Factors Affect the Customer Satisfaction of Internet Banking: an Empirical Study in China

Zhengwei Ma
1China University of Petroleum (Beijing) /School of Business Administration
Email: mzw8632425@yahoo.com.cn

Abstract

Propose of the paper is to analyze factors of customer service quality that could influence internet banking customer satisfaction in the Chinese commercial banking sector. Moreover, the paper also tries to explain the relationship between customer service quality and customer satisfaction, and to find some major facts for keeping high level internet banking customer satisfaction. The data demonstrated that customer service quality have direct and significant effect to internet banking quality in the banking sector. And customer service quality is positively related to internet banking customer satisfaction. Finally, it is observed that privacy, reputation and price are key factors to affect customer satisfaction in the internet banking service. After the validation of measurement scales, the hypothesis is verified through structural modeling. The authors validate the hypothesis and a measurement model. The paper proposes a structural model for analyzing empirically the link between customer service quality and internet banking customer satisfaction in Chinese internet banking sector.

Keywords: Internet banking, Customer service quality, Customer satisfaction

1. Introduction

The banking sector is one of the most important service providers for a nation’s economy. Today, modern, highly industrialized and technology driven economies are threatened by higher risks more than ever, and individuals’ needs to protect themselves against private risks have escalated. From a banks’ viewpoint, use of Internet banking is expected to lead to reduced costs and improved competitiveness. This service delivery channel is seen as powerful because it can retain current web-based customers, who continue using banking services from all locations. Moreover, Internet banking provides opportunities for a bank to develop its market by creating a new customer base from existing Internet users.

Given the fact that banks invest billion dollars in the internet infrastructure, customer satisfaction and customer retention are increasingly developing into key success factors in e-banking [1]. But low customer satisfaction is a major encumbrance to depress development of e-banking service in Chinese commercial bank sector. Patricio et al.’s [2] focus-group study found that customers with different patterns of use (e.g., frequency of use and type of operations performed) for an e-banking service tend to value different web-site attributes, several of which are related to website quality. Therefore, website quality has significance relationship with e-banking customer satisfaction. Website quality is a key factor to affect e-banking customer satisfaction [3].

In the present study, the creation of the measurement items went as follows. Initially, lists of items from existing instruments were compiled that would capture the five broad dimensions of customer service quality identified by Zeithaml et al. [4]: privacy/security, information quality, ease of use, graphic style and fulfillment. Where theory is less than well developed, it is beneficial to use both academic and practical perspectives [5]. Therefore, using this base list of items, several iterative focus-group discussions were conducted with managers from several banks’ online banking departments in an attempt to choose one item to adequately represent each of the main quality dimensions in online-banking. During these discussions, it was considered important, for the topic of customer service quality, to break the notion of quality into privacy, reputation, price, physical back-up, personalization and customization, empathy.

Considering the previous considerations, the paper is structured as follows: firstly, authors carry out a deep review of the relevant literature concerning the variables included in the study; secondly, authors formalize the hypotheses; thirdly, authors explain the processes of data collection and measures validation; fourthly, authors present the results and conclusions of the study. Finally, authors mentioned potential future research.
2. Literature Review

Many scholars have attempted to seek out the exact dimensions of the customer-service quality. Yang and Fang [6], for example, identified online customer-service quality vis-à-vis satisfaction. To these authors, service quality dimensions are reliability, responsiveness, ease of use and competence. Jayawardhena and Foley [7] proposed another set of the service-quality dimensions underlying customer satisfaction with an Internet banking website: download speed, content, design, interactivity, navigation and security. In the same vein, Yang and Fang [6] uncovered five: responsiveness, reliability, competence, access and security. Several other researchers [8] have made similar efforts.

Based on the preceding literature review and interviews with bankers and online banking customers, six factors were generated in the present study to explain the customer-service quality. They are price, reputation, privacy, personalization and customization, empathy and physical back-up, each of which will be elaborated in the following sections.

2.1 Customer service quality

Price represents both cost efficiency and monetary costs for using a service. Most respondents to the present survey noted that a fair price, cheaper than the alternatives, was essential. A fair service charge should include tangible monetary costs for using the service plus some supplementary fees, such as costs for technological support. Some respondents expected lower service price because of their own active input into the service process. Here is a sample of how this customer expectation comes about from the consumers’ point of view: “They charge me for not having to do their job any longer, and I think it is wrong. They charge me for a service that they do not have to do. The machines count automatically, and it goes via automated machines”. So, clearly, price (fees and charges) is one of the attributes that will determine consumers’ decisions on using e-banking systems in China.

Wang et al. [9] took reputation as a crucial factor affecting service quality. They, in the context of e-service, showed the importance of reputation to service quality. Further, McKnight and Chevany [10] argued that a good reputation would positively affect trusting beliefs because reputation is a kind of “second-hand rumor.” In the online banking, this version of reputation amounts to the accumulated set of opinions gathered from many people about an e-bank. For instance, to the extent that an individual has heard from friends and relatives many positive things (e.g., being useful, easy and high-quality) about an e-banking institute, he or she can be expected to trust that institute.

Privacy refers to the degree to which a website is safe, and customer information protected. This dimension holds an important position in e-service. In the virtual environment of e-service, customers often perceive significant risks stemming from the possibility of improper use of their financial and personal data. Raganathan and Ganapathy [11] found that one dimension of an effective website was privacy, while Furnell and Karweni [12] showed that users rarely trust websites and would avoid giving personal information for fear of losing confidentiality. Privacy is important to building trust and a long-term relationship between users and website operators.

A major benefit of online technologies is that websites can be personalized to satisfy users’ specific needs; online bankers should therefore strive to customize their services to fulfill their target market’s requirements. Madu and Madu [13] acknowledged the importance of customization by stating that online banking corporations should differentiate themselves from their competitors by creating unique qualities that will make them stand out. These authors added that since online users are looking primarily for convenience, online bankers should offer customized products and services to satisfy this need. Customized information does not necessarily mean more information, but rather information of higher quality [14]. So, personalization and customization are indeed factors that underlie customer service quality.

Even though there is no direct human interaction during a virtual online banking transaction, some human contacts are involved. For example, paying customers individual attention shows empathy to them. In response to customers’ requests, e-operators should always be cognizant of the former’s needs and show understanding of such needs. In the virtual environment of online banking, empathy is important to cultivating customers’ perception of the eservice quality without face-to-face encounters.

Online banking service depends on information technologies. Customers typically store a mass of information in the bank’s service. During the survey for the present study, some customers were worried about the security of banks’ data. In China, a customer’s data is stored in several services,
and those data are province-specific. For these reasons, physical back-up should be taken as a factor that affects customer-service quality.

2.2 Customer Satisfaction (CS)

Lee et al. [15] found that customer complaints had a direct effect on customer satisfaction. They reported that as one-dimensional attributes increased, the level of overall customer satisfaction also increased. Ahmed et al. [16] discovered that major gains in customer satisfaction were likely to come from an alleviation of complaints. These researchers, overall, concur that the number of complaints is an index of customer satisfaction. This is why, in the present study, the number of complaints were used to measure customer satisfaction.

Service quality is defined as a long-term cognitive judgment regarding an organization’s “excellence or superiority” [17]. Two main streams of research into the dimensions of service quality exist: the Nordic school, which tends to incorporate the process and outcome dimensions, and the North American school, which draws on SERVQUAL [8]. A customer-oriented quality strategy is critical to service firms as it drives customers’ behavioral intention with, for instance, highly perceived service quality leading to repeat patronage and customer loyalty [18] [19]. Accordingly, substandard service quality will lead to negative word-of-mouth, which may result in a loss of sales and profits as the customers migrate to competitors [18] [6]. These factors stress the importance of delivering high-level services, especially within an electronic environment, where customers can readily compare service firms and where switching costs are low [19].

China Financial Certification Authority (CFCA) was established by 12 national banks in China. It is the authority agency to monitor online banking services in China. CFCA uses two indexes to measure quality of online banking: percentage of increase in the number of users and the frequency of online banking service use. These measurement criteria were adopted in the present study to verify the overall online banking quality.

3. Constructs for the present study and hypothesis

According to the possible connection between customer service quality and customer satisfaction in handling private data, a direct relationship might be established between the two concepts. And follow the prior study; one construct is addressed in the present study: customer service quality and customer satisfaction, all of which are elaborated in prior paragraphs. The relationships between these constructs, as embedded in the hypothesis, are now illustrated in Figure 1.

![Figure 1. Research factors and hypotheses in the present study](image)

Taking into account the previous considerations, the relationship between customer service quality and customer satisfaction is evident in personal data handling and should be examined in greater detail. With the aim of testing this connection in the online banking customer satisfaction, the following hypothesis is proposed:

H1. There will be a positive relationship between customer service quality and customer satisfaction.
4. Data collection

The generation of the initial questionnaire was ascertained by experts and managers interviews at banks as well as through in-depth discussions with online banking users. All questions were scored using a seven-point Likert-scale, where 1 corresponds to “strongly disagree” and 7 to “strongly agree”. Pre-tests of the initial 19-item questionnaire were carried out with 30 online users to improve the questionnaire. The resulting modified 8-item pool was presented to Chinese users of online banking in drop in survey. Respondents were asked to refer to their own online banking service (the one they use regularly) when answering the questionnaire. Non-random method of collecting the data (volunteer sampling) generated 198 fully usable questionnaires. The questionnaires of collection are non-random samples. So authors compared some of the survey results with available information about the population. The results are very similar and as a consequence, authors may conclude that our sample represents the profile of the average Chinese online banking users.

5. Measures validation and results

5.1 Exploratory Factor Analysis

An exploratory factor analysis using SPSS 17 was conducted on all the data. The rotated factor matrix, resulting from an Equamax rotated principal axis factor extraction of the independent variables using the 1.0 eigenvalue cut-off criterion (see table 1), which indicates that eleven factors emerged and reports their factor loadings.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Factor loading</th>
<th>Cronbach alpha</th>
<th>Variance explained (%)</th>
<th>Construct Reliability (CR)</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS</td>
<td></td>
<td>0.856</td>
<td>43.483</td>
<td>0.8566</td>
<td>0.7491</td>
</tr>
<tr>
<td>CS 1</td>
<td>0.857</td>
<td>0.836</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 2</td>
<td>0.836</td>
<td>0.922</td>
<td>32.876</td>
<td>0.9204</td>
<td>0.6591</td>
</tr>
<tr>
<td>CSQ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSQ 1</td>
<td>0.792</td>
<td>0.800</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSQ 2</td>
<td>0.800</td>
<td>0.843</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSQ 3</td>
<td>0.843</td>
<td>0.771</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSQ 4</td>
<td>0.771</td>
<td>0.630</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSQ 5</td>
<td>0.630</td>
<td>0.533</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSQ 6</td>
<td>0.533</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Used SPSS Principal Axis Factoring extraction with Equamax rotation method

The data were tested using the SPSS 17 Exploratory Factor Analysis to evaluate the Cronbach alpha. The Cronbach alpha indicator is the most frequently used test for assessing reliability. Some scholars consider that it underestimates reliability [20]. Consequently, the use of composite reliability has been suggested [21], using a cut-off value of 0.7. The results show the value for customer service quality’s Cronbach alpha is 0.922, and the value for customer satisfaction’s Cronbach alpha is 0.856. This is satisfactory. Each item was evaluated individually to ensure convergent validity and item reliability. All factor loadings were larger than 0.5, representing an acceptable significant level of internal validity. The factor loadings ranged from 0.857 to 0.836 for customer satisfaction, and from 0.533 to 0.843 for customer service quality. All factor loadings were of an acceptable significant level, all 8 items were retained for further analysis (see table 1).
5.2 Confirmatory Factor Analysis

Authors developed a structural equations model (SEM), which the objective of testing is the proposed hypotheses (Figure 2). Authors observed that the hypothesis was supported at the 0.01 level and, in a similar way. Model fit was acceptable (Chi–square =34.279 df, p <0.001, normed Chi–Square = 1.904) From calculating, the author obtained structural equations model (SEM) model fit indexes, and listed these processes in the coming paragraphs.

![Figure 2: The structural equation model](image)

The GFI (goodness of fit index) was devised by Jöreskog and Sörbom [22] for MI and UI is estimation, and generalized to other estimation criteria by Tanaka and Huba [23]. The GFI is given by

\[
GFI = 1 - \frac{\hat{F}}{\hat{F}_b}
\]

(1)

where \(\hat{F}\) is the minimum value of the discrepancy function and \(\hat{F}_b\) is obtained by evaluating \(\hat{F}\) with \(\sum = 0\), g = 1, 2,...,G. An exception has to be made for maximum likelihood estimation, since (D2) is not defined for \(\sum = 0\). For the purpose of computing GFI in the case of maximum likelihood estimation, \(f(\hat{\Sigma}^{(g)} ; S^{(g)})\) is calculated as:

\[
f(\hat{\Sigma}^{(g)} ; S^{(g)}) = \frac{1}{2} \text{tr} \left[ K^{(g)}^{-1} (S^{(g)} - \Sigma^{(g)}) \right]^2
\]

(2)

with \(K^{(g)} = \sum^{(g)} / \hat{\gamma}_{ML}\), where \(\hat{\gamma}_{ML}\) is the maximum likelihood estimate of \(\gamma\). From used the formula (1) and (2), the author calculated that the Model’s GFI is 0.958.

The AGFI (adjusted goodness of fit index) takes into account the degrees of freedom available for testing the model. It is given by

\[
AGFI = 1 - (1 - GFI) \frac{d_b}{d}
\]

(3)

Where

\[
d_b = \sum_{g=1}^{G} p^{(g)}
\]

(4)

From used the formula (3) and (4), the author got that the model’s AGFI value is 0.917.
The Bentler-Bonett normed [24] fit index (NFI), or \( \Delta_1 \) in the notation of Bollen [25] can be written

\[
NFI = \Delta_1 = 1 - \frac{\hat{C}}{\hat{C}_b} = 1 - \frac{\hat{F}}{\hat{F}_b}
\]

(5)

Where \( \hat{C} = n\hat{F} \) is the minimum discrepancy of the model being evaluated and \( \hat{C}_b = n\hat{F}_b \) is the minimum discrepancy of the baseline model. From used the formula (5), the author calculated that the Model’s NFI is 0.971.

The comparative fit index (CFI; [26]) is given by

\[
CFI = 1 - \frac{\frac{m (\hat{C} - d, 0)}{\hat{C} - d_b, 0}}{\frac{m (\hat{C}_b - d_b, 0)}{\hat{C}_b - d_b, 0}} = 1 - \frac{NCP}{NCP_b}
\]

(6)

where \( \hat{C} \), \( d \), and NCP are the discrepancy, the degrees of freedom and the noncentrality parameter estimate for the model being evaluated, and \( \hat{C}_b \), \( d_b \), and NCP_b are the discrepancy, the degrees of freedom and the noncentrality parameter estimate for the baseline model. From used the formula (6), the author calculated that the Model of the study’s CFI is 0.986.

\( F_0 \) incorporates no penalty for model complexity and will tend to favor models with many parameters. In comparing two nested models, \( F_0 \) will never favor the simpler model. Steiger and Lind [27] suggested compensating for the effect of model complexity by dividing \( F_0 \) by the number of degrees of freedom for testing the model. Taking the square root of the resulting ratio gives the population "root mean square error of approximation", called RMS by Steiger and Lind [27], and RMSEA by Browne and Cudeck [28].

\[
\text{Population RMSEA} = \sqrt{\frac{F_0}{d}}
\]

(7)

\[
\text{Estimated RMSEA} = \sqrt{\frac{F_0}{d}}
\]

(8)

The results show that the RMSEA index is 0.068.

Overall, our model exhibited a reasonable fit with the data collected. We assessed the model fit using other common fit indices: goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), normed fit index (NFI), comparative fit index (CFI), root mean square error of approximation (RMSEA). The model exhibited a fit value exceeding or close to the commonly recommended threshold for the respective indices, the commonly suggested valued be list in table 2.

<table>
<thead>
<tr>
<th>Fit statistic</th>
<th>Suggested</th>
<th>Obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-square</td>
<td>34.279</td>
<td></td>
</tr>
<tr>
<td>Df</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Chi-square significance</td>
<td>P &lt; or = 0.05</td>
<td>0.012</td>
</tr>
<tr>
<td>Chi-square/df</td>
<td>&lt; 5</td>
<td>1.904</td>
</tr>
<tr>
<td>GFI</td>
<td>&gt; 0.90</td>
<td>0.958</td>
</tr>
<tr>
<td>AGFI</td>
<td>&gt; 0.90</td>
<td>0.917</td>
</tr>
<tr>
<td>NFI</td>
<td>&gt; 0.90</td>
<td>0.971</td>
</tr>
<tr>
<td>CFI</td>
<td>&gt; 0.90</td>
<td>0.986</td>
</tr>
<tr>
<td>RMSEA</td>
<td>&lt; 0.0.8</td>
<td>0.068</td>
</tr>
</tbody>
</table>

It was also notable that this model has allowed authors to explain at a very high level the customer service quality in customer satisfaction of online banking service. Besides, according to the standardized estimates, authors may say that customer satisfaction is clearly and positively influenced by customer service quality in handling personal data (\( \beta > 0.83 \)) in Figure 2. Authors found all six factors could separate to two groups. One group \( \beta \) is greater than 0.8. Other \( \beta \) is smaller than 0.8. And authors found that privacy, reputation and price have larger effect than other three factors for customer satisfaction (\( \beta > 0.8 \)) in Figure 2.
5.3 Construct Reliability Analysis

The construct reliability of the latent variables is an evaluation standard for the inner quality in a structural equation model. If the construct reliability is higher than 0.7, the inner quality of the model is considered acceptable [29]. The author will use the model standardized regression weights to calculate the construct reliability, presented as $\rho_c$. Construct reliability of customer satisfaction and customer service quality were calculated at a suggested lower limit of 0.70 with equation (1). The results show in the Table 1.

$$\rho_c = \frac{\sum \lambda_i^2}{\sum \lambda_i^2 + \sum \theta_i}$$

(9)

Another index, similar to construct reliability, is “average variance extracted (AVE),” presented as $\rho_v$. This index can explain how much variance explained in the latent variable comes from the observed variables. The higher the average variance extracted, the better the observed variables could explain the latent variable. Generally speaking, the model’s inner quality is considered good when the average variance extracted is higher than 0.5. The average variance extracted from customer satisfaction and customer service quality was calculated at a suggested lower limit of 0.50 with equation (2). The results show in the Table 1.

$$\rho_v = \frac{\sum \lambda_i^2}{\sum \lambda_i^2 + \sum \theta_i}$$

(10)

6. Discussion

Review the results, online-banking customer satisfaction cannot be described as one fact construct. Instead, it represents a multi-factor construct that is composed of customer service quality judgments with regard to the service categories. This study provides validated measurement scales for each factor. The empirical results strongly support the understanding of customer service quality as integral solutions. Based on our findings, management can establish a sequential priority to improve customer service quality in online banking service. The sequential priority depends on the influence to customer satisfaction. For example, when limited resources become the barrier to improve all of six factors, banks can improve privacy, reputation and price to be first step. And the banks could put physical back-up, empathy, personalization and customization to be second step.

7. Limitation

There are several limitations to the present study. First, the sample was China-focused, with all of the respondents residing in China. The participants in this survey may have possessed attributes and behaviors that differed from those in other parts of the world. Second, the sample was restricted to the consumers of banks and may have possessed attributes and behaviors that differ from those of consumers in other business sectors. Next, as mentioned earlier, in the data collection section, since it was impossible to send follow-up surveys, no attempts were made to ascertain the existence of non-response bias by comparing responses to the first-wave surveys with those to a second wave.

8. Future study

Future research may follow up the present study in a number of ways. First, the present study focuses on customer service quality and customer satisfaction as perceived by consumers who have conducted online transactions. However, a mass of individuals primarily utilize the Internet as information sources and have never conducted commercial transactions over it. These consumers may have some unique perspectives regarding online service quality. Thus, future studies should employ a more generalized website quality scale which taps perceptions from both groups. Second, as the e-commerce field becomes increasingly mature, consumers will develop distinct expectations for the quality of online services. Accordingly, more and more industry-wide service standards will be set up and implemented. Thus, future studies may utilize the expectation-disconfirmation paradigm to measure existing and new dimensions of online service quality and customer satisfaction.
9. Acknowledgement

I would like to express my deepest appreciation to all individuals who have helped me complete the study. And the project was sponsored by Research Funds of China University of Petroleum-Beijing.

10. References


