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ABSTRACT
Online banking, an Internet based service enabling people to do financial transactions, has been an obstacle for the development of e-commerce in China. This paper investigates the online banking acceptance in China. We conducted an experiment to investigate how users’ perception about online banking is affected by the perceived ease of use of website and the privacy policy provided by the online banking website. We find that both perceived ease of use and privacy policy have a significant impact on user’s adoption of online banking. In this study, we also investigate the relative importance of perceived ease of use, privacy, and security. Perceived ease of use is of less importance than privacy and security. Security is the most important factor influencing user’s adoption. A discussion of the implications of these results and limitations are provided at the end.

Keywords
Online Banking, information privacy, security, technology acceptance model (TAM), experimental design.

INTRODUCTION
Information and communication technology enables traditional financial institutions to expand their business to and through the Internet. Online banking is an Internet based service enabling people to do financial transactions, account management, and so on. In essence, online banking is an electronic consumer interface and an alternative channel of distributions (Bradley and Stewart, 2003). All main financial services featured by a traditional bank can be fulfilled through online banking. Online banking has been regarded as the most important way to reduce cost and maintain or enhance services for consumers. Electronic payment provided by online banking is the most important part of e-commerce, which connects vendor and consumers. Due to the usefulness of online banking, it has been introduced and used in many banks and in many different countries (Calin, 2002; Kari, Tero, Heikki and Seppo, 2006; Laforet and Li, 2005).

There has been a rapid growth of Chinese online banking with e-commerce. The online banking users including organizational and individual users have been growing rapidly. Even though there are about 40 million online banking users so far in China according to the latest report, while most of them are organizational users. The number of individual online banking users is still very low compared to the vast amount of Internet users. Online banking in China is still in its early stage even though the development of E-commerce in China is expanding. Security is still the biggest obstacle of the acceptance of online banking (Laforet, and Li, 2005). A joint survey in China polled over six thousand people, with nearly 90% showing severe security concerns about online banking. According to the latest report, online payment has become the biggest obstacle for the penetration of E-commerce in China. As the facilitator of online payment, online banking is of great importance to the further development of Chinese E-commerce.

As an Internet based technology, online banking is not new but still quite unfamiliar for some people in China due to the digital divide and the different level of internet experience and environments. Understanding how people perceive online banking may help policy maker and managers to facilitate the prosperity of the E-commerce.

Online banking generally has two main modes: 1) totally electronic banks and 2) an electronic branch of a traditional bank. Due to the current laws and rules in China, it is not legally acceptable to have completely Internet-based banks. Considering this fact, this study only focuses on the second mode, an electronic branch of a traditional bank.

The present research aims to investigate how people are influenced to use online banking. In particular, we want to examine how users’ adoption of online banking is influenced by the privacy policy and perceived ease of use of the online banking website, and what the role of each factor plays in the adoption process. These two main factors have been chosen according to the literature. An experimental study was conducted to investigate how users’ acceptance of online banking is affected by the perceived ease of use of the online banking website and the privacy policy provided by the online banking website. Security is also examined based on the perception of each respondent.
Our experimental findings show that both perceived ease of use and privacy policy have a significant impact on the acceptance of online banking while there is no interaction between them. Online shopping is a significant covariate, which means that it is highly correlated with online banking adoption. Furthermore, security concern is identified as the most important consideration about using online banking, even though privacy policy also impacts people’s use.

The rest of the paper is organized as follows. In section 2, the literature review on the technology acceptance and privacy and security are presented. A theoretical model is developed, and then several hypotheses are proposed. The research method, an experimental design is presented in section 3. Results are presented in section 4. Debriefing analysis revealed more information for us about the perception of online banking. This paper concludes with the discussion about the contributions and limitations of this study.

THEORY AND HYPOTHESES

Online banking adoption has been investigated from different perspectives in different countries through different research methodologies, such as the comparison study between US and Japan (Pyun, Les and Kiseok, 2002); consumer attitude and perception of online banking (Petrus and Oly, 2006), and so on.

The development of online banking has come about as part of the development in ICT (Bradley and Stewart, 2003), so it can be examined through the lens of technology acceptance model. Moreover, as a new innovation, the characteristic of online banking itself raised new questions around its adoption, such as privacy and security concerns. All of these are examined and hypotheses are presented.

TAM

Davis’ TAM and its extension has been widely recognized and used in the adoption an implementation of IT in the IS discipline. TAM posits that perceived usefulness and perceived ease of use are the two main factors determining an individual’s intention to accept and use of an IS (Davis, 1989). Perceived usefulness is defined by Davis as “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989). Perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free from effort” (Davis, 1989). These two factors have been empirically justified as important factors determining the adoption and use of IT/IS, including the adoption of online banking (Vijayasarathy, 2004).

Although there is a large body of research which supports the TAM as a good model to explain the acceptance of information systems or IT applications (IS/IT), it is questionable whether the model is applicable to analyze every IS/IT adoption and implementation. To cope with the fast change of IS/IT application, a lot of research has been carried out to extend TAM with integrating more factors to examine different IT applications thoroughly, such as including trust, social influence, and so on. These extensions at the same time also testify that TAM as a base model is quite useful for investigating the acceptance of IS. In this paper, we investigate the influence of perceived ease of use, rather than both perceived ease of use and perceived usefulness. China is still a developing country, with fast economic growth. China has become the number one country of Internet users, the US being number 2. However, using the Internet for e-commerce and online banking in China is still behind the US and the European Union. We assume that the perceived ease of use is still an important factor influencing users’ adoption of online banking.

Hypothesis 1: the easier the use of the online banking website, the more likely the users will use this service

The functionality of online banking is the same as a local bank, especially the financial services. Since online banking has the same functionality of local banks, the perceived usefulness might not be as important a factor for people to use online banking.

To explain the adoption of online banking, TAM is a good base model and it may not be able to fully capture the factors influencing the adoption of the online banking. There are some possible reasons. First of all, what the people choose to adopt online banking for is not merely technology per se, but rather a new use of banking. Online banking is an integration of IT and financial transactions. Second, the aim of online banking is to fulfill as much functionality as local banks do. Online banking is still banking just facilitated by the Internet. In this sense, perceived usefulness of the online banking is no more than a local bank. Thus, the effect of perceived usefulness may not as important as perceived ease of use. Third, the special characteristics of online banking make it different from any other information system. There is a large body of research that has been done to use TAM by including the perceived characteristics of an innovation as key independent variables. The use of online banking is always associated with the potential disclosure of financial and personal information. Security and privacy issues surrounding online banking should not be ignored.
In trying to understand the user’s adoption of online banking, security and privacy concerns should not be ignored because those are the most important concerns for trust building.

**Privacy and Security Policy**

Trust has been identified as an important factor for those financial related online services; moreover, empirical study supports that consumers make many online decisions almost solely on the basis of trust (Avinandan & Prithwiraj, 2003; Urban, Sultan and Qualls, 2000). For online banking, trust plays an extremely important role for the acceptance and use, which has been supported by both research and empirical studies, especially in developing countries (Benamati and Serva, 2007). Trust building is very important for online banking adoption. Privacy and security concern are the two crucial factors for trust building, which has been pointed out as the top two factors influencing user’ adoption.

Privacy and security have been discussed broadly both in academia and practice. Privacy is defined as the ability to control and manage information about oneself (Belanger, Hiller and Smith, 2002). Security is defined as the ability to protect against potential threats. From consumers’ standpoint, security is the ability to protect consumers’ information from information fraud and theft in the online banking business.

Privacy includes third party privacy seals and privacy statements. From the perspective of Internet bankers or other services and product providers, their customers’ information is crucial for them to plan their businesses. Consumer data includes their declared data, such as name, gender, address, and the other is consumer online behavioral data. All of this information could help online bankers to create a more detailed picture of each customer, and marketing strategies of successful firms increasingly depend on the effective use of vast amounts of detailed customer data (Culnan and Armstrong, 1999).

Consumers’ main concern is that they don’t know who is gathering the data and what is being done with the data (Culnan, 2007). Third party seal is a statement that doesn’t disclose consumers’ information to any other party or companies. There is inconsistency about the effectiveness of third party seal and self-reported privacy policy has been proven more effective than third party seal (Peterson, Meinert, Criswell and Crossland, 2007).

Privacy policy including privacy notice can serve as a useful tool to consumer’s trust building (Milne and Culnan, 2004). Empirical study has tested that procedural justice and fairness is critical in building trust in consumers (Culnan and Armstrong, 1999). The privacy policy provided by the Internet vendor can ensure that the consumers disclose their information without higher privacy concerns.

In the literature, privacy and security have been mixed together in a large body of research. There is very little research investigating the different impact of privacy and security partly due to the high correlation between them (Belanger, et al. 2002). In this study, privacy is measured by the presence or absence of specific privacy policy whether the online banking offers its own privacy policy or not. This has particular meanings to China since there are no specific laws and rules protecting consumers’ online privacy yet. Privacy commitment of online product and services merchants may serve as assuring consumers’ suspicions. Posting the websites’ privacy policy has been justified as a good business practice (Culnan, 1999). In this study, the presence or absence of specific privacy policy is used to measure the different levels of online banking websites’ commitment.

Privacy policy has been proven to be an important factor influencing people’s behavioral intention of acceptance of online banking while a specific privacy policy may have more impact on the adoption of online banking. We assume that the presence of privacy policy has more impact on the behavioral intention compared to the absence of privacy policy.

**Hypothesis 2:** the absence (presence) of privacy policy of online banking websites leads to less (more) adoption of the online banking.

Privacy doesn’t exist independently. In conjunction with privacy, security also has been labeled as a key concern of e-commerce and online banking. These two issues are interrelated. For online banking users, their transaction data is important, and their profiling data is even more important because profiling data is associated with their financial status. Once the data is disclosed, they may take the risk of economic loss.

Previous research has shown that privacy and security concerns are always mixed together. In this study, privacy is identified as an important factor influencing the acceptance of online banking. The impact of security is not investigated in this study. There are two reasons. First, even though there is a mix use of security and privacy in the extant literature, there are still some studies that provide empirical support to the dominant impact of security in influencing the Internet-related services including online shopping and banking (Belanger et al, 2002; Laforet and Li, 2005; Frank, 2006; China.Com, 2007). The second consideration is that Chinese online banking and online shopping are still in their early stages. Security is still the dominant
factor influencing peoples' acceptance of online banking in China (Laforet and Li, 2005). In this sense, other factors’ effects may be totally covered due to the dominance of the security concern and not discernible for us.

However, we still investigate how people perceive the relative importance of perceived ease of use, privacy, and security in the debriefing part of the experiment, which enables us to justify our current hypothesis that security is the most important factor influencing users’ behavior intention to use online banking.

Hypothesis 3: security is the most important factor when considering using online banking.

RESEARCH METHOD

Design
We designed and administered a laboratory experiment to test the research hypotheses. The experiment reflects a 2 (perceived ease of use: low, high) by 2 (privacy policy: absent, present) between-participants design. The dependent variable is to what extent they will use the online banking website, which is measured by an 11 point Likert scale. In all treatment conditions, the state privacy policy is presented to make sure that all treatments have to obey the state law about online banking.

Subjects
Participants were one hundred and ten undergraduate students in a Chinese university and all of them are of ethnic Chinese. They were randomly assigned to treatment conditions and their anonymity was guaranteed. They were asked to volunteer to participate in this research study. To capture the background of the subjects, we have included demographic questions regarding their age and Internet usage experience. All respondents have used the Internet before, which makes sure that all respondents have a basic knowledge about the Internet. These students have internet experience already, and some of them have used online banking before. The primary online banking users are still organizational users, but individual users with college degree have been growing fast. All of those young students cannot fully represent the whole population, but based on the reality of online banking in China, college students are the potential target customers and of great importance for the expansion of online banking service in China.

Case Material and Procedure
To test the hypothesis, a questionnaire was developed which included dependent variable - likely to use online banking, and two independent variables, perceived ease of use and privacy policy. The online banking website was described in the questionnaire; the different level of each factor was described clearly and manipulated. In the debriefing part, all participants were asked about their demographic information and Internet usage. Moreover, they were asked to rate the importance of perceived ease of use, privacy, and security, all of these three factors were measured by a seven Likert scale from 1 (no important at all) to 7 (very important).

The procedure was for the professor (not the researcher) to guide the students in each class through the questionnaire. First, she made some general explanation of the purpose of the research, ensuring the students all understood the research and have the right to volunteer. The whole experimental session lasted about five minutes.

RESULTS

Descriptive Statistics
All descriptive statistics results are shown in Table 1. There are around 10 female and 100 male students. All students are from the engineering school of a Chinese university. Their average age is about 21.6 years old. The average Internet experience is four years. All participants have at least one year of Internet experience, which indicates that the Internet is not new for them. Internet frequency measures how often they use the Internet by a 7 point Liker scale. The mean value is 4.46, so they are frequent Internet users. Each treatment has at least 26 participants.

In the following part, all p-values are two-tailed and set as 0.05.

Manipulation Checks
Two questions that captured the ease of use and privacy policy were asked for the manipulation checks. All respondents were asked to answer how they rated the perceived ease of use and policy privacy based on the case they read in the first part of the questionnaires. All manipulation check results are shown in Table 2. Subjects with the presence of privacy policy perceived
higher privacy protection of the website than subjects without a privacy policy (t=-2.855, p=0.005). Subjects with higher perceived ease of use rated the online banking website easier to use than subjects with lower subjects (t=-1.990, p=0.049).

### Table 1. Independent Samples Test of Perceived ease of use and Privacy

<table>
<thead>
<tr>
<th>Levene’s Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td>PEOU_m</td>
<td>.501</td>
</tr>
<tr>
<td>Privacy_m</td>
<td>.269</td>
</tr>
</tbody>
</table>

### Independent Samples Test

The overall results show that manipulation checks are successful.

### Hypotheses Testing

All hypotheses testing results are shown in Table 2. In the following part, the hypotheses testing processes are elaborated.

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>ANOVA</td>
<td>Supported</td>
</tr>
<tr>
<td>H2</td>
<td>ANOVA</td>
<td>Supported</td>
</tr>
<tr>
<td>H3</td>
<td>t-test</td>
<td>Supported</td>
</tr>
</tbody>
</table>

ANCOVA is used in this study. Since the adjusted R square of ANOVA is 0.275, the ANOVA only can account for about 27% total variability. There may be some other variables influencing the dependent variables as well. Some demographic questions capturing the age, Internet experience, and online shopping were also measured in the debriefing section. ANCOVA was done to test the effect of covariance. In the end, online shopping was identified as a covariate, which significantly influenced the adoption of online banking. Moreover, including the covariate enables us to explain more within-group variance, thereby increasing the power of the test. Moreover, ANCOVA removes the bias of the confounding variables.

The correlation between the covariate online shopping experience and the dependent variable likely to use is statistically significant. This means that one of the assumptions of ANCOVA is satisfied. In reality, online shopping is almost facilitated by online payment, which is one of the main functionalities of online banking. In this sense, the online shopping experience and the adoption of online banking have a positive relationship.

The significance value from Levene’s test is .787, greater than 0.05. The null hypothesis that the error variance of the dependent variable is equal across groups should not be rejected. We can conclude that the homogeneity of variance is satisfied. As the homogeneity of variance assumption was met, the results of the factorial ANCOVA can be examined to test hypothesis without concern for their validity (Kerr, Hall and Kozub, 2002).

ANCOVA results are shown in Table 3. It’s clear that covariate online shopping significantly predicts the dependent variable, because the significant value is less than 0.05. Therefore, a user’ adoption of online banking is influenced by their online shopping experience. What’s more interesting is the significant level of perceived ease of use. The impact of perceived ease
of use becomes statistically significant after adding covariate online shopping experience (p-value change from 0.134 to 0.05). Without taking into account the covariate online shopping experience, we would have concluded that perceived ease of use had no effect on the likelihood to use online banking.

Tests of Between-Subjects Effects

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>401.464^a</td>
<td>4</td>
<td>100.366</td>
<td>16.115</td>
<td>.000</td>
</tr>
<tr>
<td>Intercept</td>
<td>2.895</td>
<td>1</td>
<td>2.895</td>
<td>.465</td>
<td>.497</td>
</tr>
<tr>
<td>OnlineShopping</td>
<td>90.304</td>
<td>1</td>
<td>90.304</td>
<td>14.499</td>
<td>.000</td>
</tr>
<tr>
<td>PEOU</td>
<td>24.579</td>
<td>1</td>
<td>24.579</td>
<td>3.947</td>
<td>.050</td>
</tr>
<tr>
<td>Privacy</td>
<td>279.745</td>
<td>1</td>
<td>279.745</td>
<td>44.916</td>
<td>.000</td>
</tr>
<tr>
<td>PEOU * Privacy</td>
<td>3.089</td>
<td>1</td>
<td>3.089</td>
<td>.496</td>
<td>.493</td>
</tr>
<tr>
<td>Error</td>
<td>653.954</td>
<td>105</td>
<td>6.228</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1150.000</td>
<td>110</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>1055.418</td>
<td>109</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R Squared = .380 (Adjusted R Squared = .357)

Table 3. ANCOVA test

Hypothesis 1 predicts that the perceived ease of use has a positive impact on the acceptance of online banking. The ANCOVA results show that hypothesis 1 is not supported by the result (F=3.3947, p=0.05). Perceived ease of use does have a significant main effect on the acceptance of the online banking website.

Hypothesis 2 predicts that the presence (absence) of specific privacy policy has a positive (negative) impact on the acceptance of online banking. F value is 44.916 and the corresponding p-value is given as <0.000. Therefore, we can conclude that the privacy policy has the main effect on the acceptance of online banking.

Interaction

The interaction between perceived ease of use and privacy policy is not statistically significant (F=0.496, p=0.483), meaning there is no statistically significant interaction between them. This result makes practical sense since these two independent variables capture totally different concerns about users’ perception.

Debriefing Analysis

The debriefing questions tried to capture more information about the respondents, which helped to assess more accurately conscious differences in their perception about online banking in general. Several questions about Internet experience and their perception about the potential factors influencing online banking acceptance were asked in the debriefing part.

The relative importance of three different factors, perceived ease of use, privacy, and security, were asked. All of these three questions are measured by the seven point Likert Scale (1-not important, 7-very important). One-sample t test was conducted to compare the means of each one. The results in Table 7 show that security is the most important concern of users, followed by privacy, and then perceived ease of use. These responses demonstrate that participants are really more concerned about security than any other factors. It justified our differentiation of privacy from security.

All one sample t test results show that perceived ease of use, privacy, and security have different mean values from zero, which means all of these three factors are important to them when using online banking. The paired sample t test shows that the sequence of mean value of each variable is security, followed by privacy, and the last is perceived ease of use. All subjects rate that security is the most important concern for them in using online banking. Thus, hypothesis 4 is supported. Our former concern about this experiment is justified. The mean value of security is 5.6, close to the maxim value of 7. Security is the dominant factor influencing a user’s adoption of online banking. Privacy and perceived ease of use are also important to users, but they play a subordinate role in users’ adoption.
DISCUSSION AND CONCLUSION

This research examined the effect of the privacy policy and perceived ease of use and their influence on the users’ behavioral intention to use online banking. The findings of this study indicate the different impacts of the privacy policy, perceived ease of use, and security.

The results show that providing a specific privacy policy does have a significant impact on the adoption of online banking, which is consistent with previous research (Peterson, et al. 2007). By providing a specific privacy policy, users’ behavioral intention to use the online banking website changes dramatically. This raised the policy concern for online privacy policy makers.

By using experimental design, the study distinguished the privacy and security and demonstrated both factors playing an important role in the acceptance of online banking. Security is still the biggest concern for users, which is consistent with previous empirical results of online banking adoption in different countries, especially in developing countries.

Both privacy and security concerns are identified as the two most important factors influencing users’ acceptance of online banking, which have important implications for policy makers. The findings justified that there is an urgent need for a privacy and security policy to protect consumers’ personal and financial information. For e-commerce merchants, they can attract more consumers by providing a specific privacy policy.

The covariate online shopping is included in the ANCOVA to avoid underestimate the factors’ effect is avoided. Then, perceived ease of use is identified as a main factor influencing users’ adoption which contributes to the current literature that perceived ease of use still plays an important role of online banking. From the results, it supports that online shopping is highly correlated with online banking adoption. In this sense, online banking and online shopping as an integrated part of e-commerce should be paid more attention. More resources and efforts should be invested to facilitate the development of e-commerce.

Although these findings are helpful to understand the acceptance of online banking, several limitations should be addressed in future research. First, no real banking website was provided in this study. The perceived ease of use was totally based on the description of the case. Thus, only a number of features of website were covered. The consistency of the real website and website in this is not justified. The second limitation is about sampling. The sampling of this study was limited to students in a university. Different results may be achieved when respondents are more diversified, especially considering the familiarity of computer and Internet operations.

There are some interesting issues around the acceptance of online banking that should be addressed in the future. In this study, all participants have already had Internet experience and the perceived ease of use became significant with the covariate of Internet experience. This study addressed the privacy policy by absence or presence. More research can be done by addressing different privacy policy levels and their impact on users’ acceptance. Once the security and privacy concerns are relieved, the users will be growing exponentially. The direction of research may shift to trust, which is more complicated and doesn’t just include security and privacy concerns.

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