

The Influence of Electronic Banking Service Quality and the Satisfaction of Customers of Medium Banks in China

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Abstract

This research focused the study of quality of medium banks' e-banking services and what contributes to its customer satisfaction factors. The research started with a review of electronic banking, electronic banking service quality, and customer satisfaction. For medium banks, the quality of e-banking service included two aspects, namely service and attitude. Performance, security, website design, reliability and cost are included in e-banking services. The attitudinal aspects of e-banking included empathy. This study had three objectives, the first objective was to study the effect of performance, security, website design, reliability and cost in the service aspects of e-banking on customer satisfaction in medium banks. The second objective was to study the effect of empathy in the attitude of banking services on customer satisfaction in medium banks. The third objective was to study the impact of age, region and education among customer characteristics on customer satisfaction with e-banking services of medium banks.

A quantitative research methodology was used in this study. The research type is a survey. The sample size of this study is 400. Questionnaires and Likert scales are used to collect data. Descriptive analysis and multiple regression analysis were used to analyze the collected data. This study used Cronbach's Alpha and questionnaire tests to determine whether the questionnaire had good reliability. An expert was requested to check the validity of the questionnaire. The research was approved by the Ethics Committee of Huachiew Chalermprakiet University. The privacy of respondents was protected.

The results of this study showed that in terms of the quality of e-banking services, performance, security, website design, reliability and cost positively impact customer satisfaction in medium banks. In terms of attitude towards banking services, empathy positively affects customer satisfaction in medium banks. age, region and education among customer characteristics do not positively affect customer satisfaction in e-banking of medium banks.

Keywords : E-Banking, Service Quality, Customer Satisfaction

1. Introduction

With the development and application of Internet technology, we have entered the digital age (Bachir, 2021). During this period, the rapid development of the Internet has led to the growth of many fields, electronic banking came into being, and the traditional model began to shift to cross-channels. Electronic banking is a method of using the Internet to enable customers to conduct financial transactions. The advantages of electronic banking include: reducing costs and time spent, paying bills via online channels, transferring money, checking account balances, and carry out other activities at any time through electronic banking (Elmaraash, 2018).

Compared with traditional banks, e-banking has won the favor of customers with its convenience and time-saving advantages. However, in recent years, the quality of e-banking services has been poor, some problems have led to low customer satisfaction with the quality of e-banking services (Qin, 2019). The first problem is poor system security, poor

performance, cumbersome website design, low reliability, and high cost in the process of e-banking services, lead to low customer satisfaction (Qian, 2020). The second problem is that in the attitude of banks, e-banking lacks empathy, e-banking cannot provide personalized services according to customer needs, and cannot solve customer problems on time, lead to low customer satisfaction (Keramati, Ghaneei and Mirmohammadi, 2020).

Medium banks are an important part of China's financial system. This is due to the ability that they can supervise and manage the production and operation activities of various sectors and enterprises of the national economy. As a result, they provide better optimization for the industrial structure and improve the efficiency of the national economy. Considering its effect to the industry and economy, medium banks still retain its soundness and flexibility in operation. In the government work report that medium banks have problems of insecurity, low performance, cumbersome web pages, high cost, lack of reliability and empathy in the service process and attitude, so medium banks need to solve these problems, improve the level of financial services of medium banks, and further consolidate the main position of medium banks (He, 2021). In short, medium banks play a crucial role in China's national economy and is deemed necessary that a study on them must be made.

Minsheng Bank was chosen as a case study. Minsheng Bank is a medium-tier bank and is the first bank that opens China's private capital to enter the financial market. According to Minsheng Bank's report, since its establishment, Minsheng Bank has grown its asset size by more than 50 times, its net profit by more than 260 times, and its market share by about 13 percent, achieving high growth and ranking among the top three in the country in terms of overall competitiveness (Liu, 2019). However, all banks are now investing more in promoting e-banking and striving for a place in emerging businesses. Therefore, it is evident that Minsheng Bank leads the industry in terms of economic strength and is thus representative of medium banks.

In addition, demographic characteristics, such as age, region, and education level, may also influence customer satisfaction in e-banking of medium banks (Vijayanand, 2021). In response to the aforementioned findings, it is necessary to examine the influence of the characteristics of e-banking customers on customer satisfaction. Then, based on the retrieved information, suggestions on how to improve customer satisfaction in electronic banking of medium banks will be done.

2. Objectives

- 1) To study the impact of the quality of e-banking service security, performance, website design, reliability, and cost on customer satisfaction in medium-sized banks.
- 2) To study the impact of empathy in banking service attitudes on customer satisfaction in medium-sized banks.
- 3) To study the impact of customer characteristics on customer satisfaction of medium bank e-banking services.

3. Literature review

3.1 Electronic banking

Electronic banking refers to a virtual counter set up by banks on the Internet to initiate or process any transfer of funds using electronic technology (Luki and Gaji, 2019). With the rapid development of Internet channels, traditional banking business has been impacted, and banks' online channel business has gradually replaced traditional offline business. As a new type of banking service, internet banking has quickly become the focus of attention in the

international financial community. D'Andrea and Limodio (2019) pointed out that internet banking is a product of the combination of "Internet" and "banking," banks conduct business through the establishment of a web version of internet banking, customers can access electronic banking using personal computers and other smart devices. This is because the definition of electronic banking is further standardized and perfected, electronic banking has a more independent status. It is clear that electronic banking can be defined as Internet banking because it is widely considered an Internet-based banking business. Electronic banking is mainly aimed at individual customers and small and medium enterprises. Electronic banking does not require on-site guidance from bank staff. Moreover, electronic banking also provides services to customers through network technology (Pasha and Ahmadian, 2019). Mbabazi (2019) defined electronic banking as Internet technology to provide services to customers, which include: account opening, inquiries, transfers, wealth management, etc. It is designed to allow customers to easily manage time deposits, personal investments while staying at home. Electronic banking is based on the Internet as a public resource, while also utilizing related technologies to create a safe, convenient, and friendly connection between a bank and its customers (Talla, Shobaki and Abu-Naser, 2019). To conclude, the definition of electronic banking reveals that electronic banking is a virtual counter set up by banks on the Internet to initiate or process any transfer of funds using electronic technology. This study will focus on customer satisfaction with the quality of electronic banking services of medium banks as it is evident that customers can use its functions through electronic banking. Moreover, all studies mentioned within this section also include theoretical supports for further studies within its respective topics.

Medium banks in China have low market share in electronic banking which might be due to uneven regional development. According to the China Banking Industry Report, from the perspective of transaction size, the top three banks in China in terms of electronic banking transactions of medium banks are Industrial and Commercial Bank of China, Agricultural Bank, and Minsheng Bank (Huang and Tian, 2019). Further clarification on the topic could be explored through the mentioned literature as well as further theoretical support for the study of characteristics of Chinese medium banks' electronic banking.

In China, state-owned banks have more financial strength and attached importance to the development direction of financial networking. They invest more in the development of electronic banking, started earlier, comprised of more useful functions, and have higher credibility. Therefore, state-owned banks have a higher market share in the electronic banking sector. However, the market share of electronic banking of medium banks in China is still low, and moreover, the phenomenon of uneven business entities is undeniable. In addition, from the geographical point of view, it also has a particular influence on the medium bank's electronic banking. East China and South China are more economically developed compared to other parts. Information technology penetration rate and population quality are higher, and electronic banking development for medium banks is more favorable. However, Western China and Northern China are relatively slower in development, resulting in uneven development between the electronic banking regions of medium banks. Although there are only a handful of studies on the electronic banking of medium banks in China, it can be seen that medium banks in China suffers from uneven regional development, low market share and concentration on their main business in electronic banking (Hu, 2020).

3.2 Customer Satisfaction

Customer satisfaction is a perception that can be understood as a feeling of pleasure after receiving a service or purchasing a product, which the customer elicits by comparing the actual performance of the product or service with the expectations that the customer knows (Otto, Szymanski and Varadarajan, 2019)). Li, Lu, Hou, Cui and Darbandi (2020) stated that

customer satisfaction of banks depends on the quality of services provided by banks, and the higher the quality of bank services, the higher the satisfaction. In the service process, when the bank has low security, poor performance, cumbersome process, and unreliable and costly operations. The bank portray itself as not having a caring attitude towards customers, which may lead to customers being dissatisfied with the quality of service and thus contributes to loss of customers.

3.2.1 In terms of services

3.2.1.1 Security

Security refers to the degree of protection of customers' personal information, which involves financial security and confidentiality, and focuses on making customers feel safe in their transactions to be satisfied (Algamdi, 2020). Security can be analyzed from the perspective of protecting customers' privacy, property, and mentality (Salihu, Metin, Hajrizi and Ahmeti, 2019). At present, customers are generally concerned about the security of e-banking, users are more worried about this aspect, and banks displaying the security mechanisms applied on their websites can give customers an added sense of security (Hajduk-Stelmachowicz and Iwan, 2019).

3.2.1.2 Performance

Al-Gharaibah (2020) defines performance as completing account login and page loading tasks with accuracy and speed. It is the customer's judgment on the long-term fault-free physical operation of the brand and the physical defect free of the product.

Performance indicates how good the service is, including uninterrupted service and browser compatibility, and better performance contributes to higher satisfaction (Zimuto, 2020).

3.2.1.3 Website design

Customers use electronic banking functions through a designed website. An attractive, well-laid, easy-to-use, and aesthetically pleasing website enhances a business's marketing capabilities and increases customer satisfaction (Rahi, Ghani, and Ngah, 2020). This is because the easier the user can navigate and operate the task effectively, the more they believe that the operation is reliable.

3.2.1.4 Reliability

Reliability refers to the consistency of promised availability and quality of service; error-free transactions and the provision of accurately documented documents within the promised time frame will result in reliable and satisfied customers (Nagar and Ghai, 2019). Through analyzing customer's perception regarding the topic of reliability, a high-risk service means that the customer feels unreliable and unsafe, which could result in them not using the service. It is evident that reliability is essential. In addition, electronic banking users will consider the reliability of electronic banking.

3.2.1.5 Cost

Cost is one of the factors that influence the adoption of e-banking services. When customers use services, they always want to minimize transaction costs such as money and time or even zero service fees, and at the same time, they want to get more benefits from it, so the more value they get, the higher their satisfaction will be (Daba, 2021).

3.2.2 Banks' attitude

With each region's economic development and social progress, more and more customers are pursuing personalized consumption, and banks can provide financial

consultation, online help, and technical support to meet customers' needs (Choudhury, Singh, Kajol and Rai, 2020). Empathy treats all customers at the level of an independent individual, with services provided by enterprises personalized and unique to each individual specifically. In essence, it can be understood that the company tries its best to meet the various needs of users based on satisfying their needs and making them feel special and unique through each services. Its components include: the company's personalized service to customers, the employees' concern for customers, the company's putting customers' interests first, and the company's consideration of providing thoughtful services to customers from the level of service content. For electronic banking to increase their customers' satisfaction, they must take more initiatives to further understand their customer's need in order to provide service accordingly. Moreover, there is no significant difference between traditional banking and electronic banking in terms of empathy. Both services emphasize on personalized services, such as one-to-one services and customized financial products. In addition, customers are also drawn to electronic banking due to its customized service that serves and satisfy their need. In short, empathy contributes significantly to the satisfaction level of electronic banking services users.

3.3 Demographic characteristics

3.3.1 Age

The customer base of electronic banking is mostly dominated by young adults, or closely related to the personality traits and psychological behavior characteristics of young adult consumers. According to China's national conditions, the age stage of young-adults is between 25-34 years old. This population subset is the most active group in China's online community and has considerable online consumption experience and online consumption ability. The characteristics of the young-adult consumer group show that they have strong independence and great consumption potential. Consumers in this age group have accumulated enough consumption experience and can choose goods and services independently. In conclusion, age positively affects customer satisfaction (Hossain, Bhowmik, and Islam, 2020).

3.3.2 Region

China's electronic banking customer users are mainly concentrated in East China and South China, which reflects the differences in China's regional economic development and differences in consumer attitudes (Cui, 2019). The regional differences lie primarily in two aspects: the difference in the level of regional economic growth, and the other is the difference in regional consumer maturity and consumption concepts (Ye, Yang and Mao, 2021). From an economic point of view, East China and South China are economically developed, residents have higher incomes, as well as excess financial management funds. In contrast, the economic development of North China and Western China is relatively slow and under-developed, and there are no extra funds to purchase financial products. Economic differences will directly lead to infrastructure gaps. From this point of view, the advantage of the number of electronic banking users in economically developed regions also reflects the uneven economic development of China's national conditions. From the perspective of consumer maturity and consumption concepts, consumers in economically developed East China and West China have richer consumption experiences, higher maturity, and more advanced consumption concepts.

3.3.3 Education Level

Regarding education, a research has mentioned that customers of electronic banking and mobile banking have high educational level (Jouda, Jarad, Obaid, Abu Mdallalah and

Awaja, 2020). Comparing the two, the electronic banking customer base has a higher degree of education due to the need to comprehend harder instructions. In addition, younger generations with higher education are also more capable of adapting to new products which makes them the highest number of population utilizing the service. In other words, this group has a relatively high awareness and usage rate of electronic banking. Moreover, electronic banking requires an increasingly high level of user knowledge, in areas such as investing, for the user to utilize the service to its full potential. Knowing this, a conclusion could be drawn that education level correlates with customer satisfaction (Dhanya and Velmurugan, 2021).

3.4 Electronic banking service quality

Electronic service quality also refers to the quality formed in the service processes provided by the website or system (Shankar and Datta, 2020). It can be seen that electronic banking service quality is an intermediate link between customer behavior and the evaluation process, covering the whole process of service products, service scenarios, and service delivery in an electronic environment. In regards to the definition of electronic banking service quality, it can be concluded that electronic service quality includes two aspects, which are attitude and service processes.

3.4.1 Attitude

Attitude is an overall evaluation that expresses how much a person like or dislike an object, issue, person, or action. Attitude, as a psychological phenomenon, does not only refer to people's inner experience but also include people's behavioral tendencies. Generally speaking, attitude is latent and is mainly reflected by people's speech, expressions, and behavior. In other words, attitude determines behavior, and behavior is the external expression of attitude (Wang, Li, Mangmeechai and Su, 2021). Attitude could also be described as a continuous mental state that is prepared to feel and act in a supportive or unsupportive manner for a specific person, thing, or point of view. It highly correlates with the individual's behavior towards and individual or object. Given the sole importance of how significant an attitude of each person plays a role in their lives, it is safe to say that to be able to manipulate an individual's attitude will provide a sustainable competitive advantage in electronic service quality. Which lastly, would result in better competitive advantage for the company.

3.4.2 Service processes

Service processes refer to the procedures, tasks, schedules, structures, and activities related to service transactions and consumption (Deng, 2019). In the electronic banking system, verification and approval from customer us require before any process starts. In this case, electronic banking service process refers to the aforementioned process of using electronic banking services, i.e., transferring money, checking bills, and purchasing financial products by customers through electronic banking. In correlation, the quality of electronic banking service is determined by the evaluation created by customers throughout the process.

3.5 Factors influencing the quality of electronic banking

Ahmed (2020) develops four dimensions of service quality in electronic banking: ease of use, save time, security, and confidentiality. Sarbeng (2020) believes that security, cost, performance, and reliability are essential factors for the quality of electronic banking services. Zewge (2021) found that among the e-banking service quality dimensions, reliability, security, and performance are statistically significant for customer satisfaction. In China, with the booming development of Internet finances, following the demand, Chinese scholars began to increase their research on the quality of electronic banking services as well. Guo (2020) classified the quality of electronic banking services into five dimensions: website design, operational process, security, performance, and cost. Dong (2020) proposed that

security, website design, and performance are essential dimensions of e-banking service quality. Zhang (2020) classified the dimensions of e-banking service quality into five dimensions: security, reliability, simplicity of design, performance, and empathy.

According to researches on e-banking service quality in recent years, studies have shown that in service process, security is the primary factor studied by many scholars, followed by performance, website design, reliability, and cost respectively. In terms of attitude, empathy is the only factor of concern for scholars. Therefore, to clearly understand the quality of electronic banking services, this section introduces the attitude and service processes factors in the quality of electronic banking services.

3.6 Theoretical Framework

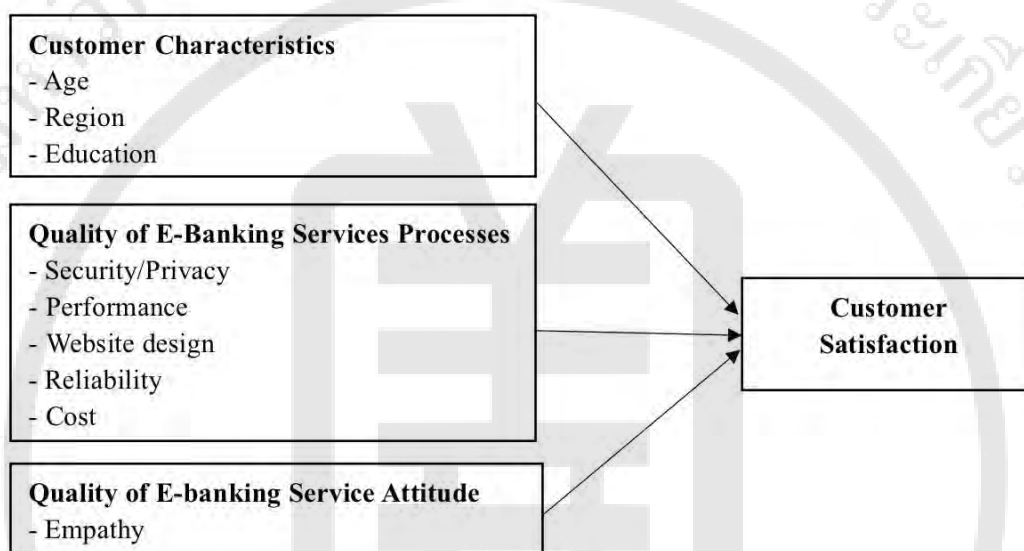


Figure 1 Theoretical Framework

3.7 Research hypothesis

In order to test the relationship between electronic banking service quality and customer satisfaction of medium banks, the following hypotheses are tested in this study:

H1: The quality of e-banking in terms of service performance, security, website design, reliability, and cost positively impacts the satisfaction of medium-sized bank customers. More specifically:

H1a: Performance in the quality of e-banking services will positively affect the customer satisfaction of e-banking in medium-sized banks.

H1b: Security in the quality of e-banking services will positively affect the customer satisfaction of e-banking in medium-sized banks.

H1c: Website design in the quality of e-banking services will positively affect the customer satisfaction of e-banking in medium-sized banks.

H1d: Reliability in the quality of e-banking services will positively affect the customer satisfaction of e-banking in medium-sized banks.

H1e: Cost in the quality of e-banking services will positively affect the customer satisfaction of e-banking in medium-sized banks.

H2: Banks' attitude towards e-banking services positively affects customer satisfaction in terms of empathy.

H3: Characteristics of customers will positively affect the customer satisfaction of medium bank e-banking. More specifically:

H3a: The age of the customer will positively affect the customer satisfaction of e-banking in medium-sized banks.

H3b: The region of the customer will positively affect the customer satisfaction of e-banking in medium-sized banks.

H3c: The education of customers will positively affect the customer satisfaction of e-banking in medium-sized banks.

4. Materials and methods

4.1 Sampling techniques

The sample for this study was Minsheng Bank e-banking customers. The sampling technique used in this study was cluster sampling. Cluster sampling is a sampling method that first divides all units into several groups, then randomly selects a part of the groups, and carries out a comprehensive survey on all units in the selected group (Barbu and Zhu, 2020). The data for this study was collected through a questionnaire survey of Minsheng Bank's e-banking customers using quantitative research to understand the impact of e-banking service quality on customer satisfaction. The questionnaires for this study were distributed to the participants randomly, then 439 completed questionnaires were collected. The questionnaire consisted of three parts. All items were measured using a 5-point Likert scale except for demographic variables.

4.2 Data Analysis

Multiple regression analysis and ANOVA analysis were used to test research hypothesis and further analyze the collected data. In regression analysis, if two or more independent variables are presented, the method will be called multiple regression. Multiple regression analysis refers to a statistical analysis method in which one variable is regarded as the dependent variable, and the other one or more variables are considered independent variables (Montgomery, Peck and Vining, 2021). The quantitative relations of linear or nonlinear mathematical models between multiple variables are established and analyzed using sampled data. Use software to encode the data and enter it into a computer for analysis.

4.3 Reliability

Reliability analysis effectively measures whether comprehensive evaluation problems have certain stability, consistency, and reliability (Zhu, 2018). Throughout this paper, Cronbach's Alpha technique was used to determine the questionnaire's reliability. Because the questionnaire in this study has a scale, the technique measures the internal consistency of the test. In order to test whether the design of the scale questions is reasonable and is effectively trying to reduce the any risks of failure, the study will select 30 people for the test questionnaire. Then, the questionnaire questions that need to be eliminated or modified will be considered. The reliability analysis of the questionnaire shows that Cronbach's alpha coefficients of performance, security, web design, reliability, and cost dimensions are 0.881, 0.916, 0.827, 0.886, and 0.895, respectively, in terms of the expectations of medium-sized banks' e-banking services. In addition, Cronbach's alpha coefficient of empathy dimension is 0.902 in terms of attitude towards e-banking of medium-sized banks; in terms of satisfaction of e-banking services of Minsheng Bank, Cronbach's alpha coefficient of performance, security, web design, reliability, cost dimension is The alpha coefficients are 0.888, 0.878, 0.832, 0.873, 0.892, respectively. In addition, Cronbach's alpha coefficient of the empathy dimension is 0.901 in terms of satisfaction with Minsheng Bank's attitude towards e-banking.

The reliability of all scales is above 0.7, indicating that the selected scales have good reliability.

4.4 Validity

Validity refers to the ability of a scale to measure the content expected to be measured (Ikart, 2019). In order to ensure the validity of the questionnaire, validity testing by experts was requested in the final stage. As for the reliability and credit of the expert, the expert comes from an Internet professional investigation platform. This expert has extensive experience in customer satisfaction research. This expert will provide professional suggestions on the design of the questionnaire, and then this study will complete the final draft of the questionnaire based on the experts' comments. The KMO value is $0.970 > 0.7$, indicating that the sample sampling appropriateness of this factor analysis was high and met the general criteria. Bartlett's sphericity test results showed a significance level of $p = 0.000 < 0.001$, reaching a significant level, indicating excellent external validity of the questionnaire.

4.5 Ethical issues

The research is approved by the Ethics Committee of Huachiew Chalermprakiet University. The researchers informed the purpose of the survey and ensured that their responses during the study are confidential. Therefore, the questionnaire's introduction will explain the meaning and importance of the study and its confidentiality. Respondents are told to fill out the questionnaire based on their willingness. These paragraphs contain only general information to protect their responses from any possible bias. The privacy of respondents is protected, and their identities will not be revealed. Finally, the collected data is given as is.

5. Results

This section is divided into three parts: sample data, descriptive data, analytical data (Analyze the factors affecting satisfaction).

5.1 Data of sample

A total of 439 online questionnaires were collected, of which 400 were from Minsheng Bank's e-banking customers, 39 were from non-Minsheng Bank customers. Therefore, 400 was used as the sample size for this study. Based on the number of 400 samples (see Table 1 below), which can be classified in terms of region into four regions. They were 106, 113, 93 and 88 people from East China, West China, South China and North China, respectively. They can be calculated in percent as 26.50%, 28.25%, 23.25% and 22.00%, respectively. There are four age groups according to age. They were 91, 124, 115 and 70 people from 15-24 years old, 25-34 years old, 35-44 years old and over 45 years old, respectively. They can be calculated in percent as 22.75%, 31.00%, 28.75% and 17.50%, respectively. There are three levels of education. They were 211, 145 and 44 people from Junior College and below, bachelor degree and higher than bachelor's degree, respectively. They can be calculated in percent as 52.75%, 36.25% and 11.00%, respectively.

Table 1 Data of the sample (N=400)

Variable	Item	Frequency	Percentage
Age	15-24 years old	91	22.75%
	25-34 years old	124	31.00%
	35-44 years old	115	28.75%
	Over 45 years old	70	17.50%
Region	East China	106	26.50%
	West China	113	28.25%
	South China	93	23.25%

Variable	Item	Frequency	Percentage
	North China	88	22.00%
Education	Junior College and below	211	52.75%
	Bachelor degree	145	36.25%
	Higher	44	11.00%

5.2 Descriptive data

This section is descriptive data. It is divided into three parts. The first part is the customer's expectation of e-banking. The second part is customer satisfaction with e-banking. The third part is the analysis of the influencing factors of satisfaction.

5.2.1 Expectation to e-banking system

This section summarizes customers' expectations of e-banking in terms of services and attitude. In terms of service expectations, they include expectations of service performance, security, website design, reliability, and cost. In terms of banking attitudes, it has expectations of empathy. The descriptive results are shown in the following table 2.

Table 2 Summary of expectations in terms of service and attitude ($N=400$)

Independent variable	Mean	Standard Deviation
Performance.	3.541	1.135
Security.	3.442	1.070
Website design.	3.515	1.054
Reliability.	3.534	1.105
Cost.	3.503	1.119
Empathy.	3.528	1.150

In terms of customers' service expectations for e-banking in medium-sized banks (see Table 2), the mean value of the performance dimension is 3.541 with a standard deviation of 1.135; the mean value of the security dimension is 3.442 with a standard deviation of 1.070; the mean value of the web design dimension is 3.515 with a standard deviation of 1.054; the mean value of the reliability dimension is 3.534 with a standard deviation of 1.105; the cost dimension has a mean value of 3.503 with a standard deviation of 1.119; as a result, the performance dimension has a high expectation, followed by reliability, website design, cost, and security, respectively. Moreover, in terms of customer attitude towards medium-sized banks, the mean value of empathy is 3.528, with a standard deviation of 1.150. Generally, a mean value greater than 3 represents a high expectation. As a result, customers have high expectations of the empathy dimension.

5.2.2 Satisfaction to e-banking system

This section summarizes customer satisfaction with e-banking in terms of service and attitude. In terms of service satisfaction includes satisfaction with service performance, security, website design, reliability, and cost. In terms of banking attitudes, it includes satisfaction with empathy. The descriptive results are shown in the table below.

Table 3 Summary of satisfaction in terms of service and attitude ($N=400$)

Dependent variable	Mean	Standard Deviation
Performance satisfaction of e-banking services.	3.503	1.136
Security satisfaction of e-banking services.	3.532	1.096
Website design satisfaction of e-banking services.	3.478	1.060

Dependent variable	Mean	Standard Deviation
Reliability satisfaction of e-banking services.	3.530	1.097
Cost satisfaction of e-banking services.	3.499	1.125
Empathy satisfaction of e-banking attitudes.	3.527	1.148
Overall customer satisfaction	3.511	1.059

First, in terms of customer satisfaction with Minsheng Bank's e-banking services (see Table 3), the mean value of the performance dimension is 3.503 with a standard deviation of 1.136; the mean value of the security dimension is 3.532 with a standard deviation of 1.096; the mean value of the website design dimension is 3.478 with a standard deviation of 1.060; the mean value of the reliability dimension is 3.530 with a standard deviation of 1.097; the mean value of the cost dimension is 3.499 with a standard deviation of 1.125. As a result, the security dimension has a high satisfaction level, followed by reliability, performance, cost and web design, respectively; secondly, in terms of customers' attitude toward Minsheng Bank's e-banking, the mean value of empathy is 3.527, with a standard deviation of 1.148. In addition, the overall customer satisfaction with Minsheng Bank's e-banking service and attitude was 3.511, with a standard deviation of 1.059. Generally speaking, a mean greater than 3 means satisfaction is high. As a result, overall, customers are satisfied with Minsheng Bank's e-banking services and attitudes.

5.3 Analysis of factors affecting satisfaction

This section provides an analysis of the factors that influence satisfaction. It is divided into three parts. The first part analyzes the impact of e-banking service aspects (performance, security, website design, reliability and cost) on satisfaction. The second part analyzes the impact of e-banking attitudinal aspects (empathy) on customer satisfaction. The third part is to analyze the effect of factors of customer characteristics (age, region, education) on satisfaction.

5.3.1 The impact of e-banking on customer satisfaction in terms of service

Table 4 The impact of e-banking on customer satisfaction in terms of service

	β	t-value	P-value
Intercept	0.016	0.648	0.517
Performance	0.180	9.953	0.000
Security	0.271	13.077	0.000
Website design	0.127	7.515	0.000
Reliability	0.207	10.945	0.000
Cost	0.250	13.855	0.000

In Table 4, the results of the impact of Minsheng Bank's e-banking on customer satisfaction in terms of service are shown in Table 4. There is a positive effect between performance ($\beta=0.180$, $p < 0.05$) and customer satisfaction of e-banking. There is a positive effect between security ($\beta=0.271$, $p < 0.05$) and customer satisfaction of e-banking. There is a positive effect between website design ($\beta=0.127$, $p < 0.05$) and customer satisfaction of e-banking. There is a positive effect between reliability ($\beta=0.207$, $p < 0.05$) and customer satisfaction of e-banking. There is a positive effect between cost ($\beta=0.250$, $p < 0.05$) and customer satisfaction of e-banking. The regression equation is: $Y = 0.016 +$

0.180*performance + 0.271*security + 0.127*website design + 0.207*reliability + 0.250*cost.

Table 5 Summary the results on proposed hypothesis (in terms of services)

	H1a. Performance	H1b. Security	H1c. Website design	H1d. Reliability	H1e. Cost
Customer satisfaction	S	S	S	S	S

(Note S: Supported; NS: Not supported)

According to Table 4 and Table 5. There is a positive effect between performance ($\beta=0.180$, $p < 0.05$) and customer satisfaction of e-banking. Hypothesis H1a is supported. There is a positive effect between security ($\beta=0.271$, $p < 0.05$) and customer satisfaction of e-banking. Hypothesis H1b is supported. There is a positive effect between website design ($\beta=0.127$, $p < 0.05$) and customer satisfaction of e-banking. Hypothesis H1c is supported. There is a positive effect between reliability ($\beta=0.207$, $p < 0.05$) and customer satisfaction of e-banking. Hypothesis H1d is supported. There is a positive effect between cost ($\beta=0.250$, $p < 0.05$) and customer satisfaction of e-banking. Hypothesis H1e is supported.

Table 6 ANOVA test of e-banking in terms of service

	Multiple R	R ²	Adjusted R ²	F-value	P-value
Performance					
Security					
Website design	0.991	0.983	0.982	4439.19	0.000
Reliability					
Cost					

In Table 6, the ANOVA test showed that $F=4439.192$, $p < 0.05$, R is 0.991, R^2 is 0.983, and adjusted R^2 is 0.982 (See Table 6). The service aspects of Minsheng Bank's e-banking (performance, security, website design, reliability, and cost) are used as independent variables. Customer satisfaction is used as the dependent variable in the regression model with statistical significance.

Table 7 ANOVA results for factors in e-banking services

	SS	df	MS	F-value	P-value
Regression analysis	440.008	5	88.002	4439.192	0.000
Residual value	7.811	394	0.020		
Total	447.818	399			

In table 7, the results of the one-way analysis of variance. Since $\alpha=0.05$, P -value < 0.05 . from these statistics, it can be seen that Minsheng Bank's e-banking has a positive impact on customer satisfaction in terms of services (performance, security, website design, reliability, cost).

5.3.2 The impact of Minsheng Bank's e-banking attitude on customer satisfaction

Table 8 The impact of empathy on customer satisfaction

	β	t-value	P-value
Intercept	0.398	8.061	0.000
empathy	0.882	66.225	0.000

In table 8, the results of the effect of empathy on customer satisfaction in e-banking service attitude are shown in Table 8. Empathy ($\beta=0.0882$, $p < 0.05$) has a positive effect on customer satisfaction in e-banking. The regression equation is: $Y = 0.398 + 0.882 * \text{empathy}$.

Table 9 Summary the results on proposed hypothesis (Empathy for e-banking attitudes)

	H2 Empathy
Customer satisfaction	S

(Note S:Supported; NS:Not supported)

According to table 8 and Table 9. Empathy ($\beta=0.882$, $p < 0.05$) has a positive effect on customer satisfaction in e-banking. Hypothesis H2 supported.

Table 10 ANOVA test of empathy factors in e-banking attitudes

	Multiple R	R ²	Adjusted R ²	F-value	P-value
Empathy	0.9575	0.9168	0.9165	4385.717	0.000

In table 10, the ANOVA test showed that $F=4385.717$, $p < 0.05$, R is 0.9575, R² is 0.9168, and adjusted R² is 0.9165 (See Table 10). The e-banking attitude (empathy) of Minsheng Bank is used as the independent variable and customer satisfaction is used as the dependent variable in the regression model, which is statistically significant.

Table 11 ANOVA results of empathy factors on e-banking attitudes

	SS	df	MS	F-value	P-value
Regression analysis	410.560	1	41.560	4386.717	0.000
Residual value	37.258	398	0.094		
Total	447.818	399			

In table 11 shows the results of the one-way analysis of variance. Since $\alpha=0.05$, P-value < 0.05 . from these statistics, it can be seen that there is no significant effect of empathy on customer satisfaction in the attitude of Minsheng Bank's e-banking.

5.3.3 The influence of customer characteristics on customer satisfaction

Table 12 The influence of customer characteristics (age, region, education) on customer satisfaction

	β	t-value	P-value
Intercept	3.182	15.285	0.000
Age	0.014	0.270	0.787
Region	0.093	1.833	0.068
Education	0.032	0.637	0.524

In table 12, the results of the influence of customer characteristics on customer satisfaction are shown in Table 12. There is a negative correlation between age ($\beta= 0.014$, $p=0.787$) and customer satisfaction in e-banking. There is a negative correlation between region ($\beta= 0.093$, $p=0.068$) and customer satisfaction of e-banking. There is a negative correlation between education ($\beta= 0.032$, $p=0.524$) and customer satisfaction in e-banking. The regression equation is: $Y = 3.182 + 0.014*age + 0.093*region + 0.032*education$.

Table 13 Summary the results on proposed hypothesis (Customer Characteristics)

	H3a. Age	H3b. Region	H3c Education
Customer satisfaction	NS	NS	NS

(Note S:Supported; NS:Not supported)

According to Table 12 and Table 13. There is a negative correlation between age ($\beta= 0.014$, $p=0.787$) and customer satisfaction in e-banking. Hypothesis H3a is not supported. There is a negative correlation between region ($\beta= 0.093$, $p=0.068$) and customer satisfaction of e-banking. Hypothesis H3b is not supported.. There is a negative correlation between education ($\beta= 0.032$, $p=0.524$) and customer satisfaction in e-banking. Hypothesis H3c is not supported.

Table 14 ANOVA test for customer characteristic factors

	Multiple R	R²	Adjusted R²	F-value	P-value
Age					
Region	0.105	0.011	0.004	1.48	0.22
Education					

The ANOVA test showed that $F=1.48$, $p<0.001$, R is 0.105, R^2 is 0.011, and adjusted R^2 is 0.004 (See Table 14). Using customer characteristics (age, region, education) as independent variables and customer satisfaction as the dependent variable in the regression model is statistically significant.

Table 15 ANOVA results for customer characteristic factors

	SS	df	MS	F-value	P-value
Regression analysis	4.951	3	1.650	1.476	0.221
Residual value	442.868	396	1.118		
Total	447.818	399			

In table 15 shows the results of the one-way analysis of variance. Since $\alpha=0.05$, P -value=0.221. from these statistics, it can be seen that customer characteristic factors (age, region, education) have no significant effect on customer satisfaction.

6. Discussion

Hypotheses H1a (performance), H1b (security), H1c (website design), and H1d (reliability) and H1e (cost) are supported. Regarding Al-Gharaibah (2020) mentioned that performance requires e-banking to be able to log in and transact quickly, available at any time, etc., during the service. Therefore, Minsheng Bank should ensure that e-banking can be quickly logged in, traded, and available at any time. Minsheng Bank can also develop a customer relationship management system to observe and provide personalized services for

customers based on the system information to meet the needs of different customers and make them satisfied. Algamdi (2020) mentioned that e-banking security requires e-banking to protect customer privacy, guarantee customer transactions and display security mechanisms on e-banking websites during the service. Therefore, to satisfy Minsheng bank customers, the secure operation of e-banking must be guaranteed. Regarding Rahi, Ghani, and Ngah (2020) stated that the website design of e-banking needs to be attractive, easy to use, and well laid out. In short, the website design of e-banking is essential. Minsheng Bank's e-banking website needs to attract customers through page design to ensure that the page layout is reasonable and easy to use so that users will stay on the e-banking website for transaction. Nagar and Ghai (2019) mentioned that reliability requires that e-banking is error-free in its services and provides accurate records documentation. Therefore, the livelihood bank needs to be error-free in its services and provide correct records documentation. In addition, Minsheng Bank should avoid errors in its services because mistakes may lead to financial losses for customers and reduced customer satisfaction. Daba (2021) mentioned that customers are cost-sensitive; e-banking needs to reduce transaction time, lower service fees, or even no service fees to satisfy customers. Therefore, Minsheng Bank needs to reduce transaction time and service fees, or even no service fees, to make customers satisfied. Regarding Choudhury, Singh, Kajol and Rai (2020) mentioned that empathy requires personalized services, financial and technical support from e-banking etc. Therefore, Minsheng Bank needs personalized services, financial and technical support, etc. In the fierce market competition, Minsheng Bank's business philosophy must change from product-centered to customer-centered to provide customers with excellent service value and thus customer satisfaction. Hypothesis 3 is that characteristics of customers (age, region, education) would positively affect the customer satisfaction of medium bank e-banking. It can be seen that the results of this study are inconsistent with the conclusions of any previous scholars. The sample characteristics variables are not significant. The reason may be due to the heterogeneity of the sample distribution. This is because in China, with a population of 1.3 billion, there is an uneven regional distribution of the population, as well as an uneven distribution of educational resources and a serious aging population (Ye, Yang and Mao, 2021). In other words, under the total sample distribution, the effect of sample characteristic variables on the dependent variable in the total sample may be smoothed out due to the issue of heterogeneity across samples (e.g., region, education, age).

In terms of performance, e-banking should optimise its performance to ensure that it should be able to log in and transact quickly and be available at all times during the service. In terms of security, e-banking should enhance security to ensure that the privacy and safety of customers are protected during the service. In terms of website design, e-banking should optimise its website design so that the web pages are attractive, easy to use and well laid out. In terms of reliability, e-banking needs to be more reliable, ensuring that there are no errors in its services and that accurate documentation is provided. In terms of cost, e-banking reduces transaction costs to satisfy customers. In terms of empathy, e-banking needs to provide a more personalised service, offering superior service value to customers and thus satisfying them.

For practitioners, it is necessary for all medium banks in China to make electronic banking more reliable, efficient and secure, to ensure the security of customer accounts, to minimize the cost of services. In addition, mid banks need to enhance their website environments to make them attractive and easy to use for their customers. Finally, practitioners of medium banks need to listen to customer feedback and focus on personalized customer service and experience to keep customers satisfied.

For further research, this study focused only on the impact of e-banking service quality on customer satisfaction. This study also collected information from only some customers of Minsheng Bank. Therefore, if someone needs to explore this area, it is recommended to collect data from customers of different banks. In addition, it is recommended that each factor be examined in detail in future studies. For example, security issues, website design, empathy focused on help menu that customer expect, etc.

7. Conclusion

In terms of service quality of e-banking, performance has a positive impact on customer satisfaction. Security has a positive impact on customer satisfaction. Website design has a positive impact on customer satisfaction. Reliability has a positive impact on customer satisfaction. The cost has a positive impact on customer satisfaction. In terms of service attitude quality, empathy had a significant positive effect on customer satisfaction. In terms of customer characteristics of e-banking, age, region and education had no positive effect on customer satisfaction. The overall survey results show that performance, security, website design, and reliability and cost combined are essential factors for the success of e-banking services. These factors can be used to develop e-banking further and keep customers happy.

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