ([Cagliano, Caniato, Spina, 2003](#)). In parallel (and perhaps as a result) there will be a greater drive towards demanding faster, more mobile and convenient services.

In addition, the research highlighted key barriers to Internet Banking as being risk, other equally convenient channels of distribution and the problems of using computers i.e. lack of computer skills. These issues require banks to reconsider the nature of the technology they use and the range and connectivity of technologies. This may include technologies to extend the reach and scope of the banks and improve convenience e.g. mobile phones, television, PDAs, it may also include issues of integrated technologies as well as operations

(Barnes, Mieczkowska, Hinton, 2003) i.e. accounts to mobile phones like i-mode FeliCa., and technologies on location e.g. banking pods or RFID used for fraud prevention.

However, the immediate pressure in product development is on “providing a secure cyber space”(Nielsen, 2005) and working with the police and Hong Kong Monetary Authority (HKMA) to enforce consumer protection and build customer trust and confidence, perhaps through a combination of multi-factor authentication (Cocheo, 2006) and greater public awareness. Beyond the security issues, product development by banks will need to focus on simplifying on-line banking and targeting value driven consumers (Silk, 2006), in effect adopting a much more customer, rather than technology or product centric approach (Shan & Hua, 2006). This makes an understanding of the consumers critical to future strategic development, even more so as the internet encourage overseas competition and the range of options and products expands further.

In conclusion, bankers are interested in customers' behaviour in adopting Internet Banking. As Ndubisi and Sinti (2006) claim, “individuals have already established personal banking norms, lifestyle, finance management systems, and account monitoring mechanisms prior to the advent of Internet Banking, their acceptance or rejection of this new mode will rely greatly on the extent this new mode accommodates or rejects all or some of the past values”. This will be the real challenge for retail banks in Hong Kong, to align to customer value. In this research, we have collected and analysed the demographic and Internet Banking behaviour of early adopters of Internet Banking, major accelerators, inhibitors, and the significant importance of perceived usefulness, ease of use and risk of adoption of Internet Banking. The information is valuable to help frame the banker's value proposition and to strengthen their positioning in an evolving Hong Kong market, perhaps even encouraging banks to move away from “doing something of value for customers” to “mobilizing customers to take advantage of customised services and to create value for themselves”(Sachan & Ali, 2006; Sureshchandar, Rajendran, Anantharaman, 2003).

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