

The influence of E-commerce experience on the relationship between online shopping attributes, customer satisfaction, and loyalty in Vietnam



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Abstract The COVID-19 pandemic has acted as a catalyst for the rapid expansion of e-commerce in Vietnam, mirroring global patterns and transforming the landscape of online consumer behavior. In response to this shift, businesses have increasingly adopted advanced and more personalized online shopping platforms to better cater to evolving customer expectations. This research explores how consumers perceive key factors such as information quality, privacy concerns, perceived security, product diversity, and delivery services—elements identified as critical to customer satisfaction. Among these variables, information quality and overall satisfaction were found to be particularly influential in fostering customer loyalty. The study analyzed data from nearly 300 valid survey responses using structural equation modeling (SEM). Findings reveal that customer satisfaction is significantly influenced by delivery performance, perceived security, the quality of information provided, and the range of products available. Furthermore, both satisfaction and information quality were strong predictors of customer loyalty. Notably, the relationship between delivery service and satisfaction was found to be moderated by consumers' level of experience with e-commerce, especially among those with over five years of online shopping history. The study concludes by offering managerial insights aimed at strengthening customer retention strategies within the e-commerce sector.

Keywords: consumer behavior, structural equation modeling, user experience, emerging markets

1. Introduction

The evolution of e-commerce has reshaped the global retail landscape, driven by rapid technological advancement and changing consumer behaviors. According to Bilgihan et al. (2016), e-commerce provides significant advantages in terms of access to product information, transaction convenience, and personalization, all of which contribute to enhanced customer experiences. The typical e-commerce process involves consumers evaluating product features, comparing prices and delivery options, selecting desired items, and completing purchases through online platforms (Ribadu & Rahman, 2019). These processes are increasingly supported by data-driven marketing strategies, allowing businesses to tailor their offerings to specific customer segments, reduce information asymmetry, and improve engagement.

Customer satisfaction in e-commerce environments has emerged as a central topic of scholarly investigation. Numerous studies have identified several key determinants of satisfaction, including information quality, perceived security, privacy assurance, and product variety (Rita et al., 2019; Vasic et al., 2019). Information quality, in particular, influences customers' trust and decision-making, serving as a foundation for satisfaction and long-term loyalty (Kim et al, 2008; Xu et al, 2013). Moreover, website attributes such as navigability, visual appeal, and system security significantly affect user perceptions and behavior (Sharma & Aggarwal, 2019). According to the Vietnam E-Commerce Association (VECOM, 2023), the e-commerce market in Vietnam is expected to reach a total revenue of \$20 billion by the end of 2023, representing a growth rate of approximately 25% from the previous year. This growth is attributed to the country's young and tech-savvy population, the expansion of internet access, and the increasing adoption of smartphones. Furthermore, the proliferation of digital payment methods has facilitated online transactions, making e-commerce more accessible to a broader demographic. While from another report by Google, Temasek, and Bain & Company (2024), the Vietnamese e-commerce market was projected to reach \$22 billion by 2024, positioning it as the third-largest e-commerce market in Southeast Asia. The market is anticipated to continue growing at a rate of 19% annually, with further expansion expected by 2030. This growth is in part driven by significant investments from both local and international companies, creating a highly competitive environment. Digital platforms such as Shopee, Lazada, TikTok Shop, and Tiki have seen significant revenue increases, contributing to the overall expansion of the sector (Metric, 2024).

The exponential growth of global e-retail reinforces the need to understand these factors. In 2017 alone, e-commerce sales reached \$2.3 trillion globally, a 24.8% increase from the previous year, and projections estimated this figure would climb



to \$4.9 trillion by 2021 (eMarketer, 2017; UNCTAD, 2019). The global e-commerce accounted for over 10% of total retail sales in 2017 and was expected to rise to 17.5% by 2021 (Protocol., 2019). In Southeast Asia, and particularly in Vietnam, e-commerce has shown remarkable potential. One key factor is the increasing internet penetration across the country, which has facilitated easier access to online platforms. According to reports, Vietnam has seen a rapid increase in internet users, with over 70% of the population having access to the internet by 2024 (Simon, 2024). The widespread use of mobile devices, particularly smartphones, has further accelerated this trend, enabling consumers to shop anytime and anywhere.

Despite these promising figures, achieving sustainable growth requires a deeper understanding of customer expectations and behaviors, especially within specific cultural and economic contexts. In Vietnam, increased internet penetration, smartphone usage, and the rise of digital payment systems have contributed to a vibrant e-commerce ecosystem. However, competition among e-retailers has heightened the need to focus on customer experience as a strategic differentiator. As suggested by Akil & Urgan (2022) and Abdella & Indradewa (2024), aspects such as delivery reliability, trust in data security, and the richness of product information play a crucial role in shaping customer perceptions and satisfaction.

Given these dynamics, this study aims to explore the factors influencing customer satisfaction in Vietnam's e-commerce environment, with a particular focus on the moderating role of consumers' online shopping experience. Understanding these relationships can provide practical insights for e-retailers looking to improve customer retention and competitiveness in the digital economy.

Consumer interaction with e-retail websites often involves browsing, evaluating product information, and comparing alternatives before forming a purchase intention or making a final decision (Teo & Yeong, 2003; Punj, 2012; Chen et al., 2022). While the primary motivation may be utilitarian—such as time efficiency or convenience—hedonic factors, including enjoyment, entertainment, and the thrill of discovering discounts or exclusive deals, also play an important role in shaping consumer engagement (Childers, 2001; O'Brien, 2010; Le et al., 2024). Moreover, price sensitivity significantly influences online purchasing behavior, as consumers frequently engage in cross-platform comparisons to obtain the most competitive pricing (Chu et al., 2008; Rahmani & Kordrostami, 2023).

In addition to seeking economic value and entertainment, online shoppers increasingly favor platforms that offer modern, diverse, and aesthetically appealing products (Shi & Hou, 2021; Nia & Shokouhyar, 2024). This trend has been confirmed in the Vietnamese context, where consumers show a strong preference for updated product assortments and responsive interfaces. As the market matures, Vietnamese customers are also becoming more sophisticated in their expectations around delivery logistics, transparency in communication, and overall service quality (OECD., 2021; Nguyễn & Trần, 2022).

Among the key antecedents to customer satisfaction in e-commerce is information quality, which encompasses accuracy, clarity, relevance, and completeness. Both Wang et al. (2009) and Hossain (2024) demonstrated that consumers who prioritize high-quality, trustworthy information are significantly more likely to engage in both digital and physical goods purchases, particularly when payment systems are secure and user-friendly. In the Vietnamese market, it seems the detailed product descriptions and clear return policies are among the most influential factors affecting consumer trust and conversion rates in online shopping environments.

Security and privacy concerns remain critical, especially as online transactions increasingly rely on electronic payment mechanisms. Saeed (2023) emphasized that consumers are highly attentive to the credibility and security infrastructure of e-retailers. This is echoed by Ho & Chen (2014) as well as Nguyen & Tran (2021), who identified perceived security as a major barrier to the growth of online shopping in Vietnam, particularly among older and risk-averse demographic segments. Effective design of web interfaces—including secure payment gateways and visible data protection assurances—can mitigate these concerns and foster higher purchase intentions.

The rise of e-commerce in Vietnam has been significantly influenced by the dominant role played by major digital platforms. Market leaders such as Shopee, Lazada, and Tiki have not only expanded their customer base but have also introduced innovative services, including live-stream shopping, interactive customer service, and optimized user experiences, which have further fueled the adoption of online shopping (Metric, 2024). Website/platform usability, transaction reliability, and delivery performance are further determinants of online shopping satisfaction (Saleem et al., 2022; Guo et al., 2023; Cuong, 2023). These findings are consistent with the results of a Vietnamese studies by Nguyen et al. (2021) and Do et al. (2023), which reported that delivery speed, product condition upon arrival, and adherence to promised timelines significantly affect both satisfaction and customer retention. Furthermore, research by Phan, Nguyen, and Pham (2021) demonstrated that service recovery efforts, including proactive communication in cases of delay or error, positively influence consumer trust and brand loyalty in Vietnam's leading e-retail platforms.

Taken together, these studies reinforce the strategic importance of building customer satisfaction through the optimization of key online shopping attributes. As suggested by Akil and Urgan (2022) and Klumpp and Jasper (2023), product variety and reliable delivery logistics are essential components of e-retail success. These elements not only enhance website satisfaction but also improve overall attitudes toward online shopping and strengthen customer loyalty (Vasic et al., 2019, Saleem et al., 2022; Guo et al., 2023)

This study is among the first to investigate both product variety and product delivery as central constructs in the Vietnamese e-commerce context. Specifically, it examines how online shopping experience moderates the relationship between core e-retail attributes (i.e., information quality, privacy concerns, perceived security, product variety, and delivery) and outcomes such as customer satisfaction and loyalty. The proposed conceptual model integrates these constructs to offer insights into Vietnamese consumer behavior and contributes to the growing literature on online retail in emerging markets. In doing so, it not only provides actionable guidance for managers but also highlights the evolving preferences of digitally savvy consumers in Vietnam.

In next part, the paper continues with a comprehensive review of the relevant literature, synthesizing prior research on the impact of key variables such as information quality, privacy concerns, perceived security, product variety, and delivery performance on customer satisfaction and loyalty. Based on these insights, the study’s hypotheses are systematically developed. The subsequent section outlines the research methodology, detailing the procedures used for data collection, measurement, and analysis. The findings are then presented and interpreted, followed by a discussion of their theoretical contributions and practical implications. The paper concludes by acknowledging its limitations and offering recommendations for future research directions within the context of e-commerce in emerging markets.

2. Materials and Methods

A quantitative, descriptive research study was conducted to investigate the impact of online shopping attributes on customer satisfaction and loyalty towards web stores in Vietnam, with e-commerce experience acting as a moderating factor. The study included male and female participants aged 16 years and older, all of whom had at least six months of experience with online shopping. The age threshold of 16 was selected based on the assumption that individuals at this age typically possess sufficient digital literacy and autonomy to engage in online purchasing activities. Moreover, in many jurisdictions, including Vietnam, individuals aged 16 and above are considered capable of making certain independent consumer decisions, especially in the digital environment where exposure to e-commerce platforms is increasingly common among adolescents.

As of 2024, approximately 57 million consumers in Vietnam are actively engaged in online shopping, positioning the country as one of the leading markets in Southeast Asia. Major e-commerce platforms like Shopee, Lazada, TikTok Shop, and Tiki have reported substantial growth, with a total transaction value of \$13.8 billion, reflecting a 40% increase from the previous year. Shopee and TikTok Shop dominate the market, with transaction values of \$9.3 billion and \$3.8 billion, respectively, accounting for 66.7% and 26.9% of the market share.

The key drivers of this growth include the convenience of online shopping and the effects of COVID-19 restrictions. Emerging trends such as livestream shopping and video-based shopping (shoppertainment) have gained significant popularity, attracting millions of viewers and driving large volumes of orders during major promotional events.

Ethical guidelines were meticulously followed, ensuring the confidentiality of participant data and securing informed consent. The collected data was analyzed using SPSS and SmartPLS software for descriptive statistical analysis. Nearly 300 completed questionnaires were returned, achieving a response rate of almost 95%, with the majority of respondents identifying as female (over 61%).

Figure 1 illustrates the proposed research model, which investigates the antecedents and consequences of customer satisfaction in the context of e-commerce.

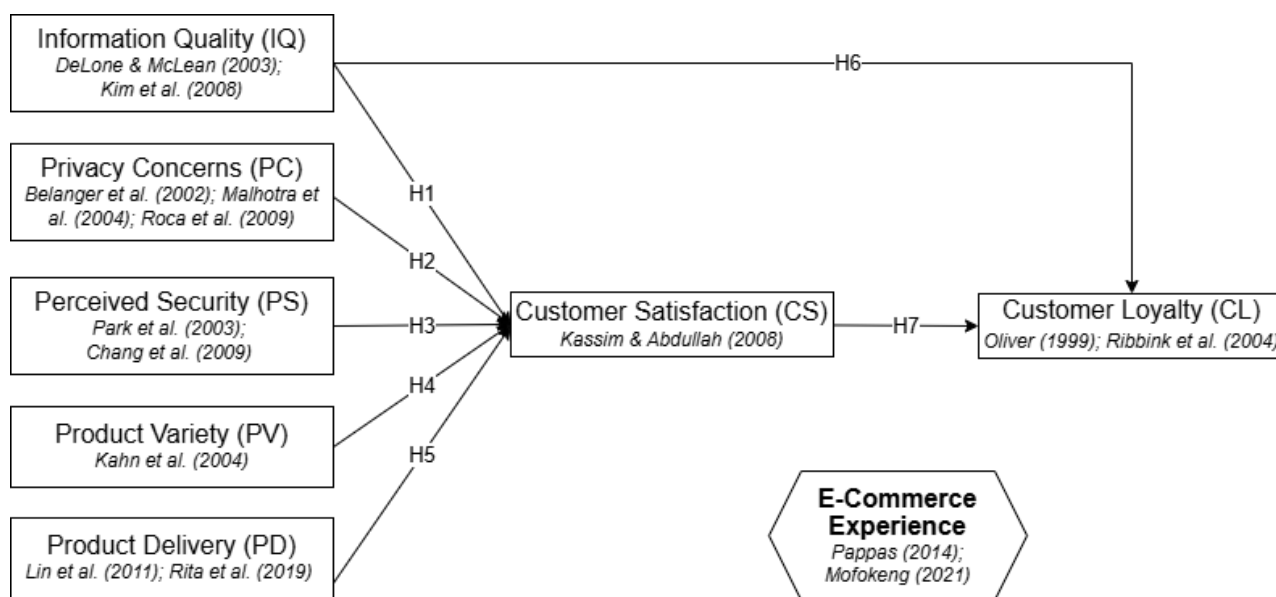


Figure 1 Conceptual framework - Research model and Hypotheses.



To empirically examine the proposed research model and hypotheses (H1–H7), Structural Equation Modeling (SEM) was employed. SEM is a comprehensive multivariate statistical technique that enables the simultaneous analysis of both the measurement model (relationships between latent constructs and their observed indicators) and the structural model (relationships among latent constructs). Given the complexity of the research framework—comprising multiple independent variables (e.g., Information Quality, Privacy Concerns), mediators (Customer Satisfaction), moderators (E-Commerce Experience), and the dependent variable (Customer Loyalty)—SEM is particularly suitable. It allows for testing direct, indirect, and moderating effects within a unified analytical framework, thus enhancing the robustness and explanatory power of the analysis. Furthermore, SEM is appropriate for theory testing and validation in consumer behavior research, as it accommodates latent variables measured through multiple indicators and accounts for measurement error. The analysis was conducted using SMART-PLS 3.0 and AMOS together, which is well-suited for exploratory studies and models with complex paths or formative constructs.

3. Results

3.1. Data preparation

The initial phase of the data analysis involved computing descriptive statistics—specifically the mean, median, and standard deviation—for all variables. To ensure data suitability for further analysis, the dataset was assessed for outliers and tested for multicollinearity among independent variables. The multicollinearity check revealed no significant concerns, as all variance inflation factor (VIF) values were below 0.5 and tolerance values were above 0.20, consistent with the thresholds recommended by Hair et al. (2012). Extremely low VIF values (below 0.10) could indicate a high level of redundancy among predictors; however, such issues were not observed in the dataset. Therefore, it was concluded that the predictor variables did not exhibit problematic intercorrelations that could distort the model estimation (Pallant, 2010).

3.2. Validity testing

To explore the dimensional structure of the constructs and assess construct validity, an Exploratory Factor Analysis (EFA) was conducted. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.892, indicating that the sample was highly suitable for factor analysis (Kaiser, 1970, 1974). Bartlett's Test of Sphericity yielded a statistically significant result (approx. $\chi^2 = 5792.80$, $df = 432$, $p < .000$), confirming that the correlation matrix was not an identity matrix and that factor analysis was appropriate (Bartlett, 1954). According to the criteria established by Tabachnick and Fidell (2007), KMO values above 0.6 are acceptable for factor analysis.

The EFA identified seven distinct components with eigenvalues greater than 1, each representing a key latent construct: Privacy Concerns (74.3%), Product Delivery (69.72%), Customer Satisfaction (66.10%), Customer Loyalty (60.4%), Perceived Security (53.23%), Product Variety (45.38%), and Information Quality (37.46%). Together, these seven factors explained 67.53% of the total variance. Principal component analysis with varimax rotation and Kaiser normalization was used to achieve factor separation. The solution converged after six iterations. Factor loadings ranged from 0.621 (PD1) to 0.879 (PS2), all exceeding the recommended threshold of 0.60, which supported the convergent validity of the measurement model (Bagozzi & Yi, 1988).

3.3. Reliability

Reliability was evaluated using Cronbach's alpha coefficients for each construct. All variables demonstrated high internal consistency, with the following alpha values: Customer Satisfaction ($\alpha = 0.921$, 4 items), Information Quality ($\alpha = 0.9028$, 6 items), Customer Loyalty ($\alpha = 0.895$, 4 items), Perceived Security ($\alpha = 0.890$, 4 items), Product Variety ($\alpha = 0.860$, 5 items), Product Delivery ($\alpha = 0.861$, 5 items), and Privacy Concerns ($\alpha = 0.8288$, 3 items). All coefficients surpassed the minimum recommended threshold of 0.70, indicating strong reliability (Malhotra, 2007). Composite reliability (CR) values were also computed to further validate the internal consistency of each construct, consistent with guidelines provided by Hair et al. (2012).

3.4. Measurement model assessment

The measurement model was evaluated using AMOS version 27 for Microsoft Windows, following the two-step procedure outlined by Kline (2016), which advocates for the assessment of the measurement model prior to testing the structural model. This sequential approach ensures the validity of the latent constructs and the robustness of their interrelationships within the theoretical framework. The SEM model is shown in Figure 2

Confirmatory Factor Analysis (CFA) was conducted to evaluate the adequacy of the seven latent constructs. Standardized factor loadings ranged from 0.641 (PD2) to 0.901 (CS2), with most indicators exceeding the recommended cut-off of 0.708, indicating acceptable item reliability (Hair et al., 2019). However, several indicators—[PV1 = 0.662], [PV2 = 0.637], [PV5 = 0.681], and [PD1 = 0.647]—fell below this threshold and were carefully reviewed. Based on standardized residual

covariances and model refinement criteria, items with low loadings or redundancy were removed, including [PD1], [PV1], [PV2], and select information quality items ([IQ1], [IQ3], [IQ5]).

Figure 2. Measurement model.

Note 3. Info = Information quality; Priv = Privacy; Se = Security; Var = Product variety; De = Delivery; Sa = Satisfaction; Lo = Loyalty

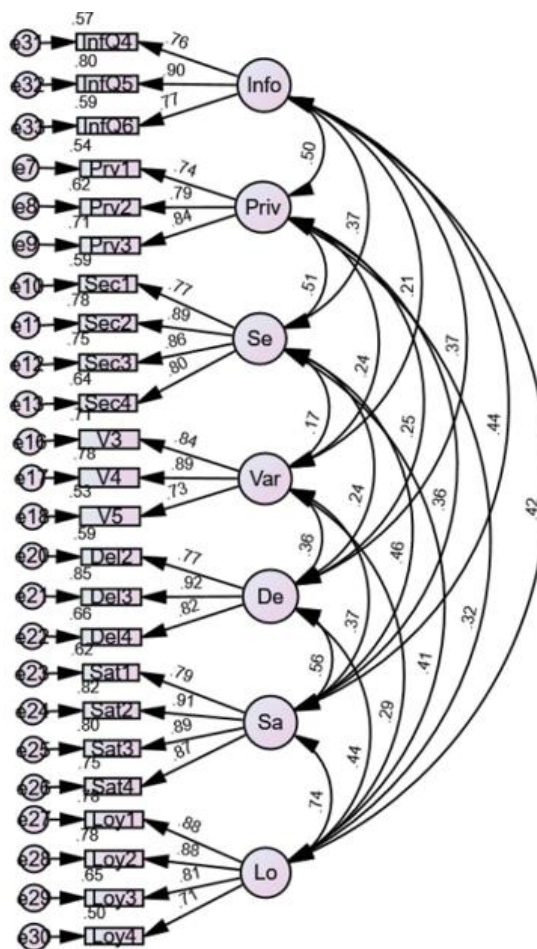


Figure 2 Measurement model of latent constructs in the e-commerce satisfaction framework.

Internal consistency was assessed using Cronbach’s alpha and composite reliability (CR). All CR values exceeded the recommended threshold of 0.70, indicating a high degree of internal consistency (Hair et al., 2012). According to Hair et al. (2019), CR values between 0.70 and 0.90 are considered good, while values above 0.95 suggest item redundancy. In this study, all constructs met the reliability criteria without exceeding the upper limit, thus avoiding issues of multicollinearity or redundancy.

Convergent validity was evaluated based on the Average Variance Extracted (AVE). An AVE value above 0.50 indicates that the latent construct explains more than half of the variance of its observed indicators (Fornell & Larcker, 1981). After the deletion of low-loading items, all constructs achieved AVE values above the 0.50 threshold, confirming satisfactory convergent validity. Additionally, factor loadings for retained indicators exceeded 0.70, reinforcing convergent validity at the item level.

Discriminant validity was assessed by comparing the square root of the AVE for each construct against its inter-construct correlations, following the Fornell-Larcker criterion. The square roots of AVE were consistently higher than the corresponding inter-factor correlations, confirming that each construct was empirically distinct (Hair et al., 2012).

Goodness-of-fit indices confirmed the adequacy of the measurement model. The chi-square minimum divided by degrees of freedom ($CMIN/DF = 342.118/229 = 1.494$) was below the commonly accepted cut-off of 3.00 (Hair et al., 2006). Other fit statistics further supported the model’s adequacy: CFI = 0.970, TLI = 0.962, IFI = 0.970, RFI = 0.898, NFI = 0.920, and RMSEA = 0.043, which is well within the recommended limit of 0.06 (Schreiber et al., 2006). These values demonstrate that the measurement model adequately captured the structure of the data.

The standardized correlations among constructs ranged from 0.172 (between Perceived Security and Product Variety) to 0.726 (between Customer Loyalty and Customer Satisfaction). Squared multiple correlations showed that CL4 had the lowest value at 0.487, while PD3 had the highest at 0.842. These results reflect adequate explanatory power and support the hypothesized relationships within the measurement model.

3.5. Structural model



The structural model was assessed using maximum likelihood estimation in AMOS 27 to evaluate the hypothesized relationships among the five exogenous and two endogenous constructs. Following the methodological recommendations of Kline (2016), the structural equation modeling (SEM) procedure was applied to examine the causal paths and overall model structure. The fit indices indicated a strong alignment between the data and the proposed model: CMIN/df = 350.958/235 = 1.493; CFI = 0.974; NFI = 0.925; IFI = 0.974; TFI = 0.904; TLI = 0.966; and RMSEA = 0.040. These values exceed commonly accepted thresholds (Hu & Bentler, 1999), confirming that the structural model exhibited a good overall fit, thereby supporting further evaluation of the hypothesized paths outlined in the conceptual framework (shown in Figure 1). The

The results of the structural equation modeling are summarized in Table 1. Six out of seven hypothesized paths were statistically significant. Information Quality had a positive effect on both Customer Satisfaction ($\beta = 0.161, p = 0.026$) and Customer Loyalty ($\beta = 0.113, p = 0.044$), supporting H1 and H2. Perceived Security ($\beta = 0.359, p < 0.001$), Product Variety ($\beta = 0.168, p = 0.010$), and Product Delivery ($\beta = 0.425, p = 0.005$) also showed significant positive effects on Customer Satisfaction, supporting H4–H6. Notably, Product Delivery had the strongest influence among all predictors. Customer Satisfaction strongly predicted Customer Loyalty ($\beta = 0.613, p = 0.001$), confirming H7. However, Privacy Concerns did not significantly affect Customer Satisfaction ($\beta = 0.015, p = 0.762$), and H3 was therefore not supported. These findings confirm the central role of Customer Satisfaction as a key mediator and highlight the importance of delivery performance and security perceptions in driving e-commerce loyalty.

Table 1 Structural equation modeling.

Path	From (Independent)	To (Dependent)	Path Coefficient (β)	t-value	p-value	Significance Level
H1	Information Quality (IQ)	Customer Satisfaction (CS)	0.161	2.568	0.026	*
H2	Information Quality (IQ)	Customer Loyalty (CL)	0.113	2.475	0.044	*
H3	Privacy Concerns (PC)	Customer Satisfaction (CS)	0.015	0.353	0.762	No Sig
H4	Perceived Security (PS)	Customer Satisfaction (CS)	0.359	3.997	0.0001	**
H5	Product Variety (PV)	Customer Satisfaction (CS)	0.168	2.817	0.010	**
H6	Product Delivery (PD)	Customer Satisfaction (CS)	0.425	5.741	0.005	***
H7	Customer Satisfaction (CS)	Customer Loyalty (CL)	0.613	9.732	0.001	***

Figure 3 illustrates the finalized structural model, including standardized path coefficients and squared multiple correlations (R^2) for the endogenous constructs. The model demonstrates a good overall fit and provides empirical support for the hypothesized relationships among the key constructs in the context of online shopping.

Figure 3. Structural model.

Note 4. Info = Information quality; Priv = Privacy; Se = Security; Var = Product variety; De = Delivery; Sa = Satisfaction; Lo = Loyalty. $p < .05^*$; $p < .01^{**}$; $p < .001^{***}$

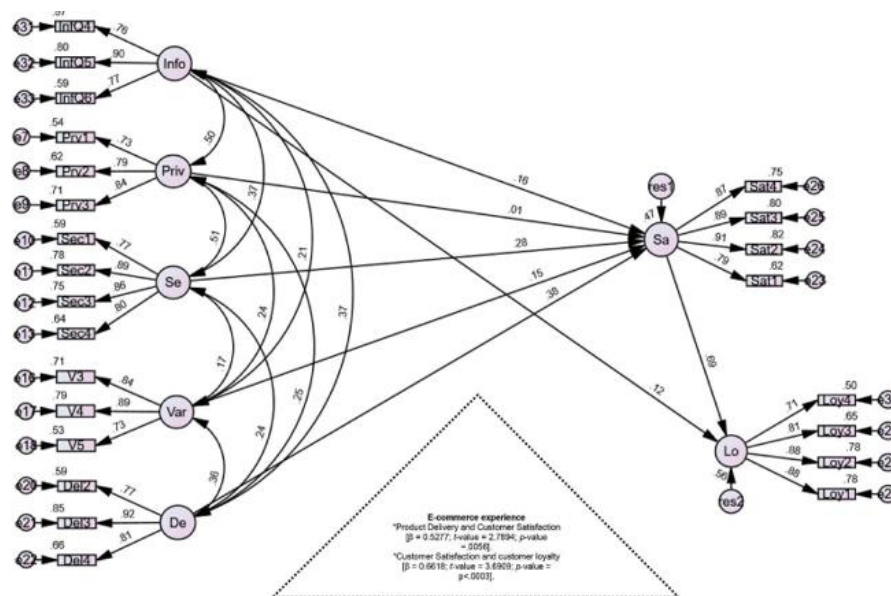


Figure 3 Structural equation model of e-commerce satisfaction and loyalty.



The squared multiple correlation (R^2) for Customer Satisfaction (Sa) was 0.47, indicating that 47% of the variance in satisfaction was explained by four exogenous variables: Information Quality (Info), Perceived Security (Se), Product Variety (Var), and Product Delivery (De). Among these, Product Delivery had the strongest direct effect on satisfaction ($\beta = 0.425$, $p < 0.001$), followed by Perceived Security ($\beta = 0.359$, $p < 0.01$), Product Variety ($\beta = 0.168$, $p < 0.01$), and Information Quality ($\beta = 0.161$, $p < 0.05$). Privacy Concerns (Priv) did not exhibit a statistically significant effect on satisfaction ($\beta = 0.015$, $p = 0.762$), suggesting that in this context, users may prioritize transactional and service-related attributes over data privacy concerns when evaluating their satisfaction with e-commerce platforms.

For Customer Loyalty (Lo), the model yielded an R^2 value of 0.56, implying that 56% of the variance in loyalty was explained by Customer Satisfaction (Sa) and Information Quality (Info). Notably, Customer Satisfaction had a strong and highly significant influence on loyalty ($\beta = 0.613$, $p < 0.001$), reinforcing its mediating role in the relationship between service attributes and behavioral outcomes. Information Quality also had a direct but weaker effect on loyalty ($\beta = 0.113$, $p < 0.05$), suggesting that accurate, relevant, and timely information can foster trust and repeat engagement, even beyond its impact on satisfaction.

The moderating effect of E-commerce Experience—depicted in the model as a dashed triangle—was tested specifically for the path between Product Delivery and Customer Satisfaction. The moderation result was statistically significant ($\beta = 0.257$, $p = 0.004$), indicating that users with more extensive e-commerce experience perceived delivery performance as more influential in shaping their satisfaction. This aligns with previous research suggesting that experienced users develop more refined expectations regarding delivery reliability, timelines, and service recovery.

In total, six out of the seven hypotheses (H1, H2, H4, H5, H6, and H7) were supported, lending empirical validation to the theoretical framework. The non-significant result for H3 (Privacy Concerns \rightarrow Customer Satisfaction) provides a valuable direction for future research, particularly in examining whether trust or perceived risk mediates this relationship.

4. Discussion

The findings offer valuable insights into consumer behavior in Vietnam's rapidly growing e-commerce sector, where digital platforms such as Shopee, Lazada, and Tiki have transformed retail dynamics. The structural model validated in this study highlights the critical factors influencing customer satisfaction and loyalty, with implications for both theory and managerial practice in the Vietnamese context.

Product delivery was identified as the most influential factor affecting customer satisfaction ($\beta = 0.425$, $p < 0.001$). This result aligns with the competitive landscape in Vietnam, where fast and reliable delivery—especially in urban centers such as Hanoi and Ho Chi Minh City—is a key differentiator among platforms. The significant moderating effect of e-commerce experience suggests that more experienced Vietnamese consumers, who often shop across multiple platforms, have higher expectations for delivery timeliness and accuracy. This finding reinforces the need for logistics integration and last-mile delivery optimization—a current focus of major Vietnamese e-retailers.

Perceived security also showed a strong positive effect on customer satisfaction ($\beta = 0.359$, $p < 0.01$). While digital payment adoption has accelerated in Vietnam due to the rise of mobile banking and e-wallets like MoMo or ZaloPay, concerns over transaction security and data protection remain. This finding suggests that ensuring robust cybersecurity protocols and transparent transaction policies is essential for maintaining consumer trust.

Product variety and information quality were also significant predictors of customer satisfaction and loyalty. With increasing product assortment and third-party sellers on Vietnamese platforms, users benefit from greater choice but also require high-quality, accurate product information. The significant paths (e.g., Info \rightarrow CS: $\beta = 0.161$, $p = 0.026$; Info \rightarrow CL: $\beta = 0.113$, $p = 0.044$) underscore the role of reliable product content—images, descriptions, specifications—in enhancing decision-making and brand credibility. This is particularly relevant for categories like electronics or fashion, where misleading or incomplete information remains a consumer pain point.

Interestingly, privacy concerns did not significantly influence customer satisfaction ($\beta = 0.015$, $p = 0.762$), reflecting a potential privacy paradox in the Vietnamese context. Despite rising awareness of data protection laws such as the 2023 Personal Data Protection Decree (Nghị định 13/2023/NĐ-CP), many users appear willing to exchange personal data for convenience and promotional benefits. This aligns with global research suggesting that, in emerging markets, transactional utility often outweighs perceived privacy risks (Taddicken, 2014).

Finally, the strong path from customer satisfaction to loyalty ($\beta = 0.613$, $p < 0.001$) confirms the central mediating role of satisfaction, consistent with previous loyalty models (Oliver, 1999). For Vietnamese e-commerce businesses, this highlights the need to move beyond price-based competition and focus on delivering consistent, high-quality service to build long-term customer retention.

In sum, the results validate a multi-dimensional service quality framework that is highly relevant to Vietnam's e-commerce environment. The emphasis on delivery, security, and information aligns well with current user expectations and market trends. These insights provide actionable guidance for platform managers aiming to improve satisfaction and drive loyalty in an increasingly saturated and demanding digital market.

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Ethical Considerations

This research adhered strictly to established ethical standards in social science research. Participants were fully informed about the objectives, procedures, and their rights prior to data collection. Informed consent was obtained in writing, ensuring that participation was entirely voluntary. All data were anonymized and stored securely to maintain confidentiality, and participants were assured that their responses would be used solely for academic purposes. The study posed minimal risk and was conducted with respect for the dignity, privacy, and autonomy of all respondents.

Conflict of Interest

The authors declare no conflicts of interest.

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