

Analysis of the Richness of Functions of Mobile Banking Services and Users' Satisfaction

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ABSTRACT

The purpose of writing this article is to use appropriate data analysis tool to do research on 2 important factors about the mobile banking services, which are the richness of functions and the users' satisfactions. To study that, we first looked up several related academic papers and most of them are from the China National Knowledge Infrastructure, which means our reference sources are basically all domestic analysis, and that is also the analysis range of this paper. For the purpose of understanding the users' thoughts specifically, we designed a comprehensive questionnaire that includes the following 5 aspects: the security of the applications, the richness of functions, ease of use, users' satisfaction and basic information. Among them, the basic information is designed to classify use groups, so that we can learn the preference of each user group and do further analysis about in which way the application can fit the needs of as many people as it can. After the data collecting process, we proceed the data analysis. In the analysis, we intend to find out the level of the connection among several characteristics of the users, like age, gender and so on. As a result, we calculated their correlation coefficients to proceed the correlation analysis. Then, based on the result we got, we developed a hypothesis about the relation between mobile banking services' users' satisfaction and richness of functions, which will be specifically stated in the article. Bottom line, because the digitization is becoming a developing trend of the banking services, more and more people will start using mobile banking services in the future. However, if the development of the related banking application could not satisfy the needs of their users, the digitization and mobile informatization would never receive the ideal outcomes that the banks and the users want and need. This article did research on this aspect and try to figure out which factor influences the satisfaction of the users of the mobile banking services, and the conclusion of it can be used as reference for the developers of the mobile banking applications.

Keywords: *Mobile, Bank, Application, Satisfaction, Security.*

1. INTRODUCTUON

With the development of technology and finance, people have not been limited to using paper money, checks and other monetary equivalents that must be mediated by banks to conduct daily transactions of goods or services in daily life, which reduces people's dependence on banks and leads to the decline of savings business income of banks. Along with the popularity of mobile phones and the appearance of mobile payment

functions, financial management in Alipay and WeChat, a large number of customers are flowing out of the bank, and the income of each major business continues to decrease. Therefore, in order to break this situation and increase the amount of net profit, banks began to use technology to carry out digital transformation, create digital transaction behavior, digitize service channels and carriers, and create new retail business combining online and offline some years ago. Mobile banking apps play the most important role in the process of digital transformation.

According to the data of the third quarter of 2019, the number of active users of Chinese mobile banking APPs is 380038 million, with a sequential growth of 5.2%. In terms of specific APP applications, ICBC APP, China Construction Bank APP and Agricultural Bank of China APP continue to rank in the top three. The number of active users was 83.918 million, 83.466 million and 65.824 million, respectively. China's comprehensive mobile banking transactions amounted to 85,166 billion yuan, with a growth percentage of 2.20%. In addition, the number of registered users of ICBC's mobile app which has the largest number of customers among banking APPs has reached 313 million. From the above data, it can be shown that there is still a big gap between Chinese mobile banking APP and other third-party payment APP, such as Alipay. Therefore, the APP of Bank of China still has a large space for development and still needs to make continuous progress.

At present, Chinese mobile banking APPs are in the stage of rapid development and mutual competition. However, some mobile banking APPs are still defective in some aspects, which affects customers' satisfaction with mobile banking APPs and leads to the lack of competitiveness of some banking APPs. At present, most of researches about satisfaction of bank are all based on a certain aspect of the bank, for instance, financial services and willing of use. In contrast, researches on users' satisfaction after using mobile banking apps are relatively lacking. Therefore, the research direction of this paper is to study the factors that affect customers' satisfaction with mobile banking APP. First of all, the factors are generally divided into four aspects, the security of APP, the functional richness of APP, the usability of APP, and overall perception of satisfaction, respectively. Then, make a questionnaire to collect the data, use statistical software to analyze and describe the data. Finally summary relevant conclusions and suggestions for the futural development of mobile banking APP.

2. LITERATURE REVIEW

To better serve different needs of different customer groups under the wave and trend of digitization, banks need to improve their mobile banking services, which is the cell phone-based applications that they provided, and make them more suitable for their users.

In recent years, many scholars have done researches on this aspect, and the results of these researches could be very useful references for banks to develop their own applications. These researches are basically covering the following aspects: the operating mechanism and future developing trends of online platform, the customer behaviors in online platform, the security of the online platform [1]. And some of them used mathematical models and questionnaires to help collect and analyze

the feedback from the users, like SPSS data analysis, KMO detects and so on [2].

The operating mechanism of these bank applications are different from each other, but they still have something in common, thus it could be inferred that these functions are necessary for a bank application and almost all customer groups have the same needs of using them. To study the digitization of banks and the applications they develop, understanding these necessary functions would be extremely important because behind them hides the developing train of thought of the designers. By comparing the developing train of thought of the designers and the actual needs of customers, there will be a basic understanding of this industry, about whether the customers and users really satisfied with the application they are using, about whether these applications make the lives of users more convenient and so on. In the article "Based on text mining fluent English-speaking App: Study on the influencing factors of user satisfaction", the similar question has been posted and researched. In this article, the author used 7 data platforms to collect the data of the satisfaction of the users of this Fluent English-Speaking app and use data pre-processing to ensure the reliable and authenticity of these comments [3]. In this article, the study will also include data collecting, but the difference is, this study chooses to use the form of questionnaire to collect the users' satisfaction of the bank applications. Moreover, in the following data analyzing process, the author used high frequency word and Collinear map to help analyze how the users feel when they use this application. And that provided us a reliable method for reference. Based on the author's result, it is not hard to summarized that the ways to improve the satisfaction of that application are as follows: ensures the independent ability of research and development, strictly control the quality of the services that are provided by the application, pay attention to the development of the products, analyze the users' data periodically and use big data analysis and artificial intelligence for advertising in order to improve the users' experience [4].

In the article "Empirical Analysis on User Satisfaction of Mobile Payment Platform", the authors analyzed the core competitiveness, advantage, disadvantage and give advice for the future development of these 3 mobile payment platforms [5]. This article also gives us some inspirations because mobile payment platform and the bank applications have something in common, like both of them can help the users to pay online, deposit online and so on. Furthermore, these two kinds of applications can also cooperate with each other, like the mobile payment platform binds with the bank accounts which can be operated and controlled with bank applications. The authors of this article also mentioned a very important point: "Research on the influencing factors of user satisfaction after users adopt

the platform is relatively lacking, and this research framework lags far behind the widespread adoption of mobile payments [6].” The appearance of this phenomenon is not uncommon in this application industry because many of the developers of the applications concern more about how to attract new users, but ignore the maintaining of the existing users, and thus lack of the development and optimizing of the applications. As a result, it makes the question “how could bank applications optimize their product” come to the surface again, which is one of the research objectives of this article.

3. METHODS

Sample and data collection

The data is collected with the questionnaire survey method. First, this study designed the outline of the questionnaire depending on three aspects which may have influence on users’ satisfaction of online bank apps, which are respectively the abundance of functions, the usability of app itself, and the safety of the system. Then this research produced a pilot test with the help of some professional people, including a D-of economy, in order to ensure that the questions are not only suggested in a rational way, but also fit well to the reality. The questionnaires are distributed among people from different fields covering a great variety of ages, districts, and salaries, which provides a guarantee of the diversification of samples. Questions were prepared in Chinese, in order to make sure that people who volunteered in this investigation have used their mother-language, so there will not be any misunderstandings to affect the final result. After everything has been done, the questions are carefully translated into English, and this study also used Google translator to prove that this translation did not have any mistake.

To design the questionnaire, people from several banks are interviewed randomly to get some information about the main reasons which may influence the users’ satisfaction. Then this paper made the original hypothesis of three main reasons, and designed the questionnaire based on these three aspects: function, usability, and safety. Several reverse problems are also inserted into the questionnaire randomly, therefore, it may found out that if there was anybody did it carelessly. Through this way, it would be much more efficient to select out those irrelevant data and drop them, so the results would be more precise. When it was time to collect the data, this study distributed the questionnaires online in several cities in both China and the U.S., such as Harbin, Shenyang, Beijing, Tianjin, Nanjing, Shenzhen, Xiamen, NYC, Chicago, Washington D.C. and so on. With the help of different people at almost all ages who are accessible to online bank apps, this research obtained the initial edition of the investigation

firm with the crude data. Then, those scales were categorized into three kinds based on the original hypothesis on those three aspects, and then analyzed them respectively [7].

This survey was conducted in 2021. Finally, the samples consist of 141 volunteers. Among those people, 41 (29.1%) were males, and 100 (70.09%) were females. 65 (46.1%) of them are at the age of 18-25, and 22 (15.6%) are 26-35, making up of the major part of this survey.

Measures

This paper used the five-point scale to measure people’s agreements towards the questionnaire items, with “1” indicating “strongly disagree” and “5” indicating “strongly agree”.

In order to measure the influence based on safety, usability, and function on people’s satisfaction, this article conducted several items to measure these three factors, respectively. To measure function, the following four questions are generated.

The functions provided by online banks such as investments and transactions of stocks and foundations are applied.

The functions provided by online banks such as recharging, billing in installment, applying for a loan, and so on, are used frequently.

The functions provided by online banks for communicating can be used frequently when connecting with other users.

The functions provided by online banks may adjust themselves to recommend some specific functions to the users towards their personal habits.

Moreover, in order to measure the safety of online banks, volunteers are given the following questions to help with this process.

After installing online bank apps, virus may appear in mobile phone systems.

After installing online bank apps, they may acquire more jurisdictions than it should have done.

After installing online bank apps, spam and scam phone calls or messages are always received.

After installing online bank apps, notifications with advertisements are always received.

After installing online bank apps, it may run autonomously with spending of data flow.

After installing online bank apps, financial losses have been caused because of the disadvantages or shortages of the apps.

After installing online bank apps, it would be difficult to clear the remnants of the files.

Another measurement is the usability of online bank apps, and several questions related are also designed.

Online bank apps have more brief steps of dealing with transactions than that offline.

Online bank apps are more intelligent and may save the time of counseling with bank clerks.

Online bank apps have truly reached the goal of “the mobilization of the bank”, allowing users to free of going to the bank to deal with transactions.

Online bank apps may fit users’ personal habits well.

Online bank apps truly let users feel more comfortable and efficient.

Online bank apps may deal with personal information of transaction in time.

Online bank apps have clear and simple design of using.

Online bank apps are better than other payment apps (such as Alipay or WeChat).

These items were valued by volunteers who are all

users of one or more online bank apps.

To make the result of the investigation more exclusive to other factors that may affect this experiment, several individual-level variables were adopted as control variables. Those chosen variables include gender, age, education experience, region, and salary. Being based on these preparators, the measurement of satisfaction is conducted by using the following items. At the same time, in order to test if the volunteers have finished the questionnaires carefully, this study developed these items in an opposite way.

(1) Online bank apps would not send notification like loan or financial information.

(2) Online bank apps are not restricted by time or space.

(3) Online bank apps have simple steps to deal with transactions.

(4) Online bank apps can clear up remnants after uninstalling.

All these items are answered by volunteers.

Table 1. Measures and Validation

<i>Construct</i>	<i>Items</i>	<i>Loading</i>
<i>Satisfaction</i> <i>(Cronbach's $\alpha =$; CR=0.874; AVE=0.637)</i>	(1) Online bank apps would not send notification like loan or financial information.	0.757
	(2) Online bank apps are not restricted by time or space.	0.881
	(3) Online bank apps have simple steps to deal with transactions.	0.864
	(4) Online bank apps can clear up remnants after uninstalling.	0.672
<i>Function</i> <i>(Cronbach's $\alpha =$; CR=0.877; AVE=0.641)</i>	(1) The functions provided by online banks such as investments and transactions of stocks and foundations are applied.	0.828
	(2) The functions provided by online banks such as recharging, billing in installment, applying for a loan, and so on, are used frequently.	0.849
	(3) The functions provided by online banks for communicating can be used frequently when connecting with other users.	0.771
	(4) The functions provided by online banks may adjust themselves to recommend some specific functions to the users towards their personal habits.	0.750
<i>Safety</i> <i>(Cronbach's $\alpha =$; CR=0.926; AVE=0.640)</i>	(1) After installing online bank apps, virus may appear in mobile phone systems.	0.822
	(2) After installing online bank apps, they may acquire more jurisdictions than it should have done.	0.830
	(3) After installing online bank apps, spam and scam phone calls or messages are always received.	0.794
	(4) After installing online bank apps, notifications with advertisements are always received.	0.811
	(5) After installing online bank apps, it may run autonomously with spending of data flow.	0.759
	(6) After installing online bank apps, financial losses have been caused because of the disadvantages or shortages of the apps.	0.866
	(7) After installing online bank apps, it would be difficult to clear the remnants of the files.	0.833
<i>Usability</i> <i>(Cronbach's $\alpha =$; CR=0.957; AVE=0.740)</i>	(1) Online bank apps have more brief steps of dealing with transactions than that offline.	0.850
	(2) Online bank apps are more intelligent and may save the time of counseling with bank clerks.	0.911
	(3) Online bank apps have truly reached the goal of “the mobilization of the bank”, allowing users to free of going to the bank to deal with	0.853

transactions.	
(4) Online bank apps may fit users' personal habits well.	0.906
(5) Online bank apps truly let users feel more comfortable and efficient.	0.894
(6) Online bank apps may deal with personal information of transaction in time.	0.911
(7) Online bank apps have clear and simple design of using.	0.892
(8) Online bank apps are better than other payment apps (such as Alipay or WeChat).	0.628

Notes: CR= composite reliability; AVE= average variance extracted

C. Reliability and Validity

Cronbach's alpha is utilized to evaluate the level of composite reliability. As what is shown in the Table 1, the alpha for each construct is above 0.70. The factor loading in the table can help the assessment of construct validity. All values of loadings presented in the Table 1 are above the cutoff point 0.7, including only one exception (0.63). Therefore, it can be proved that the

items possess a good construct of validity. Moreover, all of the results of composite reliability (CR) are higher than the level of 0.87, which exceed the 0.70 cutoff point a lot. Also, the outcoming of average variance extracted (AVE) for each construct is 0.63 or higher, exceeding the benchmark of 0.50, too. Hence, both composite reliability and average variance extracted are demonstrated.

Table 2. Descriptive Statistics and Correlations

	satisfaction	usability	safety	Safety_usability	Gender	Age	Diploma	Job	Salary
satisfaction	1								
Usability	***0.742	1							
Safety	+0.130	0.140	1						
Safety_usability	***0.453	***0.550	***0.871	1					
Gender	+0.127	-0.68	*-0.149	*-0.172	1				
Age	**0.217	***0.267	0.094	*0.181	**0.220	1			
Diploma	**-.203	-0.108	-0.074	-0.089	-0.046	***-0.36	1		
Job	-0.90	*-0.142	-0.055	-0.085	+0.133	***-0.52	-0.093	1	
Salary	*0.146	**0.224	0.078	*0.162	-0.079	***0.337	0.103	*-0.23	1

+p<0.10, *p<0.05, **p<0.01, ***p<0.001

Table 3. Regression Results

	Model 1	Model 2	Model 3
Constant	0.946*** (0.205)	2.104*** (0.612)	2.918*** (0.765)
usability	0.696*** (0.53)	0.680*** (0.056)	0.491*** (0.114)
Safety			-0.318+ (0.179)
Safety_usability			0.080+ (0.042)
Gender		-0.183 (0.029)	-0.160 (0.130)
Age		-0.010 (0.067)	-0.018 (0.067)
Diploma		-0.187*(0.094)	-0.204* (0.094)
Job		-0.006 (0.022)	-0.010 (0.022)
Salary		-0.009 (0.060)	-0.008 (0.060)

+p<0.10, *p<0.05, **p<0.01, ***p<0.001

4. RESULTS

The descriptive statistics in Table 2 show basic information on each factor and correlations among them. This research utilized significance analysis to assess the confidence level of each correlation, and the confidence level are categorized into four levels based on the value of p. In Table 3, during the process of testing the regression analysis between satisfaction and function, it is found that the level of abundance of the functions have little influence on satisfaction. Therefore, this study decided to remove this factor in case of causing possible negative influence on the results.

After removing the factor of function, according to the regression results in Table 3, satisfaction is mainly influenced by usability, and the improvement of usability can increase the level of satisfaction. Moreover, another conclusion could be drawn that safety of an app can also influence the users' satisfaction positively.

What is more, this article also made another calculation about the influence of usability enhanced by safety, and there is an obvious trend that safety apparently has the potential to increase the influence that the factor usability has made on satisfaction.

5. HYPOTHESIS

Through the study of the factors that affect the satisfaction of APP users in mobile banking, it is found that, although the bank card as an electronic product has rich functions, only safety and usability will affect user satisfaction. Specific impact factors are defined and assumed as follows.

A. Usability

The Banks advanced business programme provides automated and electronic service channels for traditional banks. Some users worry that the banks APP as an electronic device will have many steps and complex operations. Compared with traditional banking, it is a long wait, but it only has to be done at the employees request. Mobile banking APP as an electronic product, it takes time to learn and operate. So, in this case, the ease of use of the banks APP seems particularly important. As users perceive the process of opening up mobile banking services as simple and easy to use, their awareness of the usefulness of m-banking will increase. When mobile banking is simple and easy to operate, users prefer to do business online. Thus, it proposes the following hypothesis:

Hypothesis 1: Bank app usability will have a positive effect on users' satisfaction.

B. Safety

More than 61% of chinese users have safety as a primary consideration when deciding whether to use a bank app, according to the survey. Because the bank APP is an online office, and the personal information and funds of the users need to be included in the business process, the safety concerns of users are also a concern for business performance. When the safety of a bank application is at a high level, users are more likely to believe that the bank program performs better. In this case, usability has a greater impact on user satisfaction. But if bank safety is low in the state, users will also question how easy APP is to use, which can affect user satisfaction. Thus, this paper proposes the following hypothesis:

Hypothesis 2: Bank app safety has a positive moderation effect on the relationship between usability and users' satisfaction.

6. DISCUSSION

With the development of information technology and the popularization of Internet applications, the demand for mobile banking services based on Internet users is also increasing, and higher requirements are placed on the banking business model and customer service methods. To develop e-banking channel construction and business development, and earnestly implement the customer-centric service concept, mobile banking has

gradually enriched its functions, optimized service processes, improved service levels, and enhanced customer satisfaction [9].

This article focuses on mobile banking customers, taking them as the survey object, and designing a reasonable questionnaire to investigate the function richness, ease of use, security, and user satisfaction of mobile banking, and find out the functions and user satisfaction of mobile banking [10]. The relationship between degrees: (1) Safety and ease of use have a positive impact on user satisfaction; (2) Ease of use has a more significant impact on user satisfaction than safety; (3) Security does not directly affect user satisfaction but has a positive regulatory effect on it.

7. FUTURE RESEARCH

This article has studied the relationship between mobile banking feature richness, ease of use, security and user satisfaction, but there are some other issues that make us explore. First, conduct a quantitative study of samples, divide age samples, and observe whether different factors at different ages have the same degree of influence on user satisfaction. Second, conduct research based on different types of banking apps. In the context of China, banks are state-owned and privately owned. State-owned banks have larger national models and higher market shares, and private banks have stronger autonomy and more precise business positioning. Whether this research conclusions are different in the context of state-owned banks and private banks. Third, future research can explore more characteristics of mobile banking and explore some more contextualized variables.

8. CONCLUSION

This study elaborates the link between users' satisfaction and some specific characters revealed by the online bank apps by using the data collected from questionnaires to build up some mathematical models, then draw the final conclusions from the results of correlation analysis that usability is the most evident element to have influence on satisfaction, which may lead the level of satisfaction to vary the same way as it changes. What's more, it's also be found that the safety is another factor which may affect the users' satisfaction positively. Also, there's a relationship between safety and usability, that the increase of safety may have the possibility to strengthen the effects led by usability. Generally speaking, this study draws a more comprehensive picture about the degree of importance of different factors shown by online bank apps, which may offer some usable information for those banks when developing or improving those apps designed for online bank transactions.

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