



Antecedents of customer satisfaction with online banking in China: The effects of experience

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ABSTRACT

This study investigates the antecedents of customer satisfaction with online banking in China, and explores the effects of experience on the relationships between the antecedents and customer satisfaction. Based on prior research, the six antecedents of customer satisfaction – ease of use, design, speed, security, information content, and customer support service – are proposed, and the effects of experience on the relationships between these and customer satisfaction are analyzed using a structural multi-group (a high-experience group and a low-experience group) model.

The results show that design, speed, security, information content, and customer support service have a significant influence on customer satisfaction in the high-experience group or the low-experience group, but ease of use does not have a significant influence on customer satisfaction in either of the groups. Also, the results relating to the influence of the level of customer experience reveal that the effects of design, security, speed, and information content on customer satisfaction were significantly higher in the high-experience group, whereas the effect of customer support service on customer satisfaction was significantly higher in the low-experience group.

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1. Introduction

Since the first online banking services based on the Internet were provided by Stanford Federal Credit Union (SFCU) in October 1994 (Business Wire, 1995), online banking has spread rapidly in all countries of the world as a result of its convenience and ease in conducting transactions quickly and at a specific service level (Finextra, 2010). According to an International Data Corporation (IDC) report, the number of online banking users worldwide had already surpassed a hundred million by 2004 (Maenpaa, Kale, & Kuusela, 2008). Spurred by rapid growth of online banking usage, a number of the studies about online banking have been performed around the world; however, the research has mostly been confined to: the issues of online banking adoption (Cheng, Lam, & Yeung, 2006; Durkin, Jennings, & Mulholland, 2008; Lee, 2009; Yiu, Grant, & Edgar, 2007) and the customer attitude towards online banking usage (Joseph & Stone, 2003; Laforet & Li, 2005; Liao & Cheung, 2002). Now that online banking has several millions of active users worldwide, we need to shift the focus of research about customer satisfaction or customer loyalty – which increases current customer retention and life-time value of the customers (Maenpaa et al., 2008).

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Customer satisfaction, the feeling of customers using a product or service, is one of most popular research topics in marketing and e-commerce studies, including its positive effects on customers' repurchase and 'word-of-mouth' behaviors. Recent online banking studies, including Casaló, Flavián, and Guinalíu (2008), have found that customer satisfaction with previous online banking interactions have had a positive effect on both customer loyalty and positive word-of-mouth. One survey investigation (Foresee results survey, 2005) concluded that highly satisfied online bankers were nearly 39% more likely to purchase additional products and services from their bank than dissatisfied online banking customers. Thus, indentifying the antecedents of customer satisfaction with online banking is an important research subject in practice. Also, customers' attitudes and behaviors may vary according to individual characteristics such as age, gender and experience. It has been proposed that experience, in particular, influences consumer (or user) behaviors in marketing, e-commerce and information systems studies. Several studies have examined the effects of experience on customers' behavior, perceptions and behavioral intentions (Castaneda, Munoz-Leiva, & Luque, 2007; Rodgers, Negash, & Suk, 2005; Taylor & Todd, 1995). Although experience has received a lot of research attention in diverse contexts, little research has been conducted to explore the effects of experience in the online banking context.

In 1997, China Merchants Bank was first to launch an Internet payment system in China; thereafter, online banking spread rapidly in China. Most retail banks in China now provide online

banking as add-on services to existing branch activities (Laforet & Li, 2005). In 2008, the number of online banking users in China was 58 million, an increase of 45% from the previous half-year. The overall percentage of the number of users in the country has reached 19.3% (China Internet Network Information Center, 2009) and IDC predicted that online banking in China would increase rapidly from 2008 to 2012, with a compound annual growth rate (CAGRs) of 23.1% (International Data Corporation, 2008). Given the size of the online banking user community and the recent developments in online banking in China (as mentioned above), it is important to study this area since it represents a large part of the Internet economy – China surpassed the United States in its number of Internet users in June 2008, and is now ranked first in the world (China Internet Network Information Center, 2009).

Accordingly, the purpose of this study is to investigate the antecedents of customer satisfaction with online banking in China and explore the effects of experience on the relationships between the antecedents and customer satisfaction. To attain the objectives of this study, we first identify the antecedents of customer satisfaction with online banking based upon a theoretical review and logical reasoning, and we then analyze the effects of experience on the relationships between the antecedents and customer satisfaction using a structural multi-group (a high-experience group and a low-experience group) model. The next section of this study will introduce the antecedents of customer satisfaction with online banking. Our hypotheses will be explained in the third section. The research design and survey results will be presented in the fourth and the fifth sections, respectively. In the sixth section, we will discuss our results and will explain the implications of this study and further research directions.

2. Antecedents of customer satisfaction with online banking

The concept of customer satisfaction occupies a central position in marketing thought and practice (Churchill & Surprenant, 1982). Researchers have focused on antecedents of customer satisfaction because customer satisfaction is generally assumed to be a significant determinant of repeat sales, positive “word-of-mouth”, and consumer loyalty (Bearden & Teel, 1983).

Although the subject of satisfaction has been discussed extensively in the literature of information systems, e-commerce and marketing (see DeLone & McLean, 1992; Liu, He, Gao, & Xie, 2008), the exploration of antecedents to customer satisfaction with online banking is still in its infancy. Recently, some researchers (e.g., Liao & Cheung 2008) have started to investigate the determinants of customer satisfaction with online banking. Yet, there is no current consensus on the antecedents or determinants of customer satisfaction with online banking. Given that online banking deals with information systems, e-commerce, and marketing activities, we propose conducting a literature review of the antecedents of customer satisfaction with online banking.

2.1. Ease of use

In information systems literature, ease of use has been regarded as a factor that influences users' satisfaction (Doll & Torkzadeh, 1988; McHaney & Cronan, 1998), a measurement of system quality (DeLone & McLean, 1992), and a determinant of IT adoption (Davis, 1989). These phenomena have been supported by e-commerce studies. That is, in those studies that propose a key dimension of web quality (Aladwani & Palvia, 2002; Palmer, 2002) or find determinants of customer satisfaction (Pikkarainen, Pikkarainen, Karjaluoto, & Pahlila, 2006), ease of use is frequently used. In particular, Liao and Cheung (2008) proposed and empirically tested ease of use as a measurement of consumer satisfaction with online

banking. Therefore, ease of use is an antecedent of customer satisfaction with online banking.

2.2. Transaction speed

Transaction speed (often referred to response time) has received attention in the context of information systems and e-commerce due to an increase in focus on the efficiency of operational resources. Therefore, it is frequently discussed as an important factor of user satisfaction in information systems (DeLone & McLean, 1992; Srinivasan, 1985) or commercial web site evaluations (Aladwani & Palvia, 2002). Liao and Cheung (2002) argued that in advanced societies, consumers tend to be highly sensitive to the speed of service delivery, thus transaction speed, as a time-saving feature – is an essential consideration for customers' satisfaction with self service technologies such Automated Teller Machines (ATMs) and is expected to have a positive influence on customer satisfaction with online banking.

2.3. Design

Usability and design are important to human–computer interaction (HCI) because they influence user satisfaction and task performance when using a computer (Palmer, 2002). Usability refers to the extent to which the user and the system can communicate clearly and without misunderstanding through the interface (Benbunan-Fich, 2001). Good web site design enhances usability, thus affecting the success of the websites. Ranganathan and Ganapathy (2002) argued that a web site's design plays an important role in attracting, sustaining and retaining the interest of a consumer in the site. Also, several studies have empirically verified that the design of a web affects users' satisfaction (Liu et al., 2008; Zviran, Glezer, & Avni, 2006). Hence, the design of the online banking web site may also have a positive influence on customer satisfaction.

2.4. Security

Because e-commerce is based on the Internet, which is an open network, security is an important factor for e-commerce applications. Despite various technical advancements in Internet security such as cryptography, digital signatures and certificates, and authentication, consumers are still concerned about the security of monetary transactions when using the Internet (Ranganathan & Ganapathy, 2002). Monetary transactions over the Internet are the main role of online banking; therefore, if the security concern of online banking is removed, customers' satisfaction with online banking may increase. Several studies (Jun & Cai, 2001; Liao & Cheung, 2008) also argued that security was a significant determinant of online banking. To summarize, the security of online banking may have a positive influence on customers' satisfaction.

2.5. Information content

The key characteristics of a web site may be categorized into either content or design (Huizingh, 2000). Content refers to the information offered in the web site. The contents play an important role in influencing the behaviors of consumers. Thus, a lot of studies have selected content (or information content) as a measurement of web site quality (Ranganathan & Ganapathy, 2002). Although originally online banking focused on the function that performs bank transactions in Internet, most online banking web sites now provide a variety of information areas such as investment, real estate, and personal financial planning information. The information content of online banking may therefore have a positive influence on customers' satisfaction.

2.6. Customer support service

According to Joseph and Stone (2003), customer support services may be defined as the ability to provide feedback on problems about the purchased goods and services, or the purchase process itself, and to the ability to solve customer problems and concerns. Thus, customer support services can be regarded as the responsiveness dimension of service quality. Several studies have empirically tested responsiveness as a determinant of service quality or customer satisfaction with online banking (Jun & Cai, 2001; Liao & Cheung, 2008). These studies showed that responsiveness increased customers' satisfaction. Hence, the quality of online banking customer support services may have a positive influence on customers' satisfaction.

3. The moderating effects of experience

This study includes level of experience as a potential moderating variable because a review of the literature shows that people with a high level of experience are distinct from those with a low level of experience in terms of the knowledge structure (Mitchell & Dacin, 1996; Söderlund, 2002). Differences in the structure of knowledge are reflected in different activities related to information processing, such as problem solving, reasoning and induction, forming opinions, and recall and recognition of information (Hernandez Maestro, Munoz Gallego, & Santos Requejo, 2007). This implies that customers evaluate their satisfaction with online banking differently depending on their experience.

The existing literature indicates that experience is closely related to expertise (Rodgers et al., 2005) and self-efficacy (Bandura, 1986). Expertise is defined as the ability to perform product-related tasks successfully (Alba & Hutchinson, 1987), which helps people use a particular product very easily and comfortably. Self-efficacy, another construct, is defined as one's sense of competence and confidence in performing behaviors to achieve a desired outcome (Suldo & Shaffer, 2007). In information systems studies, it has also been shown to enhance users' perception of ease of use (Venkatesh & Davis, 1996). Consequently, the more the customer experiences, the higher evaluates ease of use given the effects of both expertise and self-efficacy. These high evaluations can cause a decrease in the importance of ease of use in determining customer satisfaction. In a study that explores the role of prior experience in TAM (technology acceptance model), Taylor and Todd (1995) argued that users without experience focus first on ease of use, and after overcoming concerns about use, then focus their attention on perceived usefulness. Castaneda et al. (2007) also found that experience has a moderating effect on web acceptance and that the relationship between ease of use and behavior is stronger for users with limited experience. The results of these studies suggest that ease of use is more important for users with low experience. Therefore, we establish the following hypothesis.

• **Hypothesis 1 (H1).** The effect of ease of use on customer satisfaction is significantly higher in online banking users with low experience.

If users do not overcome their concerns about using a web site, the design and transaction speed of the web site are unimportant. Castaneda et al. (2007) argued that, for individuals with limited user experience with a system, ease of use was evaluated as being a strong determinant of customer satisfaction, however, experienced users evaluated a system in a more in-depth way, specifically, they would value web site design or transaction speed more than less experienced users would. Therefore, we establish the following two hypotheses.

• **Hypothesis 2 (H2).** The effect of design on customer satisfaction is significantly higher in online banking users with high levels of experience.

• **Hypothesis 3 (H3).** The effect of transaction speed on customer satisfaction is significantly higher in online banking users with high levels of experience.

In many previous studies, security of financial transactions and personal data has been identified as determinants of online banking adoption (Durkin et al., 2008; Liao & Cheung 2002). The importance of security for the customer's attitude is determined by the consumers' perception of risk to privacy and financial transactions over the Internet, which is an open network. In studies related to online shopping, trust is seen as a crucial factor to reduce perceived risk (Pavlou, 2003), which is enhanced significantly by familiarity (often referred to as user experience) with an online vendor (Gefen, 2000). Consequently, it is deduced that the more customers transact with an online bank, the less they have concerns over security and privacy issues. Miyazaki and Fernandez (2001) concluded that higher level of Internet experience resulted in lower perceived risk and fewer concerns regarding security and online fraud. Therefore, we establish the following hypothesis.

• **Hypothesis 4 (H4).** The effect of security on customer satisfaction is significantly higher in online banking users with low levels of experience.

According to the heuristic-systematic model (Chen & Chaiken, 1999), heuristic processing takes place in situations in which people are not motivated or not able to think thoroughly about the contents of a message. In contrast, systematic processing occurs in situations in which participants are highly motivated and able to scrutinize a message. Thus, when users evaluate a website, users with low levels of experience will process the website heuristically, drawing on those aspects that are easy to evaluate (ease of use), whereas users with higher levels of experience will assess the more detailed aspects of the website such as information content (Castaneda et al., 2007). Therefore, we establish the following hypothesis.

• **Hypothesis 5 (H5).** The effect of information content on customer satisfaction is significantly higher in online banking users with high levels of experience.

Experience refers to personal knowledge or skill derived from participation or observation. Thus, individuals with lower levels of experience may have more problems in interacting with online banking than individuals with high levels of experience. Customer support service means to provide feedback promptly on problems regarding the online banking process, or solving the customer's dissatisfaction (Joseph & Stone, 2003). This implies the fact that users with low levels of experience may depend on customer support services more, and they may therefore also evaluate it as a more important feature, than users with high levels of experience. Therefore, we establish the following hypothesis.

• **Hypothesis 6 (H6).** The effect of customer support service on customer satisfaction is significantly higher in online banking users with low levels of experience.

4. Research methodology

4.1. Data collection

Since the primary users of online banking are college students and white collar workers in China (China Internet Network Information Center, 2009), the respondents were chosen randomly from

university campuses and on the streets. A total of 300 questionnaires were distributed, among which 224 usable questionnaires were collected and used in the analysis. The respondents were equally distributed between male (114) and female (114). Approximately, 96% of the respondents were over the age of 20, and 69% of the respondents had over 1 year of Internet banking experience.

Detailed descriptive statistics relating to the respondents' characteristics are shown in Table 1.

4.2. Measurements' development

The questionnaire used for data collection contained scales to measure the various constructs of the research model. The measurements were adapted from studies by Aladwani and Palvia (2002), Joseph and Stone (2003), Suh and Han (2003), Yoon and Kim (2009), and Rod, Ashill, Shao, and Carruthers (2009). Although we adapted most of the items from previous studies to establish the content validity of the measurements, some items were newly developed for this study. A pilot test was, therefore, conducted with university students to validate the measurement items. The wording of the survey items was modified based on the results of the pilot test and the advice of IT consultants. All items of the questionnaire are shown in Appendix A.

Individuals indicated their agreement or disagreement with the survey items using a seven-point scale. Data analysis proceeded in two stages. First, a validity test on the research measurements was conducted by confirmatory factor analysis (CFA). Second, an analysis of the structural multi-group model was used to test the associations in the research model.

5. Results

The structural equation modeling (SEM) approach was used to validate the research model. Partial least squares (PLS-Graph Version 3.0) was employed to perform the analysis. PLS employs a component-based approach for estimation, and places minimal restrictions on sample size and residual distributions. PLS also supports a pooled significance test for a structural multi-group (Chin, 2000), which is becoming the most common approach in IS studies (Qureshi & Compeau, 2009). Thus, PLS was used to accommodate the presence of relatively lean sample sizes and multi-group analysis.

5.1. Reliability and validity of measurement items

Partial least squares (PLS) can tests the convergent and discriminant validity of the scales. In a confirmatory factor analysis (CFA) by PLS, convergent validity is shown when a measurement loads highly (coefficient above 0.60) and loads very significantly (t -val-

ues well within the 0.01 level), on its assigned construct (Bagozzi & Yi, 1988). Table 2 shows the factor loadings of the measurement items and t -values.

The factor loadings of all items surpass the recommended level of 0.60, demonstrating convergent validity, and all t -values are also above 1.96 (Gefen & Straub, 2005).

Discriminant validity is shown when: (1) measurement items load more strongly on their assigned construct than on the other constructs in a CFA; and, (2) the square root of the average variance extracted (AVE) of each construct is larger than its correlations with the other constructs (Gefen & Straub, 2005).

As shown in Table 2, all the measurement items loaded considerably more strongly on their respective factor than on the other constructs. Table 3 shows the square root of AVE and the inter-construct correlations. A comparison of the correlation with the squared AVE shows that all correlations between two constructs are less than the squared AVE of both groups.

In order to assess the reliability of measurement items, we compute composite construct reliability coefficients. Composite reliabilities range from 0.849 (for ease of use) to 0.929 (for customer satisfaction), which exceed the recommended level of 0.70 (Bagozzi & Yi, 1988). AVEs range from 0.653 (for ease of use) to 0.814 (for customer satisfaction), which also exceed the recommended level of 0.50 (Fornell & Larcker, 1981). The results, therefore, demonstrate a reasonable reliability level of the measured items.

5.2. Common method bias

Since data were self-reported for all of the variables – six dependent variables and one independent variable – there were possible sources of common method bias, including consistency motif and social desirability (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). We used an approach that is used commonly in IS studies (Klein, Rai, & Straub, 2007; Liang, Saraf, Hu, & Xue, 2007; Ke & Zhang, 2009), and performed an analysis to assess common method bias using PLS. We did this using the following procedures. First, a common method factor was added in the PLS model, whose indicators include all of the principal construct items. Then variances of each indicator were calculated, substantively explained by the principal constructs and by the common method factor. The squared values of the common method factor loadings were interpreted as the percentage of indicator variance caused by method, whereas the squared loadings of substantive constructs were interpreted as the percentage of indicator variance explained by substantive constructs.

As shown in Table 4, the average of variances substantively explained by the principle constructs is 0.718, while the average of variance explained by the method-based factor was 0.008. The subsequent ratio of substantive variance to method variance is 90:1, with no significant method factor loadings detected for all but two items with significant at the 0.01 level. This analysis supports the conclusion that common method bias did not impact our results (Klein et al., 2007).

5.3. Hypothesis testing results

In order to test the hypotheses, we divided all the respondents into two groups: individuals with more than one online banking use per month (high-experience group), and all the rest (low-experience group), and we established structural multi-group models for the groups. A customer who performs more than one online banking per month may be regarded as a high-experience user because a large percentage of bank transactions happen on a monthly basis.

Having assessed the structural multi-group model, we examined the coefficients of the causal relationships between con-

Table 1
Descriptive statistics of respondents' characteristics.

Measure	Value	Frequency (%)
Gender	Male	114(50.0)
	Female	114(50.0)
Age	Below 20	7(3.1)
	20–29	211(95.5)
	30–39	8(3.5)
	Over 40	2(0.9)
Degree of online banking experience	<1 year	69(30.3)
	<2 year	83(36.4)
	<3 year	50(21.9)
	≥3 year	26(11.4)
Frequency of online banking	<1 per month	101(44.3)
	≥1 per month	127(55.7)

Table 2
Confirmatory factor analysis results.

Construct		Construct loading scores							t-Value
		1	2	3	4	5	6	7	
Ease of use	EOU1	0.789	0.440	0.338	0.369	0.400	0.280	0.364	21.74
	EOU2	0.840	0.482	0.463	0.567	0.425	0.371	0.492	33.87
	EOU3	0.794	0.545	0.378	0.426	0.469	0.275	0.416	19.07
Design	DSG1	0.488	0.890	0.529	0.498	0.443	0.348	0.508	68.56
	DSG2	0.564	0.817	0.490	0.559	0.506	0.385	0.481	26.93
	DSG3	0.496	0.846	0.501	0.464	0.499	0.391	0.462	35.30
Transaction Speed	SPD1	0.435	0.514	0.866	0.486	0.417	0.382	0.490	42.97
	SPD2	0.350	0.508	0.884	0.512	0.411	0.402	0.501	42.76
	SPD3	0.496	0.523	0.843	0.499	0.529	0.441	0.485	35.16
Security	SEC1	0.405	0.446	0.449	0.849	0.426	0.404	0.553	34.44
	SEC2	0.438	0.480	0.478	0.864	0.478	0.436	0.529	46.45
	SEC3	0.546	0.556	0.463	0.852	0.542	0.411	0.562	36.79
	SEC4	0.526	0.500	0.541	0.752	0.493	0.360	0.453	19.11
Information content	IFQ1	0.354	0.318	0.420	0.377	0.702	0.383	0.424	13.99
	IFQ2	0.467	0.508	0.361	0.498	0.834	0.449	0.529	29.48
	IFQ3	0.451	0.493	0.470	0.522	0.851	0.560	0.568	38.99
	IFQ4	0.414	0.455	0.411	0.437	0.778	0.486	0.497	26.66
Customer support	SVQ1	0.382	0.371	0.466	0.501	0.570	0.836	0.480	28.80
	SVQ2	0.294	0.378	0.356	0.359	0.475	0.893	0.464	44.89
	SVQ3	0.335	0.396	0.410	0.409	0.514	0.884	0.547	46.05
Customer satisfaction	SAT1	0.481	0.524	0.510	0.562	0.612	0.554	0.896	52.40
	SAT2	0.475	0.519	0.562	0.573	0.554	0.541	0.924	65.79
	SAT3	0.482	0.496	0.465	0.582	0.566	0.453	0.886	49.73

Table 3
Square root of AVE and inter-construct correlations and composite reliability.

Construct	Factor							CCR ^a	AVE ^b
	(1)	(2)	(3)	(4)	(5)	(6)	(7)		
Ease of use	<i>0.808</i>							0.849	0.653
Design	0.605	<i>0.851</i>						0.888	0.725
Transaction speed	0.493	0.595	<i>0.865</i>					0.899	0.748
Security	0.573	0.596	0.577	<i>0.830</i>				0.898	0.689
Information content	0.534	0.565	0.582	0.522	<i>0.794</i>			0.871	0.630
Customer support	0.387	0.439	0.486	0.472	0.597	<i>0.871</i>		0.904	0.759
Customer satisfaction	0.531	0.569	0.634	0.569	0.640	0.573	<i>0.902</i>	0.929	0.814

Italics region: square root of AVE.

^a CCR, composite construct reliability.

^b AVE, average variance extracted.

structs, which would validate the hypothesized effects. Fig. 1 illustrates the paths and their significance on the structural model. As shown in Fig. 1, most paths are significant above the 0.05 level with the exception of five paths: ease of use and customer support service on customer satisfaction in the high-experience group, and ease of use, design, and transaction speed on customer satisfaction in low-experience group.

Approximately, 63% and 53% of the variance of customer satisfaction in the high-experience group and low-experience group, respectively ($R^2 = 0.628, 0.527$) is explained by ease of use, design, transaction speed, security, information content, and customer support service.

The hypotheses were examined by comparing the path coefficients based on the Wynne Chin approach. Chin (2000) provides an approach for multi-group comparison, which is to treat the standard error estimates from each re-sampling in a parametric sense via *t*-tests. As indicated in Table 5, all *t*-values comparing the two groups are significant above the 0.05 level. Therefore, hypotheses testing by comparing the path coefficients can be performed.

Four hypotheses were supported in the testing: H2, H4, H5, and H6. As shown in Table 5, the effect of ease of use on customer satisfaction (H1) is insignificant at $\alpha = 0.05$ in both groups and the

path coefficient (H3) from security to customer satisfaction in the low-experience group is larger than it is in high-experience group. Thus, H1 and H3 were rejected.

Additionally, we analyzed customer perceptions upon the constructs. Table 5 shows the mean scores and standard deviations, together with significant *F* ratios between the two groups. Experience differences in perceptions upon the constructs were examined using ANOVAs. As shown in Table 6, significant differences were found for ease of use, security, information content, and customer satisfaction based on the level of online banking experience. These results indicate that customers with high online banking experience have a higher number of positive perceptions about the ease of use, security, information content, and customer satisfaction than customers with low experience.

6. Discussion and conclusions

The use of online banking is expected to grow; however, as there has already several millions of active users worldwide, we need to shift the focus of research towards customer satisfaction and customer loyalty (Maenpaa et al., 2008) and extend the research area to diverse topics including culture, gender, and the experiences of online banking users. Accordingly, this study inves-

Table 4
Common method bias analysis.

Construct		Substantive factor loading (R_1)	R^2	Method factor loading (R_2)	R^2
Ease of use	EOU1	0.923**	0.852	−0.145**	0.021
	EOU2	0.721**	0.520	0.124*	0.015
	EOU3	0.785**	0.616	0.018	0.000
Design	DSG1	0.963**	0.927	−0.092*	0.008
	DSG2	0.702**	0.493	0.136	0.018
	DSG3	0.880**	0.774	−0.034	0.001
Transaction speed	SPD1	0.896**	0.803	−0.037	0.001
	SPD2	0.939**	0.882	−0.071	0.005
	SPD3	0.755**	0.570	0.113	0.013
Security	SEC1	0.954**	0.910	−0.132**	0.017
	SEC2	0.937**	0.878	−0.086	0.007
	SEC3	0.772**	0.596	0.091	0.008
	SEC4	0.640**	0.410	0.143	0.020
Information content	IFQ1	0.792**	0.627	−0.098	0.010
	IFQ2	0.855**	0.731	−0.027	0.001
	IFQ3	0.768**	0.590	0.093	0.009
	IFQ4	0.765**	0.585	0.016	0.000
Customer support	SVQ1	0.751**	0.564	0.122*	0.015
	SVQ2	0.993**	0.986	−0.128*	0.016
	SVQ3	0.864**	0.746	0.013	0.000
Customer satisfaction	SAT1	0.844**	0.712	0.059	0.003
	SAT2	0.943**	0.889	−0.021	0.000
	SAT3	0.920**	0.846	−0.038	0.001
Average		0.842**	0.718	0.001	0.008

* Significant at the 0.05 level.

** Significant at the 0.01 level.

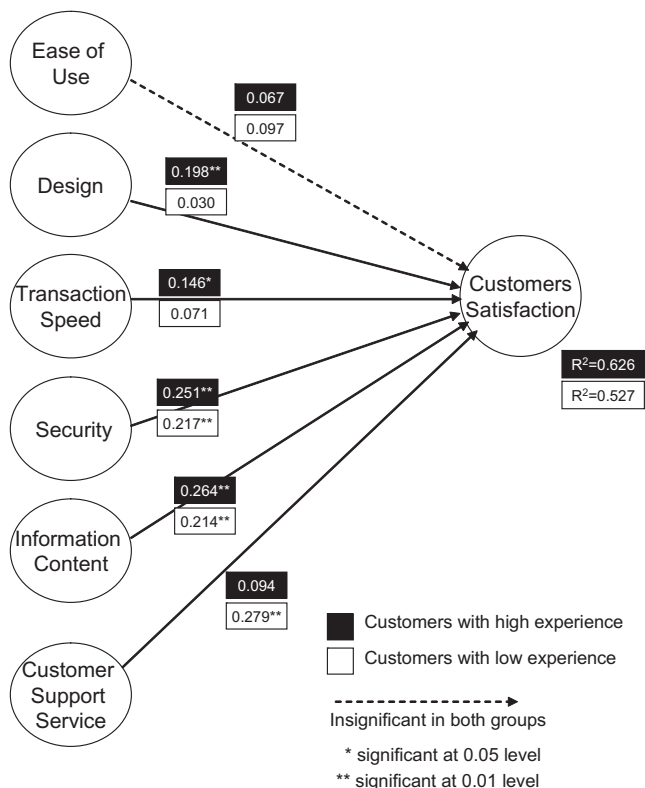


Fig. 1. Path diagram for research model.

tigates the antecedents of customer satisfaction with online banking and explores effects of experience.

The results showed that design, security, speed, information content, and customer support service had a significant influence on customer satisfaction for those customers with either high or low experience, but ease of use did not have a significant influence on customer satisfaction in either of the two groups. The finding that ease of use did not affect customer satisfaction contradicts previous studies (Devaraj, Fan, & Kohli, 2002; Liao & Cheung, 2008). Possible explanations for these findings are the technical attributes of online banking and an increase in customers' Internet experience. Although online banking can be regarded as a new information technology (IT), it is based on web technologies that have an ease of use feature, and which are frequently used by many people today. Thus, even though they may be new online banking customers, they may not have much trouble in using online banking. Some studies related with technology acceptance models (TAMs) demonstrated that the more experienced users were with respect to IT, the lower the effects of ease of use (Castaneda et al., 2007).

The results of the hypotheses testing verified that experience is a moderating factor in the relationships between the antecedents and customer satisfaction. In customers with high experience, design, security, speed, and information content were found to be more important influences on customer satisfaction, whereas customer support services had more of an effect on customers with low experience. These results imply that the customers with high experience place greater emphasis on information system attributes (design, security, speed, and information content) than service attributes (customer support services), and also that they carry out a systematic processing when they evaluate an online banking application. Namely, customers with high experience with online banking evaluate their satisfaction with a relatively comprehensive and analytical scrutiny of judgment-relevant information (Chen & Chaiken, 1999).

Contrary to our expectations, H4 was not supported. It appears that although customers' experience may lead to a higher level of trust, it may not lead to a lower level of perceived risk and security (Corbitt, Thanasankit, & Han, 2003). The results showed that the effect of security on customer satisfaction is significantly higher in online banking users with high experience. As shown in Table 6, customers with high experience have higher positive perceptions about the security of online banking than customers with low experience. However, an increasing number and sophistication of hacking tricks such as phishing, pharming, and spyware, as well as new and emerging online fraud schemes, maybe have heightened the perception of those customers with high experience that institutional trust is much more required than now and security is still an important issue with respect to online banking use. As shown in Table 5, security, after information content, is the strongest influencing factor on customer satisfaction.

6.1. Contributions and implications

This study presents important implications for research and practice. Despite the rapid growth of online banking, previous research has mostly been confined to the adoption of online banking services. This study focused, instead, on customer satisfaction. Therefore, the significant contribution of this study lies in its initiation of research into customer satisfaction with, and customer loyalty towards, online banking. This study concludes that experience plays a moderating role in relationships between antecedents and customer satisfaction with online banking.

The findings of this study have important implications for banking practitioners by providing strategic insights into achiev-

Table 5

Comparison of the path coefficients in both samples.

	High experience		Low experience		t-Value comparing the two group
	Path coefficient	Path standard error	Path coefficient	Path standard error	
H1: Ease of use	0.067	0.083	0.097	0.116	−2.18*
H2: Design	0.198**	0.094	0.030	0.119	11.5**
H4: Transaction speed	0.146*	0.075	0.071	0.096	6.43**
H3: Security	0.251**	0.093	0.217**	0.085	2.87**
H5: Information content	0.264**	0.090	0.214**	0.107	3.75**
H6: Customer support	0.094	0.076	0.279**	0.102	−15.16**

t-Values were calculated using the procedure described in Chin (2000). The procedures were as follows:

First, calculate the pooled estimator for the variance, which is $Sp = \text{square root of } \{[\text{square of } (m-1)/(m+n-2)] * \text{square of SE for sample1} + [\text{square of } (n-1)/(m+n-2)] * \text{square of SE for sample2}\}$.

Then, subtract the paths for the two samples. Take this difference and divide by $Sp * \text{square root of } (1/m + 1/n)$.

Note. m , n (sample sizes) SE (standard error).

* Significant at the 0.05 level.

** Significant at the 0.01 level.

Table 6

Mean scores and standard deviations.

Construct	High experience		Low experience		Significant F ratios
	Mean	SD	Mean	SD	
Ease of use	5.44	1.00	4.86	1.19	15.58*
Design	5.18	1.14	4.88	1.27	3.63
Transaction speed	5.25	1.21	4.75	1.23	9.62
Security	5.53	1.12	4.98	1.23	12.13*
Information content	5.11	1.09	4.78	1.11	4.99*
Customer support	4.79	1.31	4.54	1.34	2.01
Customer satisfaction	5.60	1.13	5.00	1.16	15.22*

* Significant at the 0.01 level.

ing customer satisfaction with online banking. First, information content and security play a critical role in customer satisfaction with online banking. Recently, most online banking web sites provide a variety of information areas such as investment, real estate, and personal financial planning. These additional information services can provide a way to gain competitive advantage in online banking through customer satisfaction. In addition, due to the continuing evolution of Internet hacking techniques, customers are still concerned with the safety of financial transactions over the Internet. To satisfy and secure their customers, online banking managers must keep a close eye on information content and security. Second, although the effects of design and speed on customer satisfaction with online banking were insignificant for customers with low experience, the effects were significant for customers with high experience. Therefore, online banking managers should continually invest in information technology to enhance system quality, such as design and speed. Finally, customer support service appeared to be the most influential factor in online banking customer satisfaction for customers with low experience. It is, therefore, desirable for online banking managers to provide more customer support services to their new customers.

6.2. Limitations and further research issues

Although this study provides meaningful implications, it has some limitations. First, this study did not analyze the national culture of China. Differences in national culture can affect consumers' behavior in using online banking services. In particular, China has strong collectivism and a high long-term orientation and we cannot, therefore, be absolutely sure that the same results apply to other countries. In order to assure the results, the study should

be conducted in other countries. Second, this study could not control income and occupation variables that can affect the results. Because most respondents were reluctant to complete this information in the survey, we could not analyze the effects of these parameters. Therefore, future research should test the influence and effect of these additional details.

Appendix A

A.1. Ease of use (adapted from Yoon and Kim (2009) study)

- EOU1. This online banking application has easy navigation.
- EOU2. This online banking application has easy transaction processing*.
- EOU3. This online banking application has an easy inquiry procedure.

A.2. Design (adapted from Aladwani and Palvia (2002) and Yoon and Kim (2009) studies)

- DSN1. This online banking application has a neat and tidy web design.
- DSN2. This online banking application has a web design which is ease to use*.
- DSN3. This online banking application has an attractive web design.

A.3. Security (adapted from Suh and Han (2003) and Yoon and Kim (2009) studies)

- SEC1. The security devices of this online banking application properly transfer the data that is sent by me.
- SEC2. The security devices of this online banking application protect the data that is sent by me.
- SEC3. The security devices of this online banking application do not permit changes to data that are sent by me.
- SEC4. Due to security devices, this online banking application does not deny the facts of the data sent by me.

A.4. Speed (adapted from Aladwani and Palvia (2002) and Yoon and Kim (2009) studies)

- SPD1. The connection speed of this online banking application is fast.
- SPD2. The transaction processing speed in this online banking application is fast*.
- SPD3. The page loading speed of this online banking application is fast.

A.5. Information content (adapted from Aladwani and Palvia (2002) and Yoon and Kim (2009) studies)

- INF1. The information content of this online banking application is useful.
- INF2. This online banking application provides relevant information content.
- INF3. This online banking application provides current information content.
- INF4. The information content of this online banking application is easily understood.

A.6. Customer support service (adapted from Joseph and Stone (2003) study)

- CSS1. This online banking application faithfully reply customer's inquires*.
- CSS2. This online banking application provides feedback promptly on problems.
- CSS3. This online banking application is ready to address and solve the customer's problems and dissatisfaction.

A.7. Customer satisfaction (adapted from Rod, Ashill, Shao, & Carruthers (2009) study)

- SAT1. I am satisfied with the transaction processing in the online banking application.
- SAT2. I am satisfied with the services provided by this online banking application.
- SAT3. On the whole I am satisfied with this online banking application.

Note. * newly developed item in the study.

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