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## **Impact of Service Quality and Relative Advantage of Mobile Banking on Customer Loyalty: The Mediating Role of Satisfaction**

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### **Abstract**

Researching service quality and relative advantages to customer loyalty is no longer a new topic. However, the author chose as the research object the Gen Z and Millennials customer base between the ages of 18-40, which is the customer file that will dominate the banking industry in the future. The research topic is the first research article in the Vietnamese context to analyze the impact of service quality and relative advantage on customer loyalty. This research can be considered as a premise in Vietnam, creating conditions for application to future research articles with similar topics, the conclusions are all based on a solid theoretical basis. The study combines scales from previous studies, then proposes a new scale to measure service

quality and loyalty to fit the research model. More specifically, with the service quality structure: Adding 2 observed variables extracted from the scale of Lewis (2006)<sup>[18]</sup>, Kaur *et al.* (2021) directly related to ego satisfaction and personalization tendency and update technology suitable for research subjects and the context of the 4.0 era; with the loyalty structure: adding 1 observed variable extracted from the scale of Casalo *et al.* (2008), Davis (1989)<sup>[6]</sup> with the aim of increasing the connection of the relationship between satisfaction and loyalty. In addition, the study also adds the variable relative advantage of mobile banking and the mediating role of satisfaction compared to the model of Zhou (2021).

**Keywords:** Mobile Banking, Customer Loyalty, Fintech

### **1. Introduction**

The non-cash payment market continuously achieved record growth while the increasing number of mobile device users marked the remarkable growth rate of mobile banking (Sujeong, 2018; Puriwat & Tripopsakul, 2017). In Vietnam, under the impact of Covid19 and the pressure from the digital transformation revolution, this argument is proven more clearly than ever. More specifically, payments via Internet channels increased by 89.36% in quantity and 40.55% in value; via mobile phone channel increased 116.1% in quantity and 92.3% in value; via QR code method will increase 182.5% in quantity and 210.6% in value by 2022. From applying technology, developing a variety of products and services has helped mobile banking become an increasingly important part of the world. Indispensable in consumers' lives. However, under the pressure of financial technology businesses and to serve a dominant customer base with high egos and an increasing need for personalized services and experiences, mobile banking has not yet fully understood. Enough about the customer to satisfy them and build their loyalty.

Vietnam is witnessing a vibrant competition between e-wallets and mobile banking in the cashless payment market. Under the impact of the Covid-19 pandemic, the pressure on banks is increasing and digital transformation is happening faster than in decades, which is intensifying competition between banks and companies. Financial technology (Fintech) in providing online payment services to people.

### **2. Research Overview**

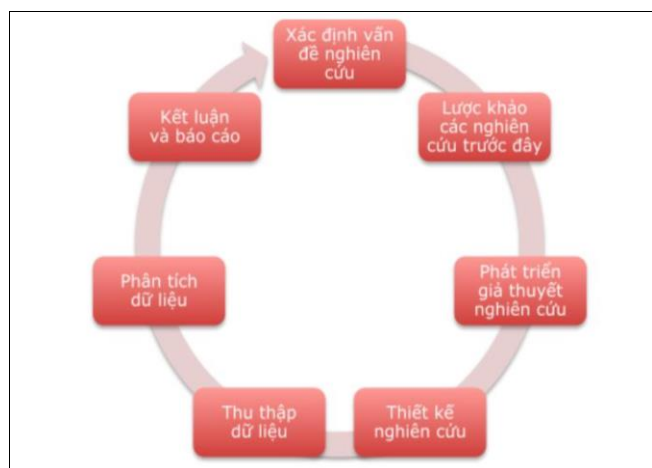
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Alonso-Dos-Santos and colleagues (2020) [1] conducted research on the factors that determine the level of loyalty of Mobile Banking users (original: Determinants of Mobile Banking Users' Loyalty). The main objective of this study is to identify the variables that have the greatest influence on mobile banking user loyalty. Main research results on a sample of 228 mobile banking users in Chile show that satisfaction has a direct, positive impact on loyalty. However, from the perspective of the authors, the study does not use a specific development model but uses proven relationships from previous studies to develop hypotheses and models, according to this is a weakness of the research article that can lead to a lack of normality and generalization.

Zhou and colleagues (2021) conducted research on factors affecting service quality and loyalty when using mobile banking (original: A study on factors affecting service quality and loyalty intention in mobile banking). Based on a sample of 224 people and integrating the SERVQUAL model suitable for the digital transformation era, the research has produced results with high practical significance, more specifically, directly or indirectly, the results emphasize the importance of (1) interface design, (2) system quality, (3) security and (4) service quality to loyalty (original: "(1) interface design, (2) system quality, (3) security assurance and (4) service quality" of customers using mobile banking services. This is the latest innovation model and, from the author's perspective, the most suitable to analyze this topic in the context of digital transformation.

**3. Research Methodology and Research Data**

**3.1 The Research Process is Carried Out in the Following 7 Steps:**



Source: Đỗ Thị Kim Hào (2020)

**Fig 1:** Research implementation process

**3.2 Develop Hypotheses and Propose Models**

Based on the above overview, make the following assumptions:

**About Interface Design**

H1. Mobile banking interface design has a positive impact on the quality of the mobile banking system.

H2. Mobile banking interface design has a positive impact on mobile banking service quality.

**System Quality**

H3. The quality of the mobile banking system has a positive impact on the security of mobile banking for mobile applications.

H4. Mobile banking system quality has a positive impact on loyalty intention.

**Security**

H5. The security of mobile banking has a positive impact on customer service quality.

**Service Quality**

H6. Mobile banking service quality has a positive impact on customer satisfaction.

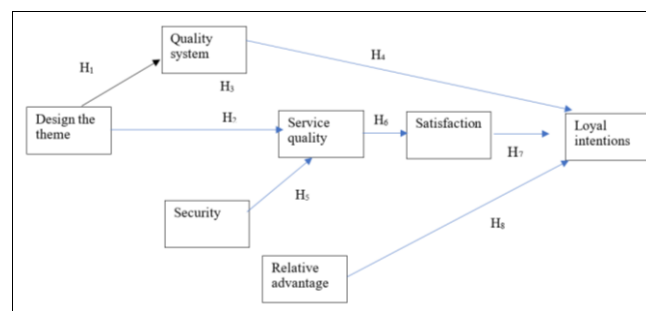
**Satisfaction and loyalty**

H7. Customer satisfaction with mobile banking services has a positive impact on loyalty.

**Relative Advantage**

H8. Relative advantage has a direct and positive impact on customer loyalty to mobile banking.

From the above assumptions, the authors propose a research model:



**Fig 2:** Proposed model

**Research Data**

Data were collected through an online survey. The total number of survey participants was 1,103, distributed based on the correlation of enrollment size and the ratio of respondents between universities: high schools divided at a ratio of 2:1. Specifically as follows, the survey was sent to focus on students and lecturers of 4 major economics universities in Hanoi, including University of Economics - University of Danang (241), Foreign Trade University (220), University of Labor and Social Affairs (235), Academy of Finance (177) and 2 high schools including Nguyen Hue High School for the Gifted (114) and Marie Curie High School (116). After the survey process, the number of responses received was 479, reaching a response rate of 43.4%. Finally, the authors selected the questionnaires that met the requirements for data analysis with the final number. 330 valid votes were collected.

**Table 1:** Questionnaire design (Likert scale from 1 to 5)

Variable name	Items	Measurement	Source
Application interface	INT1	Using the Mobile banking app is very easy for me	Bharati & Chaudhury (2004); Schierz <i>et al</i> (2010) <sup>[26]</sup>
	INT2	The interface design of Mobile banking applications is impressive and eye-catching	
	INT3	The navigation design of the app interface makes it easy for me to learn the different functions	
System quality	SYS1	Response speed on Mobile banking application is fast	McKnight <i>et al</i> (2002)
	SYS2	Professional, timely and efficient online customer service to solve problems	
	SYS3	Mobile banking application has good compatibility, stable and smooth operation	
Service quality	SER1	The functions on the Mobile banking application can fully meet daily business needs	Cronin <i>et al</i> (2000); McDougall & Levesque (2000); Petrick & Backman (2002) <sup>[22]</sup> ; Shankar <i>et al</i> (2020)
	SER2	Mobile banking applications have products and services with state-of-the-art technology	Lewis (2006) <sup>[18]</sup>
	SER3	When customers have a problem, app-based banking shows a sincere interest in solving the problem.	Kaur <i>et al</i> (2021)
	SER4	I am satisfied with the payment transaction service of Mobile banking applications	Cronin <i>et al</i> (2000); McDougall & Levesque (2000); Petrick & Backman (2002) <sup>[22]</sup> ; Shankar & <i>et al</i> (2020)
	SER5	I am satisfied with the loan operations on Mobile banking applications	
	SER6	I am satisfied with the Q&A - customer care service on Mobile banking applications	
	SER7	I am satisfied with the business investment services of Mobile banking applications	
	SER8	I am satisfied with the credit card service on the app Mobile banking	
Security	SEC1	Mobile banking is highly secure and can ensure the safety of accounts and money	Luarn & Lin (2005) <sup>[19]</sup> ;
	SEC2	Transparent and traceable data and transaction processes	Luarn & Lin (2005) <sup>[19]</sup> ;
Satisfaction	SAT1	Mobile banking application has provided the most advanced banking services.	Toor <i>et al</i> (2016) <sup>[27]</sup> ; Moraru & Duhnea (2018)
	SAT2	I am satisfied with the experience of using banking services on Mobile banking applications	Casalo & cộng sự (2008) Davis (1989) <sup>[6]</sup>
	SAT3	I am satisfied with the banking services of the application Mobile banking	
	SAT4	I am satisfied with the variety of services on the Mobile banking application	Cronin <i>et al</i> (2000); McDougall & Levesque (2000); Petrick & Backman (2002) <sup>[22]</sup> ; Shankar <i>et al</i> (2020)
Relative advantage	REL1	Save costs when using banking services on Mobile banking applications	Lee (2009)
	REL2	Save time when using banking services on Mobile banking applications	
Loyalty	LOY1	I plan to continue using online banking services in the future	Casalo <i>et al</i> (2008) Davis (1989) <sup>[6]</sup>
	LOY2	Banks should innovate services on the Mobile banking app to increase positive experiences	Arcand <i>et al</i> (2017); Lee & Chung (2009); Baabdullah <i>et al</i> (2019)

#### 4. Analyze research results

##### 4.1 Descriptive Statistics of the Sample

**Table 2:** Survey sample characteristics

Observed variables	Quantity	%
<b>Sex</b>		
Male	193	58,5
Female	137	41,5
<b>Usually</b>		
Regularly/every day	179	54,2
1-2 times/week	28	8,5
3 - 4 times/week	15	4,5
5 - 6 times/week	108	32,7
<b>Age</b>		
18 - 25 years old	204	61,8
26 - 30 years old	123	37,3
31 - 40 years old	3	0,9
<b>Level</b>		
University	239	72,4
Master	91	27,6
<b>Income</b>		
Under 5 million	14	4,2
From 5 - 10 million	266	80,6
Over 10 million - 20 million	20	6,1
Over 20 million	30	9,1
Total	330	100

**Table 3:** Results of testing model fit and convergent validity

Potential variables	Observed variables	Outer loading	Cronbach's Alpha (CA)	Aggregate reliability (CR)	Average Variance Extracted (AVE)
INT	INT1	0,792	0,739	0,851	0,655
	INT2	0,830			
	INT3	0,807			
SYS	SYS1	0,815	0,750	0,857	0,666
	SYS2	0,801			
	SYS3	0,831			
SER	SER1	0,800	0,899	0,919	0,585
	SER2	0,753			
	SER3	0,768			
	SER4	0,801			
	SER5	0,775			
	SER6	0,718			
	SER7	0,733			
	SER8	0,770			
SEC	SEC1	0,908	0,769	0,897	0,812
	SEC2	0,895			
REL	REL1	0,875	0,701	0,870	0,770
	REL2	0,880			
SAT	SAT1	0,834	0,836	0,890	0,670
	SAT2	0,813			
	SAT3	0,801			
	SAT4	0,825			
LOY	LOY1	0,840	0,825	0,884	0,657
	LOY2	0,781			
	LOY3	0,785			
	LOY4	0,833			

**Check for Convergent Validity**

The testing standard used for evaluation in this section is the average variance extracted (AVE) greater than 0.5 (Hair *et al.*, 2010) [10]. The average variance extracted (AVE) of the constructs is presented in Table 3 specifically as follows: Interface design (INT) is 0.851, System quality (SYS) is 0.857, Security (SEC) is 0.897, Service Quality (SER) is 0.919, Satisfaction (SAT) is 0.890, Relative Advantage (REL) is 0.870, Loyalty (LOY) is 0.884. All constructs have an AVE index greater than 0.5 and the external loading coefficients of the observed variables are greater than 0.5, so the scale has convergent validity.

**Discriminant Validity Test**

The analysis results show that after performing bootstrapping, the HTMT values of all relationships are different from 1 on the 2.5% to 97.5% percentile, this shows that the structure achieves good discrimination. (Garson, 2016) [9]. From there, the authors confirmed that the scale

achieved discriminant value.

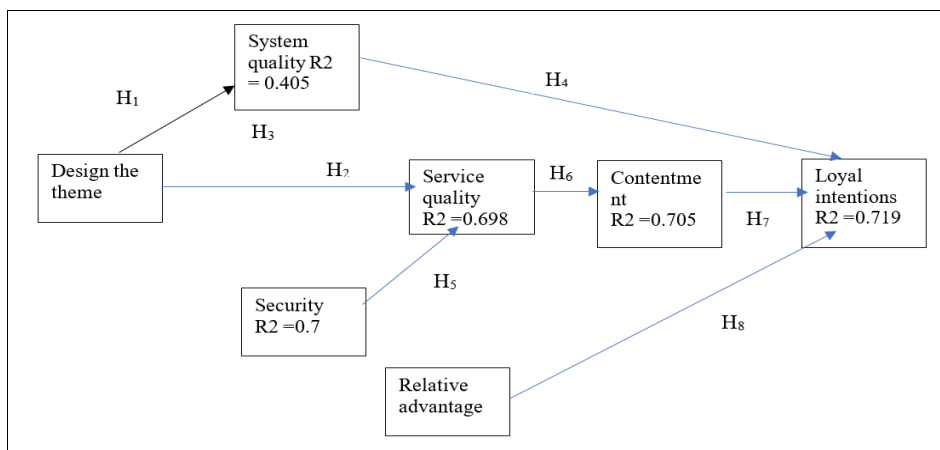
**Test “Method Variance Error”**

After the authors put 26 observed variables into the SPSS model for testing, the results showed that the largest total variance was 49.672%, less than 50%, satisfying Hairman's 1-factor testing requirement. So, the research model does not have the phenomenon of method variance bias.

**SEM Structural Model Results**

The PLS-SEM model quality assessment criteria as well as the hypothesis testing steps in this study are based on the assessment suggestions of Hair *et al.* (2017) [10].

The external loading indexes for each variable are consistent with results > 0.7. Shows that latent variables can explain more than 50% of the variation in observed variables. From the results of testing the appropriateness of the scale, the author proceeded to build a model from Smartpls software with the following results:



**Fig 3:** Model testing results (PLS)

**Evaluate Multicollinearity**

In general, the VIF indexes of the structures do not exceed the standard of 3. Therefore, the structures do not have multicollinearity problems.

**Hypothesis Testing**

In PLS-SEM the Bootstrap algorithm is used to determine the statistical significance of the coefficient (Hair *et al.*,

2017) [10]. If the t-value coefficient of the Bootstrap algorithm gives a result greater than 1.96, it will correspond to the value  $\alpha = 0.05$ , and thus the relationship between two latent variables is considered statistically significant at 5% level. In this study, the non-parametric bootstrap technique was used to test 330 observations, repeated 5000 times to ensure the requirements for testing the linear structural model.

**Table 4:** Bootstrap and VIF test results

Hypothesis	Relationship	Standardized impact coefficient ( $\beta$ )	T-value	P-value	VIF	Result
H <sub>1</sub>	INT → SYS	0,637	17,279	***	1,000	Accept
H <sub>2</sub>	INT → SER	0,432	9,199	***	1,614	Accept
H <sub>3</sub>	SYS → SEC	0,608	15,101	***	1,000	Accept
H <sub>4</sub>	SYS → LOY	0,147	3,200	***	2,225	Accept
H <sub>5</sub>	SEC → SER	0,496	10,665	**	1,614	Accept
H <sub>6</sub>	SER → SAT	0,840	40,963	***	1,000	Accept
H <sub>7</sub>	SAT → LOY	0,482	7,904	***	2,873	Accept
H <sub>8</sub>	REL → LOY	0,309	4,558	***	2,051	Accept

Chú thích: \* $p < 0,05$ ; \*\* $p < 0,01$ ; \*\*\* $p < 0,001$

Based on what was found in the PLS-SEM analysis, the results of all hypotheses and relationships in the model were shown. Accordingly

**System quality (SYS):** Interface design structure (INT) has a large positive influence on system quality ( $\beta=0.637$ ,  $P < 0.05$ ). This is very relevant in practice because it lays the foundation for developing and improving the system through optimizing the user interface. These results provide important information for system designers and managers to enhance user experience and ensure high system quality. Interface design is an important factor for technology products, especially software products, mobile applications, websites and other interfaces. Good interface design can help users easily use the product, increase intuitiveness and attract users. On the contrary, a poor interface can cause difficulties for users and reduce product quality. Therefore, research and development of good interface designs will play an important role in enhancing the quality of technology products.

**Security (SEC):** Here we consider the impact of system quality (SYS) on security. Accordingly, from the results of running the model, we see that system quality has a positive effect on security ( $\beta=0.608$ ,  $P < 0.05$ ). From there, the study accepts hypothesis H3. This is consistent with reality, because when the system is well designed and developed, its security is also significantly improved.

**Service quality (SER):** Service quality is directly affected by two factors including security and interface design. The results show that, at the 5% significance level, security and interface design both have a positive impact on service quality, in which security has a greater impact ( $\beta=0.496$ ) than interface design. ( $\beta=0.432$ ). These two factors successfully explained 69.8% of the variation in service quality ( $R^2=0.698$ ). Thus, the authors accept hypotheses H2 and H5. The results of this study have important practical implications because it provides specific information about the importance of security and interface design in improving service quality.

**Satisfaction (SAT):** Statistical results also support hypothesis H6. That is, service quality (SER) has a positive effect on customer satisfaction ( $\beta=0.840$ ,  $P < 0.05$ ). Specifically, service quality successfully explained 70.5% of the variation

in customer satisfaction ( $R^2 = 0.705$ ). This is reasonable and consistent with practice because when customers feel satisfied with service quality, they will tend to become loyal customers and recommend that product or service to others. Understanding the impact of service quality on customer satisfaction helps organizations tailor their efforts to create a positive customer experience.

**Loyalty (LOY):** Finally, loyalty is proven to be directly affected by three factors: system quality (SYS), satisfaction (SAT) and relative advantage (REL). According to the results of running the model, at the 5% significance level, system quality, satisfaction and relative advantage all have a positive impact on customer loyalty. In which satisfaction ( $\beta=0.482$ ) has the greatest impact, followed by relative advantage ( $\beta=0.309$ ) and the least impact is system quality ( $\beta=0.147$ ). Thus, the study accepts hypotheses H4, H7 and H8. This research result has important practical implications in managing service quality and creating customer loyalty. The results demonstrate that system quality, satisfaction, and relative advantage all positively influence customer loyalty.

**Check the Level of Influence**

Effect size f (f squared) is the coefficient that evaluates the effectiveness of the impact of each independent variable on the dependent variable. f will have suggested thresholds used to compare the order of impact of the independent variable on the dependent (Hair *et al.*, 2017) [10]. Cohen (1988) proposed the  $f^2$  index table to evaluate the importance of independent variables in which:  $0.15 < f^2 < 0.35$ : Average level of influence and  $f^2 \geq 0.35$  represents the level of influence great benefit.

**Table 5:** Influence coefficient

Relationships between structures	Giá trị $f^2$	Influence level
INT → SER	0,338	Average influence
INT → SYS	0,681	Big effect
REL → LOY	0,165	Average influence
SAT → LOY	0,288	Average influence
SEC → SER	0,505	Big effect
SER → SAT	2,392	Big effect
SYS → SEC	0,585	Big effect

Through the results obtained in Table 4, it can be seen that interface design (INT) has a medium impact on service quality ( $f^2=0.338$ ) and a large impact on system quality ( $f^2=0.681$ ). Meanwhile, loyalty is influenced on average by two factors: relative advantage and satisfaction. Notably, the strong influence of service quality on satisfaction ( $f^2=2.392$ ) represents the true nature of reality. All relationships have medium to large effect sizes indicating that all relationships are statistically very significant.

## 5. Conclusion

The main purpose of the study is to analyze the impact of service quality and relative advantage on customer loyalty and to serve the research process. The authors use the PLS-SEM model to analyze the data. Data was collected in Vietnam-an emerging market, especially after the COVID-19 period, non-cash payments and the number of internet users continuously reached record growth, opening up potential. Great application of the research. The selected research sample is young people in Hanoi between the ages of 18 and 40, a group of people who are expected to dominate the mobile banking market in the coming years. Regarding the research results, all hypotheses are accepted. More specifically, interface design positively affects service quality, consistent with the research results of Zhou (2021). Service quality has a positive effect on customer satisfaction, consistent with research by Aldas-Manzano (2011). Research by Zhou (2021) and Aldas-Manzano (2011) has also been tested for compatibility through the impact of customer satisfaction on their loyalty. And finally, the results of the impact of customer loyalty on relative advantage are also completely consistent with the research of A Esmael (2021). At the same time, the study clearly shows the mediating role of satisfaction in the relationship between service quality (SER) and loyalty (LOY). From there, it can be seen that the research has completely achieved the set research goals.

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