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E-Banking Service Quality and Customer Satisfaction with Moderator Factor

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Abstract

This study explores the dimensions of e-banking service quality influencing customer satisfaction in commercial banks in Vietnam, with a focus on the moderating role of word of mouth (WOM). Using a mixed-methods approach, combining qualitative insights with quantitative analysis through Partial Least Squares Structural Equation Modeling (PLS-SEM), the study identifies five key dimensions: transaction speed, efficiency, reliability, responsiveness, and confidentiality. The findings reveal that these dimensions significantly impact customer satisfaction, with a statistical significance of 1%. Additionally, WOM is found to strengthen the positive relationship between ebanking service quality and customer behavior perspectives, the research provides insights into how WOM amplifies the effects of high-quality e-banking services.

Keywords:

Commercial Bank; Customer Satisfaction; E-Banking Service; Service Quality; WOM.

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1- Introduction

The integration of financial and banking markets presents both opportunities and challenges for Vietnamese commercial banks in expanding and enhancing their operations. With a growing population and increasing financial needs among individuals, households, and small and medium-sized enterprises, commercial banks in Vietnam have shifted their focus toward retail banking services. E-banking has emerged as a critical component of this transition, offering significant operational efficiencies, especially during the Industry 4.0 era. As Shankar & Jebarajakirthy [1] note, the success of banking services hinges on trust between banks and consumers and the ability to provide high-quality services at reduced transaction costs.

E-banking services initially emerged as supplementary channels, such as Internet Banking, SMS Banking, and Mobile Banking, designed to support traditional banking. However, with rapid technological advancements, e-banking has evolved into an integrated digital platform that fundamentally transforms and redefines the modern banking ecosystem. These changes extend to organizational structures, operational processes, product and service offerings, and customer engagement methods. Despite its growth, e-banking services in Vietnam face challenges. The State Bank of Vietnam [2] reported that only 40% of the population utilizes bank transaction accounts. Despite Vietnam's extensive banking network, seven major banks accounted for 55% of the market share in 2020 and over 84% of total system assets by 2022. Meanwhile, the proportion of people with bank accounts rose to 80% in 2023, and electronic payments reached 21.9 billion USD in 2024. However, cash still represented 63% of the total transaction value in 2023. These figures highlight the underutilized potential of e-banking and underscore the need to enhance transaction systems to meet the demands of a rapidly digitalizing market.

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Considering these circumstances, understanding the determinants of customer satisfaction in e-banking has become crucial to unlocking its full potential. Among these, service quality has been widely recognized as a key driver. It has been explored in the context of e-banking, with numerous studies emphasizing its significant influence on customer satisfaction [3–10]. These investigations consistently underscore the importance of key service dimensions such as reliability, security, and ease of use in fostering positive customer experiences. Despite these contributions, the literature has largely neglected the potential moderating role of word-of-mouth (WOM) in the relationship between e-banking service quality and customer satisfaction. To bridge this gap, the present study integrates [11] reformulation of attitude theory into a research framework encompassing e-service quality, customer satisfaction, and loyalty. This approach offers fresh insights by exploring how WOM influences customer satisfaction in e-banking services.

The research is grounded in Bagozzi [11] attitude theory, which provides a robust framework for understanding the cognitive and affective processes through which attitudes shape behaviors. This theoretical foundation is particularly apt for examining how customers evaluate e-banking service quality and how these evaluations translate into satisfaction and loyalty. By applying this lens, the study delves into the moderating effect of WOM, investigating its role in amplifying the relationship between service quality and customer satisfaction. This perspective provides a deeper understanding of WOM's influence on customer perceptions within the digital banking environment.

Building on established frameworks such as Parasuraman et al. [12] SERVQUAL model, which identifies core dimensions like reliability, responsiveness, and assurance, this study tailors these constructs to the e-banking context. Specifically, it incorporates transaction speed, efficiency, reliability, responsiveness, and confidentiality as critical dimensions of e-banking service quality. These attributes, repeatedly associated with customer satisfaction in prior research [3, 5], are key to capturing the unique features of e-banking services and their impact on customer experiences.

Including WOM as a moderating variable represents a significant extension of the existing literature. While prior studies have extensively examined the direct effects of e-banking service quality on customer satisfaction, few have considered how WOM can amplify these effects by shaping perceptions, building trust, and enhancing customer engagement. The study contributes to the theoretical discourse on customer satisfaction by analyzing this interaction. It offers actionable insights for practitioners leveraging WOM to improve e-banking services and customer satisfaction.

2- Literature Review and Hypothesis Development

2-1-Literature Review

2-1-1- Service Quality

Researchers widely agree that service quality (SQ) is a multidimensional concept. Bolton & Drew [13] and Oliver [14] define service quality as the gap between customers' expectations and the actual service they receive. Similarly, Grönroos [15] evaluates SQ by comparing the expected value before service use and the perceived value afterward, emphasizing three components: technical quality (what the customer receives), functional quality (how the service is delivered), and image (shaped by both technical and functional quality).

Grönroos et al. [12] and Parasuraman et al. [16] further refine this understanding by introducing the SERVQUAL model, identifying five gaps in service delivery. The fifth gap, representing the difference between expected and perceived service quality, determines overall SQ. The smaller the gap, the higher the quality. Parasuraman also developed the SERVQUAL scale with 22 pairs of variables measuring customer perceptions and expectations across five dimensions: tangibles, reliability, responsiveness, assurance, and empathy.

Later, Edvardsen et al. [17] suggested that service quality must meet customer expectations and satisfy their needs, accounting for factors such as pricing and interactions before, during, and after service delivery. Service quality is closely linked to customer satisfaction, serving as its precursor [18]. A provider delivering services that meet customer needs achieves satisfaction, as service quality strongly influences customer satisfaction [19, 20]. Thus, enhancing customer satisfaction requires improving service quality. The two are interdependent, with service quality being a key determinant of customer satisfaction [18].

2-1-2- E-banking Services

Electronic banking (e-banking) is the product of globalization, tough competition, information technology systems, and communication tools. Today, it has become a self-service channel through which banks provide information and

services to their customers more easily using different technological platforms, from the Internet website to mobile broadcasting [21, 22]. Furthermore, Drigă & Isac [23] raised the concept of e-banking, which includes banking products and services used electronically to settle small and large-value transactions for individuals and organizations. Websites, telephones, and remote controls are different ways to approach e-banking.

Basic e-banking services allow banks to provide these functions over the phone or internet platform and include current and savings account balances, transfers between accounts, and credit card advances. Thus, e-banking streamlines and simplifies banking activities and services for customers. Customers can do online transactions without physical contact [21, 24].

2-1-3- E-banking Service Quality

Several studies have mentioned the concept of e-service quality differently [25-27]. Accordingly, in the study of Tran [27], e-banking service quality represents customers' overall assessment of e-banking services through three aspects: Online customer service quality, online information system quality, and banking product and service quality. Besides, Nguyen [25] believes that e-banking service quality is measured by efficiency, reliability, security, and responsiveness. Meanwhile, the study of Santos [26] proposed an approach to e-banking service quality, emphasizing reliability, efficiency, and safety in digital services.

E-banking service quality affects service transaction costs, customer satisfaction, and loyalty [28, 29]. Factors influencing e-banking service quality have been adapted from previous studies [16, 30, 31]. Additionally, specific factors significantly impact e-banking service quality, such as the efficiency and the speed of e-banking transactions. Those enhance customer satisfaction because the speed can assist in completing transactions on time [16]. The second factor is 'fast service efficiency,' which has also been identified by Hammoud et al. [5] and Bateson [32] as a key influence on e-banking service quality. Furthermore, Liao and Cheung [33] suggested that reliability is important in evaluating the quality of e-banking services, a finding also supported by Kettinger & Lee [34]. Other essential factors include responsiveness [35], and privacy and security [36].

2-2-Empirical Studies

Hammoud et al. [5] investigates the effect of e-banking service quality (SERVQUAL) on customer satisfaction in Lebanese Banking. Their findings have demonstrated that reliability, efficiency, friendless feedback, responsiveness and communication from service support, and security and privacy significantly impact customer satisfaction. In particular, reliability was the most impactful factor among them. However, the investigation revealed that usability and accessibility increased customer satisfaction and soothed long-term loyalty. This is similar to the investigation of Liébana-Cabanillas et al. [7].

The study by Beshir & Zelalem [4] in Ethiopia used structural equation modeling (SEM) to analyze the impact of ebanking service quality on customer satisfaction and loyalty. The results showed that efficiency, responsiveness, ease of use, security, and commission significantly predict customer satisfaction at the 5% significance level. At the same time, customer satisfaction significantly positively affected their loyalty.

Moreover, Ul Haq & Awan [6] study explored the effect of e-banking service quality on e-banking loyalty through the mediating role of users' satisfaction. The results of the study show that reliability and website design have a positive impact on e-banking loyalty, especially during the COVID-19 period. Security and privacy indirectly impact loyalty through satisfaction with e-banking. The indirect impact of reliability and website design on loyalty is only partially mediated by satisfaction. Similarly, Tetteh [10] and Ayinaddis et al. [3] supported their findings by demonstrating the mediating role of customer satisfaction between e-banking service quality and customer loyalty. However, convenience, ease of use, accessibility, and affordability are the different variables that belong to the e-banking service quality and are the determinants of customer satisfaction that are investigated [10]. Meanwhile, responsiveness, reliability, security, privacy, speed, and convenience significantly positively affect customer satisfaction, according to research by Ayinaddis et al. [3]. Another study by Sewaka et al. [9] analyzed the connection between service quality, customer satisfaction, and loyalty intention among e-banking users. The findings revealed a positive, statistically significant association between service quality, customer satisfaction, service quality, customer loyalty, as well as customer satisfaction, loyalty intention.

In summary, the above studies demonstrate consistent results regarding the role of service quality in enhancing customer satisfaction and loyalty in the banking sector. Customer satisfaction is a mediator factor intervening in the relationship between service quality and customer loyalty. Those authors identified different dimensions of

service quality affecting customer satisfaction, which made their studies distinguishable. Therefore, this research fills the gap by examining the moderating role of WOM in the effect of e-banking service quality on customer satisfaction.

2-3-Hypothesis Development

Based on the analysis of the above studies, the author identifies the following factors of e-banking service quality such as the transaction speed [16], efficiency [5, 32], reliability [34], responsiveness [35], and confidentiality [36].

2-3-1- The Transaction Speed Affects E-Banking Services Quality

Service transaction speed is related to the timeliness of the service process and the level of transparency in service completion time [37-42]. For service-based businesses, speed is the core element of good service delivery [43]. Therefore, fast transaction speed will help customers make timely and efficient transactions. Key aspects of transaction speed encompass response time, order handling, service execution, transaction procedures, communication, information technology, and issue resolution [16, 44]. The service process emphasizes ensuring that the product or service is delivered on time as promised to the customer. The importance of speed in e-banking is also emphasized by previous studies [33, 45, 46], as it directly affects customer satisfaction. Thus, the proposed hypothesis is:

Hypothesis 1 (H_1): *Transaction speed has a positive impact on e-banking service quality at commercial banks in Ho Chi Minh City.*

2-3-2- The Efficiency Affects E-Banking Services Quality

Efficiency relates to how the bank handles and completes a transaction from the beginning [47]. In addition, the number of completed transactions within a specific time measures bank efficiency [48]. All et al. [49] believe efficiency means prompt and convenient online banking services. Other authors add that the indicators for efficiency are quick responses to users [50], speedy downloads [51], and well-structured websites [26].

Previous studies, such as [5, 30–32, 40, 52, 53] agreed that efficiency has a positive effect on the quality of e-banking services at commercial banks. Based on these reasons, the hypothesis below is given:

Hypothesis 2 (H_2): The efficiency has a positive impact on e-banking service quality at commercial banks in Ho Chi Minh City.

2-3-3- Reliability Affects E-Banking Services Quality

Hammoud et al. [5] and Zhou [54] argue that the quality of e-banking services is closely related to reliability, significantly impacting customer satisfaction. Reliability, in this context, is defined as the ability to perform promised services accurately and consistently. This includes meeting customer expectations regarding transaction speed and ensuring accuracy in processing transaction amounts, such as withdrawals. Additionally, reliability is reflected in the system's ability to operate continuously 24/7, as expected [55].

Furthermore, Antony [45] emphasizes that the reliability of e-banking services depends not only on the accurate processing of transactions but also on ensuring that the system remains available and continuously operational to meet consumer needs. Technical problems or system downtime can erode customer confidence, negatively impacting their overall experience. A reliable e-banking system boosts customer confidence, increases satisfaction, and ultimately fosters customer loyalty. Customers who trust the consistent performance of the service are more likely to use it frequently and remain loyal to the bank. By maintaining system reliability, banks not only meet immediate customer needs but also build a sustainable relationship that positively contributes to the long-term development of e-banking services.

Reliability has been shown to have a positive impact on e-banking service quality, as demonstrated in prior studies [5, 33, 34, 54]:

Hypothesis 3 (H₃): Reliability has a positive impact on e-banking service quality at commercial banks in Ho Chi Minh City.

2-3-4- Responsiveness Affects E-banking Services quality

Responsiveness, the willingness of a bank to assist its customers, is crucial in providing quick solutions, especially through the use of e-banking [35]. Nazeri et al. [56] further highlight that the reponsiveness to customer inquiries or complaints timeliness is a key factor in customer satisfaction or dissatisfaction with e-banking services. This underscores the vital role of technology in enabling banks to respond quickly and accurately, thereby preventing customer attrition.

Anouze & Alamro [57] also acknowledge responsiveness as an important indicator in evaluating the e-banking service quality. In a digital world where e-banking is becoming the norm, banks need to draw the link between responsiveness and customer satisfaction with purchase intent. If banks are able to grasp and enhance these key parameters, it can help them be more competitive and keep their customers locked in the digital era.

Responsiveness is a key aspect of e-banking service quality that significantly influences customer satisfaction, as suggested by prior studies [29, 30, 58]. Therefore, the following hypothesis is proposed:

Hypothesis 4 (H₄): Responsiveness positively affects e-banking service quality at commercial banks in Ho Chi Minh City.

2-3-5- Confidentiality Affects E-banking Services Quality

Several studies define confidentiality as the assurance of secure transactions between customers and banks, where customers' personal information is not shared without their consent, and the highest level of security for their data is maintained [36, 51]. Moreover, Nazeri et al. [56] found that information security (or confidentiality) on e-banking websites can directly impact the quality of banking services. This includes users' trust in the website's ability to protect against intrusions and data theft and quickly resolve transaction errors and server issues during online banking activities.

Studies by [30,58–62] demonstrate that security has a positive impact on the quality of e-banking services. Therefore, the following research hypothesis is proposed:

Hypothesis 5 (H_5): Confidentiality positively affects e-banking service quality at commercial banks in Ho Chi Minh City.

2-3-6- E-Banking Service Quality Affects Customer Satisfaction

Service quality is a crucial factor in the banking industry, as it ensures high customer satisfaction, essential for creating a competitive advantage [63]. In service industries, service quality is assessed during the service delivery process [64]. In the banking industry, service quality can be defined as the extent to which the provided service meets customer expectations, determined by comparing customers' initial expectations with their perceptions after experiencing the actual service [9].

The research of Toor et al. [61] and Supriyanto et al. [65] is of particular significance as they examined the impact of e-banking service quality on customer satisfaction, finding a positive and significant relationship. Similarly, the study conducted by Beshir and Zelalem [4] in Ethiopia, and the analysis by Hammoud et al. [5] in Lebanon's banking sector, further underscore the importance of e-banking service quality. Their findings, which align with those of Mohamud [66] and Sharma et al. [67], confirm that e-banking service quality has a positive and significant impact on customer satisfaction. Therefore, the following hypothesis is proposed:

Hypothesis 6 (H_6): *e*-banking service quality positively affects customer satisfaction at commercial banks in Ho Chi Minh City.

2-3-7- Moderator Factor

Word of mouth (WOM) is one of the most powerful tools for promoting products and services, generated through informal conversations between consumers independent of the company providing the service [68]. WOM is particularly important in the service sector, as sharing positive experiences can directly influence others' purchasing decisions [68, 69]. It is a critical method for businesses to grow their customer base [70]. WOM is considered one of the most reliable ways customers can access brand information, make product-related decisions, and decide to purchase [71, 72].

In the retail banking industry, WOM has significant potential to enhance customer satisfaction when customers experience quality service. Increasing competition due to globalization and technological developments has pushed banks to focus more on meeting customer needs. By providing excellent service and being transparent about their expertise, banks can encourage strong WOM, which builds trust and increases customer satisfaction. In this context, WOM is a natural marketing tool and helps banks affirm their reputation in the market. Alongside promotional tools, advertising remains one of the most popular methods for financial institutions [73]. Based on the available agruments, the author proposed the hypothesis:

Hypothesis 7 (*H*₇): WOM positively moderates the relationship between e-banking service quality and customer satisfaction at commercial banks in Ho Chi Minh City.

3- Research Model and Methodology

3-1-Research Model

Figure 1 presents the research model, visually depicting the connections and interactions among the core variables to provide a structured overview of the study's framework.



Figure 1. Research model

3-2-Research Methods

This study employs both qualitative and quantitative methods. In the first stage, qualitative methods (expert interviews and customer surveys) are used to refine and supplement observational variables in the preliminary scales. The results from the group discussions helped to establish the main scale. The author then designed an interview questionnaire and conducted a survey to develop a formal questionnaire. In this stage, a qualitative approach is applied to identify relevant factors [74] in the current sector through interviews with ten experts from commercial banks in Ho Chi Minh City. Following this, a group discussion with 50 consumers was organized to adjust factor scales, ensuring that the survey questions are reliable.

In the second stage, the author conducted a random survey of customers who use e-banking services at commercial banks in Ho Chi Minh City, employing the convenience sampling method. In the final stage, the author conducted quantitative research using SmartPLS 4, which facilitates the assessment of measurement and structural models to test the proposed hypotheses. The author collected, coded, and screened the data for analysis in SmartPLS 4. PLS-SEM was utilized to perform tests and examine the structure of the research model based on the following steps:

First, construct reliability was tested by applying Cronbach's alpha and composite reliability (CR) for each construct. All constructs had Cronbach's alpha values above 0.8, satisfying the condition suggested by Henseler et al. [75]. Additionally, as stated by Jr et al. [76], in order to ensure reliability and convergent validity, CR and average variance extracted (AVE) should exceed 0.7 and 0.5, respectively.

Second, we performed the discriminant validity assessment using the values of Heterotrait–Monotrait correlations (HTMT), as Henseler et al. [75] recommended. A indicating that the scales have good discriminant validity.

3-3-Research Sample

According to Nguyen [77], data collection requires a sample size of at least five observations per variable. Therefore, the author directly distributed surveys to 350 managers and heads or deputy heads of departments at branches of joint stock commercial banks in Ho Chi Minh City from September 2023 to May 2024. After excluding incomplete responses, 317 valid questionnaires were obtained (accounts for 90.6%).

A questionnaire initially including 27 items was generated, consisting of 8 items for e-baniking service quality, customer satisfaction, and WOM. The measures used in this study are adopted a five-point Likert scale, described by "Strongly agree" (= 5) and "Strongly disagree" (= 1).

4- Research Results and Discussions

4-1-Research Results

Table 1 presents the sample distribution data based on two criteria: gender and age of customers using e-banking services. This data was collected from a survey sample of 317 customers. First, the gender distribution is relatively balanced, with a slightly higher proportion of men (52.1%) than women (47.9%). Second, regarding age distribution, the 36-45 age group represents the largest segment, making up nearly half of the sample (43.8%), indicating that this age group is more inclined to use e-banking services. The age groups 18-35 and 46-55 also constitute significant portions of the sample, at 23.7% and 22.4%, respectively. Meanwhile, customers under 18 and over 55 comprise a relatively small segment, accounting for only about 10% of the sample. Overall, Table 1 shows that the survey sample has minimal gender variation and is primarily focused on the 36-45 age group, which has the highest usage rate of e-banking services.

	• •	•
Criteria	Frequency	Percentage (%)
Gender		
Female	165	52.1%
Male	152	47.9%
Total	317	100.0%
Age		
Under 18	3	0.9%
From 18 to 35	75	23.7%
From 36 to 45	139	43.8%
From 46 to 55	71	22.4%
Over 55	29	9.1%
Total	317	100.0%

Table 1. Demographic analysis

The next section provides the results of the measurement model underwent assessment with a focus on the reliability of the indicators, construct, convergent validity, and discriminant validity via CA, CR, and AVE. Fist, Table 2 provides the composite reliability as follows

Table 2. Composite reliability

	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
BM	0.935	0.938	0.885
CL	0.980	0.980	0.961
HL	0.976	0.976	0.954
HQ	0.977	0.978	0.935
PH	0.984	0.985	0.969
TC	0.979	0.981	0.942
TD	0.969	0.993	0.915
WOM	0.982	0.983	0.965

Table 2 shows all constructs have CA values above 0.8, which suggests the constructs are acceptable. While all the constructs also satisfy the conditions applied for CR and AVE, thus they have reliability and convergent validity.

According to Clark & Watson [78] and Kline [79], the standard threshold for discriminant validity testing is 0.85. The results in Table 3 indicate that all HTMT values are below this threshold. Consequently, the discriminant validity supports the distinctiveness of each construct when compared to others in the model (Table 3).

					-		-		
	BM	CL	HL	HQ	PH	тс	TD	WOM	WOM x CL
BM									
CL	0.587								
HL	0.239	0.714							
HQ	0.075	0.633	0.681						
PH	0.537	0.609	0.391	0.215					
TC	0.331	0.757	0.677	0.558	0.409				
TD	0.381	0.718	0.557	0.491	0.423	0.672			
WOM	0.616	0.453	0.428	0.098	0.449	0.363	0.325		
WOM x CL	0.542	0.37	0.027	0.06	0.465	0.174	0.266	0.38	

Table 3. Discriminant validity assessment using HTMT

Table 4 provides the inner VIF values obtained from the SmartPLS software. The results indicated that multicollinearity was not an issue among the predictors, as all VIF values were within the acceptable range (VIF < 3), in accordance with Hair et al. [80]. Hence, the next section displays the results of structural equation modeling (Figure 2).



Next, the author will use the R-squared or adjusted R-squared index to evaluate the impact level of one or more independent factors on the dependent factor in the research model, as shown in Table 5.

Table 5. Model Fit Test Results				
R-square R-square adjusted				
CL	0.812	0.809		
HL	0.622	0.618		

Table 5 summarizes the results of adjusted R-square values. First, for e-banking service quality, a statistically significant R-square (adjusted R-square is 0.809) indicates that about a total of 81.2% variance in e-banking service quality is explained by transaction speed, efficiency, reliability, responsiveness, and confidentiality conflict. The high value indicates a good model fit of this construct. In the same line, the adjusted R-square of customer satisfaction is 0.618, i.e., 61.8% variance of customer satisfaction is explained by e-banking service quality. The overall adjusted R-square values show that the model fits well.

To assess the effect size, f-squared (f^2) is applied using the PLS Algorithm. The f² value indicates that exogenous latent variables have a large influence on endogenous variables based on the criteria: the effect size is weak if f² equals 0.02; the effect size is moderate if f² equals 0.15; and the effect size is strong if f² equals 0.35. The results of f² values are shown in Table 6.

Table 6. f ² values						
CL HL						
BM	0.279					
CL		1.077				
HL						
HQ	0.356					
РН	0.131					
тс	0.189					
TD	0.100					
WOM		0.112				
WOM × CL 0.317						

Based on the provided Table 6, which contains f^2 values for various constructs, we can analyze the effect sizes based on the rule of thumbs above. First, BM (Confidentiality) shows a moderate effect on CL (E-banking service quality) with an f^2 value of 0.279, which is considered a moderate to strong effect. While CL (E-banking service quality) has a f^2 value of 1.077, indicating a very strong effect on HL (customer satisfaction) on the model.

Regarding HQ (Efficiency), it also shows a notable effect on CL (E-banking service quality) with an f^2 of 0.356, which is strong. Whereas PH (Responsiveness) and TC (Reliability), with their f^2 values of 0.131 and 0.189 respectively, have moderate effects on CL (E-banking service quality) approximately. Besides, TD (Transaction speed) and WOM (Word of Mouth) show weaker effects, with f^2 values of 0.100 and 0.112, respectively, indicating weak effects. Finally, WOM × CL (interaction term) has an f^2 of 0.317, suggesting a strong effect on the HL (Customer satisfaction).

4-2-Discussions

To evaluate the impact relationships, the author will use the results of Bootstrap analysis. The results of testing the relationships between variables are shown in Table 7.

Path	Original sample (O)	P values	Hypothesis	Decision
$TD \rightarrow CL$	0.195	0.000	H1	Accept
$HQ \rightarrow CL$	0.319	0.000	H2	Accept
$TC \rightarrow CL$	0.273	0.000	H3	Accept
$PH \rightarrow CL$	0.194	0.000	H4	Accept
$BM \rightarrow CL$	0.278	0.000	H5	Accept
$\text{CL} \rightarrow \text{HL}$	0.734	0.000	H6	Accept
WOM \rightarrow HL	0.237	0.001		
WOM x CL \rightarrow HL	0.246	0.000	H7	Accept

Table	7.	Hypothesis	testing

The research results indicate that transaction speed, efficiency, reliability, responsiveness, and security positively and significantly impact the quality of e-banking services at commercial banks in Ho Chi Minh City, as evidenced by positive regression coefficients and p-values less than 1%. Additionally, customer satisfaction is influenced by e-banking services and WOM, with WOM playing a moderating role in the impact of e-banking services on customer satisfaction at these banks. The findings align with Bagozzi [11] attitude theory, demonstrating how customer attitudes toward e-banking service quality significantly influence satisfaction levels. The moderating role of WOM reinforces the theoretical proposition that social interactions amplify customer perceptions, extending the applicability of traditional service quality models to the e-banking context.

First, the transaction speed factor has a positive and statistically significant impact on the quality of online banking services at some commercial banks in Ho Chi Minh City due to the positive regression coefficient (β =0.195) and the p-value less than 1%. This shows that hypothesis 1 is accepted, meaning that transaction speed positively impacts the quality of online banking services at commercial banks in Ho Chi Minh City. Under the condition that other factors remain unchanged, when the transaction speed increases by 1%, the quality of online banking services at some commercial banks in Ho Chi Minh City increases by 19.5%. The research results are proven in studies [33, 43-46]. For customers using e-banking services, transaction speed is important as it ensures timely and uninterrupted processing of transactions, as experienced in fund transfers and bill payments. These results align with the studies of Akbar & Wadud [43] and Liu & Zhang [44]. Furthermore, Antony [45] and Bacinello et al. [46] further highlight the crucial role of transaction speed in improving the quality of online services and enabling customer loyalty in the competitive e-banking environment. Real-time payment systems, artificial intelligence, and robust IT infrastructure would ensure operational activity automation with no errors and reduced bank costs.

Second, the efficiency factor has a positive and statistically significant impact on the quality of online banking services at certain commercial banks in Ho Chi Minh City, as indicated by a positive regression coefficient ($\beta = 0.273$) and a p-value of less than 1%. Meanwhile, Hypothesis 2 is supported and states that efficiency positively influences the quality of online banking services at commercial banks in Ho Chi Minh City. Holding other factors constant, a 1% increase in efficiency is associated with a 27.3% improvement in e-banking service, user-friendly interfaces and organization are indications of efficiency. The findings reveal that efficiency is highly appreciated, as it caters to timely transactions and facilitates customers to make a transaction quickly, thus providing a pleasant banking experience. Prior works, such as those by Hammoud [5] and George & Kumar [30], highlight efficiency as a significant factor influencing customer satisfaction towards e-banking. Likewise, Tahira et al. [53] confirm efficiency as a key factor in e-banking service quality by optimizing processes and eliminating unnecessary steps for a seamless user experience.

Third, the reliability factor has a statistically significant positive impact on the quality of e-banking services at commercial banks in Ho Chi Minh City because it has a positive regression coefficient ($\beta = 0.319$) and a p-value of less than 1%. This supports Hypothesis 3, suggesting that reliability positively influences the quality of retail banking services at these banks. Holding other factors constant, a 1% increase in reliability is associated with a 31.9% improvement in e-banking service quality at commercial banks in Ho Chi Minh City. These findings align with previous studies [5, 33, 34, 54]. Reliability is a cornerstone of e-banking service quality, directly influencing customer perceptions of technological competence and security in Vietnam's banking system. A dependable platform reassures users about accurate transactions and data protection and addresses critical concerns such as fraud and breaches, particularly in Ho Chi Minh City's competitive market. The strong link between reliability and service quality highlights its role in building trust and satisfaction, as evidenced by a 31.9% improvement in e-banking quality when reliability increases. To achieve this, banks must invest in advanced IT infrastructure, real-time monitoring, and staff training, ensuring system stability and a seamless customer experience in Vietnam's digital banking landscape.

Fourth, responsiveness exhibits a positive and statistically significant effect on e-banking service quality at commercial banks in Ho Chi Minh City, as evidenced by a regression coefficient of β =0.194 and a p-value below 1%. These findings demonstrate that Hypothesis 4 is confirmed, which indicating that responsiveness enhances service quality in Vietnamese context. Assuming other variables are constant, a 1% improvement in feedback correlates with a 19.4% increase in retail banking service quality. These results align with prior research, such as [29, 30, 58]. Responsiveness, referring to the speed and effectiveness with which e-banking customer support addresses inquiries and solves problems, is the most important aspect when assessing e-banking service quality in Vietnamese commercial banks. The banks can greatly improve their customers' perceptions of service quality by facilitating a quick response system to queries, troubleshooting, and comforting communication.

Fifth, the confidentiality factor exhibits a positive and statistically significant effect on online banking service quality at certain commercial banks in Ho Chi Minh City because of a regression coefficient of β =0.278 and a p-value below 1%. This finding supports Hypothesis 5, confirming that security positively influences online banking service quality. Assuming all other factors remain constant, a 1% increase in security correlates with a 27.8% improvement in service quality. These results align with previous research by [30, 58–62]. Confidentiality regards safeguarding personal data,

safe payment processing, and protection against fraud or unauthorized transaction access. Each high-security standard gives customers peace of mind by ensuring that their correspondence and money are safely stored and protected, which helps to build trust in the e-banking system. Investment in adequate cybersecurity technologies, encryption protocols, fraud detection systems, and real-time threat monitoring tools is essential for banks to stay competitive in the cyber world and maintain a secure and trustful digital banking experience.

Sixth, due to the positive regression coefficient (β =0.734) and the p-value less than 1%, the factor of e-banking service quality has a positive and statistically significant impact on customer satisfaction using e-banking services at some commercial banks in Ho Chi Minh City. This shows that hypothesis 6 is accepted, meaning that e-banking service quality positively impacts customer satisfaction using e-banking services at commercial banks in Ho Chi Minh City. Under the condition that other factors remain unchanged, when e-banking service quality increases by 1%, customer satisfaction using e-banking services at some commercial banks in Ho Chi Minh City increases by 73.4%. The research results are proven in the studies of [4, 5, 66, 67]. E-banking quality is a fundamental determinant of customer satisfaction, as it significantly influences customer-oriented impressions in their interaction with commercial banks. On the other hand, high-quality e-banking services characterized by transaction speed, efficiency, reliability, responsiveness, and confidentiality boast a seamless and trustworthy experience that matches or exceeds the customer's expectations. Improvements in service quality serve not only to streamline operational efficacy in transaction processing but also to reinforce customer contentment. With e-banking services ascending in competitive markets like Ho Chi Minh City, where digital banking solutions are rapidly evolving, above-average service quality emerges as a key differentiator for customer retention and competitive advantage. Recognizing the renewed emphasis on e-banking service quality and its impact on customer satisfaction reinforces the need for ongoing investment in technological innovations, user-friendly interfaces, and stringent security measures to ensure customer value and build and sustain their trust in the banking experience.

Finally, the findings reveal that Word of Mouth (WOM) significantly moderates the relationship between e-banking service quality and customer satisfaction in Vietnam. Specifically, the positive coefficient of 0.246, above zero, indicates that WOM intensifies the influence of e-banking service quality on customer satisfaction. This suggests that as WOM becomes a valuable mechanism, the impact of high-quality e-banking services on customer satisfaction grows stronger. In other words, when customers share positive experiences and recommendations about e-banking services, it amplifies the perceived quality of these services, increasing user satisfaction. This moderating effect underscores the importance of WOM as a tool for commercial banks to leverage customer satisfaction further.

WOM is a potent force in customer acquisition and retention, as numerous studies have demonstrated. In the banking sector, where trust and reputation are crucial, WOM is often regarded as the most reliable source of information for customers, supported by various research findings [68, 69, 71, 72, 81]. Positive feedback about e-banking experiences can significantly influence potential and existing customers' perceptions, making them more likely to use the service. WOM empowers customers to make informed, confident decisions about financial services, reinforcing the quality and reliability of a bank's e-banking offerings.

Therefore, the moderating role of WOM in this context is precious for commercial banks in Vietnam. By encouraging satisfied customers to share their positive experiences, banks can strengthen the relationship between service quality and satisfaction. This effect can enhance the overall customer experience, increase satisfaction, and foster a loyal customer base. WOM validates the quality of e-banking services and serves as a strategic tool for banks to differentiate themselves in a competitive market by capitalizing on positive customer interactions and endorsements.

5- Conclusion

The study employs PLS-SEM to assess the influence of e-banking service quality factors on customer satisfaction at commercial banks in Ho Chi Minh City. The findings highlight WOM's crucial role in amplifying service quality's effect on customer satisfaction. Given the context of international integration and intense competition within Vietnam's banking sector, especially during the digitalization era, WOM's moderating role on the relationship between e-banking service quality and customer satisfaction is increasingly essential. Bank managers should prioritize strategies that encourage customers to share positive feedback through WOM, as this enhances the bank's reputation and strengthens the trust of new and existing customers in the e-banking services provided, fostering satisfaction and loyalty. Furthermore, managing e-banking service quality should be aligned with social media platforms to fully leverage WOM's potential, aiding banks in preserving and growing their market share in today's highly competitive environment. In the digital age, WOM is a powerful promotional tool and a strategic differentiator that enables Vietnamese commercial banks to distinguish themselves and build lasting competitive advantages.

Despite the valuable research findings, certain limitations are inevitable. First, some service quality dimensions are derived from the SERVQUAL model; however, future studies could explore e-banking service quality using alternative frameworks, such as the ".comQ" model. Second, other moderating factors, such as perceived value and perceived risk, could be considered instead of WOM.

6- Declarations

6-1-Data Availability Statement

The data presented in this study are available in the article.

6-2-Funding

This research is funded by the University of Finance - Marketing, Vietnam.

6-3-Institutional Review Board Statement

Not applicable.

6-4-Informed Consent Statement

This study does not involve any experimental procedures with human subjects. Data is collected via designated surveys with voluntary participants. Verbal informed consent is obtained from all participants before conducting the survey. All participants are fully informed of the purpose of the study and the extent of involvement. They are free to withdraw from research at any time. Privacy, confidentiality, and anonymity are guaranteed with strict ethical guidelines to ensure data is served for academic purposes only.

6-5- Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the author.

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Appendix I

Abbreviation	Full Term
AVE	Average variance extracted
CR	Composite reliability
HTMT	Heterotrait-Monotrait correlations
PLS-SEM	Partial Least Squares Structural Equation Modeling
SQ	Service quality
WOM	Word of mouth

Table A1. Abbreviations

Table A2. Dimensions and Items for Questionnaire

Dimensions	Scale	Measurement items	References
	TD1	Time-saving is an essential consideration for users of conventional electronic retail banking facilities.	
Transaction	TD2	It is easy to quickly complete transactions anywhere.	
Speed (TD)	TD3	I can complete a transaction quickly on the website of online banks.	[0, 55, 82]
	TD4	The e-banking platform ensures rapid processing.	
	HQ1	The e-banking service offers information and products tailored to my preferences.	
	HQ2	I can efficiently complete transactions of e-banking service on the banks' website.	[5 50 82 82]
Efficiency (HQ)	HQ3	The online banking website makes finding the e-banking services I need easy.	[5, 59, 82, 83]
	HQ4	Using e-banking services helps me save significant time.	
	TC1	Transactions with the online banking are error-free.	
	TC2	The online banking should inform customers exactly when services will be performed.	[5 (1 00]
Reliability (TC)	TC3	E-banking services perform for me the service right on the first time.	[5, 61, 82]
	TC4	I prefer conducting my transactions through e-banking services rather than visiting a bank branch.	
	PH1	I believe online banking provide quick service.	
Responsiveness (PH)	PH2	E-banking services are available 24/7.	[5, 59, 82]
	PH3	The bank handles customer complaints about e-banking services in a professional manner.	
	BM1	I feel fully secure when conducting transactions of e-banking services on the banks' websites.	
Confidentiality (BM)	BM2	E-banking services ensure strong protection for my financial transactions.	[5, 60, 82]
× /	BM3	E-banking services safeguard my privacy effectively.	
	CL1	Overall, e-banking services exceed my expectations.	
Service Quality (CL)	CL2	This bank's overall e-banking services are high quality.	[5, 61, 84]
()	CL3	The e-banking services of commercial banks in Vietnam consistently provide clear and accurate information.	
	HL1	I am satisfied with the e-banking services offered by Vietnamese commercial banks.	
Customer Satisfaction (HL)	HL2	I am willing to share positive feedback about e-banking services with others.	[82]
	HL3	I recommend online banking services to others.	
	WOM1	I rarely miss opportunities to say good things about this e-banking service to others.	
Word of Mouth (WOM)	WOM2	I actively encourage my friends or relatives to use this e-banking service.	[85]
	WOM3	I recommend this e-banking service to my friends or relatives if they are searching for one.	