

The role of online public relations and social influence on customer behavior at Vietnamese commercial banks

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ABSTRACT

This study examines the effects of personalization (Per), social media (SM), and timeliness (Tim) on online public relations (OPR) and customer behavior (CB), as well as the mediating role of OPR and the moderating role of social influence (Soc). Data from 337 customers of Vietnamese joint-stock commercial banks were analyzed using partial least squares structural equation modeling (PLS-SEM). The results show that Per and SM significantly enhance OPR, whereas Tim does not affect OPR but directly influences CB. The indirect effects of Per, SM, and Tim on CB through OPR are not significant, indicating that OPR does not mediate the relationships. Although OPR has a small positive effect on CB in the moderation model, Soc neither directly affects CB nor moderates the OPR–CB relationship. These findings suggest that OPR supports digital relationship management but does not automatically translate communication activities into behavioral responses. Banks should therefore prioritize personalized, credible, transparent, and secure communication.

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1. INTRODUCTION

In the context of rapid digital transformation, Vietnamese Joint Stock Commercial Banks (JSCBs) are being compelled to adapt swiftly to technological advances and evolving customer behaviors (CBs). Nearly 80% of the Vietnamese population now uses digital services, with 58% of customers preferring to conduct financial transactions via online applications. Simultaneously, 76% of users actively search for information on banking products and services through digital platforms, and banking app traffic has surged by 128% compared with the pre-2023 period [1]. These statistics highlight a fundamental shift in consumer behavior: customers are becoming more proactive in seeking information and increasingly rely on peer evaluations as a form of social proof to reduce perceived risks [2] and to enhance decision confidence. Consequently, banks must revise their marketing strategies—particularly in the area of online public relations (OPR) to align with this new digital engagement paradigm. OPR plays a pivotal role in shaping public perception by influencing how audiences receive, evaluate, and retain brand messages [3]. Its timeliness (Tim), enabled through instant feedback and proactive information updates, helps mitigate the adverse impact of communication crises and swiftly restores customer trust [4]. Furthermore, personalized communication—tailored to customer segments in both content and delivery—enhances satisfaction and promotes continued service usage. Empirical evidence from Jackowicz *et al.* [5] confirms that interactive OPR activities such as

social-media responses and issue resolution strongly predict customers' continued engagement in the Polish banking sector. Similarly, Wang and Yang [6] underscore social media (SM)'s role in ensuring transparency, effective crisis management, and the timely dissemination of accurate information, thereby reinforcing institutional credibility. SM, therefore, functions as a crucial intermediary platform for OPR campaigns. It not only accelerates message diffusion but also encourages customer participation and content sharing [7]. Given the intangible nature of financial services—where customers face difficulty evaluating products before use information shared online profoundly influences brand perceptions and purchasing decisions. Two-way interaction between organizations and publics generates emotional value, amplifies brand resonance, and positively shapes consumer behavior [8]. This phenomenon aligns with social influence (Soc) theory, which posits that individual decisions are shaped by the beliefs and attitudes of others. Within financial contexts, customers tend to rely on credible and validated sources when selecting trustworthy brands, while OPR serves to convey expert-endorsed and reliable messages [9].

However, the Vietnamese banking sector still faces serious challenges related to digital trust. In 2024 alone, 341 incidents concerning online financial transactions were reported, and 44% of financial applications had not yet implemented robust cybersecurity measures [10]. These crises have significantly eroded consumer confidence, heightened risk perceptions, and reduced satisfaction. Furthermore, the dual-tier banking structure in Vietnam—where the State Bank acts as the central regulatory authority overseeing monetary policy and systemic stability, while commercial banks function as intermediaries—creates a uniform environment with limited differentiation opportunities. Strict regulatory constraints restrict variations in interest rates or specialized services, compelling banks to seek alternative strategies to build competitive advantage. In this context, OPR emerges as a strategic instrument for banks to communicate transparency, demonstrate social responsibility, manage crises, and promote digital transformation initiatives. Despite numerous studies on OPR across industries, research gaps persist in the Vietnamese banking sector. Specifically, there remains a limited understanding of: i) how personalization (Per), SM, and Tim affect OPR; ii) how OPR influences CB; iii) the moderating role of Soc in the OPR–CB relationship; iv) the mediating function of OPR in linking digital communication antecedents to behavioral outcomes; and v) managerial implications for optimizing OPR performance within the banking industry.

The present study addresses these gaps by examining the interrelationships among digital communication variables and their influence on CB through the mediating role of OPR. It also reinforces the theoretical applicability of Soc theory in predicting CB in the banking context. The OPR construct is explored within a dual framework that illustrates how banks operating under strict regulatory conditions can simultaneously maintain compliance and achieve differentiation to sustain customer trust. Employing both qualitative and quantitative methods, this study develops reliable measurement scales, collects empirical data, and validates the proposed structural model using partial least squares structural equation modeling (PLS-SEM) analysis. The findings contribute both theoretically and practically: they enhance understanding of OPR's role in digital relationship management and provide actionable insights for bank managers to design effective communication strategies that strengthen trust, manage crises, and foster long-term customer engagement in the digital economy.

2. LITERATURE REVIEW

2.1. The role of online public relations in the banking sector

In the increasingly competitive environment of Vietnamese JSCBs, OPR has emerged as a strategic communication tool implemented across multiple digital channels—such as official websites, SM platforms, and customer databases—to deliver positive messages, attract customers, protect brand reputation, and proactively manage crises [11]. Unlike traditional media, SM platforms enable real-time interaction between organizations and customers, fostering two-way communication that enhances engagement and responsiveness. As emphasized by Wang and Yang [6] and Lou and Kim [12], SM provides organizations with opportunities to establish direct dialogue with the public through comments, replies, and content sharing. In contrast, websites and emails are limited by message latency and a lack of peer-to-peer diffusion, while SM facilitates immediate responses and community-based discussions. Lou and Kim [12] further demonstrated that when organizations leverage SM influencers who combine visual appeal with authenticity and relatability, they can evoke empathy and emotional resonance, thereby strengthening audience connection and enhancing brand equity. Similarly, Gupta *et al.* [13] found that customers exposed to OPR activities showcasing banks' corporate social responsibility (CSR) efforts tend to develop positive emotions—such as admiration, trust, and respect—that directly influence purchase intentions and brand loyalty. Complementing these insights, Cardoso *et al.* [14] noted that when banks employ financial experts as influencers to introduce banking products, these individuals not only promote but also interpret and illustrate complex financial concepts, helping customers better understand and trust new digital services.

The interactive and continuous nature of OPR allows banks to respond promptly to online transaction incidents, ensure transparency and message consistency, and use influencer credibility to increase message acceptance among customers. However, while prior studies have confirmed the communicative effectiveness of OPR, few have examined how it contributes to the development of digital trust—a critical determinant of customer confidence in digital banking environments, where concerns about data privacy, transparency, and cybersecurity are increasingly prominent. Jafri *et al.* [15], through a meta-analysis of 26 studies, identified digital trust as the strongest predictor of customers' adoption of digital banking services, surpassing even convenience and perceived usefulness. Building on this, Gupta and Shukla [16] emphasized that digital trust is cultivated through transparent legal frameworks, robust security technologies, and banks' timely responsiveness to system failures or crises. These findings highlight the pivotal role of OPR in fostering trust by disclosing CSR initiatives, communicating compliance and data protection policies, and maintaining a responsive and open dialogue with customers.

Therefore, OPR is not merely a communication channel but a foundational mechanism for establishing and sustaining customers' digital trust. In this study, OPR is conceptualized as a mediating construct that transmits the effects of three antecedents—Per, SM, and Tim—on CB. Concurrently, Soc is proposed as a moderating factor that amplifies the strength of the OPR–CB relationship. This means that in customer segments with higher social susceptibility, the same level of OPR engagement can generate stronger behavioral conversion outcomes. Clarifying this dual mechanism not only deepens theoretical understanding of OPR within digital trust formation but also provides practical guidance for Vietnamese JSCBs to optimize digital communication strategies, enhance competitive advantage, and strengthen brand credibility in an increasingly digitalized marketplace.

2.2. Theoretical background

2.2.1. Social influence theory

Soc theory, originally proposed by [17], explains how an individual's behaviors, attitudes, or beliefs are shaped by others within a social group. According to this theory, Soc operates through three primary mechanisms: compliance, identification, and internalization. These mechanisms alter the manner in which individuals receive information, interact, and make decisions in a social environment. Irrespective of context—whether in physical settings or online—individuals engage in interaction patterns that reflect their personality traits, attitudes, and emotions [18]. On online social platforms, Soc extends beyond direct interpersonal interactions and manifests powerfully through channels such as social networking sites, forums, and other online media. Because these platforms transcend spatial and temporal boundaries and involve large numbers of participants, user comments, ratings, shares, and community behaviors serve as “social cues” that significantly affect consumer perceptions and actions [19]. In the banking sector, factors such as the degree of trust in peer evaluations, herd-behavior tendencies, and the persuasive force of transmitted information can exert a pronounced impact on brand awareness, information acceptance, and decisions regarding the use of banking services [20], [21]. In particular, Algharabat *et al.* [20] demonstrated that, in an online context, Soc fosters cohesive brand communities, which in turn enhance customer loyalty and encourage positive consumer behaviors. This dynamic is especially critical in financial services, where heightened risk and information asymmetry lead consumers to frequently consult others' opinions and behaviors before making decisions.

Consequently, Soc can either amplify or attenuate the effect of OPR on CB, depending on the extent to which customers are influenced by their communities. When levels of Soc are high, customers tend to place greater trust in social signals—such as positive comments, expressions of approval, or expert advice—thereby rendering OPR activities (e.g., interactive engagement, timely crisis communication, and personalized messaging) more effective in shaping CB. Conversely, when Soc is low and customers prefer to make decisions independently of community input, the efficacy of OPR may be constrained because customers are less responsive to social information or word-of-mouth. Examining Soc as a moderating variable clarifies the conditions under which OPR can achieve maximal effectiveness in optimizing digital communication strategies for Vietnamese JSCBs.

2.3. Proposed hypotheses and research model

2.3.1. Relationship between online public relations and personalization

The rapid advancement of digital technology and the pervasive influence of SM have fundamentally transformed OPR in both scope and nature. Valentini *et al.* [22] contend that OPR is not merely a shift from traditional communication channels to digital platforms, but rather a paradigm transformation—from one-way message dissemination to dialogic, interactive communication and value co-creation with the public. This evolution reflects a deeper transition in how organizations build and maintain relationships with their audiences, moving beyond transactional communication toward participatory engagement that cultivates trust, empathy, and long-term loyalty. At the heart of this transformation lies per—a defining characteristic of modern OPR [23]. Per enables organizations to shape customer attitudes, intentions, and behaviors through

the delivery of tailored content and context-specific interactions. By adhering to dialogic communication principles and providing individualized responses, organizations can effectively address specific customer concerns, reduce negative emotions, and prevent dissatisfaction-driven behaviors. As demonstrated by Wang and Yang [6] and Dhanesh *et al.* [24], such practices not only strengthen the responsiveness of digital communication but also convert reactive crisis management into opportunities for deepening stakeholder relationships.

SM plays a pivotal role in amplifying these effects. Engagement metrics such as likes, comments, and shares serve as behavioral indicators of public connection and emotional resonance. These actions reflect active participation and signal audience trust, ultimately reinforcing positive attitudes and purchase intentions [24]. Furthermore, when messages and brand narratives are delivered by credible influencers whose identity and values align with the target audience, the impact is even more pronounced. Lou and Kim [12] emphasize that this congruence between influencer authenticity, message relevance, and audience context generates stronger brand engagement and emotional attachment. Importantly, Per in OPR extends beyond mere content adaptation. Tran *et al.* [23] highlight that it involves a strategic alignment between communication tone, channel, and imagery with the psychological and situational context of the recipient. In crisis management and complaint-handling scenarios, customized responses and timely information can reduce negative sentiment, restore trust, and enhance corporate reputation. Supporting this perspective, Weidig *et al.* [25] estimate that personalized crisis communication can increase revenue by 5%–15% and improve OPR effectiveness by 10%–30%, underscoring its tangible impact on organizational performance.

Taken together, these insights affirm that Per in OPR is not a superficial tactic of message modification but a comprehensive relational strategy. It integrates tailored message design, influencer engagement, and emotional resonance to foster meaningful customer experiences. Through this multidimensional approach, OPR evolves from a conventional communication tool into a strategic management framework—one that enables organizations, particularly banks, to cultivate emotional connections, enhance digital trust, and strengthen customer loyalty in an increasingly competitive and interconnected digital marketplace. On this basis, the following hypotheses are proposed. H1: Per exerts a positive effect on OPRs. H2: Per exerts a positive effect on CB.

2.3.2. Relationship between social media and online public relations

With the acceleration of digital transformation, OPR has evolved into a strategic approach for managing brand reputation in the dynamic digital environment. Ausat [26] defines OPR as the use of online platforms—such as SM, blogs, and websites—to shape public perception, deliver positive brand messages, strengthen stakeholder relationships, and respond swiftly to crises that could damage organizational credibility. In this regard, OPR extends beyond the scope of traditional communication activities; it functions as a deliberate, reputation-oriented management strategy that integrates communication effectiveness with digital adaptability. Central to the success of OPR is the role of SM. Alalwan *et al.* [7] describe SM as a collection of internet-based applications that enable users to create and share content (user-generated content) and engage in interactive, two-way communication. These platforms—including social networks, blogs, online forums, and video-sharing sites—constitute the fundamental infrastructure supporting OPR in the digital age. Unlike traditional OPR, which relied on one-way communication through mass media, online OPR leverages SM as a primary channel for message dissemination, image building, crisis response, and long-term relationship maintenance with target audiences.

The unique characteristics of SM—interactivity, dialogic exchange, and visual engagement—make it particularly effective for OPR. Dhanesh *et al.* [24] highlight that visual storytelling on social platforms enhances user engagement, as reflected in metrics such as likes, shares, and comments. These user interactions signify more than superficial attention; they represent active co-creation of meaning and a sense of connection between organizations and their publics. Features such as sharing, commenting, and expressing emotions (like or react) contribute to an electronic word-of-mouth ecosystem, which amplifies the organization's message, extends its reach, and increases brand credibility [7]. Moreover, as Ausat [26] observes, SM has become a central arena for the formation and diffusion of public opinion by creating a “virtual public sphere” where cross-border dialogue occurs, influencing both economic behavior and consumer decision-making. However, despite its advantages, SM also poses challenges such as misinformation, fake news, and the formation of “filter bubbles” that distort perception. OPR strategically addresses these risks by fostering transparency, encouraging authentic dialogue, and promoting credible information sources to sustain public trust and mitigate potential crises.

In essence, SM and OPR are mutually reinforcing. SM provides the technological foundation and participatory culture that empower OPR to function as a two-way, relational communication mechanism rather than a unidirectional promotional tool. Through its capacity for immediacy, viral dissemination, and deep engagement, SM transforms OPR into a proactive system of relationship management that not only

enhances organizational reputation but also strengthens emotional connection and long-term loyalty among customers in the digital era. Based on this theoretical foundation, the following hypothesis is proposed. H3: SM exerts a positive effect on OPR.

2.3.3. Timeliness and online public relations

Tim has been recognized as a defining attribute of effective OPR. Ngo *et al.* [27] describe Tim as the degree to which organizations provide frequent and prompt updates of current information to their audiences. Building on this foundation, Bulantseva [28] identifies Tim as one of the core characteristics that differentiates OPR from traditional public relations, emphasizing its role in fostering responsiveness, transparency, and trust in the digital environment. Empirical evidence reinforces this conceptual understanding, and Dapko *et al.* [29] compared organizations' response behaviors to user comments and inquiries on Facebook, examining cases where responses were made within 24 hours versus those with delayed or no replies. The study found that prompt responses—within one day—significantly increased users' intention to engage, demonstrated through actions such as likes, comments, contest participation, and revisits to the fan page. Conversely, delayed or absent responses led to reduced engagement levels and a higher probability of negative comments. These findings underscore that Tim in OPR is not merely operational efficiency but a key determinant of audience perception and relationship quality.

Further supporting this view, Li *et al.* [30] confirmed that real-time information updates, or immediateness, encourage audiences to engage more deeply with brand messages, thereby enhancing trust and reducing uncertainty associated with misinformation. Similarly, Bulantseva [28] highlights that prompt and consistent message updates enable organizations not only to respond swiftly but also to protect their reputation during crises—ultimately strengthening public confidence and loyalty. The strategic value of Tim in OPR becomes especially critical in crisis management. Murta and Santos [4] demonstrate that rapid and transparent online communication can effectively limit the spread of negative narratives while reinforcing customer trust in the brand. In today's digital financial landscape, where customers increasingly rely on online platforms for transactions, expectations for timely responses have intensified. Customers tend to lose confidence when banks fail to resolve service interruptions or transaction errors promptly. Therefore, ensuring real-time responsiveness and continuous information updates within OPR is essential not only for maintaining customer satisfaction but also for enhancing the overall digital experience.

Collectively, these insights indicate that Tim is far more than a functional aspect of OPR—it is a strategic communication capability. By integrating speed, accuracy, and consistency in online responses, organizations can strengthen digital trust, foster deeper engagement, and maintain reputational resilience in an era where immediacy defines both communication effectiveness and customer expectations. Based on this theoretical foundation, the following hypotheses are proposed. H4: Tim exerts a positive effect on OPRs. H5: Tim exerts a positive effect on CB.

2.3.4. Online public relations and customer behavior

According to Nurfurqonah *et al.* [3], OPR activities that emphasize transparent information, timely updates, and rapid responsiveness on SM effectively reduce customers' perceived risks and strengthen their trust in organizations. This role becomes especially vital in the banking sector, where products and services are largely homogeneous, and customers tend to be more risk-averse and sensitive to financial uncertainty. In such a context, OPR functions not only as a communication tool but as a strategic instrument that shapes how customers perceive, evaluate, and act upon financial information.

One key approach that enhances the effectiveness of OPR is Per. By tailoring messages to individual needs and collaborating with credible influencers who possess financial expertise and social trust, banks can guide customers' decision-making processes and reinforce brand reliability [12]. This is essential because financial decision-making is not purely rational—it is influenced by cognitive perceptions, emotional responses, and situational contexts [31]. Zhao *et al.* [21] further demonstrate that customers' trust develops when they observe authentic experiences shared by others on online platforms, as such shared narratives function as social proof. Similarly, psychological factors—such as perceived security, empathy, and reassurance—are recognized as critical determinants shaping customers' financial behaviors and their overall attitudes toward brands. Within this framework, OPR serves as both a rational and emotional conduit for trust-building. When banks use OPR to communicate CSR initiatives on SM, these efforts extend beyond simple information sharing; they evoke positive emotions, foster favorable brand associations, and strengthen customers' intentions to engage with banking services [14]. This emotional connection complements the cognitive dimension of OPR by transforming information into perceived value, particularly when messages are delivered in a timely, personalized, and visually engaging format.

In addition, the immediate and prospective nature of social media communication plays a decisive role in deepening customer engagement. Furthermore, the immediate and prospective nature of social media communication plays a decisive role in deepening customer engagement. Li *et al.* [30] found that real-time

updates facilitate customer engagement by enabling audiences not only to access information but also to participate actively in ongoing online interactions. In a similar vein, timely and transparent communication through social media can strengthen customers' perceptions of organizational responsiveness and credibility [29]. These findings suggest that the effectiveness of OPR extends beyond information dissemination, as it enables organizations to maintain continuous communication and respond promptly to customers' concerns.

In the banking context, where customers increasingly rely on digital channels to evaluate and interact with service providers, the Tim, Per, and SM interactivity of OPR may contribute to more favorable customer responses. Accordingly, OPR can be regarded as an important communication mechanism through which banks strengthen customer relationships and influence subsequent customer behavior. Based on the above arguments, OPR is expected to positively influence customer behavior. Therefore, the following hypothesis is proposed. H6: OPR positively influences customer behavior.

2.3.5. The role of social influence

Leong *et al.* [32] define Soc as the extent to which an individual's perceptions and decisions are shaped by the opinions, evaluations, and behaviors of others within a community—particularly on online platforms. Building upon Kelman's foundational theory [17], Soc explains how individuals internalize social norms and adopt behaviors, attitudes, or beliefs that align with those of their reference groups. In the digital era, this phenomenon extends beyond face-to-face interactions to include virtual environments such as social networking sites, online forums, and media-sharing platforms. Within these spaces, user actions—such as sharing, commenting, or rating—serve as “social cues” that shape how consumers interpret information and make decisions [19].

In the banking industry, where services are intangible and perceived financial risk is high, customers often depend on peer opinions and online reviews to reduce uncertainty and strengthen their confidence in financial institutions. Algharabat *et al.* [20] found that Soc in online environments fosters cohesive brand communities, which enhance customer engagement and loyalty through shared trust and identification. Similarly, Zhao *et al.* [21] demonstrated that herd behavior tendencies and the visibility of others' interactions significantly influence the degree of trust customers place in organizational messages. In other words, the public's perception of credibility often stems not only from corporate communication itself but also from the validation provided by the collective behavior of others.

Given this context, Soc operates as a moderating mechanism in the relationship between online communication activities—such as OPR and CB. OPR, through its consistent dissemination of positive messages, real-time crisis management, and strategic brand-building efforts, aims to shape customer perceptions by enhancing trust, usage intention, and word-of-mouth advocacy. However, the effectiveness of these efforts depends largely on the level of Soc acting upon the customer. When Soc is high—that is, when individuals actively seek community opinions, rely on peer evaluations, or follow collective decision patterns—OPR initiatives tend to generate stronger persuasive effects. In such cases, the bank's messages are reinforced by social validation, amplifying their credibility and behavioral impact. Conversely, when Soc is low and individuals prefer to make independent judgments, the effect of OPR may weaken, as these customers are less receptive to external endorsement or social cues.

Overall, this dynamic underscores the contextual nature of OPR effectiveness. Soc not only magnifies the reach and resonance of digital communication but also determines the degree to which customers internalize brand messages. In industries such as banking—where trust and credibility are paramount—recognizing and leveraging Soc is essential for maximizing the strategic impact of OPR initiatives on CB. Based on this theoretical foundation, the following hypothesis is proposed. H7: Soc moderates the relationship between OPR and CB.

2.3.6. The mediating role of online public relations

In the digital era, OPR has become a crucial mechanism for building transparency, trust, and engagement between organizations and their publics. According to Nurfurqonah *et al.* [3], OPR activities that emphasize transparent information, timely updates, and rapid responsiveness on SM effectively reduce customers' perceived risks and strengthen their trust in organizations. This role becomes especially vital in the banking sector, where products and services are largely homogeneous, and customers tend to be more risk-averse and sensitive to financial uncertainty. In such a context, OPR functions not only as a communication tool but as a strategic instrument that shapes how customers perceive, evaluate, and act upon financial information. One key approach that enhances the effectiveness of OPR is Per. By tailoring messages to individual needs and collaborating with credible influencers who possess financial expertise and social trust, banks can guide customers' decision-making processes and reinforce brand reliability [12]. This is essential because financial decision-making is not purely rational—it is influenced by cognitive

perceptions, emotional responses, and situational contexts [31]. Zhao *et al.* [21] further demonstrate that customers' trust develops when they observe authentic experiences shared by others on online platforms, as such shared narratives function as social proof. Likewise, psychological factors—such as perceived security, empathy, and reassurance—play a crucial role in shaping customers' financial behaviors and attitudes toward brands.

Within this framework, OPR serves as both a rational and emotional conduit for trust-building. When banks use OPR to communicate CSR initiatives on SM, these efforts extend beyond simple information sharing; they evoke positive emotions, foster favorable brand associations, and strengthen customers' intentions to engage with banking services [14]. This emotional connection complements the cognitive dimension of OPR by transforming information into perceived value, particularly when messages are delivered in a timely, personalized, and visually engaging format. Moreover, the immediate and prospective of SM communication play a decisive role in deepening customer engagement. Li *et al.* [30] found that real-time updates encourage audiences to interact not only by consuming information (breadth engagement) but also by participating in ongoing discussions (depth engagement). Such interactive participation enhances perceived credibility, mitigates misinformation, and reinforces brand trust. Similarly, transparency and prompt responsiveness on SM foster feelings of respect and assurance among customers, further solidifying trust [29].

Collectively, these studies indicate that OPR influences CB through two intertwined mechanisms: cognitive (information-based understanding and trust) and affective (emotional connection and attachment). The defining features of OPR—Tim, Per, and SM interactivity—serve as the operational channels through which these mechanisms are activated. In the banking industry, where differentiation through products and pricing is limited, OPR thus emerges as a strategic competitive advantage. By combining transparency, empathy, and responsiveness, OPR enables banks to cultivate digital trust, enhance customer experience, and foster long-term loyalty in an increasingly competitive and technology-driven financial landscape. Based on this theoretical foundation, the following hypothesis is proposed: H8: OPRs mediates the relationship between Per, SM, Tim, and CB.

2.4. Research model

After synthesizing the literature, the study's conceptual model has been developed as Figure 1. To examine the relationships between the constructs of this research. The conceptual model has been developed to investigate how Per, SM, and Tim affect CB, with OPR acting as a mediator and Soc serving as a moderator of these relationships.

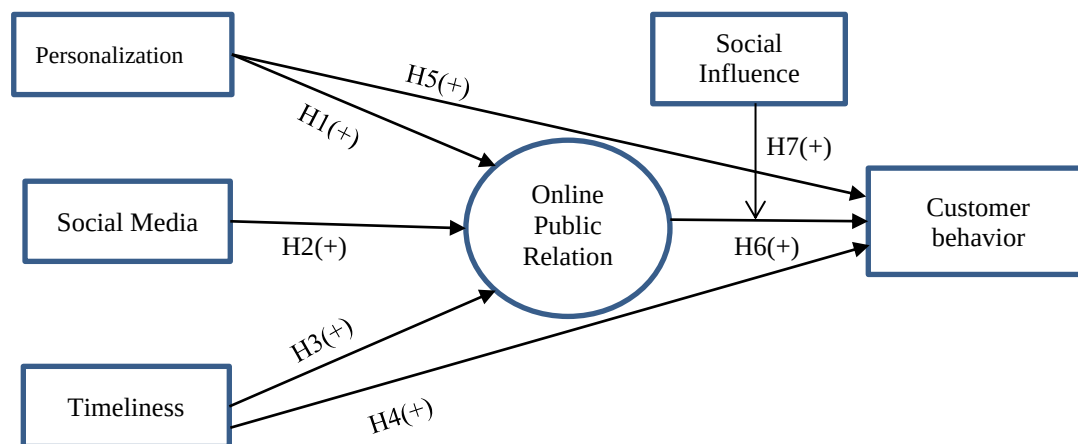


Figure 1. Research model

3. RESEARCH METHODOLOGY

This study employs a mixed-method research approach, integrating both qualitative and quantitative methods to rigorously examine the relationships among Per, SM, Tim, OPR, Soc, and CB. The qualitative phase was conducted to develop the theoretical foundation and propose the conceptual research model, while the quantitative phase was utilized to test measurement scales, validate the research model, and empirically verify the hypotheses. This methodological combination enables robust statistical testing and allows for the generalization of findings across a substantial customer base.

The study focuses on customers currently using online services at five leading Vietnamese JSCBs, as identified in the 2024 Vietnam Banking Brand Ranking published by Brand Finance. These banks include the Bank for Investment and Development of Vietnam (BIDV), the Joint Stock Commercial Bank for Foreign Trade of Vietnam (Vietcombank), the Vietnam Joint Stock Commercial Bank for Industry and Trade (VietinBank), the Military Commercial Joint Stock Bank (MB Bank), and the Vietnam Technological and Commercial Joint Stock Bank (Techcombank). These institutions were selected due to their significant market share, comprehensive service portfolios, and diverse interaction channels with customers—making them representative cases for analyzing online customer engagement within the Vietnamese banking sector. A self-administered questionnaire employing five-point Likert scales (1 = strongly disagree to 5 = strongly agree) was used, in accordance with established practices in business research [33].

The measurement items for each construct were adapted from prior studies to ensure content validity:

- i) Per: four items adapted from Davidow [34] assess the extent to which banks tailor message content, format, and delivery timing according to each customer's profile, behaviors, and needs.
- ii) SM: three items drawn from Wibowo *et al.* [35] measure the degree to which customers interact with and disseminate bank-related content on social platforms.
- iii) Tim: three items adapted from Davidow [34] capture the frequency and speed with which customers receive current information and crisis updates from the bank.
- iv) OPRs: four items based on Yuping [36] and Cheng *et al.* [37] evaluate perceived transparency, two-way interactivity, and credibility of the bank's OPR activities.
- v) Soc: four items adapted from Book and Tanford [38] gauge the extent to which customers' perceptions and decisions are affected by peer evaluations and community feedback in online environments.
- vi) CB: items drawn from Parasuraman *et al.* [39] measure customers' intentions to use banking services, actual usage behaviors, and willingness to provide word-of-mouth recommendations.

4. RESEARCH FINDINGS

The survey was conducted anonymously via Google Forms. Participants were required to read the survey information and provide informed consent before proceeding to answer. No email addresses were collected, no login was required, and all personally identifiable information was removed from the dataset prior to analysis. Only aggregated demographic data were collected to prevent any possibility of re-identification.

An initial soft sample of 350 responses was collected through the online survey; however, 13 responses were deemed invalid, resulting in a final sample of 337 valid observations. The data were analyzed using the PLS-SEM technique. According to Jin *et al.* [40], PLS-SEM is particularly suitable for research models incorporating both mediating and moderating variables, as it enables the simultaneous estimation of measurement and structural models while testing indirect and interaction effects through the bootstrapping procedure.

Demographic analysis of the 337 valid responses revealed that 55.2% of participants were female and 44.8% were male. Regarding marital status, 65.9% were married, and 34.1% were single. In terms of age, the majority of respondents were adults: 31.5% were above 35 years old, 27% between 31 and 35, 24% between 25 and 30, and 17.5% under 25. As for experience with online banking services, 72.1% had used such services for more than five years, 14.5% for three to five years, and 13.4% for less than three years. Educational attainment was relatively high, with 80.7% holding a bachelor's degree and 13.1% possessing a postgraduate qualification. Income levels were concentrated between 7 and 13 million Vietnamese Dong (VND) per month (63.5%), while 15.4% reported earnings above 13 million VND, aligning closely with Vietnam's national average monthly income of 8.8 million VND. Overall, the demographic profile indicates that the majority of respondents were mature and experienced users of online banking services—attributes that likely contribute to greater awareness of risk and trust issues. The high educational background suggests the respondents' ability to comprehend and critically respond to online messages. Additionally, the slight predominance of female and married participants reflects a general tendency toward financial caution and a preference for stability when engaging in digital banking services.

The results of the Cronbach's alpha reliability test presented in Table 1 indicate that all values exceed the threshold of 0.7, demonstrating strong internal consistency within the dataset. Similarly, both ρ_A and ρ_C coefficients surpass the minimum acceptable values, confirming the reliability of the constructs. Furthermore, the average variance extracted (AVE) values are all greater than the recommended threshold of 0.5 [41]. These findings collectively indicate that all measurement scales meet the required statistical standards and exhibit high levels of convergent validity.

Table 1. Measurement model assessment results

Research concepts	Factors	Factor loadings	Cronbach's alpha	Composite reliability (ρ_A)	Composite reliability (ρ_C)	AVE
CB	CB1	0.806	0.816	0.824	0.879	0.646
	CB2	0.870				
	CB3	0.766				
	CB4	0.766				
OPR	OPR1	0.886	0.822	0.828	0.894	0.737
	OPR2	0.857				
	OPR3	0.831				
Per	Per1	0.873	0.846	0.869	0.896	0.683
	Per2	0.840				
	Per3	0.774				
	Per4	0.817				
SM	SM1	0.886	0.879	0.880	0.926	0.806
	SM2	0.904				
	SM3	0.903				
Tim	Tim1	0.873	0.791	0.792	0.878	0.706
	Tim2	0.799				
	Tim3	0.846				

4.1. Predictive assessment

The model's fit was evaluated using the standardized root mean square residual (SRMR) index, as reported in Table 2. In this analysis, the proposed model yielded an SRMR of 0.061—under the 0.080 threshold—indicating a minimal average discrepancy between the estimated and observed covariance matrices and therefore a strong correspondence between the model and the empirical data [41]. Additionally, the normed fit index (NFI) registered at 0.807, surpassing the acceptable benchmark [42]. Finally, the estimated model's d_{ULS} and d_G values exhibited only marginal increases compared to the saturated model, demonstrating that the hypothesized structure nearly captures the empirical covariance matrix in its entirety [42].

The coefficient of determination (R^2) in Table 3, as emphasized by Hair *et al.* [41], serves as a central criterion for evaluating the explanatory power of the structural model in PLS-SEM. The R^2 value indicates the extent to which exogenous variables account for the variance in endogenous constructs, thereby reflecting the model's predictive capability. As presented in Table 3, the R^2 value for OPR is 0.174, suggesting that the three antecedent variables—Per, SM, and Tim—collectively explain approximately 17.4% of the variance in OPR. According to Hair *et al.* [41], this represents a moderate explanatory level in the context of social science research. Meanwhile, the R^2 value for CB is 0.130, indicating that the model explains 13% of the variance in CB responses. Although this value is modest, it is meaningful and acceptable within exploratory research settings, where the goal is to uncover new relationships rather than to achieve high predictive precision. Overall, these findings demonstrate that the proposed model possesses satisfactory explanatory power for the constructs under investigation and provides a solid foundation for subsequent hypothesis testing and mediation–moderation analyses. In addition to the coefficient of R^2 , the study also evaluated the effect size (f^2) to measure the strength of the relationships between independent and dependent variables. According to Hair *et al.* [41], the f^2 statistic helps assess the practical significance of hypothesized relationships by identifying which variables exert a substantial impact on the model's explanatory capacity.

Table 2. Model fit testing

Model fit index	Saturated model	Estimated model
SRMR	0.061	0.061
d_{ULS}	0.565	0.577
d_G	0.232	0.233
Chi-square	487.904	488.696
NFI	0.808	0.807

Table 3. Coefficient of determination

Endogenous construct	R^2	Adjusted R^2
CB	0.130	0.122
OPR	0.174	0.167

As presented in Table 4, the f^2 analysis reveals that Per has an f^2 value of 0.099 in its relationship with OPR, indicating a meaningful contribution to explaining variance in OPR. Meanwhile, Tim shows an f^2 value of 0.010 in its relationship with CB, suggesting it is the most influential factor in explaining CB responses. By contrast, the remaining relationships exhibit small or negligible f^2 values, implying that their

individual contributions to the overall model are limited. Collectively, these findings underscore that while several antecedents play a role in shaping OPR and CB, Per and Tim represent the most practically significant predictors in this study. Taken together, the R^2 and f^2 findings furnish evidence that the proposed model demonstrates an acceptable level of explanatory power: the antecedent constructs exert moderate effects on OPR, and OPR, in turn, partially translates these influences into CB, albeit with a modest final impact. These outcomes justify further examination of the mediating and moderating roles of the model's constituent factors.

Table 4. The effect sizes f^2

Construct	CB	OPR	Per	SM	Tim
CB					
OPR	0.010				
Per	0.005	0.099		0.026	
SM		0.055			
Tim	0.108	0.012		0.004	

4.2. Mediating variable test result

In this study, the bootstrapping procedure was employed to examine the mediating role of OPR in the relationships among Per, SM, Tim, and CB. The results of the bootstrap analysis revealed in Table 5 that the path from OPR to CB was statistically insignificant ($\beta = 0.099$, $t = 1.619$, and $p = 0.105$), suggesting that OPR does not exert a meaningful influence on CB within the model. Further analysis of the indirect effects indicated that none of the mediated paths achieved statistical significance—Per $\rightarrow$ OPR $\rightarrow$ CB ($\beta = 0.032$, $p = 0.131$), SM $\rightarrow$ OPR $\rightarrow$ CB ($\beta = 0.021$, $p = 0.152$), and Tim $\rightarrow$ OPR $\rightarrow$ CB ($\beta = 0.013$, $p = 0.333$). Similarly, the direct effects of Per ($\beta = 0.067$, $p = 0.283$), SM ($\beta = 0.031$, $p = 0.152$), and Tim ($\beta = 0.110$, $p = 0.104$) on CB were also non-significant.

According to Hair *et al.* [43], in the context of PLS-SEM, a structural path is considered statistically significant when the t-value exceeds 1.96, and the p-value is under 0.05 at a 95% confidence level. Since all tested paths in the current model failed to meet these thresholds, the relationships can be deemed non-significant in both statistical and practical terms. Consistent with Hayes [44], when neither the direct nor the indirect paths are significant, the relationship is classified as no-effect non-mediation, implying that the hypothesized mediator does not transmit or account for the effect of the independent variable on the dependent variable. Similarly, Hair *et al.* [42] emphasize that p-values and t-statistics remain the primary bases for hypothesis validation in SEM; thus, insignificant values in both pathways necessitate the rejection of the mediation hypothesis. Based on this theoretical and empirical evidence, the present study concludes that OPR does not play a mediating role in the relationships among Per, SM, Tim, and CB. This outcome suggests that, within the examined context, CB is likely influenced more directly by other factors beyond OPR, highlighting the need for further exploration of alternative mediating mechanisms in digital communication models.

Table 5. The mediating variable test result

Relationship (Path)	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ((O/STDEV))	P values	Result
OPR $\rightarrow$ CB	0.099	0.103	0.061	1.619	0.105	
Per $\rightarrow$ CB	0.100	0.102	0.059	1.679	0.093	
Per $\rightarrow$ OPR	0.327	0.331	0.059	5.561	0	
Per $\rightarrow$ SM	0.161	0.166	0.059	2.722	0.007	
SM $\rightarrow$ CB	0.022	0.023	0.015	1.432	0.152	
SM $\rightarrow$ OPR	0.217	0.218	0.054	4.032	0	
Tim $\rightarrow$ CB	0.322	0.327	0.062	5.169	0	
Tim $\rightarrow$ OPR	0.114	0.116	0.065	1.748	0.081	
Tim $\rightarrow$ SM	0.061	0.062	0.058	1.049	0.294	

4.3. Moderator variable test result

In behavioral and management research, not all relationships between independent and dependent variables remain stable; rather, they are often influenced by contextual or external factors. These factors, known as moderator variables, function to alter the direction or strength of the primary relationship [44]. Testing for moderation enables researchers to determine whether the effect of an independent variable on a dependent variable becomes stronger, weaker, or even changes direction as the level of the moderator varies. In this study, moderation analysis was conducted to examine the role of Soc as a moderating variable in the relationship between OPR and CB. The objective of this test is to assess whether Soc amplifies or attenuates

the impact of OPR on CB responses, thereby clarifying the contextual conditions under which OPR exerts its effect in the digital banking environment.

Following the procedure for testing moderating effects in PLS-SEM proposed by Hair *et al.* [43], this study examined the direct, indirect, and interaction effects among the constructs in the model. The results presented in Table 6 indicate that OPR has a positive and statistically significant effect on CB ($\beta = 0.217$, $t = 2.649$, $p = 0.008$, $CI = [0.055; 0.361]$), although the f^2 is relatively small ($f^2 = 0.042$). This finding confirms the positive role of OPR in promoting CB responses, even if the magnitude of influence remains modest. Conversely, Soc does not exert a significant direct impact on CB ($\beta = -0.014$, $t = 0.181$, $p = 0.857$, $CI = [-0.160; 0.146]$), suggesting that Soc within this research context is not sufficiently strong to directly shape CB. Regarding the moderation test, the interaction effect of $Soc \times OPR \rightarrow CB$ is positive but statistically insignificant ($\beta = 0.084$, $t = 0.897$, $p = 0.370$, $CI = [-0.102; 0.263]$). The f^2 ($f^2 = 0.006$) is extremely small, and the coefficient of R^2 for CB ($R^2 = 0.043$) further indicates that the model has limited explanatory power. Collectively, these findings imply that Soc does not play a significant moderating role in the relationship between OPR and CB. According to Hair *et al.* [43], the assessment of moderation effects should consider not only the statistical significance (via bootstrapping) but also the f^2 to evaluate practical relevance. In this case, both indicators reveal a weak and negligible moderating effect, suggesting that social factors were not sufficiently strong to alter the relationship between OPR and CB within the studied context. This result highlights that, despite the interactive potential of digital environments, Soc alone may not be a decisive factor in shaping customers' behavioral responses to OPR initiatives in the Vietnamese banking sector.

Table 6. Moderation testing results (with Bootstrap)

Relationship (Path)	β	t-value	p-value	95% CI (LL–UL)	f^2
OPR $\rightarrow$ CB	0.217	2.649	0.008	[0.055; 0.361]	0.042
Soc $\rightarrow$ CB	-0.014	0.181	0.857	[-0.160; 0.146]	0.000
Soc $\times$ OPR $\rightarrow$ CB	0.084	0.897	0.370	[-0.102; 0.263]	0.006

5. RESULTS AND DISCUSSION

The findings show that Per positively influences OPR, consistent with prior studies emphasizing that personalized communication strengthens customer engagement and customer–brand relationships [26]. However, Per does not directly affect CB, likely due to privacy and data security concerns in the banking sector. SM also positively influences OPR by facilitating rapid information sharing and two-way communication, thereby enhancing engagement and trust [19]. In contrast, Tim does not significantly influence OPR, although it directly affects CB. Unlike prior studies [31], customers in Vietnam's banking sector appear to prioritize accuracy, reliability, and security over communication speed. Another important finding is that OPR does not significantly mediate the relationships between Per, SM, Tim, and CB. Similar to Dhanesh *et al.* [24] and prior studies [6], [7], the effectiveness of OPR depends largely on the credibility and usefulness of shared information. Thus, OPR functions more as a communication channel than a direct driver of behavioral change. Finally, Soc does not significantly moderate the relationship between OPR and CB. This finding reflects Vietnam's digital culture, where SM is used mainly for entertainment and personal communication rather than financial purposes [30]. Prior studies [40] also noted that the impact of Soc depends on information credibility and contextual factors. Overall, the results suggest that effective OPR in the Vietnamese banking sector depends more on trust, credibility, and perceived security than on communication speed or social conformity. Therefore, banks should prioritize transparent, trustworthy, and value-driven communication strategies to strengthen customer trust and long-term engagement.

This study has several limitations that provide directions for future research. First, increasing the sample size would improve the reliability and representativeness of the findings while allowing for more robust statistical analysis. Second, the study focuses only on Vietnam's banking sector; therefore, differences in culture, public trust, regulations, and digital infrastructure may limit the generalizability of the findings to other countries or industries. For future research, scholars might explore additional moderating or mediating variables—such as trust, perceived value, customer involvement, and cultural context—to examine how these factors influence the relationship between OPR and CB. Incorporating these constructs may further clarify the mechanisms by which OPR shapes consumer actions in diverse settings.

6. CONCLUSION

This study examined the effects of personalization, social media, and timeliness on OPR and CB using data from 337 customers of Vietnamese joint-stock commercial banks. The findings show that personalization and social media significantly enhance OPR, whereas timeliness does not significantly affect

OPR but directly influences CB. The mediation analysis confirms that OPR does not mediate the relationships between these antecedents and CB. Moreover, social influence neither directly affects CB nor moderates the OPR–CB relationship. These results indicate that OPR primarily serves as a digital communication and relationship-management mechanism rather than as a direct channel through which communication activities automatically translate into behavioral responses. The study suggests that banks should prioritize personalized content, interactive social media communication, information credibility, transparency, and security instead of relying mainly on communication speed or social conformity. The findings contribute to the OPR literature by clarifying its role and boundary conditions within a regulated and high-risk financial-services context. Nevertheless, the sample size and focus on the Vietnamese banking sector may limit the generalizability of the results. Future studies should employ larger and more diverse samples and examine additional mechanisms, including digital trust, perceived security, perceived value, and customer involvement.

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C : **C**onceptualization

M : **M**ethodology

So : **S**oftware

Va : **V**alidation

Fo : **F**ormal analysis

I : **I**nvestigation

R : **R**esources

D : **D**ata Curation

O : Writing - **O**riginal Draft

E : Writing - Review & **E**ditng

Vi : **V**isualization

Su : **S**upervision

P : **P**roject administration

Fu : **F**unding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

ETHICAL APPROVAL

The study complied with established ethical standards, obtaining informed consent from participants, maintaining their anonymity, and ensuring that participation was voluntary. No personally identifiable data were gathered, and institutional policies indicated that formal ethical approval was not necessary.

DATA AVAILABILITY

The data that support the findings of this study are available from the corresponding author upon reasonable request. The data were collected from customers of five Vietnamese joint-stock commercial banks. Due to confidentiality agreements and ethical considerations to protect respondents' privacy, the data are not publicly available.

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