

Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economics



Bachelor Thesis

**Analysis of relationship between Czech Online Banking and client
satisfaction**

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CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

BACHELOR THESIS ASSIGNMENT

JieWang Yan

Economics and
Management Economics
and Management

Thesis title

Analysis of Relationship between Czech On-line Banking and Client Satisfaction

Objectives of thesis

The aim of the diploma thesis is to determine and to evaluate the relationship between Czech on-line banking and client satisfaction.

The aim will be fulfilled based on the partial aims. Then, several hypotheses will be defined and verified. Based on the results of an empirical analysis the final conclusions will be introduced.

Methodology

The diploma thesis will cover both theoretical and empirical part. Theoretical part will contain theoretical background of the selected topic as well as the methodological framework. Scientific literature will be used to prepare the literature overview. The empirical analysis will be based mainly on own survey. Other suitable methods will be employed as well. Based on the empirical analysis the results will be presented and some recommendations will be suggested.

The proposed extent of the thesis

30-40 pages

Keywords

Online banking; Client satisfaction; Questionnaire; Factor analysis; Correlation analysis.

Recommended information sources

DE VAUS, D A. *Surveys in social research*. London: Routledge, 2014. ISBN 978-0-415-53018-7.

JOHNSON, M. D., ANDERSON, E. W., & FORNELL, C. (1995). Rational and adaptive performance expectations in a client satisfaction framework. *Journal of Consumer Research*.

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Declaration

I declare that I have worked on my bachelor thesis titled " Analysis of relationship between Czech Online Banking and client satisfaction" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break any copyrights.

In Prague on 11.03.2020

_____ Jie Wang Yan _____

Analysis of relationship between Czech Online Banking and client satisfaction

Abstract

In the last 10 years, as the rapid development of technology has touched and covered banking business, various countries have gradually developed online banking, which is to realize online banking business through electronic technology. In the Czech Republic, online banking business has gradually become popular among banks, however, it also intensifies the competition of online banking business among banks. Therefore, this thesis conducts a comprehensive analysis of online banking, using relevant literature to sort out the relationships between online banking and client satisfaction with specific indicators arrived one the one hand, adopting questionnaires survey to obtain real Czech online banking client data on the other hand, so as to analyze the factors that affect Czech users' satisfaction with Czech online banking. Based on client data, the thesis analyzes the factors that affect Czech users' satisfaction with Czech online banking, and proposes improvement suggestions based on the shortcomings of online banking identified from the data analysis, hoping to provide relevant enlightenment to Czech online banking, and banks may make improvements according to the plan to enhance the global competitiveness of Czech online banking. At the same time, the improvement of the bank's own business can also provide clients with a better sense of use, thereby achieving a win-win situation for both the banks and the client.

Keywords: Online banking; Client satisfaction; Questionnaire; Factor analysis; Correlation analysis.

Analýza vztahu mezi českým online bankovníctvím a spokojeností klientů

Abstrakt

V posledních 10 letech, kdy se rychlý rozvoj technologií dotkl a pokryl bankovní podnikání, různé země postupně vyvinuly online bankovníctví, které má realizovat online bankovníctví prostřednictvím elektronických technologií. V České republice se online bankovníctví mezi bankami postupně stalo populárním, ale také zesiluje konkurenci mezi bankami v oblasti online bankovníctví. Tato práce proto provádí komplexní analýzu online bankovníctví s využitím relevantní literatury k vyřešení vztahů mezi online bankovníctvím a spokojeností klientů s konkrétními ukazateli, které na jedné straně přišly, na druhé straně přijímá dotazníkový průzkum k získání skutečných dat o českém klientovi z online bankovníctví, abychom mohli analyzovat faktory, které ovlivňují spokojenost českých uživatelů s českým online bankovníctvím. Na základě údajů o klientech diplomová práce analyzuje faktory, které ovlivňují spokojenost českých uživatelů s českým online bankovníctvím, a navrhuje návrhy zlepšení na základě nedostatků online bankovníctví zjištěných z datové analýzy v naději, že českému online bankovníctví a bankám poskytne relevantní informace. může provést zlepšení podle plánu na zvýšení globální konkurenceschopnosti českého online bankovníctví. Zlepšení vlastního podnikání banky zároveň může klientům poskytnout lepší pocit použití, čímž se dosáhne situace výhodné pro obě banky i pro klienta.

Klíčová slova: Online bankovníctví; Spokojenost klienta; Dotazník; Faktorová analýza; Korelační analýza.

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1. Introduction

In the recent past years, commercial banks have transferred many businesses to the Internet and mobile phones, making use of the speed and convenience of the Internet to greatly improve the working efficiency of the bank, and expand the business volume, in the meanwhile, innovative service products are constantly emerging.

The level of client demand and the improvement of bank service quality complement each other. On the one hand, clients have personalized needs, who hope to obtain personalized, fast and safe services to improve work efficiency and time utilization, which promotes the diversification of services provided by banks, thereby promoting the further advancement of electronic banking services. On the other hand, fierce competition among banks has provided clients with the possibility to compare services between different banks. Through comparison, clients have become more aware of how to choose products and services that suit them. Hence, the competition among banks is becoming increasingly fierce, while competition in online banking business is becoming more and more homogeneous at the same time. For banks, market competition is competing for client resources after all. In the service industry, the client is God, and the banking industry is of no exception. The needs of clients are the goal and direction of the development of online banking services. Only by adhering to the client-centric service concept and paying attention to the individual needs of clients can banks improve their satisfaction, and then achieve the purpose of improving the competitiveness of their own enterprises. Therefore, in such a fiercely competitive environment, the key for online banking to gain a foothold is to conscientiously implement client satisfaction strategies, respect clients' individual needs, and try to meet client needs, only in this way can online banking hold invincible position in the market. Indeed, the processing of online banking business has many characteristics that differ from traditional banks. There is huge isolation between the online banking that provides services and the clients who enjoy the services are, however, though this isolation improves the efficiency of the banks, it also prevents the bank from directly understanding clients' degree of satisfaction

with the service provided. The results that cannot be directly fed back cause banks to be unable to solve the problems in a targeted manner, which may easily cause client complaints and even loss of clients.

Therefore, the thesis conduct investigation and research on online banking client satisfaction is of great significance to the development of banks and enhance the competition of banks.

2. Objectives and Methodology

2.1 Aim of the thesis

The thesis provides analysis from the perspective of commercial banks that provide online banking services, and the research on client satisfaction can enable banks to intuitively see client satisfaction with online banking business and existing problems, in the meantime, pointing out the direction for improving online banking services in the future. First of all, online banking client satisfaction index evaluation can enable banks to establish a client-centric business philosophy, and effectively promote the continuous improvement and innovation of products and services by banks, thereby enhancing the competitiveness of banks. What's more, from the perspective of clients who purchase products and enjoy services, after banks have implemented client satisfaction index evaluations, clients can obtain true and reliable information on online banking functions and service based on the published satisfaction index, and refer to other clients' experience for reference to reduce the risk of buying and using for themselves. Finally, the current research on the client satisfaction model and indicator system of Czech online banking is not complete because of limited materials. To a certain extent, the research in this thesis provides direction and further thinking for future research on Czech online banking satisfaction.

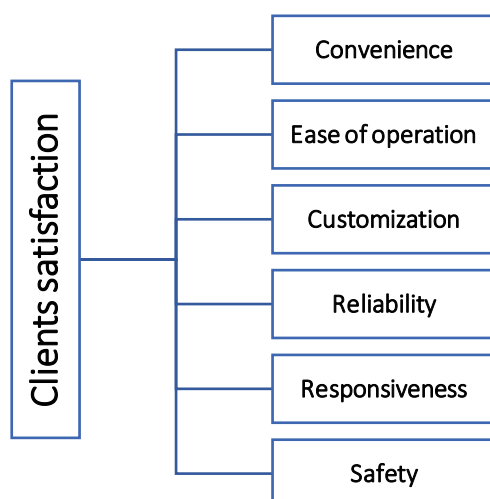
Therefore, the thesis is aiming to understand the influencing factors of online banking service, find out the existing problems, and propose possible solutions. Through questionnaire surveys, it allows to learn clients' satisfaction with the online services of the top 5 Czech banks, explore the what the factors that really affect clients' satisfaction with online banking services, and point out the specific degree and direction of the impact, as well as identify areas with low satisfaction, and at the end, the thesis will put forward solutions to improve satisfaction.

2.2 Methodology

2.2.1 Design of the questionnaire

With studying and reading a large number of literature theories, this thesis is based on the five dimensions of the SERVQUAL model, referring to relevant research results of other scholars, thus designing a questionnaire. For example, the evaluation dimensions of Internet service quality proposed by PZB (2002, p. 85) involve indicators such as consultation access and content, security, ease of use, reliability, privacy, accessibility, responsiveness, and compensation, however, many scholars also proved that although the SERVQUAL model has a certain degree of stability, when used across industries and regions, in order to adapt to the characteristics of the industry, it is still necessary to modify the concept and composition of each dimension. Therefore, when evaluating the quality of domestic online banking services, SERVQUAL scale needs to be adjusted.

Hence, in this thesis, the client satisfaction evaluation model of online banking is as follows:



Scheme 1: Client satisfaction model created by author

The questionnaire consists of two parts. The first part is the basic information of the surveyed respondents, including age, gender, culture, salary, monthly usage of online banking and preferred online banking. Investigation and analysis of this part of the data can better grasp the basic information of the interviewees and the use of online banking, and prepare for the

further investigation of online banking satisfaction. The second part is to explore the six aspects, namely Convenience, Ease of operation, Customization, Reliability, Customization and Safety, to evaluate their relationships with client satisfaction.

Likert scale is a commonly used form in questionnaire surveys (Byrne, 2010). Respondents will score each item according to their own feelings, including 5 levels. The scores range from 1 to 5 with a total of 5 levels, with the one-to-one correspondence is shown as 5: "Strongly agree"; 4: "Agree"; 3: "Unsure"; 2 "Disagree"; 1: "Strongly disagree ". The total score for each dimension from respondent indicates its attitude score, from this score, the attitude can be revealed.

2.2.2 Data analysis method of questionnaire survey

The purpose of this survey is to evaluate online banking client satisfaction. In order to test hypotheses, SPSS19.0 software is mainly used to process data, and the following analysis methods are mainly used:

2.2.2.1 Descriptive analysis

Generally speaking, the first step in data analysis is to perform descriptive analysis. Descriptive analysis is the statistical description of variable data. Commonly used techniques include analyzing the frequency, concentration, and dispersion of the data, and drawing some intuitive images to describe the characteristics of the data. Descriptive analysis mainly involves macro-level analysis, which can reflect the basic characteristics of the data and some internal laws, so as to provide ideas and guidance for the subsequent micro-data analysis. This thesis will conduct a descriptive analysis on the interviewee's personal information and online banking usage by using SPSS, which will help to make a preliminary depiction of the interviewee's portrait and provide background support for subsequent analysis.

2.2.2.2 Analysis of reliability and validity

This is mainly used to analyze the results of the 6 factors. The stability and consistency of the Likert scale analysis results involve reliability test. The larger the value of the reliability analysis result, the higher the reliability and stability of the results reached by the scale, and the Cronbach Alpha coefficient is the most extensive used indicator in analysis of reliability in the Likert scale. Scholars have not yet reached a consensus on the size of the Cronbach Alpha coefficient when it is deemed acceptable. Nunnally (1978) believes that Alpha coefficient being 0.7 is the lowest acceptable threshold for the test, and DeVellis (1991) made a clear quantitative definition of the correspondence between Alpha coefficient and reliability, it said that when the Alpha coefficient belongs to 0.8-0.9, the reliability of the scale result is considered to be very good. In this thesis, 0.7 is considered to be the lowest value for the reliability test to be approved, and this standard will be used for the reliability analysis of the six factors.

Validity analysis reveals the degree to which test tools are used to accurately test the results. The validity includes content validity, structure validity and criterion validity. According to the different aspects reflected by the validity, there are also different validity analysis methods.

Regarding the correlation between reliability and validity analysis, when the reliability is low, the validity will be correspondingly low, but when the reliability is high, the validity may not be high. These two analysis indicators will reflect the quality of this questionnaire and will also provide suggestions and inspiration for future in-depth research.

2.2.2.3 Factor analysis

Factor analysis is to classify more variable factors into one category, so that fewer indicators are used to describe data facts. This is mainly through identifying the relationship between factors, thereby classifying closely related variables, simplifying factors and providing more intuitive information for questionnaire information.

2.2.2.4 Correlation analysis

Correlation analysis is mainly used to test the dependence between factors, and to determine the degree and direction of the correlation. As the most widely used index in correlation analysis, the correlation coefficient is used to reflect the correlation, represented by r , as a ratio, its value is between -1 to 1. When r is -1 or 1, it represents a completely negative or positive linear relationship. When r is between (-1, 1), there is a correlation between the two variables. The positive r reflects the positive correlation, while the negative represents the negative correlation. Specifically, the degree and direction of the correlation can be subdivided into the following categories: $[-1, -.8) =$ strong, negative; $[-.8, -.5) =$ moderate, negative; $[-.5, .5] =$ weak; $(.5, .8] =$ moderate, positive; $(.8, 1] =$ strong, positive.

2.2.3 Hypotheses proposed

To evaluate and determine the relationship between Czech online banking and client satisfaction, there are some factors extracted from literature review, and the hypotheses are proposed to be verified.

H0₁: Convenience cannot positively affect client general satisfaction;

H1₁: Convenience can positively affect client general satisfaction.

H0₂: Ease of operation cannot positively affect client general satisfaction;

H1₂: Convenience can positively affect client general satisfaction.

H0₃: Customization cannot positively affect client general satisfaction;

H1₃: Convenience can positively affect client general satisfaction.

H0₄: Reliability cannot positively affect client general satisfaction;

H1₄: Convenience can positively affect client general satisfaction.

H0₅: Responsiveness cannot positively affect client general satisfaction;

H1₅: Convenience can positively affect client general satisfaction.

H0₆: Safety cannot positively affect client general satisfaction;

H1₆: Convenience can positively affect client general satisfaction.

3. Literature Review

3.1 Research on the quality of electronic services

Jamie and Aron (2011) proposed that in the past few decades, people have paid more and more attention to the definition, evaluation and management of service quality in the electronic environment. The concept of electronic service was born with the development of the Internet, and then with the development of e-commerce, it has become a recent hot topic. Many scholars have put forward different concepts about electronic services. They pointed out that what people generally recognize today is electronic services, which is a key factor in the success of e-commerce. With increasing electronic service concept in the commercial field, people have gradually realized the necessity of evaluating and testing the quality of electronic services. Therefore, in the past 20 years, significant progress has been made in the research of service quality theory.

Rowley (2006) pointed out through research that the existing literature mainly focuses on the research on the factors of quality of online service as well as the methods of promoting electronic service, but few precise definitions on electronic service quality is available. Collier and Bienstock (2009, p.178) defined electronic service quality as "the client's perception of service results and their perception of economic recovery if economic problems occur". Parasuraman et al. (2005) pointed out that, to some extent, the quality of electronic services represents the efficiency and effectiveness of online trading of products and services.

3.2 Definition and characteristics of online banking

3.2.1 Definition of online banking

Online banking refers to banks using the Internet to establish virtual websites or use other facilities to provide services. Its most basic feature is to provide users with 3A services, namely Anytime, Anywhere Anyhow (Biasutti & Frate, 2017). Akinyele and Olorunleke (2010) believed that online banking usually has two meanings, one is at the institutional level and the other is at the business level. Usually, the concept that everyone refers to in daily life is the business concept. Online banking provides financial services through the virtual Internet. There are traditional banking services and new services, where new services are competitive products brought to commercial banks by technological innovation. Online banking is based on traditional banking products, on the basis of this, with the development of the network, the connotation of its services has changed, and new business varieties have been produced. Today, there are two main forms of what we call online banking, namely, online branch banking and pure online banking (Yong, Pearce, 2013).

(1) Network branch bank. The network branch bank effectively combines information technology and banking. The bank uses the Internet as a means of providing services, establishes a bank site through Internet technology, and provides online services to clients on this basis. The bank's online site plays the role of a branch or business department of the bank, and can provide auxiliary services to non-online branches, and can also conduct business on its own.

(2) Pure online banking. The concept of pure online banking comes from the American Safety First Internet Bank, which refers to a bank with only one site, a virtual bank. The characteristic of a virtual bank is that it has only one office location, with no branches and no business outlets, all businesses are conducted online.

3.2.2 Features of online banking services

The functions of online banking continue to increase. On the one hand, the types of services continue to increase, and on the other hand, the objects of services are also increasing. Today, online banking can fulfill most of the functions of commercial banks. Ganguli and Roy (2010) argued that it is not difficult to imagine that one day online banking will replace today's bank outlets to a certain extent. Williams et al. (2015) summarized that nowadays, the types of online banking services around the world are divided into two types: basic services and derivative services. Basic services refer to all Internet users are provided with bank-related information services and traditional bank inquiry, payment, and transfer services; derivative services refer to new financial forms integrated with the Internet, mainly including online payment, online purchase of financial products and other investment businesses. Sindwani and Goel (2015) listed the basic features of online banking services, and they are as follows:

A) Closely rely on the rapid development of computer technology, make full use of computer network and communication technology, and penetrate services to every corner.

B) Change the traditional business operation mode of the bank, abandon the traditional service process such as the bank's reception desk in the lobby, and choose to directly launch the banking business online.

C) Compared with traditional counter services, the biggest advantage of online banking services lies in its convenience. Online banking users can conduct transactions through online banking at any time, regardless of location and time, and can efficiently carry out basic content such as fund account balance inquiry, transaction flow inquiry, various payment, shopping, etc., which saves time for clients, reduces costs for enterprises, and completely achieves a win-win situation for individual users, corporate users, and banks.

In terms of ensuring the security of transactions, the bank's online services will not rely solely on a single technology. On the contrary, under normal circumstances, the bank will cooperate with the use of a variety of computer technologies, so that a variety of advanced technologies can compensate for each other's shortcomings, in the meantime, providing

clients with the greatest security for the benefit of funds, so as to protect the bank's own business and reputation, and effectively combat criminal acts.

3.3 Research on service quality and model of online banking

Daniel (1999) explained online banking as "various channels and service platforms such as the Internet, digital TV and telephone are employed to offer clients with customized and personalized services from banks", which allows banks to use online banking business to build and maintain close contact with clients. One of the economical methods is banking products, which improve the efficiency of banks by providing more convenient and diverse banking services to clients in unconventional channels. In the meanwhile, banks started to largely depending on online banking to provide clients services, through continuously developing and launching new functions and services during the service process, it strives to communicate with clients more efficiently at a lower cost. With regard to the influencing factors, Trabold et al. (2006) analyzed various factors that affect the quality of online services and found that operation convenience and safety are particularly important among many factors. Wolfenbarger and Gilly (2003) summarized the factors affecting service quality, and put forward four main factors, including: the design, reliability, security and client service quality of online banking websites. Among them, there are a total of 14 subdivision indicators. Wenying and Sun (2010) analyzed the data collected from the Internet and confirmed the highly positive correlation between client satisfaction and loyalty. Zeithaml, Parasuraman and Malhotra (2002) studied the relationship between electronic service quality and client satisfaction, and established a related model for the study. Among them, the factors mainly include two related categories, including affecting service quality and commercial website. Specifically, the factors include, simple operation, flexibility, efficiency improvement, and security. The established model is mainly used to test the relationship between these proposed factors and client satisfaction. The results show that electronic service quality and website design can significantly affect client satisfaction, and both show

a highly positive relationship, that is, the same increase and decrease. This conclusion also confirms the relationship between service quality and client's perceived value and brand loyalty. In the research carried out by Yen and Lu in 2008, it is found that the function of electronic services, client privacy protection, accessibility, self-realization and response efficiency will have a significant impact on the uncertainty test of clients using electronic services, and these factors have positive effect on client satisfaction and recognition. Szymanski and Hise (2000) analyzed client satisfaction from the perspective of clients' perception of network convenience, website design and financial security. These factors do not involve the quality of service, nor the self-realization of clients, but it only to measure subjective satisfaction from the technical point of view of the website. In the research conducted by Sun (2009), personalization, availability, and effectiveness are used as proxy variables that affect electronic services, he tried to study the relationship between electronic service quality and client satisfaction & recognition. The results demonstrate that the quality of electronic services directly affects client satisfaction and recognition. Similarly, the research indicates that client satisfaction and recognition will affect client loyalty to it.

Al-Hawari and Ward (2006) conducted an empirical study on UK and US well-known banks, and the results showed that the bank's proactive measures to improve client satisfaction with the quality of electronic services can increase the bank's profit. According to early studies on the service quality of traditional business model, improvements were made to study the quality of network services by Zeithaml et al. (2000, 2002) and Parasuraman et al. (2005). Specifically, scholars further created the ESQUAL model on the basis of the 7 dimensions proposed by Zeithaml. Ho and Lin (2010) carried out empirical research on online banks in Taiwan. They designed 17 indicators, a total of 5 dimensions to describe user satisfaction. These five factors are derived from the service quality model designed by Cristobal (2007). They are, website design, client service, security, preferential treatment and information provision respectively. In addition, Kassim and Abdullah (2010) explored the relationship between service quality, client satisfaction and loyalty, and found that service quality can positively improve client satisfaction and loyalty.

3.4 Research on client satisfaction

Regarding the definition of client satisfaction, Cardozo (1965) analyzed it for the first time. It is suggested that client satisfaction refers to the satisfied feeling that clients perceive after enjoying a certain service or purchasing a product. ISO9000 defines client satisfaction as the degree to which the client's perceived needs are met, its core thought is that satisfaction is mainly affected by expectations. When expectations are high, product or service provision cannot meet expectations, then satisfaction is low. On the contrary, if the satisfaction from products and services is higher than expected, the satisfaction is high. Similarly, Philip Kotler (2003) also believes that satisfaction is determined by ex-ante expectations and perceptions of actual effects, that is, high client satisfaction is because the actual perceived value of products or services is higher than ex-ante psychological expectations. Richard Oliver (2000) defines satisfaction as an evaluation of clients' satisfaction with their own service. The evaluation of satisfaction is an assessment of the performance of the products or services provided by the bank, which determines that the level of pleasure is related to client satisfaction. There are two situations, one is that pleasure level is lower than the level of satisfaction, the other is pleasure level being above the level of satisfaction. Satisfaction indicates the client's recognition of the product or service, and the opposite feeling of satisfaction is the feeling of dissatisfaction, which means the client's unsatisfied attitude toward the product or service. Scholars include James Hirst (2014) believe that self-realization of client value is the core of improving client satisfaction. Client recognition of service is closely related to satisfaction, and it is found that client recognition growth is positively related to corporate profit growth. As a result, improving service quality and meeting client needs, thereby improving client satisfaction is also a process of enterprise value realization.

3.5 Research on countermeasures to improve client satisfaction

Lian Yuqing (2001) pointed out that if want to improve client loyalty, businesses must learn

to choose high-quality clients, provide differentiated services to clients' different needs, implement a client manager system, and fully implement client satisfaction strategies. Guan Zheng (2006) established a structural model to conduct empirical research on broadband client loyalty based on reading domestic and foreign literature on client subjective and objective reasons, and the main factors included in the model are inherent motivation, external incentives, client satisfaction and client loyalty, and thereby proposed targeted countermeasures to implement effective client loyalty enhancement.

4. Practice part

4.1 Choices of indicators to measure clients satisfaction

4.1.1 Convenience

Parasuraman et al. (2014) distributed a questionnaire to 1,900 clients, the results of the questionnaire showed that convenience and client satisfaction are significantly related. In this thesis, the convenience of online banking can be defined as whether the design of the bank interface and the content design of online banking can save clients time and improve business efficiency.

4.1.2 Ease of operation

Ease of operation is defined as the website system allows convenient learning and operation when the client is operating the system. Ease of operation is a key variable of the Technology Acceptance Model (TAM), this model has a high degree of acceptance in the field of acceptability. At the same time, a report based on electronic commerce pointed out that the confirmation of perceived ease of use largely depends on trust. Because of the existence of trust, transactions on the website can be completed very quickly. In terms of trust perception, clients' perception of ease of use is to increase reputation, which is one of the influencing factors of a more reliable website. Some scholars (Lin& Hsieh, 2005; Kumbhar et al, 2010)

believed that usability determines client loyalty, more specifically, the ease of use inversely affects the acceptable risk. Most trustworthy users are considered to come from easy-to-operate websites, and easy-to-operate websites also gain more trust from the outside world because of these clients. In the application of information technology, Venkatesh and Morris (2000) believe that perceived ease of use will affect their satisfaction. From the examples listed above, it can be concluded that the ease of operation of online banking itself will have a positive impact on the effectiveness of online banking services. Abdinnour-Helmet (2005) believes that the degree of recognition of commercial websites is positively related to ease of use. Liao and Cheung (2008) proposed and proved that ease of use can be used to measure client satisfaction with online banking. Therefore, ease of use is inseparable from the satisfaction of online banking clients.

4.1.3 Customization

Customization refers to treating each client as an independent individual, and the company provides each client with unique care and personalized service. In essence, customization means that companies try their best to meet the different needs of each client, so that each client feels his own uniqueness and particularity (Joseph et al, 1999). Customization reflects the client enjoyment of the personalized service brought by the company, the care that the staff brings to the client, the staff's understanding of the client's requirements, the reflection of the client's interest in the company's emphasis, and the time and content of the service required by the client, as well as the degree of matching with the services provided by the company. Online banking and traditional banks both need to provide personalized services to clients, where these services include financial services specially provided by the bank according to its personal services and private services. The pros and cons of personalized services determine whether online banking can be favored by clients. In order to obtain client satisfaction and loyalty, online banking needs to provide more distinctive and personalized services.

4.1.4 Reliability

Reliability is explained in the SERVQUAL model as the company's ability to fulfill promises (2002, p. 85). Its component items include a) complete things as promised to clients on time; b) appropriate assistance to clients when they encounter difficulties; c) the company is reliable and record relevant records correctly. Clients expect reliable service performance, for example, the business performs the service content in a timely and accurate manner to ensure the accuracy of corporate financial data and client record data. Dabholker (1996) defines reliability as the consistency of service quality, service commitment, and commodity availability. When clients enjoy high-risk services, especially when clients cannot determine the output of the service themselves, the security of the service is particularly important. When it comes to purchasing banking, insurance, securities trading, medical care, and legal services that involve money, online banking clients will pay special attention to the reputation of the bank in terms of security. Therefore, safety and reliability can be regarded as online banking fulfilling client requirements on time and responsibly, while at the same time making best attempts to avoid or reduce risks as much as possible when facing risks.

4.1.5 Responsiveness

Responsiveness refers to the willingness and ability to help clients solve problems in a timely manner and improve their service levels (Kumar& Best, 2006). Its components are: a) Even though banks can't answer client questions immediately, they need to tell clients the exact time of feedback; b) provide timely service; c) actively help clients. In general, enterprise staff need to be able to take timely measures to meet client requirements and respond to client needs. If clients cannot get a timely response from the company, the company will have a negative image in the minds of clients. Once the employee fails to provide the right service with the client, the company and employees must have a quick response mechanism to compensate the client and restore the client's satisfaction with the company. If a company does not take any measures for service errors, 86% of clients will feel dissatisfied with such

a response, however once the company sincerely takes remedial measures to clients, this ratio will drop by 20%.

4.1.6 Security

Compared with physical banks, the security of online banking has become an aspect that users pay more attention to when using online banking. Because of the virtual nature of online banking, users cannot actively protect the safety of personal property and privacy, therefore, banks give users a sense of security is particularly important. According to the results of iResearch's "Development Report"(iResearch, 2010), security has a great impact on the acceptance of online banking by individual users. According to Yuan Jiaying's research results (Yuan, 2016), 65.8% of users still have concerns about security, while 65.7% of potential users are worried about the security of online banking, and regard security as an important evaluation criterion for accepting online banking. Therefore, this thesis believes that security is a significant factor influencing client satisfaction of online banking service quality, therefore, the security dimension is added to the construction of the online banking service quality evaluation model.

4.2 Analysis of survey data

4.2.1 Descriptive statistical analysis

4.2.1.1 Demographic variables of the sample

The following table is the demographic variables of the sample. This survey mainly analyzes the sample's gender, age, education level, monthly income and the use of online banking.

Table 1. Sample gender analysis

Indicator	Frequency	Percentage	Effective percentage
Male	73	39.5	39.5

Female	111	60	60
Unknown	1	0.05	0.05
Total	185	100.00	100.00

Source: Created by author with questionnaire collected

It can be seen from the above table that among the 185 valid questionnaires participating in the survey, 73 were males and 111 were females, accounting for 39.5% and 60% respectively, indicating that the women's opinion is more overwhelmed in this questionnaire.

Table 2. Sample age analysis

Indictor	Frequency	Percentage	Effective percentage
Below 20	15	8.11	8.11
21-30	61	32.97	32.97
31-40	29	15.68	15.68
41 and above	80	43.24	43.24
Total	185	100.00	100.00

Source: Created by author with questionnaire collected

Among the population participating in the survey, there are 15 people under 20 years old, accounting for 8.11%; 61 people aged 21-30, accounting for 32.97%; 29 people aged 31-40, accounting for 15.68%; and for above 40 years old, the number of people is 80, accounting for 43.25%. It can be seen from the above table that people aged 41 and above accounted for the highest proportion in this questionnaire survey, which is partly due to the respondents being surveyed.

Table 3. Sample education degree analysis

Indicator	Frequency	Percentage	Effective percentage
Highschool graduate or below	96	51.89	51.89
Some college but no degree	19	10.27	10.27

Bachelor degree	29	15.68	15.68
Master degree	31	16.76	16.76
Doctoral degree	5	2.70	2.70
Professional degree	5	2.70	2.70
Total	185	100.00	100.00

Source: Created by author with questionnaire collected

The table above shows that the sample educational background is as above. The highest proportion is the Highschool graduate or below, with 96 people, accounting for 51.89%, followed by the master's degree, with 31 people accounting for 16.76%. The proportion of bachelor degree and above is 37.06%.

Table 4. Samples monthly income analysis

Indicator	Frequency	Percentage	Effective percentage
Below 25,000 CZK	104	56.2	56.2
25,000-45,000	63	34.1	34.1
45,000-65,000	13	7	7
65,000-85,000	1	0.5	0.5
85,000-105,000	2	1.1	1.1
105,000 and above	2	1.1	1.1
Total	185	100.00	100.00

Source: Created by author with questionnaire collected

Most respondents' monthly income below 25,000 CZK, 104 people, accounting for 56.2%, followed by the range of 25,000-45,000, with 63 people accounting for 34.1%, only 2.2 people have monthly income that is higher than 85,000.

Table 5. Sample use frequency of online banking analysis

Indictor	Frequency	Percentage	Effective percentage
3 times of less	30	16.2	16.2

4 times-5 times	41	22.2	22.2
6 times-8 times	27	14.6	14.6
More than 8 times	87	47.0	47.0
Total	185	100.0	100.0

Source: Created by author with questionnaire collected

From the table above, it can be seen that most users use online banking more frequently. Only 16.2% use online banking less than 3 times a month, 22.2% use 4-5 times, and 14.6% for 6-8 times a month. What's notable is that 47% accounted for more than 8 times. This shows that the service of online banking has penetrated into people's daily life, and the usage rate among respondents is very high.

Table 6. Clients use frequency for the online banking

Indictor	Frequency	Percentage	Effective percentage
ČSOB	31	13.30%	13.30%
Česká spořitelna	56	24.03%	24.03%
Komerční banka	28	12.02%	12.02%
Raiffeisenbank	26	11.16%	11.16%
UniCredit Bank	10	4.29%	4.29%
Other banks	82	35.19%	35.19%
Total	233	100.0	100.0

Source: Created by author with questionnaire collected

With some of respondents have selected more than 1 banks, the total amount in total is more than 185. And through the investigation, it is found that 82 online banking users use Další banky, accounted for 35.19%, which is a relatively high proportion. In addition, among the online banks selected by respondents, Česká spořitelna is chosen by approximately 24% respondents, while only 4.29% people adopt UniCredit Bank. Hence, generally among the five biggest banks, there is huge difference for their market shares among online banking

use.

4.2.1.2 Descriptive statistical analysis of the indicators to be studied

The question options of this questionnaire are based on the Likert scale, which divides the degree of consent into 5 levels. 1 represents a very low level, and gradually increases to 5, which represents a very high level. Respondents can fully express their wishes through 5 levels. At the same time, this questionnaire uses a positive way of expression, which can facilitate the calculation of satisfaction scores in the later stage. A higher score means a higher degree of recognition by the respondents. In the meanwhile, the larger the standard deviation, the greater the difference in the opinions of the respondents. The following table include the maximum value, minimum value, mean value and standard deviation obtained by calculating each indicator separately.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
The page design is concise and clear, and the location of important information is clear.	185	1	5	3.63	1.424
The relevant consulting content is rich and varied and updated at any time.	185	1	5	3.50	1.239
The website is connected and the internet speed is faster.	185	1	5	3.46	1.395
Can search the online bank quickly to the required information.	185	1	5	3.51	1.315
The operation steps of online banking are simple, convenient and easy to learn.	185	1	5	3.60	1.434
Online banking can provide personalized services and responses.	185	1	5	3.36	1.316
Internet banking can remind you of personal events in time.	185	1	5	3.21	1.256
Online banking sets up corresponding measures to avoid customer misoperation.	185	1	5	3.48	1.277
The online banking allows you to clearly understand the services you enjoy.	185	1	5	3.37	1.350
The online bank can provide you with accurate service records.	185	1	5	3.51	1.260
The online banking system is operating well.	185	1	5	3.64	1.404
The online bank can quickly and promptly respond to customer requests.	185	1	5	3.52	1.315
The online bank can be open all day, you can handle various businesses anytime, anywhere.	185	1	5	3.63	1.451
This online bank can quickly handle all kinds of business for you.	185	1	5	3.32	1.244
For your complaints and questions that cannot be answered immediately, the online bank will provide the exact feedback service.	185	1	5	3.25	1.214
The online bank can guarantee the security of your private information.	185	1	5	3.57	1.350
The online bank can guarantee the security of online business processing.	185	1	5	3.54	1.302
The online bank can guarantee the safety of your property.	185	1	5	3.43	1.342
This online bank provides you with tools to enhance the security of the online banking system.	185	1	5	3.47	1.352
Your general satisfaction degree on the online banking,	185	1	5	3.54	1.399
Valid N (listwise)	185				

Figure 1. Mean and standard deviation for indicators (Source: from SPSS, own work)

It can be seen from the above table that the standard deviation of all the questionnaires in the whole questionnaire is between 1.2-1.5, which means that the respondents' opinions on online banking satisfaction are relatively inconsistent, and the dispersion is relatively large, while the average value is between 3.2-3.65, which shows relative satisfaction. Among them, the score for "Internet banking can remind you of personal events in time" is only 3.21,

which is the factors that score the lowest, and the standard deviation is not very large, indicating general low satisfaction for the service.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Convenience	185	1	5	3.56	1.272
Ease of operation	185	1	5	3.52	1.280
Customization	185	1	5	3.35	1.153
Reliability	185	1	5	3.51	1.241
Responsiveness	185	1	5	3.43	1.165
Safety	185	1	5	3.50	1.265
Valid N (listwise)	185				

Figure 2. Mean and standard deviation for 6 factors (Source: from SPSS, own work)

The scores for factors are derived from computing the average value of its indicators included. Among them, the factors in the Convenience dimensions of the bank have higher scores. On the contrary, the scores for the Customization and Responsiveness factor are lower.

4.2.2 Reliability and validity test

4.2.2.1 Reliability test

Reliability refers to the consistency and stability of the experimental results obtained by the investigation (Grönroos, 2007). In order to verify the reliability and validity of the questionnaire question design and results obtained, reliability evaluation is required after analyzing the impact factors. The higher the reliability, the more reliable and the higher the quality of the questionnaire. Here, the reliability test of the questionnaire in this thesis adopts the SPSS19.0 method.

Reliability Statistics- Convenience	
Cronbach's Alpha	N of Items
0.898	2

Figure 3. Reliability test for Convenience (Source: From SPSS, own work)

Reliability Statistics - Ease of operation	
Cronbach's Alpha	N of Items
0.917	3

Figure 4. Reliability test for Ease of operation (Source: From SPSS, own work)

Reliability Statistics - Customization	
Cronbach's Alpha	N of Items
0.881	3

Figure 5. Reliability test for Customization (Source: From SPSS, own work)

Reliability Statistics - Reliability	
Cronbach's Alpha	N of Items
0.918	3

Figure 6. Reliability test for Reliability (Source: From SPSS, own work)

Reliability Statistics - Responsiveness	
Cronbach's Alpha	N of Items
0.913	4

Figure 7. Reliability test for Responsiveness (Source: From SPSS, own work)

Reliability Statistics - Safety	
Cronbach's Alpha	N of Items
0.961	4

Figure 8. Reliability test for Safety (Source: From SPSS, own work)

Reliability Statistics for total table	
Cronbach's Alpha	N of Items
0.984	20

Figure 9. Reliability test for Whole table (Source: From SPSS, own work)

Cronbach's coefficient is ranged between (0,1), the higher the coefficient value, the higher the internal consistency and the better the reliability between the factors and the general satisfaction. The criteria for judging the reliability index value of the subscale are as follows: Below 0.5, it means that the reliability of the subscale is not good, and it is better to delete; between 0.5-0.599, it indicates that the reliability of the subscale is acceptable but low; between 0.6-0.699, it means that the reliability of the subscale is acceptable; the reliability of the subscale is good between 0.7-0.799; the reliability of the subscale is very good between 0.8-0.899; the reliability of the subscale is very ideal if it is above 0.9 (Kaushik& Rahman, 2015). In the context, the coefficients of " Convenience ", " Ease of operation ", " Customization ", "Reliability", "Responsiveness" and "Safety" in the table are: 0.898, 0.917, 0.881, 0.918, 0.913, 0.965 respectively, demonstrating that except for the " Convenience " and " Customization ", all the factors' reliability are very ideal. And the coefficient for the whole table is as high as 0.984, indicating the consistency of the data is high, and the questionnaire has a good internal structure.

4.2.2.2 Validity test

Table 7. KMO and Bartlett's test

KMO and Bartlett test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.972
Bartlett's Test of Sphericity	Appro.chi-Square	4645.42
	df	171
	Sig	0.000

Source (From SPSS, own work)

KMO and Bartlett are the methods used in this thesis to test reliability and validity. In order to verify whether the test data can be used for factor analysis, it is necessary to analyze the relative size of the simple correlation coefficient and the partial correlation coefficient between the observations, the value range of KMO is (0,1). When the value of KMO is closer to the upper limit, the more correlated between variables, the more suitable for factor analysis (Lin& Hsieh, 2005). Kaise (1998) believes that $KMO > 0.8$, then it can be used to analyze the factors. In this research experiment, $KMO = 0.972$, which is within the acceptable scope of factor analysis.

The purpose of Bartlett's test is to verify whether the required data comes from a multivariate normal distribution. If the F value of the test is significant, it proves that the selected data comes from the population of the multivariate normal distribution, which can be analyzed more deeply. In this experiment, p value of Barlett test is 0.000, which can prove that the research data comes from a normal distribution. According to the above verification, the reliability and validity of the questionnaire meet the requirements.

4.2.3 Factor analysis

Communalities		
	Initial	Extraction
The page design is concise and clear, and the location of important information is clear.	1.000	0.855
The relevant consulting content is rich and varied and updated at any time.	1.000	0.795
The website is connected and the internet speed is faster.	1.000	0.689
Can search the online bank quickly to the required information.	1.000	0.769
The operation steps of online banking are simple, convenient and easy to learn.	1.000	0.852
Online banking can provide personalized services and responses.	1.000	0.767
Internet banking can remind you of personal events in time.	1.000	0.537
Online banking sets up corresponding measures to avoid customer misoperation.	1.000	0.825
The online banking allows you to clearly understand the services you enjoy.	1.000	0.801
The online bank can provide you with accurate service records.	1.000	0.735
The online banking system is operating well.	1.000	0.818
The online bank can quickly and promptly respond to customer requests.	1.000	0.801
The online bank can be open all day, you can handle various businesses anytime, anywhere.	1.000	0.759
This online bank can quickly handle all kinds of business for you.	1.000	0.657
For your complaints and questions that cannot be answered immediately, the online bank will provide the exact feedback service.	1.000	0.690
The online bank can guarantee the security of your private information.	1.000	0.824
The online bank can guarantee the security of online business processing.	1.000	0.811
The online bank can guarantee the safety of your property.	1.000	0.778
This online bank provides you with tools to enhance the security of the online banking	1.000	0.851
Extraction Method: Principal Component Analysis.		

Figure 10. Common factor variance (Source: From SPSS, own work)

The higher the commonality, the more measurable common characteristics of the measured variable and other variables, which means that the variable is more influential. In the figure above, the commonality values after the principal components are extracted by the principal component analysis method are relatively high, so all the items are meaningful.

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative%	Total	% of Variance	Cumulative%
1	14.615	76.919	76.919	14.615	76.919	76.919
2	0.669	3.522	80.441			
3	0.525	2.763	83.204			
4	0.378	1.992	85.196			
5	0.366	1.927	87.124			
6	0.357	1.878	89.002			
7	0.288	1.514	90.515			
8	0.264	1.391	91.906			
9	0.238	1.252	93.158			
10	0.198	1.042	94.200			
11	0.194	1.022	95.222			
12	0.160	0.842	96.064			
13	0.143	0.754	96.818			
14	0.126	0.664	97.482			
15	0.115	0.605	98.088			
16	0.105	0.555	98.643			
17	0.095	0.500	99.143			
18	0.083	0.439	99.581			
19	0.080	0.419	100.000			

Figure 11. Test result of Component Analysis for 19 components (Source: SPSS, own work)

Given the 19 indicators, it can be seen that the cumulative percentage of the first indicator is 76.919%, and first 7 indicators have cumulative percentage with 90.515%, hence, these 7 factors contain most of the information. In general, the test indicates that the extracted factors are appropriate.

4.2.4 Correlation analysis

The tightness and trend of changes between variables are described by appropriate statistical indicators. Correlation analysis is usually used to study the uncertain relationship between variables, and the Pearson correlation coefficient is usually used to quantify it (Pizzutti& Backman, 2006). The study uses correlation analysis to explore the six dimensions of online

banking service quality, and explore the correlation and strength between each dimension and satisfaction.

4.2.4.1 Correlation analysis between Convenience and overall satisfaction

From Figure 12, it shows that the correlation coefficient between Convenience dimension and online banking client satisfaction is 0.875, showing a positive correlation, and the p value is less than 0.01, reject the H0₁, demonstrating the positive relationship is significant.

		Convenience	General satisfaction
Convenience	Pearson Correlation	1	.875**
	Sig. (2-tailed)		0
	N	185	185
General satisfaction	Pearson Correlation	.875**	1
	Sig. (2-tailed)	0	
	N	185	185

** . Significantly correlated at the .01 level (bilateral)

Figure 12. Correlation analysis between Convenience and general satisfaction (Source: From SPSS, own work)

4.2.4.2 Correlation analysis between Ease of operation and overall satisfaction

From Figure 13, it is seen that there is a positive correlation between ease of operation and online banking client satisfaction, with a correlation coefficient of 0.869, and the p value is less than 0.01, reject the H0₂, demonstrating the positive relationship is significant.

		Ease of operation	General satisfaction
Ease of operation	Pearson Correlation	1	.869**
	Sig. (2-tailed)		0
	N	185	185
General satisfaction	Pearson Correlation	.869**	1
	Sig. (2-tailed)	0	
	N	185	185

** . Significantly correlated at the .01 level (bilateral).

Figure 13. Correlation analysis between Ease of operation and general satisfaction (Source: From SPSS, own work)

4.2.4.3 Correlation analysis between Customization and overall satisfaction

From Figure 14, it showcases that Customization has a positive correlation with online banking client satisfaction, the correlation coefficient is 0.817, and the p value is less than 0.01, reject the H0₃, demonstrating the positive relationship is significant.

		Customization	General satisfaction
Customization	Pearson Correlation	1	.817**
	Sig. (2-tailed)		0
	N	185	185
General satisfaction	Pearson Correlation	.817**	1
	Sig. (2-tailed)	0	
	N	185	185

** . Significantly correlated at the .01 level (bilateral).

Figure 14. Correlation analysis between Customization and general satisfaction (Source: From SPSS, own work)

4.2.4.4 Correlation analysis between Reliability and overall satisfaction

From Figure 15, it displays that the reliability dimension is positively correlated with online banking client satisfaction, and the correlation coefficient is 0.900, indicating the correlation is very good, moreover, the p value is less than 0.01, reject the H0₄, demonstrating the positive relationship is significant.

		Reliability	General satisfaction
Reliability	Pearson Correlation	1	.900**
	Sig. (2-tailed)		0
	N	185	185
General satisfaction	Pearson Correlation	.900**	1
	Sig. (2-tailed)	0	
	N	185	185

** Significantly correlated at the .01 level (bilateral).

Figure 15. Correlation analysis between Reliability and general satisfaction (Source: From SPSS, own work)

4.2.4.5 Correlation analysis between Responsiveness and overall satisfaction

From Figure 16, the correlation between responsiveness and online banking client satisfaction is 0.854, which is very good and has a positive correlation, moreover, the p value is less than 0.01, reject the H0₅, demonstrating the positive relationship is significant.

		Responsiveness	General satisfaction
Responsiveness	Pearson Correlation	1	.854**
	Sig. (2-tailed)		0
	N	185	185
General satisfaction	Pearson Correlation	.854**	1
	Sig. (2-tailed)	0	
	N	185	185

Figure 16. Correlation analysis between Responsiveness and general satisfaction (Source: From SPSS, own work)

4.2.4.6 Correlation analysis between Safety and overall satisfaction

From Figure 17, it demonstrates that the correlation between security and online banking client satisfaction is 0.882, showing a positive correlation, furthermore, the p value is less than 0.01, reject the H_0 , demonstrating the positive relationship is significant.

		Safety	General satisfaction
Safety	Pearson Correlation	1	.882**
	Sig. (2-tailed)		0
	N	185	185
General satisfaction	Pearson Correlation	.882**	1
	Sig. (2-tailed)	0	
	N	185	185

Figure 17. Correlation analysis between Safety and general satisfaction (Source: From SPSS, own work)

		Convenience	Ease of operation	Customization	Reliability	Responsiveness	Safety
Convenience	Pearson Correlation	1	.907**	.873**	.908**	.877**	.898**
	Sig. (2-tailed)		0	0	0	0	0
	N	185	185	185	185	185	185
Ease of operation	Pearson Correlation	.907**	1	.858**	.891**	.889**	.870**
	Sig. (2-tailed)	0		0	0	0	0
	N	185	185	185	185	185	185
Customization	Pearson Correlation	.873**	.858**	1	.868**	.897**	.852**
	Sig. (2-tailed)	0	0		0	0	0
	N	185	185	185	185	185	185
Reliability	Pearson Correlation	.908**	.891**	.868**	1	.885**	.901**
	Sig. (2-tailed)	0	0	0		0	0
	N	185	185	185	185	185	185
Responsiveness	Pearson Correlation	.877**	.889**	.897**	.885**	1	.884**
	Sig. (2-tailed)	0	0	0	0		0
	N	185	185	185	185	185	185
Safety	Pearson Correlation	.898**	.870**	.852**	.901**	.884**	1
	Sig. (2-tailed)	0	0	0	0	0	
	N	185	185	185	185	185	185

Figure 18. Correlation matrix among the 6 external dependent variables (Source: From SPSS, own work)

The above figure is the correlation coefficients matrix among the variables of "Convenience", "Ease of operation", "Customization", "Reliability", "Responsibility" and "Safety", whose p values are all near to 0, hence they are all significant under the 0.01 significant level. Furthermore, among the 6 factors, they all are positively related, which demonstrate the positive relationship between factors, for example, if the score for Convenience is larger, then the score for other factors will be larger as well.

4.2.5 Summary of the data analysis

From the above analysis of the four aspects of the data, on the one hand, from the descriptive statistics, the samples collected in this study have no major abnormal phenomena, and the average score of the 6 factors is between 3.45, indicating the general high satisfaction. It can be seen from the Reliability and validity test that the data passes the test, indicating the consistency and stability and validity; from the factor analysis, it can be seen that the variables have a large amount of information, and showcases have the capacity to explain others; from the correlation analysis, it is found that there is a significant positive correlation between factors and satisfaction degree and within factors, indicating that these selected factors are all positively related to customer satisfaction decisions. On the other hand, seeing from the respondents surveyed, the Customization and Responsiveness dimensions of the bank falls a little behind, on the contrary, the performance for the Convenience is leading. Based on the statistical analysis, the hypotheses can be answered.

Hypothesis 1: Convenience does positively affect client general satisfaction under 99 percent confidence level.

Hypothesis 2: Ease of operation does positively affect client general satisfaction under 99 percent confidence level.

Hypothesis 3: Customization does positively affect client general satisfaction under 99 percent confidence level.

Hypothesis 4: Reliability does positively affect client general satisfaction under 99 percent confidence level.

Hypothesis 5: Responsiveness does positively affect client general satisfaction under 99 percent confidence level.

Hypothesis 6: Safety does positively affect client general satisfaction under 99 percent confidence level.

5. Discussion

5.1 Analysis of influencing factors of client satisfaction with online banking

5.1.1 Analysis of safety factors

When false information, false advertisements, information stolen and other incidents often appear on the operation page of online banking, the bank's reputation and reputation will be greatly reduced, facing the risk of client loss (Jamie, 2011). Therefore, online banking should guarantee client personal information and financial transactions. The security of the data in the process enables the data to be fully protected from being stolen by a third party. Online banking transactions and information storage are built on the global open Internet, the openness of the network means that the system ports of online banking can be accessed from any network node in the world, which makes it possible for a third party to illegally invade the online banking system and steal client property or client information. At the same time, the online banking system is designed and maintained by the bank's programmers and data engineers. The systems designed by humans are bound to have defects, making the online banking system likely to be invaded by a third party. At the same time, different online banks have different requirements for transaction supervision and management, and the industry has not formed a unified standard. This may allow the virus to escape the supervision and directly penetrate the online banking transaction system to steal clients or banks. assets. Generally speaking, the current technical problems of online banking are more prominent. For developed countries in the European Union, even though their banks have established a strict supervision system, there will still be situations in which clients' property is stolen (Biasutti & Frate, 2017). Moreover, with the continuous development and technological innovation of network technology in recent years, the means for hackers to invade the online banking system have become diverse and undetectable, and the technical risks faced by

online banking have become more and more complex. In order to adapt to the continuous development of network technology, the system of online banking should also be further optimized and upgraded, strengthen the research on the technical risks faced by online banking, and provide strong guarantees for the safety of clients' property.

5.1.2 Analysis of Service Factors

Internet banking is a new way of serving clients compared to traditional banks, which means that the way that online banking serves clients is different from that of traditional banks. The biggest feature of online banking is that clients do not directly contact the bank in reality, but instead select or purchase services provided by online banking for the client. This method provides convenience to clients and allow them to enjoy the services provided by online banking anytime and anywhere, but the new contradiction brought about is that whether the communication between clients and online banking can be timely and effective if there is a problem with the services provided by online banking.

The length of the feedback time and the accuracy of the feedback content of the client's problems directly affect the client's satisfaction with online banking. Online banking means that banks conduct business and provide services to clients through the Internet. However, online banking has designed a new division of departmental functions. If the bank's division of departmental functions is not clear enough, or there is a duplication of function division, it will seriously affect clients' satisfaction with online banking services. Usually, online banking will divide the department into marketing department, technical department, comprehensive management department, etc. The marketing department is responsible for the business development of online banking, the technical department is responsible for technical issues such as the update and maintenance of the online banking system, and the comprehensive management department is responsible for coordinating the functions of various departments. However, the division of management between departments and departments is likely to cause duplication of functions and some management problems such as vacuum zone. At the same time, some of the problems encountered by clients in the use

of online banking are usually belong to service department, who are the front-line personnel to communicate with clients. But generally speaking, these front-line personnel only receive basic training. For some technical problems of online banking, they lack professional knowledge and skills, and it is difficult to give satisfactory answers to clients and cannot solve the problems raised by clients. At present, online banking services are not paying enough attention to clients. At present, online banking is still focusing on grabbing market share and developing new businesses, and has not taken client experience and service experience into the central consideration.

In addition, due to the influence of traditional physical banking concepts, online banking is not sufficiently innovative in terms of business at present, and it has not been able to develop a further commercial online banking model. Most online banks lack the specific division of market business and lack service content for clients of different systems, making most clients unable to enjoy the satisfactory services that match their needs during the use of online banking. In the era of Internet banking, in the face of incentive competition from peers, only by achieving product innovation as soon as possible and providing targeted services can make clients satisfied. In addition, in order to expand their financial business and maximize their benefits, some banks exaggerate some financial investment products to induce clients to make investment choices. Although the behavior of online banking seems to satisfy clients' investment needs, it affects clients' right to choose, and seriously affects clients' satisfaction with banking services.

5.1.3 Analysis of operational factors

The ease of operation has a great influence on the client's satisfaction with online banking. There are many aspects in operability factors, the page layout of the design website, the complete distribution of functional modules, and the cumbersomeness of business operations are all related to the operability factors. At this stage, online banking services are developing rapidly, and increasing clients use online banking services, and they have higher demands for the convenience of operating online banking services. Through the product service and

investigation, it is found that the main factor for clients to select a certain bank service is the ease of operation. Clients believe that the most important issue that banks should pay attention to and start to solve are options related to ease of operation. Among the factors influencing clients in choosing different banks for business, ease of operation and convenience are the most important factors. Clients frequently change banks to handle business, the main factor is whether the business is easy to handle.

5.2 Countermeasures to Improve Client Satisfaction

5.2.1 Security improvement strategy

Online banking uses the Internet to develop traditional banking services. The virtual nature of the Internet makes currency transactions virtual, then, banks and clients no longer conduct transactions at the bank window through real currency, but use the Internet to directly conduct digital currency transactions in the bank's virtual system. This will make people pay more attention to the security issues of online banking. In fact, in the world, the security issue of online banking has always been the core issue of the development of banks, and it is the key for clients to evaluate whether a bank is trustworthy.

5.2.1.1 Technological innovation of bank network security system

At present, after recent years of development, the security of online banking has continued to improve, and clients have become increasingly trusting in online banking transactions. However, the security of online banking cannot be loosened at any moment. In order to innovate the bank's network security system, it is first necessary to understand the manifestation of security risks in the system. First, clients conduct transactions in the banking network system, if the system is maliciously attacked by a third party, client information may be leaked or the money may be transferred. Second, there can be loopholes in the bank's own network security system, so third-party hackers may find the loopholes and attack the loopholes, which may cause the bank to lose control of the network security

system and cause huge losses to the bank and its clients (Akinyele& Olorunleke, 2010). Third, when a client uses a computer to operate online-banking, the virus can attack the computer system, which may cause the client to suffer property losses. These security risks will cause potential economic losses to banks and clients. Therefore, banks should continuously upgrade their online banking systems, strengthen technological innovations in network security systems, and establish a variety of methods for systems to protect the property and information of banks and clients.

Firstly, we must establish advanced safeguard technology. Through various forms such as password verification, CA certificate, SSL encryption (encrypted socket layer protocol) and anti-hacking software to ensure the security of client information (Sindwani & Goel, 2015). Secondly, timely update the software and hardware systems, provide clients with the latest version of the security system, and guarantee the security of online banking transactions in multiple ways. The hardware protections commonly used now include online banking shields, dynamic passwords, dynamic SMS passwords, and combined verification (such as double verification of passwords and dynamic SMS passwords) (Sindwani & Goel, 2015). Software protection is usually to install software products that match online banking on the client, such as professional browsers, dynamic soft keyboards, etc., to ensure the safety of clients' online transactions. Thirdly, control the amount and time of each transaction. Amount control means that there is an upper bound on the transaction limit of a certain account within a day, so as to avoid the risk of large transactions. Time control means that there is a delay in the arrival time of each transaction, that is, the transaction amount is not immediately transferred to the counterparty's account. Once there is a transaction risk, the safety protection measures of time delay play a huge role in recovering the transaction amount, avoiding losses to a certain extent, and protecting client property. Fourth, strengthen identity recognition and verification. The internationally universal 1024 asymmetric key algorithm is used to establish a security system to provide protection for verifying user information and confirming legitimate user identities. At the same time, it supports asymmetric RSA algorithms and smart IC cards as storage media to ensure the security of clients' accounts.

5.2.2 Service improvement strategy

Online banking establishes the connection between the bank and the client through the Internet, so the questions and suggestions that the client feedbacks to the bank must lag behind. In order to provide clients with high-quality services, banks are required to deal with problems reported by clients in a timely manner and listen to client suggestions, not only to ensure that the communication channel between the bank and clients is smooth, but also to ensure that the bank can provide timely feedback to clients. In the current survey, the most concerned by the respondents is that online banking can solve the problems faced by clients in the first time, or even if online banking cannot solve the problems, it will clearly inform the specific time limit for the solution. This also shows that online banking should focus on the communication and feedback issues with clients and improve the quality of their services. Online banking can improve its services through the following aspects:

Firstly, online banking should clarify the functions of each department and prevent a management vacuum. At the same time, banks may sort out the common problems that clients have in the process of using online banking, and formulates client problem collections. When clients met corresponding problems in the manual, they can be solved by checking the manual, which improves the efficiency of problem solving and also improves clients satisfaction with service. Secondly, in the process of using online banking, banks must pay attention to the changes that online banking operations bring to clients, and respond to client questions in a timely manner. When a client encounters difficulties and questions in the use of online banking, which are difficult to solve, the department corresponding to the problem should be arranged, and specific personnel should be assigned to solve the client's problem one-on-one. Regularly check the message board and reply to emails at a certain frequency is required as well. Every time a difficult problem is solved, it can be updated to the difficult problem manual mentioned in the first point, so that the difficult problem manual is updated regularly. Thirdly, pay attention to the client's experience and evaluation of the service. Establish a service scoring system and mechanism, and at the same time allow clients to rate

online banking services, so that online banking services can be better improved. For service failure incidents, it is necessary to arrange relevant personnel to follow up and communicate in time, learn the reason for the failure, and provide clients with certain compensation. Lastly, the communication channels between online banking and clients should be diversified to ensure that clients can easily communicate with the bank under any circumstances. For communication through different channels, special personnel should also be arranged to follow up. In addition, the service methods of online banking are diversified, the business is also diversified, and the clients they face are also different groups. To better serve different groups of clients, online banking should think about how to classify diversified businesses to meet the needs of different clients. Therefore, online banking must form a client-centric service and development concept. At the same time, online banking should also compare with other banks to discover its own advantages and disadvantages, give full play to its advantages, and develop businesses that are attractive to clients to maximize the interests of the bank, while at the same time be able to defeat the competition of other banks.

Online banking should first conduct market research, understand the business needs of the market, and prepare in advance to provide more reasonable and high-quality services.

Online banking classifies target clients according to different standards, such as the client's occupation and income. Grasp the different needs of different types of clients, and launch different services for different types of clients. At the same time, it can launch key businesses for potential key clients, and arrange dedicated personnel for docking and visits at the same time, so as to improve the service experience of key clients.

For the existing big data system, the client's information is integrated, the client's business needs and preferences are analyzed and then summarized, then stored according to the different levels of the client.

5.2.3 Strategies for improving ease of operation

The ease of operation of online banking is the main reason clients consider choosing a bank for business. On the premise of ensuring security, online banking should improve the ease

of operation of its system, thereby increasing client satisfaction and obtaining more loyal clients. After gaining more loyal clients, loyal clients can promote the online banking through word-of-mouth, obtaining more trust from new clients, and expanding the audience of online banking services. At present, to improve the simplicity of the online banking operating system, the following measures can be taken.

Firstly, the operation steps should be simple and easy to learn, and at the same time, provide clients with an operation manual. The operation manual should be simple and easy to learn, and the language should be simple and easy to understand, so as to reduce clients' evaluation of the complexity of the online banking operating system. Secondly, the online banking operating system should provide part of the picture interface and auxiliary text to help clients operate. For some of the more important and specific operation steps, a combination of voice prompt and picture instructions can be used to help clients master them. Thirdly, establish a client return visit mechanism to regularly allow clients to evaluate the online banking operating system, and update the existing operating system through client evaluations. On the premise of ensuring the security of the system, pay more attention to the client's sense of experience and avoid making clients give up because of the complicated online banking operating system. In the increasingly fierce banking competition, banks should always focus on clients, take care of client experience as the primary consideration, and client satisfaction as the primary development goal of the bank. Online banking can establish a client information database, communicate with clients in a timely manner, understand client preferences and market changes, and establish close contact with clients. Providing clients with convenient, fast and efficient services is the primary goal that should be established for the development of online banking.

6. Conclusion

The subject of this thesis is relationship between Czech Online Banking and client satisfaction. First of all, this thesis expounds online banking and online banking satisfaction through literature research, and explores the potential factors that affect bank satisfaction. In order to analyze with practice, this thesis summarizes 6 factors, namely Convenience, Ease of operation, Customization, Reliability, Customization and Safety, as factors that may affect customer satisfaction with online banking. In order to verify the hypotheses, this study designed a questionnaire. By collecting 185 questionnaires, it summarized the satisfaction scores on the six factors and overall satisfaction of Czechs for mainstream Czech online banking. Through quantitative data analysis, it was found that the questionnaire' structure is stable and the sample has no major errors, what's more, these 6 factors all have statistically significant positive relationships with clients satisfaction on online banking. Therefore, this research confirms that Convenience, Ease of operation, Customization, Reliability, Customization and Safety have positive impacts on client satisfaction with online banking. Based on this conclusion, this thesis analyzes the factors that score relatively low in the questionnaires and those have significant impacts on client satisfaction, including the security, service, and operation issues. Hence, in the last part, the thesis puts forward corresponding improvement opinions, so as to provide improvement directions and suggestions for Czech online banking.

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8. Appendix

Client satisfaction survey questionnaire for online banking service quality

In order to understand the service quality of domestic online banking, please indicate your satisfaction with the following service quality you feel. This questionnaire is conducted anonymously. All information is for academic research purposes only. Relevant information will never be disclosed to the outside. Please feel free to fill it out and sincerely thank you for your cooperation.

Part 1: Personal Information

The following is the statistics of your basic information. This information is only used for statistical analysis and will not be disclosed to the public. Please feel free to fill in:

1. What is your gender?

[01] Male [02] Female [03] Prefer not to say

2. Your age?

[01] Under 20 years old [02] 21-30 [03] 31-40 [04] Over 40 years old

3. Your education

[01] High school graduate or below [02] some college but no degree [03] Bachelor's degree [04] Master's degree [05] Doctoral degree [06] Professional degree (please specify)

4. Your monthly income?

[01] Below 25,000 CZK [02] 25,000~45,000 CZK [03] 45,000~65,000 CZK

[04] 65,000~85,000 CZK [05] 85,000~105,000 CZK [06] 105,000 CZK and above

5. How often do you use online banking services each month

[01] 3 times or less [02] 3 times to 5 times [03] 5 times to 8 times [04] 8 times or more

6. Which bank's online banking service do you usually use? (More than one option can be chosen)

[01] ČSOB [02] Česká Spořitelna [03] Komerční banka [04] UniCredit Bank CZ [05]

Raiffeisenbank

[06] Others

Part 2: Online Banking Service Quality

For the following statements, please choose the option that best suits your personal experience based on your experience of receiving services in online banking. Fill in your evaluation score in the blank space. The scores range from 1 to 5 and a total of 5 levels

5: "Strongly agree"; 4: "Agree"; 3: "Unsure"; 2 "Disagree"; 1: "Strongly disagree"

Convenience

The page design is concise and clear, and the location of important information is clear. ()

The relevant consulting content is rich and varied and updated at any time. ()

Ease of operation

The website is connected and the internet speed is faster. ()

Can search the online bank quickly to the required information. ()

The operation steps of online banking are simple, convenient and easy to learn. ()

Customization

Online banking can provide personalized services and responses ()

Internet banking can remind you of personal events in time ()

Online banking sets up corresponding measures to avoid client misoperation ()

Reliability

The online banking allows you to clearly understand the services you enjoy ()

The online bank can provide you with accurate service records ()

The online banking system is operating well ()

Responsiveness

The online bank can quickly and promptly respond to client requests ()

The online bank can be open all day, you can handle various businesses anytime, anywhere
()

This online bank can quickly handle all kinds of business for you ()

For your complaints and questions that cannot be answered immediately, the online bank

will provide the exact feedback service ()

Safety

The online bank can guarantee the security of your private information ()

The online bank can guarantee the security of online business processing ()

The online bank can guarantee the safety of your property ()

This online bank provides you with tools to enhance the security of the online banking system()

Satisfaction

Your general satisfaction degree on the online banking ()

This concludes our visit, thank you for your support and cooperation! If you have any questions about the issues involved in this investigation

Please point out your opinions. Your criticism and suggestions are welcome. Thanks again!