Applying expectation-confirmation theory to probe what influences online banking continuance

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Abstract

Of the numerous studies of online banking adoption, few have examined post-adoption continuance of online banking. By incorporating Internet self-efficacy with expectation-confirmation theory (ECT), this empirical study revealed that Internet self-efficacy and satisfaction are the two strongest influences on user intention to continue banking online. By adopting the concept of service quality measurement model, this study concluded that perceived performance strongly influences customer satisfaction. By breaking Performance into Trust, Service Quality and Usefulness, the analytical results in this study indicated that Trust is the strongest Performance dimension while Service Quality and Usefulness significant but weaker Performance dimensions. By analyzing Service Quality via three aspects of Function, System, and Content, the research found that Function is the service quality most valued by adopters followed by System and Content.

Key words : Online banking, Adoption continuance, Satisfaction, Internet self-efficacy

應用期望確認理論於探討
網路銀行的持續使用影響因素

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摘要

　　探討網路銀行採用的研究雖多，但探討影響網路銀行持續使用的研究確很少，因此藉由放入網路自我效能於期望確認理論的研究架構中，此實證研究發現：網路自我效能與滿意度是二個最重要影響使用者持續使用網路銀行的因素。此外，經由借用服務品質衡量模式的觀念，本研究發現：最主要影響使用者滿意度的因素為使用者「認知的績效表現」。將網路銀行的整體績效分解成「信任」、「服務品質」與「有用性」，此研究發現：「信任」是使用者是否持續使用網路銀行最重要的績效構面，「服務品質」與「有用性」雖然也會顯著地影響使用者是否持續使用網路銀行、但影響程度低於「信任」。本研究並從三個構面（功能品質、系統品質、內容品質）來衡量「服務品質」，結果發現：功能品質是網路銀行使用者最重視的服務品質構面，其次為系統品質與內容品質。

關鍵字：網路銀行、採用持續性、滿意度、網路自我效能

1. INTRODUCTION

Web-based services such as email, MSN, online searching, online auctions, online shopping, blogging, and peer-to-peer music services have been rapidly accepted and became popular since these services are available in Taiwan. Comparing to these services widely and continuously adopting by Internet users once they have used them, the ratio of online banking users to Internet users has lagged far behind expectations since online banking was introduced in March 2000 (Yu & Lo 2007). Moreover, during the first five years of online banking services, online banking remained seriously underused in Taiwan and largely under-noticed by Taiwanese banks and the number of those people that are willing to continuously bank online is significant lower than expected (Yu 2008[a]).

Fortunately, with the astonishing advances in information, communication, and Internet technologies and the rapid decrease in prices of these technologies, the online banking sector now has attracted the attention of Taiwanese banks, which have become increasingly interested in online banking. Particularly giving the growing cost of maintaining physical branches, heavy investments in information technologies and intense competitive pressures within the financial service industry, banks have to develop effective and efficient marketing campaign to draw potential customers and increase the satisfaction of existing customer (Yu 2008[a]). As a result, numerous studies of online banking adoption have been conducted in Taiwan.

Because social psychology theories suggest that individual behavior is traceable and predictable, a considerable amount of academic research over the past decade has employed such theories (e.g., theory of reasoned action (TRA), technology acceptance model (TAM), and theory of planned behavior (TPB)) to investigate individual motivation to banking online (Yu 2008b). However, initial adoption of online banking does not ensure continuous banking online. User motivation, beliefs and attitudes may change over the time as users gain first-hand experience (Bhattacherjee & Premkumar 2004). Thus, despite the extensive literature in online banking, most studies have examined initial adoption rather than adoption continuity (Bhattacherjee 2001a; Thong et al. 2006; Vatanasombut et al. 2008), which results in that factors affecting online banking continuance has been little understood and not been comprehensively discussed. To fill this gap, this study aims to explore the factors that influence online banking continuance.

2. THEORETICAL BACKGROUND

Parthasarathy and Bhattacherjee (1998) is perhaps the earliest study of post-adoption behavior in the context of online services, and the subsequent works of Bhattacherjee (2001[a],

2001b) are perhaps the earliest studies in the domains of adoption continuance of online banking and business-to-consumer e-commerce, respectively. With the context of web-based services, the literature on post-adoption continuance contains two primary schools of thought (Karahanna et al. 1999; Bhattacherjee 2001a; Hsu et al. 2004; Hong et al. 2006; Ifinedo 2006; Ozdemir & Abrevaya 2007). Although both schools emphasize individual psychological motivations for continued use of web-based services, the first school assumes that the beliefs regarding the service and affective responses to behaviors can explain both adoption and adoption continuance whereas the second school assumes that some beliefs (i.e., attitude) are pre-adoption constructs while others (i.e., satisfaction) are post-adoption constructs.

As a result, one view is that continued use is an extension of acceptance behavior. In this line of thought, the same set of motivations is employed to predict both initial adoption and post-adoption continuance. Another view is that adoption continuance is an outcome of the initial adoption experience. In this line of thought, adoption is a decision to use a product/ service, while continuous use is post-adoption behavior regarding the product/service. Recently, via two longitudinal studies of IT usage, Bhattacherjee and Premkumar (2004) found that user beliefs may change with time as users gain first-hand experience with IT usage. Since their research empirically supported that change is an inevitable part of human life and the first school ignores potential changes in the cognitive processes of consumers following their consumption experience (Karahanna et al. 1999; Bhattacherjee 2001a; Hsu et al. 2004; Hong et al. 2006), this study applied the second school of thought to investigate what factors affect adoption continuance in online banking. That is, this study contended that adoption differs from adoption continuance because adoption is the initial decision to use a product/service while continued use is post-adoption behavior regarding the product/service.

After extensive literature review, this work found that in the past decade theory-based studies regarding the adoption of online banking is huge and dominated by TRA, TAM, TPB or some mixture of two or three of these theories. Meanwhile, only two theory-based studies of online banking continuance exist in literature. They are Bhattacherjee (2001a) and Vatanasombut et al. (2008), and both studies used expectation-confirmation model as a theoretical basis. The expectation-confirmation model is grounded on the expectation-confirmation theory (ECT) introduced by Oliver (1980). Figure 1 shows that the model was originally intended to probe the motivations for merchandises repurchases. Since then, ECT has been widely employed in many empirical studies and various product/service contexts to measure customer post-purchase satisfaction and to predict their repurchase intention.
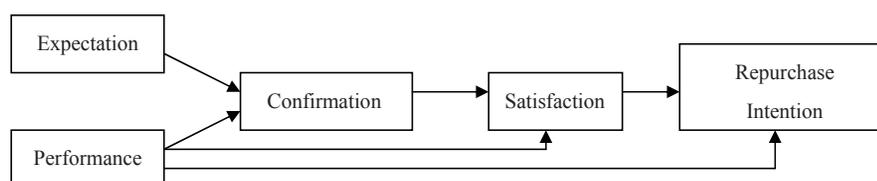

Figure 1: The expectation-confirmation model for merchandises repurchases

Built on the above and that use continuance is similar to repeated purchase behavior consistently concluded by many studies (Parthasarathy & Bhattacherjee 1998; Karahanna et al. 1999; Bhattacherjee 2001[a]; Bhattacherjee 2001[b]; Hsu et al. 2004; Lin et al. 2005; Hong et al., 2006; Wu et al., 2006), this study applied the ECT as the research theoretical basis to construct research hypotheses. The use continuance and repeated purchase behavior can be considered as a same aspect, basically due to that both behaviors follow an initial adoption/purchase decision, both are influenced by the consistencies/inconsistencies between the excepted and perceived performance after the initial adoption, both depend on the satisfaction of the post-adoption experience, and both can potentially lead to ex post reversal of the initial decision.

Notably, for assessing the construct of confirmation (or called disconfirmation) as depicted in Figure 1, two main approaches exist (McKinney et al. 2002). First, disconfirmation can be computed by subtracting expectation from perceived performance. Second, disconfirmation can be measured directly as an independent construct of perceived disparity. The underlying concept of the first approach is identical to that of the service quality measurement model (hereafter, "PZB model") developed by Parasuraman et al. (1985). Therefore, the concept of PZB model was adopted to assess the construct of confirmation (as shown in Figure 1) in this work.

The PZB model hypothesizes that five service quality gaps incur consumer disconfirmation. By analyzing variables for each gap, Parasuraman et al. (1988) concluded that expected service quality is a consumer desire that originates from word-of-mouth, personal needs and experiences, and external communications by the service provider whereas perceived service quality depends on the customer evaluation of the service delivered by the service provider. By building on a handful of studies examining the inconsistencies between expected and perceived service quality as well as studies revealing differences between service quality and satisfaction, Zeithaml et al. in 1988 (Zeithaml et al. 1996) confirmed that customer perceptions of service quality depend on the size and direction of Gap five, which is the aggregated function of Gaps 1-4. Since then, numerous works have used the PZB model to assess consumer expectations and perceptions regarding the service quality, as depicted in Figure 2.
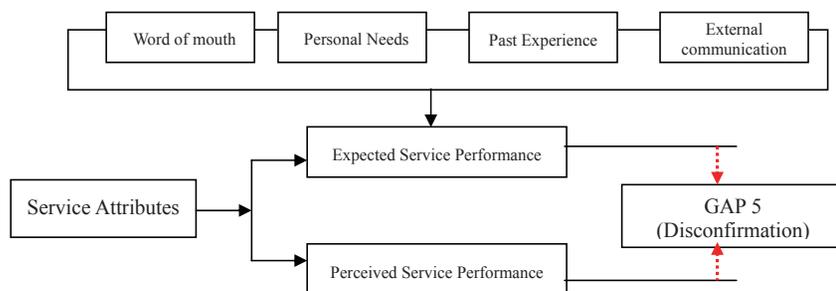

Figure 2: The PZB model

3. HYPOTHESIS DEVELOPMENT

Through review of the ECT-based literature revealed that, whether the context is physical merchandise or web-based services, all prior studies consistently concluded that satisfaction is an important precursor of repurchase willingness and use continuance (Oliver 1997). Recent research (Hsu et al. 2006; Roca et al. 2006; Wu et al., 2006) clearly indicates that intention to use web-based services such as online learning and shopping is positively associated with satisfaction. Accordingly, in the online banking service context, the following hypothesis H1 is posited below:

H1: User satisfaction with banking online is positively related to continued use intention.

Other than satisfaction, perceived performance is known to predict repurchase intentions, which has been confirmed by ECT-based research, not only to repurchase traditional goods (Churchill & Surprenant 1982; Anderson & Sullivan 1993) but also to reuse information system-based or web-based services (Bhattacherjee 2001[a]; Bhattacherjee 2001[b]; Kim & Malhotra 2005; Wu et al. 2006; Chou & Chen 2009). Notably, original ECT studies did not posit that performance expectation is a significant antecedent of repurchase intentions (Anderson and Sullivan, 1993), but some researchers (Compeau & Higgins 1995; Hsu et al. 2004) found that performance expectations is a salient belief construct that markedly impacts use continuance. Based on the above, the following hypotheses are proposed:

H2: User expected performance regarding online banking is positively related to continued use intention.

H3: User perceived performance regarding online banking is positively related to continued use intention.

By integrating ECT and social cognitive theories, Hsu et al. (2004) examined seven hypotheses and concluded that Internet self-efficacy is associated with intention to continue using online services. However, after collecting 187 valid questionnaires from a population of university students, Wu et al. (2006) recently examined eight hypotheses based on the framework integrating computer self-efficacy and ECT. Their empirical results showed that computer self-efficacy is not significantly related to continued use. Notably, Wu et al. (2006) applied the term computer self-efficacy in reference to the self-evaluated ability in computer use, which was measured using a ten-item instrument developed by Compeau and Higgins (1995). In contrast, Hsu et al. (2004) distinguished Internet self-efficacy from computer self-efficacy and measured Internet self-efficacy using eleven items adapted from Compeau and Higgins (1995), Estin and LaRose (2000), Joo et al., (2000), and Torkzaden and Van Dyke (2001). Therefore, the fourth hypothesis is posited.

H4: Users' Internet self-efficacy is positively related to the intention to continue use of online banking services.

The ECT centers on that confirmation is a major factor in satisfaction decisions and that perceived performance correlates with satisfaction (Oliver 1980; Churchill & Surprenant 1982; Anderson & Sullivan 1993). The definition of satisfaction initially defined by Locke in 1976 (Anderson & Sullivan 1993; Bhattacherjee 2001[a]), was later extended by Oliver in 1981 (Anderson and Sullivan, 1993). Both definitions emphasize that lower expectation and higher performance increase confirmation, which in turn positively influences customer satisfaction and intended continuance (Bhattacherjee 2001[a]). Since the literature consistently confirms that satisfaction increases as perceived performance increases and that satisfaction increases as confirmation increases (Bhattacherjee 2001[a]; Bhattacherjee 2001[b]; Hsu et al. 2004; Hsu et al. 2006; Roca et al. 2006; Wu et al. 2006), the following hypotheses are posited:

H5: User confirmation is positively related to their satisfaction with online banking.

H6: User perceived performance is positively related to their satisfaction with online banking.

Building the above discussion, the presented research structure integrates ECT and PZB with Internet self-efficacy by proposing the six hypotheses in Figure 3. As grounded in ECT and PZB, expected performance is deemed as the baseline or reference used by consumers to evaluate online banking while perceived performance is considered a post-consumption evaluation of online banking.
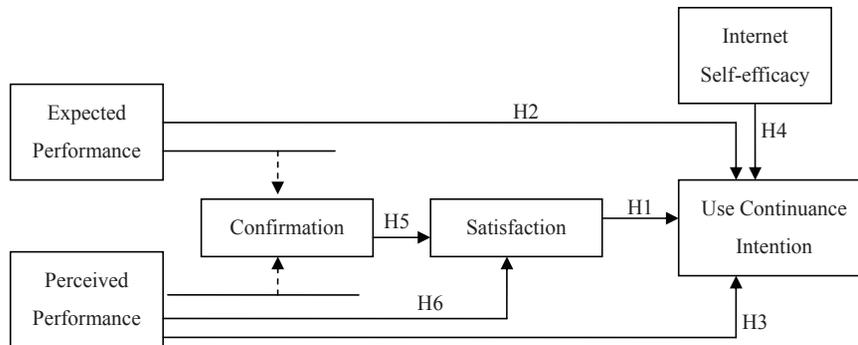

Figure 3: The presented research structure

4. MEASUREMENT DEVELOPMENT

A critical task in achieving the research purpose was constructing a valid questionnaire to measure each construct displayed in Figure 3. To ensure their validity, all constructs were operationalized from related literature (Bhattacherjee 2001[a]; Bhattacherjee 2001[b]; Hsu et al. 2004; Roca et al. 2006; Wu et al. 2006), and multiple-item scales drawn from pre-validated measures were reworded to fit the online banking context. Accordingly, three items were used to assess "intention to continue banking online". The first item was adapted from Bhattacherjee

(2001[a], 2001[b]), the second item was adapted from Hsu et al. (2004) and Roca et al. (2006), and the third item was adapted from Roca et al. (2006) as follows:

INT1. I would continue using online banking services rather than stop banking online.

INT2. I would use online banking services frequently in the future.

INT3. I would recommend others to use online banking services rather than any other alternatives (for example, traditional banking).

Through reviewing the overall satisfaction scale in ECT literature, Bhattacherjee (2001[a]), McKinney et al. (2002), and Wu et al. (2006) employed four semantic differential adjective pairs initially developed by Spreng et al. (1996) to capture respondent satisfaction levels. Following their concept of using cognitive and affective components to assess satisfaction, satisfaction was operationalized with the following four items on a seven-point Likert scale in response to the following query: After banking online, how do you feel?

SAT1. very dissatisfied vs. very satisfied

SAT2. very displeased vs. very pleased

SAT3. very frustrated vs. very contented

SAT4. very terrible vs. very delighted

Internet Self-Efficacy was assessed in accordance with Hsu et al. (2004), Ma and Liu (2005), and Roca et al. (2006). Self-efficacy is personal confidence in the ability to perform a particular behavior and is believed to have an important role in human behaviors (Compeau & Higgins 1995). Information system researchers generally agree that self-efficacy is multidimensional construct with beliefs coming from the breadth, depth, and finesse of knowledge (Ma & Liu 2005). Hence, in accordance with the empirical results of Hsu et al. (2004), Ma and Liu (2005), and Roca et al. (2006), the respondents were asked to respond to the following six questions using a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree):

ISE1. I am confident in my capability to navigate websites.

ISE2. I am confident in my capability to search information via websites.

ISE3. I am confident in my capability to download files from a website.

ISE4. I am confident in my capability to upload files to a website.

ISE5. I am confident in my capability to post messages on a website.

ISE6. I am confident in my capability to chat on websites.

The confirmation (also called disconfirmation) construct was operationalized by comparing expected and perceived performance as discussed in previous section. The procedure was the same as that used in the PZB model to measure Gap 5 between the expected and perceived service performance. Unlike that ECT originally gauged the conformation by examining expected and perceived performance via collecting respondents' opinions at pre-buying stage and post-buying stage, PZB model used two-column format to gather respondents' opinions regarding expected and perceived performance via one-round field survey. Notably, the expected

and perceived performances herein were assessed by three elements of trust, service quality, and usefulness. The reason is online banking performance should be a multifaceted construct that is influenced by several elements rather than single element.

Numerous academic studies and industry surveys in the past decade indicate that that security, safety, risk, trust, privacy, confidentiality, credibility, and accountability are the key causes of reluctance to banking online. However, terminology used and assessed varies among authors. For example, in the one of earliest studies (Sathye 1999), both "safety and security" and "security and reliability" are used to assess the security in the context of internet banking. Khalfan and Alshawaf (2004) considered "privacy and security" as the main barrier but used data confidentiality and privacy, data availability, and authority and accountability to evaluate "privacy and security". Wang et al. (2003) and Amin (2007) believed that Trust is very important to online banking customers, but they defined Trust as the perceived credibility and used two elements of privacy and security to assess perceived credibility.

Taken together, the above findings indicate that the core implications behind these terms (i.e, security, safety, risk, trust, privacy, confidentiality, credibility, and accountability) are quite similar but defined by researchers in many different ways; and definitions may overlap or focus on different aspects, which often reflect the paradigms of the academic disciplines of individual researchers. Accordingly, in accordance with the work of Wingreen and Baglione (2005), trust can reflect the level of security, and some researchers (Dinev & Hart 2006) have alluded that the cumulative influence of Internet trust outweighs privacy concerns or the risk perceptions of individual Internet users. This study used Trust in reference to the core implications behind these terms, and seven items were adapted from related literature (Sathye 1999; McKinney et al. 2002; Wang et al. 2003; Khalfan & Alshawaf 2004; Wingreen & Baglione 2005; Dinev & Hart 2006; Amin 2007) to operationalize trust. The respondents were asked to indicate the extent to which they agreed with the following statements about banking online:

TRU1. Personal information is always treated confidently when banking online.

TRU2. Sensitive information (e.g. credit card number) provided during online banking is always secure.

TRU3. Information provided by bank websites is always credible.

TRU4. Information provided by online banking is always accurate.

TRU5. Risks associated with banking online are always low.

TRU6. Online banking transactions are secured with highly commitment.

TRU7. Advances in Internet Security technology ensure a safe online banking environment.

A review of the extant literature on adoption continuance indicates that all ECT-based studies that have included usefulness in their models consistently contended that usefulness is a crucial performance desired by consumers (Parthasarathy & Bhattacherjee 1998; Bhattacherjee 2001[a]; Bhattacherjee 2001[b], Lin et al. 2005; Hong et al. 2006; Ifinedo 2006; Roca et al. 2006;

Wu et al. 2006). Accordingly, usefulness is included in this study. Based on the works of Bhattacherjee (2001[a] ,2001[b]), Ma and Liu (2005), and Roca et al. (2006), the respondents were asked to express their agreement with each of the following four statements to assess usefulness on a seven-point Likert scale in response to the following query: When dealing with banking issues,

USF1. online banking services improves my productivity;

USF2. online banking services enhances my effectiveness;

USF3. online banking services increases my efficiency;

USF4. online banking services are very useful to me.

In the PZB model, service quality was gauged by SERVQUAL, a well-known service quality questionnaire first presented and tested by Parasuraman et al. (1985). Since SERVQUAL was originally used to measure service quality in banks, credit cards, securities brokers, and product repair and maintenance, using SERVQUAL to measure the quality of information systems and electronic services has been questioned and debated in the literature. Consequently, many studies have modified SERVQUAL versions to measure service quality in specific environments such as information systems, e-commerce and online shopping. Accordingly, by breaking Performance into Trust, Usefulness, and Service Quality, this study operationalized online banking service quality by three dimensions, namely content quality, system quality, and function quality, drawn from the relevant literature (Bhattacherjee 2001[b]; Parasuraman et al. 2005; Roca et al. 2006; Shih & Fang 2006). The following items for operationalizing content quality, system quality, and function quality were rated on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Content quality

CQ1. The online banking website provides visually appealing formats.

CQ2. The online banking website provides ease-to-understand interfaces.

CQ3. The online banking website provides correct information.

CQ4. The online banking website provides up-to-date information.

System quality

SQ1. The online banking website is always quickly to be accessed.

SQ2. The online banking website is always stably to be operated.

SQ3. The online banking website always leads to a predicted result whenever navigating on it.

SQ4. Operating a process via the online banking website is always reliable.

Function quality

FQ1. The online banking website promptly fulfills my request.

FQ2. The online banking website completely fulfills my needs.

FQ3. The online banking website leads me to complete a transaction in a clear way.

FQ4. The number of steps for each service in online banking website is adequate.

5. FOCUS GROUP INTERVIEW AND SAMPLING

In the past decade, theory-based studies regarding the adoption of online banking is huge and dominated by TRA, TAM, TPB or some mixture of two or three of these theories. Meanwhile, the literature review reveals only two theory-based studies of online banking continuance. The first one is Bhattacherjee (2001[a]), and the second one is Vatanasombut et al. (2008). Since the pertinent literature regarding continued use of online banking was considered insufficiently rich to provide a highly validated research foundation for this work, two focus-group discussions involving online banking executives and scholars familiar with online banking were conducted to verify and, if necessary, revise the research structure.

After an invitation letter was sent to online banking executives of each of the top twenty banks on the List of Financial Institutions published by the Central Bank of the Taiwan government (http://www.cbc.gov.tw/), five banks responded positively, and four of the five participated in the first focus group discussion on April 19, 2008. Two invited scholars and an online banking services manager of a well-known financial institution attended the second focus group discussion on April 30, 2008. The research purpose was explained in the beginning of each focus group discussion. After carefully examining the proposed research structure and rewording some questionnaire items to better fit the current online banking context in Taiwan, the participants highly supported and encouraged this research because they felt the financial services industry was becoming increasingly customer-centric and the benefits for banks providing web-based services rely heavily on the continued use rather than merely opened the online banking account.

Following the suggestions made by two focus group interviews, a forty-five-item, five-section questionnaire was developed. Notably, as suggested by the focus group, respondents may find it easier to express their feeling about a specific online bank that they frequently use rather than online banking in general. Therefore, this study focuses on the relationship between each subject and a particular bank rather than between an individual and internet banking in general. Hence, the first section of the questionnaire asked respondents four questions. The first of which was whether the respondent had ever opened an online banking account. If the response was "yes", the next was "What online bank do you frequently use". In bold text below this statement was the following: "if you use more than one online bank, please indicate only the one you use most frequently".

To ensure that the correspondents answer each question correctly, the following sentence appeared at the beginning of each of sections 2-4 in bold type "Please answer the following questions according to the online bank you use most frequently". The second section of the questionnaire contained nine questions, which assessed the two constructs of continued use intention and Internet self-efficacy. The third section contained four questions for measuring satisfaction and twenty-three questions in the fourth section for assessing the expected and

perceived performance. Each performance construct was measured in three dimensions of trust, service quality, and usefulness. The service quality construct was measured in three aspects: content quality, system quality, and function quality. Finally, five questions in the fifth section collected basic respondent information. All questions in Sections 2-4 were measured on a seven-point Likert scale ranging from "strongly disagree" to "strongly agree".

Pre-testing of ten EMBA students and an expert panel consisting of two bank professionals and two academics was conducted to ensure that the questionnaire briefly and clearly reflected the domain of each construct. Notably, due to privacy concerns, protected by Taiwanese law validated in late 2006, all participating banks in focus group interviews declined to assist us to distribute the questionnaires to their customers. Given the effectiveness and feasibility of the survey in terms of time, manpower and other resources, an online sampling approach was taken. The advantages of online surveys over paper-based mail surveys have been discussed in some online research (Couper 2000; Bhattacherjee 2001[a] ;Bhattacherjee 2001[b]; Sax et al. 2003). For example, conducting an anonymous questionnaire survey by mail is difficult because of the need to follow-up with non-responders whereas an anonymous study via online survey is easier performed.

A common problem in questionnaire surveys is the response rate and non-response bias (Couper 2000; Karjaluoto et al. 2002; Sax et al. 2003). As suggested in the literature (Karjaluoto et al. 2002; Sax et al. 2003), offering monetary incentives is apparently effective for increasing the response rate. Therefore, the cover page described this study was sponsored by National Science Council of The Republic of China and offered rewards for completing the questionnaire. After completing the one-month online survey, this study randomly selected three respondents with valid questionnaires and gave each of then an electronic dictionary, and randomly chosen sixty valid respondents and rewarded them a book. After coding the collected data in an SPSS file, the uniformity of the responses in relation to date of receipt was examined for non-response bias, the IP addresses of respondents were examined for double submissions, and unanswered questions in incomplete questionnaires were examined for item non-response bias.

During a one-month online field survey, 686 questionnaires were collected. Compared to the profile of total Internet population released by Taiwan Network Information Center (http://www. twnic.net.tw/), the 686 respondents quite reflect the share in the demographic data of the general Internet population in Taiwan. After discarding invalid responses, the number of valid responses was 354. As Table 1 shows, of the 354 valid samples, 178 (50.28%) of the respondents were male while 176 (49.72) were female. According to Taiwanese banking laws, customers must be 20 years old to open an online banking account; therefore, all 354 valid respondents in this study were over 20 years old. Of 354 online banking survey respondents, 86.2% had bachelor degrees or above, over 90% were 20-40 years old, and 68.3% used online banking services less than seven times per month. The average annual income of 44.1% of all respondents was NT$ 250,000-500,000 during the last three years.

Table 1: Profile of respondents

Total respondents

Category	Number	Percentages	Category	Number	Percentages
Opened bank account			Sex		
Yes	354	332	Male	51.60%	48.40%
No	332	354	Female	48.40%	51.60%

Total online banking adopters (Valid respondents)

Category		Number	Percentages	Category		Number	Percentages
Gender	Male	178	50.28%	How long have you banking online	< 3 months	28	7.9%
	Female	176	49.72%				
Age	< 25 years*	56	15.8%		3-6 months	50	14.1%
	25-30 years	142	40.1%		6-12 months	66	18.6%
	30-35 years	100	28.2%		1-2 years	98	27.7%
	35-40 years	24	6.8%		2-3 years	52	14.7%
	40-45 years	14	4.0%		3-5 years	48	13.6%
	45-50 years	6	1.7%		over 5 years	12	3.4%
	>50 years	12	3.4%				
Occupation	Financial/Banking/ Insurance	34	9.6%	Average Annual income within 3 years (unit: Thousand NT $)	< 250	60	16.90%
	Electronic/Information/ Communication Service	112	31.6%		250-500	156	44.1%
	High Tech R&D / Manufacturing	22	6.2%		500-750	72	20.3%
	Construction	36	10.2%		750-1000	28	7.9%
	Culture/Mass communication/ Publishing	12	3.4%		1000-1500	24	6.8%
	Medical	20	5.6%		1500-2000	6	1.7%
	Education	12	3.4%				
	Military	2	6.0%		> 2000	8	2.3%
	Policy	6	1.7%				
	House keeping	12	3.4%	The average frequency of banking online per month	≦ 3 times	170	48.0%
	SOHO	30	8.5%		4-6 times	72	20.3%
	Student	56	15.8%		7-10 times	26	7.3%
	Others	0	0.0%		11-15 times	16	4.5%
Education	High School (or less)	14	4.0%		16-20 times	34	9.6%
	Junior College	54	15.3%		21-25 times	12	3.4%
	Bachelor Degree	218	61.6%				
	Master Degree	66	18.6%		≧ 26 times	24	6.8%
	Ph.D.	2	0.6%				

6. DATA ANALYSIS AND HYPOTHESES TESTING

Since all questions for construct measurements were adapted from previous studies and carefully reworded to fit the context of online banking in Taiwan, content validity was maintained. By executing principal component analysis using varimax rotation, Table 2 shows that Cronbach alpha values for each construct were at least 0.859, which verified the internal consistency of each construct. Besides, factor loadings of all items used to measure each construct were at least 0.629 with most between 0.7 and 0.9, and inter-item correlation matrices under each construct were all significant ($p < 0.01$). Therefore, all constructs used in this investigation had adequate discriminate validity, and the convergent validity of each construct was confirmed.

As shown in Table 2, Trust, Service Quality and Usefulness jointly accounted for 87.64% of Performance regarding online banking, which implies that customer concerns regarding online banking can be adequately elucidated by Trust, Service Quality and Usefulness. Further, Trust accounted for 45.98% of Performance variance while Service Quality and Usefulness accounted for 24.25% and 17.41%, respectively, of Performance variance. This indicates that Trust is the most concerned performance in the minds of people banking online. The data in Table 2 also clearly reveal that Function Quality was the top service quality concern of online bank users as it reflected 34.08% of the variance in Service Quality and was followed by System Quality, which accounted for 25.599% of the variance in Service quality, and then by Content Quality, which accounted for 18.939% of the variance in Service quality.

Table 3 and Figure 4 show the structural model testing performed using LISREL 8.5 software for path analysis and the evaluation results for H1-H6. As suggested earlier by Hsu et al. (2004) and Roca et al. (2006), the seven model-fit criteria in Table 3 were adopted to test whether the empirical data fit the proposed linear structural model. The statistical data in Table 3 clearly reveal that all criteria exceed the suggested level, indicating an acceptable fit of the proposed linear structural model to the data and a realistic assessment of the test results.

Figure 4 demonstrates that 47.2% of the observed variance in consumer intention to continue banking online can be jointly explained by Internet Self-Efficacy, Satisfaction and Perceived Performance while Expected Performance did not significantly impact user intentions to continued banking online. Accordingly, Hypotheses 1 and 3-4 were supported while Hypothesis 2 was rejected. As expected, Satisfaction was also significantly predicted by Confirmation and Perceived Performance, which supported Hypotheses 5-6. Figure 4 shows that 42.4% of the variance in Satisfaction could be collectively explained by Confirmation and Perceived Performance.

Table 2: Scale items and exploratory factor analysis

Construct / Sub-construct			Q#	Factor Loading	Explained Variance (Eigen-value)		Alpha Value
Continuance Intention			INT1	0.834	78.414% (2.352)		0.859
			INT2	0.835			
			INT3	0.683			
Satisfaction			SAT1	0.731	78.637% (3.145)		0.909
			SAT2	0.815			
			SAT3	0.785			
			SAT4	0.815			
Internet Self-Efficacy			ISE1	0.712	76.46% (4.588)		0.935
			ISE2	0.835			
			ISE3	0.887			
			ISE4	0.813			
			ISE5	0.629			
			ISE6	0.712			

Construct / Sub-construct			Q#	Factor Loading	Explained Variance (Eigen-value) [Cumulated Variance]	(Eigen-value) [Cumulated Variance for Performance]	Alpha Value	
Performance	Trust		TRU1	0.704	75.42% (5.279)	(4.113) [45.98%]	0.944	
			TRU2	0.710				
			TRU3	0.829				
			TRU4	0.750				
			TRU5	0.730				
			TRU6	0.828				
			TRU7	0.728				
	Service Quality	Function Quality	FQ1	0.830	34.08% (4.430) [34.08%]	(2.169) [70.23%]	0.914	0.920
			FQ2	0.884				
			FQ3	0.870				
			FQ4	0.817				
		System Quality	SQ1	0.796	25.599% (3.328) [59.679%]		0.934	
			SQ2	0.879				
			SQ3	0.849				
			SQ4	0.875				
		Content Quality	CQ1	0.815	18.939 (2.462) [78.618%]		0.886	
			CQ2	0.845				
			CQ3	0.675				
			CQ4	0.721				
	Usefulness		USF1	0.861	82.62% (3.305)	(1.557) [87.64%]	0.930	
			USF2	0.830				
			USF3	0.799				
			USF4	0.814				

Notably, the empirical data in this work reveal that Expected Performance is not a salient factor in whether adopters continue using online banking services. This finding is consistent with the studies of Oliver (1980), Churchill and Surprenant (1982), and Anderson and Sullivan (1993) but is inconsistent with Compeau and Higgins (1995) and Hsu et al. (2004). These

empirical results may be attributable to the finding by Compeau and Higgins (1995) and Hsu et al. (2004) that Expectation is operationalizd as "Outcome Expectation", which is defined as a post-use construct and evaluated by pre-use experience, while Expected Performance is a pre-consumption construct in the traditional ECT model (Hsu et al., 2004).

Table 3: Overall Model Goodness-of-Fit Statistics

Model Goodness-of-Fit Index	Recommended Value	Results Obtained from the Study
Chi-Square/degree of freedom	$\leqq 3.0$	2.971
Goodness-of-Fit Index (GFI)	$\geqq 0.90$	0.942
Adjusted Goodness-of-Fit Index (AGFI)	$\geqq 0.90$	0.923
Normed Fit Index (NFI)	$\geqq 0.90$	0.911
Non-Normed Fit Index (NNFI)	$\geqq 0.90$	0.907
Comparative Fit Index (CFI)	$\geqq 0.90$	0.914
Incremental Fit Index (IFI)	$\geqq 0.90$	0.928
Root Mean Square Residual (RMSR)	$\leqq 0.10$	0.065
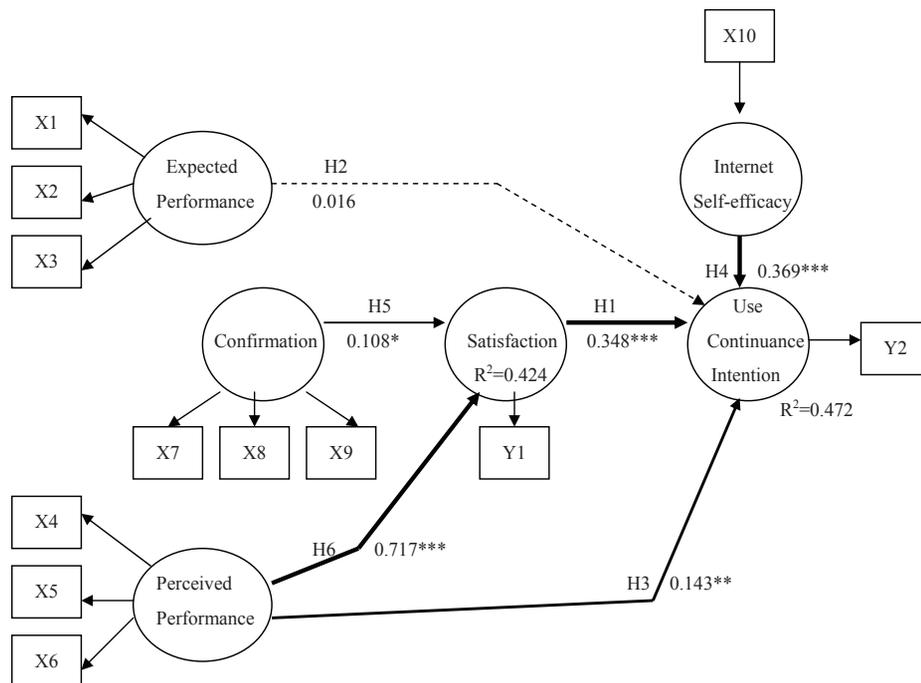
X1, X2, and X3 denote expected trust, service quality, and usefulness, respectively. X4, X5, and X6 denote perceived trust, service quality, and usefulness, respectively. X7, X8, and X9 denote the confirmation between expected trust and perceived trust, expected service quality and perceived service quality, and expected usefulness and perceived usefulness, respectively. X10 represents Internet self-efficacy, Y1 stands for satisfaction, and Y2 denotes use continuance intention.

- - - ▶ represents no significance, ⟶ represents significance (p < 0.05),
⟶ represents very significance (p < 0.01), ⟶ represents extreme significance (p < 0.001)

Figure 4: LISREL analysis of the proposed linear structure model

The path coefficients between latent independent variables and latent independent variables in Figure 4 indicate that continued using online banking intention was very strongly influenced by Internet Self-Efficacy (β= 0.369 with P value < 0.001) and Satisfaction (β= 0.345 with P value < 0.001), and significantly influenced by Perceived Performance (β= 0.143 with P value < 0.01). Perceived Performance (β= 0.717 with P value < 0.001) has a very strong influence on Satisfaction, while Satisfaction was only appreciably impacted by Confirmation (β= 0.108 with P value < 0.05). Regarding the empirical findings that perceived performance over confirmation on influencing satisfaction, which is inconsistent with Bhattacherjee (2001a). One explanation for this phenomenon is that, in this study, Perceived Performance was composed of three constructs of Trust, Service Quality, and Usefulness whereas it was only composed of Usefulness in Bhattacherjee (2001a). However, regarding that satisfaction increases as perceived performance increases and that satisfaction increases as confirmation increases, both Bhattacherjee (2001a) and this work are consistent to all extinct literature (Bhattacherjee 2001b; Hsu et al. 2004 ;Hsu et al. 2006; McKinney et al. 2002; Roca et al. 2006; Wu et al. 2006), which reveals both confirmation and perceived performance are main determinants of satisfaction.

7. DISCUSSION AND IMPLICATIONS

To examine any differences among adopters, Parthasarathy and Bhattacherjee (1998) categorized adopters as early and late adopters according to their time of adoption. Similarly, Polatoglu and Ekin (2001) separated 114 valid Turkish respondents into three groups: Early Adopters, who had used online banking services for more than 10 months; Early Majority, who had used the services for 5 to 10 months; and Late Majority, who had used the services for less than 5 months. Mattila et al. (2003) separated 1167 Finland respondents into three categories: Early adopters, Majority adopters and Late adopters. Although the rational behind these works is just to distinguish adopters for the purpose of data analysis according to their time of adoption, current literature separating the samples into Roger's adopter categories (i.e., innovators, earlier adopters and early majority) seems arbitrary.

According to innovation diffusion theory (Rogers 2003), the rate of innovative technology adoption can be represented by a bell-shaped (frequency) curve or an S-shaped (cumulative) curve. Rogers (2003) used normal frequency distribution to classify individual adopters into the following five categories: innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%), and laggards (16%). Since respondents in this study indicated 51.60% online banking adoption rate in Taiwan, this investigation categorized current adopters as innovators, earlier adopters, and early majority if their adoption time was less than one year, between one and three years, and over three years, respectively, as shown in Table 4.

Table 4: Drill-down analysis of the current online banking users

	Online banking current users			F-value
	Innovators	Early Adopters	Early Majority	
Perceived Trust	6.2143	6.1440	5.7658	5.366***
Perceived Usefulness	5.8589	5.7656	5.6699	5.998***
Perceived Service Quality	6.0066	5.9066	5.7181	4.600***
Perceived Function Quality	6.0885	5.9706	5.6882	4.044***
Perceived System Quality	6.0209	5.9860	5.9253	2.663***
Perceived Content Quality	5.9115	5.7632	5.5407	3.954***
Internet Self-Efficacy	5.9688	5.5043	5.0888	47.737***

Via the drilling down analysis of current online banking users, Table 4 indicated that, among all perceived constructs evaluated by current users, the average assessment of "innovators" significantly exceeds that of "early adopters" while the average assessment of "early adopters" also significantly exceeds that of "early majority", particularly in the average of Internet self-efficacy. In line of this finding, the study separated these perceptions into two parts of "Internet self-efficacy" and "Perceived performances" containing Trust, Usefulness, and Service Quality.

By focusing on the relationship between "Internet self-efficacy" and "the use of online banking services", this study found that adopters with high Internet self-efficacy are likely to continue using online banking services, which is also supported by Hypothesis 4 test, and both willingness to use an innovative web-based service and frequency of using a novel web-based service are highly correlated with Internet self-efficacy. That is, individual willingness to adopt and continue using online banking is positively related to Internet self-efficacy, and the time and frequency of banking online are strongly influenced by Internet self-efficacy. Accordingly, the first implication leads to that willingness to adopt and continue using a new service depends on whether the user is familiar with the context in which the innovative service was launched. This implication explains why individuals may be risk-averse in financial investment but risk-inclined in mountain climbing or why some are risk-averse in online services but risk-inclined in auto racing.

Regarding the perceived performances evaluated by "innovators" are all significantly over those evaluated by "early adopters" as well as the perceived performances evaluated by "early adopters" all significantly exceed those evaluated by "early majority", we further examined the linkage between "perceived performance" and "satisfaction". As shown in Figure 4, Hypothesis 6, user satisfaction was significantly influenced by perceived performances, was supported. Accordingly, the second implication is that the longer adopters use online banking services, the more likely they are to become heavy users as long as they are satisfied with the performance. That is, the first implication attributes the determinant motivating individual

initiatives to accept online banking services to individual self-efficacy in the context of Internet while the second implication attributes the determinant influencing individuals to continuously bank online to individual using-experience satisfaction.

By using one-way analysis of variance, which is the appropriate statistical technique for testing differences among three or more independent groups, this study performed a drill-down analysis of all collected respondents (including 354 online banking users and 332 non-users), this study discovered that the average expected performances of online banking users is significantly exceed those of non-users. Although ECT studies vary in their conceptualization of expectations (Bhattacherjee, 2001[a]), most scholars operationalize expectation as a belief/attitude presentation. For example, Oliver (1980) defined attitude as a function of expected outcomes while Cronin and Taylor (1992) conceptualized expectation as an attitude before making a purchase decision. Thus, by conceptualizing Expected Performance as an attitude, the third implication of this investigation is that changing the attitudes of non-users is a critical step in successfully attracting them to online banking. As argued in the work of Bhattacherjee and Premkumar (2004), individual beliefs and attitudes may change with time when gaining first-hand experience. One of effective approach to change the attitudes of non-users may offer incentive programs encouraging non-users to use online banking services.

In a critical review of the literature in customer satisfaction, Yi (1990) found that, although inferred and perceived confirmation are both good predictors of satisfaction, inferred confirmation has several limitations. First, perceived performance (post-consumption ratings) may be biased by expected performance (pre-consumption ratings). Second, inferred confirmation produces a "ceiling or floor" effect when respondents give the highest or lowest rating on expected performance. Third, the reliability of confirmation decreases with a decreasing variance in either the expected performance or perceived performance because the two ratings tend to be highly correlated. Fourth, a model including expected performance, perceived performance, and inferred confirmation is likely to be over-specific because inferred confirmation is measured by comparing expected and perceived performance.

The above discussion explains why all ECT-based studies of web-customer satisfaction (Bhattacherjee 2001[a]; Hsu et al. 2004 ;Hsu et al. 2006; Roca et al. 2006; Wu et al. 2006) measure confirmation by subjectively perceived performance instead of inferring confirmation to predict satisfaction. However, no ECT-based studies to date have empirical supported the above argument in a web-base service setting. This investigation of 354 valid respondents yielded empirical evidence that performance-based measures provide a more valid construct for predicting satisfaction than do disconfirmation-based measures. This study clearly suggests that perceived performance directly rather than indirectly impacts customer satisfaction through inferred confirmation since perceived performance was the strongest predictor of user satisfaction ($R^2 = 0.330$) wile confirmation ($R^2 = 0.094$) was a significant but weaker predictor.

Therefore, the fourth implication is that perceived performance-based confirmation is a better predictor of customer satisfaction with online banking than inferred confirmation.

8. CONCLUSIONS AND FUTURE RESEARCH

Empirical analysis of 354 valid respondents suggests that adoption continuance of online banking was predicted primarily by the self-efficacy of customer Internet skills ($R^2 = 0.203$) and satisfaction with online banking ($R^2 = 0.197$) and secondarily by their perceived performance of using online banking services ($R^2 = 0.073$). In the aspect of customer self-efficacy, this research is consistent to previous research (Hsu et al. 2004; Ifinedo 2006; Roca et al. 2006). However, unlike research in traditional merchandise repurchase (Cronin & Taylor 1992) suggesting that perceived performance may play a bigger role than satisfaction in high involvement situations, this study found that satisfaction has a greater influence than perceived performance on intention to continue using online banking services.

This investigation also confirmed that the ETC and its variation not only predict customer intention to repurchase physical goods, they also predict repeated use of online services. However, the influence power of each construct in the extended ETC may differ across types of services/products. To achieve the goal of attracting prospective customers to bank online, the most important issue is resolving their Trust concerns, demonstrating the usefulness of online banking, and satisfying basic and necessary customer demands in terms of Must-be attributes (i.e., Functional Quality). To achieve the goal of motivating current customers to continue bank online, the most important issue is enhancing customer satisfaction by offering high performance in Function, System, and Content qualities.

This empirical study also found that Internet self-efficacy significantly influences web-based service continuance as well as initial adoption intention. Since self-efficacy is a multidimensional construct with beliefs (regarding the service) coming from the breadth, depth, and finesse of knowledge (Ma & Liu 2005), further study of its influences on Internet self-efficacy is needed. Determining whether the main influences are working habits, living environments, self interest or subjective norms may give online banking marketers valuable clues for devising effective strategies for customer retention as well as reuse willingness

The figures in Table 1 reveal that over 80% of the respondents held Bachelor degrees or above, which indicates that advanced education is positively related to use of online banking services. Following Table 1, this research discovers that security concerns increase with the ages of respondents, which indicates younger people have more Trust in online banking. Table 1 also displays that online banking users tend to be younger (below 30 years old), educated, have mid-level incomes, and employed in the electronics, information, and communication industries. However, Table 1 just profiles the respondents rather than general online banking population.

The data in Table 1 should be interpreted cautiously.

Some limitations and future research directions of this study are noted. First, although the analytical results of this study may be applicable to many other web-based services, determinants of use continuance intentions may differ across different online services. Second, due to privacy concerns, all participating banks in the focus group interview declined to assist with distributing questionnaires to their customers. After considering the effectiveness and feasibility of different sampling methods, this work collected data using online sampling. Consequently, generalizing the findings to the general population must be cautious. Third, only five out of top twenty banks participated in the interviews, and this study was performed in a single country. To increase the robustness of the findings of this study needs more studies.

Fourth, with the stably and increasingly competition in online banking sector, bank managers currently not only care their customers whether continuously banking online, but also gradually care how to encourage their customers to use advanced functions (i.e., online buying financial portfolio, online redemption stock or fund, online credit card or debit card usage, etc.) rather than merely use basic functions (i.e., online ATM, transferring money, and checking bank statement). Since current literature including this study did not shed the light on this issue, this issue is worthwhile to be further studied and examined. Fifth, since bank managers' emphasis has been shifted from adopting online banking basic services to using its advanced services, the future research may be worthwhile to examine the difference between "intention to use basic services" and "intention to use advanced services". That is, more elaborated study designs are needed to investigate the difference between factors influencing individual willingness to use basic services and factors influencing individual willingness to use advanced services.

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