

# The Impact of Digital Banking Services on Customer Satisfaction

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**Abstract:** With the rapid development of information technology, the banking industry is accelerating digital transformation, changing customer experience and reshaping the competitive landscape. This article explores the impact of digital banking services on customer satisfaction, focusing on the three core dimensions of convenience, security and personalization. Research is conducted through questionnaires and empirical analysis. The study found that the convenience, security and personalization of digital banking services have a significant positive impact on customer satisfaction. Through an in-depth analysis of these service characteristics, this article puts forward strategic recommendations to improve customer satisfaction, aiming to help banks remain competitive and achieve sustainable development in digital transformation. The research results provide empirical support for the banking industry, emphasize the importance of service quality improvement and innovation, and provide a reference for banks' market positioning and service optimization in the digital era.

**Keywords:** Digital banking services, Customer satisfaction, Service quality.

## 1. Introduction

With the advancement of technology, digital transformation of banking business has become a major development trend in the global banking industry. Digital banking services, including online banking transactions, mobile applications, self-service terminals, and artificial intelligence customer services, have not only changed customers' financial service experience, but also have a profound impact on the competitive landscape of the banking industry. Customer satisfaction is a key indicator for banks to maintain competitive advantage and sustainable development. It not only directly affects customer retention and recommendation behavior, but also increases the likelihood of successful cross-selling and increases customer lifetime value. Therefore, studying the impact of digital banking services on customer satisfaction has important practical significance.

The promotion of digital banking services has accelerated significantly around the world. According to reports in 2022, more than 360 million adults around the world have begun to use mobile devices or computers for online banking services, which shows that the use of digital banking services is growing. In addition, changes in customer needs, technological advancements and pressure from competitors have also promoted the digital transformation of traditional banks. During the epidemic, a large number of customers began to turn to online and mobile banking services, and a survey showed that more than 70% of bank customers used digital channels more frequently for transactions. At the same time, the introduction of technologies such as artificial intelligence, big data analysis, blockchain and cloud computing has promoted the digital transformation of traditional banks and created research needs for new digital banking service models. Fintech companies and large technology companies also provide innovative financial services, posing direct competition to traditional banks, forcing banks to pay more attention to the digitalization of customer experience and services to remain competitive.

The above data and trends show that with the continuous evolution of digital technology and the growing needs of customers, the digital transformation of banking business has become an irreversible trend. However, the digital transformation of banking business is not just a change in technology, but more importantly, its impact on customer satisfaction. Customer satisfaction is directly related to a bank's customer loyalty and market share, and is one of the key indicators of bank performance. Therefore, studying the relationship between digital banking services and customer satisfaction can not only help banks evaluate current service performance, but also guide banks' future service improvement and product development strategies.

## 2. Related Literature

### 2.1. Current Research Status at Home and Abroad

#### 2.1.1. Research Related to Satisfaction

The customer satisfaction theory proposed by Cardozo (1965) is mainly used in marketing and business management. This theory holds that customer satisfaction is affected by multiple factors, the main one being the customer's perception of "value for money" for the cost of goods and services paid. Cardozo measures customer satisfaction using the price expectation gap, which is the difference between customers' expectations and perceived value. When customers perceive value greater than expectations and costs, they will be satisfied with the goods and services provided by the business. In addition to the customer satisfaction theory proposed by Cardozo (1965), Bearden et al. (1984) conducted a large number of studies and proposed the influencing factors of customer relationship management theory on customer satisfaction. Antreas and Athanassopoulos (2000) divided customers into personal customers and business customers, and pointed out that personal customer satisfaction is affected by five factors including innovation, company image, perceived price, perceived quality and convenience. Depiana

and Hartelina (2021) believe that payment equality has a significant impact on customer satisfaction. They believe that the sense of fairness and equality brought by payment will affect customer satisfaction, which in turn affects customers' re-consumption behavior.

With the development of technology, especially Internet technology, consumer behavior patterns have undergone tremendous changes, and traditional customer satisfaction models are gradually unable to meet the requirements of the times. Based on this, Kuznyetsova and Pogorelenko (2018) studied from the perspective of big data and the Internet era and found that customer attention is also very important to customer satisfaction. At the same time, the development of management science has made enterprise management no longer a closed internal affair. Knowledge management, organizational management and technical management will also affect customer satisfaction. This study proposes strategies to improve customer satisfaction. Sub (2013)'s research found that in most bank customer satisfaction cases, factors such as the professional skills, service quality and brand image of internal bank employees have an important impact on customer satisfaction. Since customer satisfaction is the subjective feeling of customers, in order to study customer satisfaction more objectively, a scientific and reasonable index system must be established.

### 2.1.2. Research on Digital Banking Services

At present, digital smart banks are developing rapidly and have gained wide social recognition and achieved important development results. According to Kim and Shim (2016), the development of the Internet has promoted the growth of online finance and posed a huge challenge to traditional banks. This has also forced traditional banks to transform themselves to the Internet to improve service efficiency. Due to the high efficiency of Internet information dissemination, traditional banks need to use the advantages of Internet information to improve service effectiveness. At the same time, according to Lien et al. (2020), from the perspective of commercial bank business transformation, the impact of information technology on traditional commercial banking business was discussed in depth. Therefore, they believe that the use of information technology to achieve digital transformation of traditional commercial banks is conducive to banks reducing costs and increasing efficiency. They also proposed that digital transformation can be achieved by using Internet electronic information means.

Kuznyetsova et al. (2018) proposed an evaluation model for the digital transformation of commercial bank outlets. The model uses a comprehensive evaluation method to evaluate the effect of digital transformation of traditional commercial bank outlets. In addition, the model can also effectively discover problems that arise in the process of digital service transformation of commercial bank smart outlets. According to Fumhe (2019), the reason for people switching to electronic statements is not because of the negative impact of paper on the environment, but because of the convenience of using electronic statements. The study also showed that the main reason participants chose to use mobile applications and online banking platforms to access online declarations was because of the traceability of electronic statements. According to Ismail and Alawamleh (2017), customers prefer service providers that provide the most time-saving and labor-saving services. Convenience can be measured in many different ways, including ease of use, whether online banking

is available at any time, whether waiting in line is avoided, the amount of time saved compared to traditional banking, and the ease of the login process.

## 2.2. Dimensionality and Measurement of Variables

This study uses digital banking services as independent variables, and its three dimensions are convenience, security, and personalized services. Customer satisfaction is studied as the dependent variable.

Digital banking services refer to financial services provided to customers through digital channels such as the Internet and mobile devices. In this study, digital banking services include three dimensions: convenience, security, and personalized services.

Convenience refers to the convenience of digital banking services in time and space. Convenient digital banking services allow customers to trade and manage assets at any time and any place, greatly improving customer experience.

Security refers to the account security and information security of digital banking services. Customers will conduct a large number of transactions and asset management through digital banking services, so digital banking services must have a high degree of account and information security to protect customers' funds and information security.

Personalized services refer to digital banking services that provide personalized services according to customer needs. Digital banking services can provide personalized recommendations, products and services based on factors such as customer transaction history and preferences.

Customer satisfaction refers to customer satisfaction and loyalty to digital banking services. Customer satisfaction can be evaluated from multiple aspects, including customer expectations, experience, trust, and loyalty. Digital banking services improve customer satisfaction and loyalty by providing convenient, secure and personalized services, thereby enhancing the market competitiveness of digital banking services.

## 3. Research and Analysis

### 3.1. Trust Level Analysis

In order to evaluate the internal consistency of the questionnaire, this study used SPSS 28.0 for reliability analysis. Among them, the Cronbach's  $\alpha$  value of the scale was used to evaluate consistency. Generally, the Cronbach's  $\alpha$  value of the total scale should be higher than 0.80, and between 0.70 and 0.80 is also acceptable. For the subscale, the Cronbach's  $\alpha$  value should be higher than 0.60, and between 0.60 and 0.70 is also acceptable. Hair et al. (2009) proposed that a Cronbach's  $\alpha$  value greater than 0.7 indicates that the scale has a high reliability. In exploratory studies, the Cronbach's  $\alpha$  value should be at least greater than 0.6. If the  $\alpha$  value of the total scale is less than 0.70 or the  $\alpha$  value of the subscale is less than 0.60, it is necessary to consider revising the scale or adding or deleting questions. In the reliability analysis, the scale after deleting items is used as a sensitivity analysis indicator, and the indicator value is judged by comprehensively considering the corrected total correlation coefficient (CITC) and the  $\alpha$  coefficient of the deleted items. If one item does not meet the standard test value, consider revising the question or directly deleting it. In this study, the total scale correlation coefficient CITC value, the  $\alpha$

coefficient of the deleted item, and Cronbach's  $\alpha$  value were used to test the overall reliability and dimensional reliability. The  $\alpha$  value of the total scale should be greater than 0.7, and the CITC value should be greater than 0.4. If the CITC value is less than 0.4, and the overall  $\alpha$  coefficient increases after deleting a question, consider deleting the question. If the test standards of the above three conditions are met at the same time, it means that the scale has reliability in the predictive questionnaire and can be used in the formal questionnaire.

**Table 1.** Initial reliability of the digital banking service scale

name		Corrected Total Correlation (CITC)	$\alpha$ coefficient with term removed	Cronbach's $\alpha$ coefficient
Convenience (CV)	PO1	0.815	0.894	0.873
	PO2	0.693	0.889	
	PO3	0.596	0.846	
	PO4	0.614	0.867	
	PO5	0.628	0.881	
	PO6	0.734	0.862	
Safety (SF)	RE1	0.784	0.903	0.882
	RE2	0.672	0.887	
	RE3	0.587	0.852	
	RE4	0.523	0.869	
	RE5	0.615	0.876	
	RE6	0.732	0.851	
Personalized Service (PS)	SA1	0.781	0.898	0.875
	SA2	0.678	0.895	
	SA3	0.573	0.846	
	SA4	0.520	0.876	
	SA5	0.619	0.879	
	SA6	0.749	0.857	

Note: Convenience (CV); Safety (SF); Personalized Service (PS)

According to the results in Table 1, the reliability coefficients of the three dimensions of convenience, security, and personalized services are 0.873, 0.882, and 0.875, respectively, all higher than the reliability standard value of 0.7. At the same time, the CITC values of the analysis items are also greater than 0.4, indicating that there is a good correlation between the analysis items. Therefore, it can be concluded that the digital banking service scale performs well in terms of reliability and relevance. The reliability coefficient values of the three dimensions are 0.873, 0.882, and 0.875, respectively, which further confirms that the reliability quality of the data is good.

**Table 2.** Customer Satisfaction Scale Reliability

name		Corrected Total Correlation (CITC)	$\alpha$ coefficient with term removed	Cronbach's $\alpha$ coefficient
Satisfaction (ST)	ST1	0.643	0.869	0.874
	ST2	0.698	0.879	
	ST3	0.713	0.843	
	ST4	0.595	0.862	
	ST5	0.824	0.853	
	ST6	0.678	0.881	

Note: Satisfaction (ST)

According to the data in Table 2, we can observe that the

values of the corrected total correlation coefficient (CITC) are all greater than 0.4, which indicates that there is a good correlation between the items. In addition, the  $\alpha$  coefficient after deleting each item is less than the overall Cronbach's  $\alpha$  coefficient, which indicates that each item plays an important role in the reliability of the entire scale. Finally, the Cronbach's  $\alpha$  coefficient of the scale is 0.874, indicating that its reliability level is good. In summary, the data reliability coefficient value of the scale is 0.874, which comprehensively indicates that the data reliability quality is excellent.

### 3.2. Validity Analysis

Validity refers to the degree of consistency between the measurement results and the content to be examined. If the measurement results are more consistent with the content to be examined, the validity is higher; otherwise, the validity is lower. Assessing validity usually requires considering the significance of the KMO coefficient and Bartlett's test of sphericity. The value range of the KMO coefficient is between 0 and 1. The closer to 1, the better the structural validity of the questionnaire. If the significance of Bartlett's sphericity test is less than 0.05, the questionnaire can be considered to have good structural validity.

**Table 3.** Validity Analysis Table

KMO and Bartlett's test		
KMO sampling suitability measure		0.771
Bartlett's test of sphericity	Approximate Chi-Square	2814.172
	Degrees of Freedom	1121.381
	Significance	0.000

Source: This study compiled

Based on the data in Table 3, we conducted KMO and Bartlett tests to verify the validity of the questionnaire. The coefficient result of the KMO test is 0.771, and the chi-square value of the Bartlett test is 2814.172 (Sig.=0.000<0.01). These results indicate that the questionnaire has good overall validity. The KMO coefficient reflects the correlation between variables in the sample. The results here show that there is a strong correlation between variables and is suitable for factor analysis. Bartlett's test tests whether there is a correlation between variables, and the results show that there is a significant correlation between variables. In summary, the questionnaire has high validity and can be used for subsequent data analysis.

### 3.3. Correlation Analysis

**Table 4.** Correlation coefficient matrix of each variable

	Convenience	safety	Personalized service	Satisfaction
Convenience	1			
safety	.828*	1		
Personalized service	.726*	.713*	1	
Satisfaction	.675*	.608*	.657*	1

Note: \*Significance less than 0.05 is relevant

As shown in the table, first, there is a strong positive correlation between the variables. Specifically, convenience and security show a high correlation coefficient (0.828), while convenience and personalized services and security and personalized services also show strong positive correlations

(0.726 and 0.713, respectively). This shows that there is a high degree of interdependence between the four variables, that is, they influence each other. Therefore, changes in one variable may lead to corresponding changes in other variables.

Secondly, the correlation coefficient between convenience and satisfaction is 0.675, which is slightly lower than the correlation coefficients between convenience and personalized services and security. This may indicate that the impact of convenience on satisfaction is slightly different from its impact on personalized services and security. Specifically, convenience plays a greater role in improving personalized services and security, while its impact on improving satisfaction is relatively small.

In addition, all variables are positively correlated with each other, and the correlation coefficient is positive. This indicates that as one variable increases, other variables are likely to increase as well. This is in line with our expected results, because convenience, security, personalized services, and satisfaction are all evaluations of the quality of products or digital banking services, and they should promote each other.

Finally, different variables have different degrees of influence on the target variable, and the size of the correlation coefficient is also different. Here, the correlation coefficient of security is the largest, indicating that security has the most significant impact on satisfaction, personalized services, and convenience. Therefore, if you want to improve satisfaction, personalized services, and convenience, you first need to consider improving the security of digital banking services.

In general, through the analysis of the variable correlation coefficient matrix, we have come to the above conclusions. This helps us better understand the relationship between convenience, security, personalized services, and satisfaction, and provides guidance for improving digital banking services.

### 3.4. Regression Analysis

Regression analysis is a method for quantitative analysis of two or more determined variables, and is also one of the most widely used data analysis methods. The following table is based on the results of SPSS 28.0 software analysis.

**Table 5.** Regression analysis results

Model	Standardized coefficient	t	Significance
	Beta		
constant			.000
Convenience	.327	5.284	.000
safety	.213	2.791	.000
Personalized service	.225	3.511	.000

Note: \*Dependent variable: Satisfaction

According to the regression analysis results in the above table, the following conclusions are drawn: First, the significance test of the regression model shows that the p value is less than 0.05, indicating that the regression model is statistically significant, that is, the independent variables have a significant impact on the explanation of the dependent variable. Secondly, the standardized coefficients of the independent variables can be used to compare the impact of the respective variables on the dependent variable. According to the analysis results, the standardized coefficient of convenience is 0.327, the standardized coefficient of security

is 0.213, and the standardized coefficient of personalized service is 0.225. Therefore, convenience has the greatest impact on satisfaction, followed by personalized service and security. Further analysis of the regression results shows that the t values of the three independent variables are all greater than 2 and the p values are less than 0.05, indicating that the impact of convenience, security and personalized services on satisfaction is significant and statistically significant. Finally, the significance test result of the constant term is that the p value is greater than 0.05, indicating that the constant term is not statistically significant in explaining the variation of the dependent variable, that is, the constant term has weak explanatory power on the model.

In summary, according to the regression analysis results, the hypotheses H1, H2 and H3 are supported, that is, convenience, security and personalized services have a significant impact on satisfaction. Specifically, convenience has the most important impact on satisfaction, and personalized service and security also have a significant impact on satisfaction. However, the constant terms play a relatively small role in the model. These analysis results provide valuable information for us to further understand and improve digital banking services.

## 4. Conclusions

According to the results of the above correlation analysis and regression analysis, the hypothesis verification conclusions of this study are shown in the following table:

**Table 6.** Summary of research hypothesis verification conclusions

Assumptions	Assumptions	Validation results
H1	Convenience positively affects satisfaction	Establishment
H2	Safety positively affects satisfaction	Establishment
H3	Personalized service has a positive impact on satisfaction	Establishment

Based on the above empirical analysis, the following conclusions are drawn:

First, convenience has a significant positive impact on customer satisfaction. The convenience of digital banking services continues to improve. Customers can transfer money, check balances, handle business and other operations anytime and anywhere through mobile phones, computers and other devices, eliminating the cumbersome process of waiting in line and greatly saving customers' time and energy. This convenience allows customers to reduce the trouble of being unable to solve problems in time due to time and space constraints, thereby improving customer satisfaction. Customers have a good experience with the convenience of digital banking services, which can enhance their loyalty to the bank and increase their willingness to use it again.

Secondly, security has a significant positive impact on customer satisfaction. Security is one of the important considerations for customers to choose and trust banks. Customers are more concerned about the security of their funds and personal information and do not want to be affected by hacker attacks, fraud and other issues. Banks need to strengthen network security and data privacy protection

measures and adopt advanced encryption technology and identity verification mechanisms to ensure that customers' funds and information are effectively protected. When banks can provide digital banking services with higher security, customers will be more trusting and satisfied with the bank's services and enhance their loyalty to the bank.

Finally, personalized service has a significant positive impact on customer satisfaction. Digital banking services can provide personalized services by collecting and analyzing customer data to understand their preferences and needs. For example, banks can recommend financial products and financial solutions suitable for customers based on their consumption habits and financial status. Banks can also provide customers with customized services based on their preferences and wishes, such as special credit card benefits, high-quality customer service, etc. Personalized services can meet the individual needs of customers and make them feel cared for and valued, thus improving customer satisfaction and loyalty. Customers who feel valued and cared for are more likely to choose to continue using the bank's services.

In summary, convenience, security and personalized services are important aspects of digital banking service quality and have a positive impact on customer satisfaction. In addition, based on the characteristics and needs of different customer groups, we carry out targeted service innovation and improvement to further improve customer satisfaction. The research hypotheses H1, H2 and H3 were all verified, that is, convenience, security and personalized services all have a positive impact on satisfaction. This means that if companies can provide more convenient, secure and personalized services in their services, customer satisfaction will increase. Therefore, when providing digital banking services, banks should focus on improving convenience, strengthening

security protection measures, and providing personalized services to improve customer satisfaction.

## References

- [1] Cardozo, R. N. (1965). An Experimental Study of Customer Effort, Expectation, and Satisfaction. *Journal of Marketing Research*, 2(3), 244-249.
- [2] Bearden, W. O., Lichtenstein, D. R., & Teel, J. E. (1984). Comparison Price, Coupon, and Brand Effects on Consumer Reactions to Retail Newspaper Advertisements. *Journal of Retailing*, 60(2), 11-34.
- [3] Depiana, E., & Hartelina, H. (2021). Marketing Service on Customer Satisfaction of Yamaha Motorcycles at PT Ramarayo Perdana Karawang. *Aptisi Transactions on Management (ATM)*, 25(1), 75-99.
- [4] Kim, G., & Shim, M. (2016). Study on the Mobile FinTech Vacant Technology using Patent Analysis, 32(4), 185-211.
- [5] Lien, N., Doan, T., & Bui, T. N. (2020). Fintech and Banking: Evidence from Vietnam. *Journal of Asian Finance Economics and Business*, 45(9), 54-80.
- [6] Kuznyetsova, A., & Pogorelenko, N. (2018). Assessment of the banking system financial stability based on the differential approach. *Banks and Bank Systems*, 13(3), 120-133.
- [7] Sub, B., & Han, I. (2013). Effect of trust on customer acceptance of Internet banking. *Electronic Commerce Research and Applications*, 12(2), 109-110.
- [8] Fumhe, A. N. (2019). Customer adoption and use of the electronic statement service in online banking. Dissertation (MCom)--University of Pretoria.
- [9] Ismail, L. B., & Alawamleh, M. (2017). The Impact of Online Banking of Customer Satisfaction in Jordan. *Journal of Organisational Studies & Innovation*, 4(2), 1-13.