IMPACT OF E-COMMERCE FACTORS ON CUSTOMER SATISFACTION IN E-TOURISM: EVIDENCE FROM GENERATION Z IN VIETNAM

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ABSTRACT*:* This research investigates the impact of E-commerce factors on customer satisfaction among Generation Z in the context of E-tourism in Vietnam. A quantitative research design was employed, drawing on survey responses from 500 Gen Z participants with prior experience in E-tourism services. Data were processed using SPSS 27 and Amos 24, applying techniques such as Cronbach's Alpha, Exploratory Factor Analysis (EFA) and Confirm Factor Analysis (CFA), Structural Equation Modeling (SEM) to ensure measurement reliability, validity, and robust hypothesis testing. Based on a survey of Generation Z in Vietnam, the study identifies the E-commerce factors that significantly influence customer satisfaction in the context of online tourism services as follows: system usability, efficiency, security, personalization, trust and perceived usefulness. Among these, personalization exerts the strongest effect, followed by usability and efficiency, while security demonstrates a comparatively weaker influence. By focusing on Generation Z, an increasingly dominant consumer group, this study extends existing research that has predominantly addressed E-commerce in Vietnam. This study contributes to the growing body of literature on E-tourism in Vietnam by providing evidence from a specific consumer segment. The results offer practical insights for businesses and policymakers seeking to enhance service quality, meet the expectations of Generation Z, and competitiveness in the digital era.

KEYWORDS: E-commerce, E-tourism, Gen Z, Customer satisfaction, Vietnam

I. INTRODUCTION

E-commerce has become a dominant force in the global digital economy, started evolving from a simple information-sharing platform (i-commerce) and online transactions with electronic payments (t-commerce), to a sophisticated, integrated business ecosystem (c-business) powered by tools like ERP, CRM, and SCM (Laudon & Traver, 2021). This transformation is particularly evident in Vietnam, where the B2C retail E-commerce market reached an estimated USD 16.4 billion in 2022 and is projected to grow to USD 43 billion by 2025 (Department of E-commerce and Digital Economy, 2022; Google, Temasek & Bain & Company, 2019). Despite this rapid growth, online sales still account for only 7% of total retail turnover, highlighting significant untapped potential, especially in the E-tourism sector (Statista, 2023).

While tourism is a strategic economic pillar for Vietnam, the integration of E-commerce into tourism sector presents both opportunities and challenges, including the need to improve technological infrastructure, enhance data security, and optimize the user experience (Tran, 2021). As a digital extension of traditional tourism, E-tourism enables travelers to research, book, and purchase travel-related services online, minimizing reliance on traditional intermediaries and offering greater convenience and accessibility (Schwabe, G., 2002). For Kazandzhieva & Santana (2019), E-tourism operates as a cohesive ecosystem, linking various components such as e-airlines, e-hospitality, and e-travel agencies to enhance the efficiency and reach of tourism offerings, therefor the creation of an E-tourism system is a logical sequence of the digitalization of all processes in the value chain of the travel and tourism industry.

In fact, the rise of digital consumption has positioned Generation Z as a key demographic shaping online purchasing behavior. Expected to constitute 25% of the global workforce by 2025, this generation places a high value on personalization, sustainability, and responsive service (Nielsen, 2018). While prior studies have examined E-commerce in Vietnam, most remain fragmented and rarely focus on the unique behavior and satisfaction of Gen Z consumers within a specific regional E-tourism context. This creates a significant research gap in understanding how key E-commerce factors influence this crucial consumer segment. The findings of this study are expected to theoretically provide deeper insights into Gen Z's consumer behavior in the digital tourism landscape, serving as a foundation for future studies and practically offer specific and actionable recommendations for local tourism businesses and policymakers in Quang Ninh in particular and Vietnam in general to improve service quality and enhance customer experience.

By addressing this critical research gap, this study not only emphasizes the urgency of investing in digital infrastructure but also highlights the importance of tailoring business strategies to the unique preferences of the younger generation. Therefore, research model is proposed as in Figure 1:
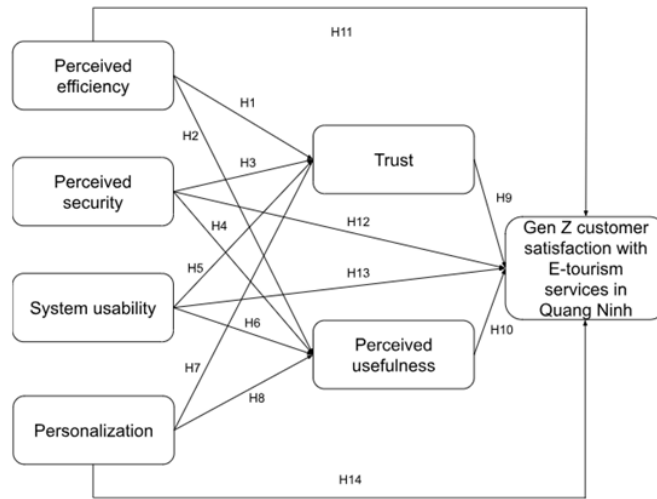

Figure 1. Proposed research model.

Theoretical Development and Hypotheses

Our research model is built upon established theoretical frameworks, including the EGOVSAT model (Abhichandani et al., 2006), E-SQ and E-S-Qual scales (Parasuraman et al., 2005; Zeithaml et al., 2005), and foundational theories on technology adoption like the Technology Acceptance Model (TAM) (Davis, 1989). These models provide a robust foundation for examining how specific E-commerce service quality dimensions influence consumer trust, perceived usefulness, and overall satisfaction. Based on a comprehensive review of the literature, we propose the following hypotheses.

Efficiency

Efficiency refers to the ease with which users can navigate and complete transactions on an E-commerce platform, minimizing effort, time, and cost (Abhichandani et al., 2006; Gefen, 2000). An efficient system enhances user experience, which is expected to positively influence their perceptions of the system's usefulness and trustworthiness. Prior studies suggest that higher efficiency not only improves the overall user experience but also strengthens perceptions of a system's trustworthiness and usefulness, both of which are critical antecedents of customer satisfaction. In the context of Generation Z, who value speed and convenience in digital interactions, system efficiency is expected to play a particularly salient role in shaping their satisfaction with E-tourism services. Based on this reasoning, the following hypotheses are proposed:

   H1: Greater efficiency in E-commerce systems increases the level of trust among Generation Z customers.
   H2: Higher efficiency in E-commerce platforms enhances Generation Z customers' perceptions of usefulness.
   H11: The efficiency of E-commerce systems contributes positively to the satisfaction of Generation Z customers with E-tourism services.

Security and Privacy

Security and privacy are widely recognized as critical determinants of consumer confidence in online environments. They play a central role in reducing perceived risks and strengthening user trust, while also enhancing perceptions of service value (Parasuraman et al., 2005; Gómez-Hurtado et al., 2024). In E-commerce, a secure platform that ensures data protection, safe transactions, and confidentiality does not only reinforce trust and perceived usefulness but also directly contributes to overall customer satisfaction (Christian & France, 2005). For Generation Z, who are digital natives but also highly conscious of privacy concerns, the assurance of security is a decisive factor in shaping their online experiences and loyalty in E-tourism services. So that the following hypotheses are proposed:

   H3: E-commerce security positively influences the trust of Generation Z customers.
   H4: E-commerce security positively influences the perceived usefulness for Generation Z customers.
   H12: E-commerce security positively influences the satisfaction of Generation Z customers with E-tourism services.

Usability

System usability, often measured through the E-S-Qual and E-RecS-Qual scales (Parasuraman et al., 2005), refers to the platform's ability to remain functional and accessible while effectively supporting users when issues arise. Prior studies highlight its importance in shaping user perceptions: Davis (1989) identifies usability as a key determinant of system acceptance, while Guo et al. (2017) demonstrate that system stability significantly enhances customer satisfaction. For Generation Z, who value speed, convenience, and seamless digital experiences, usability is expected to strengthen both trust and perceived usefulness, ultimately improving satisfaction with E-tourism services. Therefore, the authors propose hypotheses H5, H6, H13 as belows:

  H5: The usability of the E-commerce system positively influences the trust of Generation Z customers.

  H6: The usability of the E-commerce system positively influences the perceived usefulness for Generation Z customers.

  H13: The usability of the E-commerce system positively influences the satisfaction of Generation Z customers with E-tourism services.

Personalization

Personalization in E-commerce refers to the ability of digital platforms to tailor services, content, and recommendations to individual user preferences (Adomavicius & Tuzhilin, 2005). Personalization derived from the E-SQ scale (Zeithaml et al., 2005) reflects the system's capacity to respond to users' needs and expectations in real time. Prior research shows that personalization enhances the relevance of information, strengthens perceptions of usefulness (Liang et al., 2009), and shapes positive user attitudes. In addition, Jose and Carmen (2021) emphasize that personalization strongly influences both the initial impression and long-term loyalty of Generation Z. In the tourism sector, personalized services, such as customized travel suggestions or adaptive pricing strategies, significantly enhance customer experience and satisfaction (Li & Karahanna, 2015). For Generation Z, who expect instant, engaging, and tailored digital interactions, personalization is thus considered a critical determinant of trust, perceived usefulness, and satisfaction with E-tourism services. Based on this reasoning, the following hypotheses are proposed:

  H7: Personalization in E-commerce positively influences the trust of Generation Z customers.

  H8: Personalization in E-commerce positively influences the perceived usefulness for Generation Z customers.

  H14: Personalization in E-commerce positively influences the satisfaction of Generation Z customers with E-tourism services.

Trust

Trust is widely recognized as a cornerstone of online transactions, helping reduce uncertainty and perceived risk in digital environments (Gefen, 2000; Pavlou, 2003). Within the E-SQ scale, trust is emphasized as a crucial determinant in customers' decisions to use a service (Parasuraman et al., 2005). It reflects the extent to which consumers believe that online service providers are reliable, honest, and capable of safeguarding their interests. Prior studies have consistently shown that trust not only enhances perceptions of system usefulness (Gefen et al., 2003; Kim et al., 2009) but also contributes directly to customer satisfaction and purchasing decisions (Wang et al., 2018; Chen & Dhillon, 2003). For Generation Z, who are digitally savvy yet remain cautious about online risks, trust serves as a decisive factor in shaping satisfaction with E-tourism services and fostering long-term loyalty. Trust is a critical determinant of customer behavior in online environments. As emphasized in the E-SQ scale (Parasuraman et al., 2005), trust reduces perceptions of uncertainty and risk, thereby encouraging users to engage with digital platforms. Wang et al. (2018) and Chen & Dhillon (2003) argue that trust not only enhances customer satisfaction but also directly shapes purchasing decisions and loyalty. However, recent studies have reported inconsistent findings. For instance, Liu et al. (2023), in their investigation of festival participants under the influence of COVID-19, found that trust did not exert a direct effect on customer satisfaction. Similarly, Wayan Masri et al. (2020), examining the impact of information system quality and relationship quality on continuance intention in E-tourism in Taiwan, demonstrated that trust does not directly influence continuance intention but rather exerts an indirect effect through satisfaction. In the E-tourism context, Generation Z, who are both digital natives and risk-sensitive consumers, rely heavily on trust to determine whether E-commerce services are reliable and beneficial. While E-commerce factors such as efficiency, security, usability, and personalization may improve system performance, their ultimate effect on satisfaction depends largely on whether customers perceive the platform as trustworthy. In this way, trust serves as a bridge that links system attributes to customer satisfaction.

  H9: Trust has a positive impact on the satisfaction of Gen Z customers with E-tourism in Quang Ninh.

Perceived Usefulness

Perceived usefulness, rooted in the Technology Acceptance Model (Davis, 1989), refers to the extent to which customers believe that an E-commerce platform enhances their ability to complete tasks effectively and conveniently. Prior studies (Venkatesh & Davis, 2000; Hsu & Lin, 2008) highlight perceived usefulness as a major driver of technology adoption and service satisfaction. According to SERV-PERVAL (Petrick, 2002), perceived usefulness also captures the broader value customers derive from digital services in supporting their work and daily life. For Generation Z customers, usefulness is not

only about efficiency but also about personalization and seamless integration into their digital routines. When platforms are perceived as useful, they significantly elevate satisfaction and foster loyalty. Crucially, perceived usefulness acts as a mediator in the relationship between E-commerce system quality and customer satisfaction. While system features (e.g., usability or personalization) provide technical advantages, their impact on satisfaction becomes meaningful only when customers perceive tangible benefits. Thus, usefulness transforms system quality into customer-perceived value, which ultimately drives satisfaction. Therefore, the authors propose hypothesis H10:

H10: Perceived usefulness has a positive impact on the satisfaction of Gen Z customers with E-tourism in Quang Ninh.

II. METHODS

Sample and Procedure

This study adopted a primary data collection strategy using structured questionnaires, targeting respondents in Hanoi, Ho Chi Minh City, and Quang Ninh, three of Vietnam's most prominent urban centers. The survey instrument was developed from established measurement frameworks synthesized from prior research (Parasuraman et al., 2005; Abhichandani et al., 2006) and supplemented with additional items tailored to the specific context of E-tourism and Generation Z in Vietnam.

All variables were measured on a 5-point Likert scale, ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). To ensure clarity and reliability, a pilot phase included expert review and in-depth discussions with 20 Gen Z individuals actively engaged in online shopping and digital tourism. Further input from E-tourism practitioners in Quang Ninh province was used to confirm the content validity and contextual appropriateness of the scales

Revisions were made to enhance precision and alignment with the digital consumption patterns and urban infrastructure of Vietnamese cities. The finalized questionnaire was distributed through both online and in-person channels. Given time and accessibility constraints, the study employed convenience and non-probability sampling, enabling the collection of a diverse and contextually relevant dataset.

The final sample comprised 321 valid responses, with demographic characteristics summarized in Table 1. The majority of respondents belonged to Generation Z (born 1997–2012), with university students forming the largest share (49.5%), followed by working professionals (27.7%) and high school students (22.7%). This distribution is consistent with the tendency of students and employed individuals to have greater internet access, higher familiarity with digital commerce, stronger preferences for online shopping, and more frequent travel. Across these subgroups, Generation Z participants often play an active role in shaping consumption decisions for themselves and their families (Kotler, 2011).

Measures

This study aims to examine and analyze the relationship between E-commerce factors and the satisfaction of Generation Z customers in online tourism services in Quang Ninh. After data cleaning, the dataset was processed using SPSS 27 to conduct a series of statistical tests and evaluations. The analytical procedure included reliability testing with Cronbach's Alpha and Exploratory Factor Analysis (EFA). In addition, the dataset was further analyzed using Amos 24, employing advanced techniques such as Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) to explore in greater depth the relationships among the model's variables. This approach allowed for the identification and assessment of differences in the relationships between independent variables and Gen Z customer satisfaction. The findings revealed that Gen Z satisfaction with online tourism services is influenced by trust and perceived usefulness across four key dimensions of E-commerce: personalization, usability, efficiency, and security. These results provide empirical evidence to inform the development of digital strategies for tourism enterprises, aiming to strengthen customer engagement and enhance competitiveness in the evolving digital economy.

III. RESULTS

The final dataset comprised 321 valid responses, with the demographic characteristics presented in Table I. Analysis revealed that the majority of participants belonged to Generation Z (born between 1997 and 2012), with university students representing the largest segment (49.5%), followed by working professionals (27.7%) and high school students (22.7%). This sample composition is considered appropriate, as university students and employed individuals are generally more likely to have frequent internet access, possess familiarity with online commercial activities, prefer shopping through digital platforms, and exhibit a higher tendency to travel. Furthermore, university students, working professionals, and high school students within Generation Z collectively contribute to making consumption decisions for themselves and their families (Kotler, 2011).

Table 1. Survey respondent characteristics

	N	%		N	%
Gen Z cohort			***Problems with E-tourism***		
Students	73	22.7	Used	151	47
College students	159	49.5	Never	170	53
Workers	89	27.7			
Frequency of using E-tourism			***Price Comparison***		
Frequent	92	28.7	Always	165	51.4
Occasionally	125	38.9	Occasionally	121	37.7
Seldom	104	32.4	Seldom	27	8.4
			Never	8	2.5

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Table 2. Descriptive statistics of variables in the model

Variable	Mean	Standard deviation	Corrected Item - Total correlation	Cronbach's Alpha
HQ1	3.22	0.964	0.590	
HQ2	3.44	0.947	0.660	
HQ3	3.22	0.996	0.478	Efficiency (HQ): 0.794
HQ4	3.43	0.920	0.545	
HQ5	3.47	0.932	0.605	
BM1	3.21	0.946	0.476	
BM2	3.35	0.970	0.668	
BM3	3.30	0.958	0.652	Security (BM): 0.815
BM4	3.36	0.967	0.658	
BM5	3.38	0.965	0.570	
KD1	3.08	1.076	0.545	
KD2	3.17	0.986	0.574	
KD3	3.40	0.930	0.313	Usability (KD): 0.734
KD4	3.33	0.976	0.533	
KD5	3.29	0.982	0.520	
CN1	3.46	0.945	0.557	
CN2	3.43	0.946	0.570	
CN3	3.36	1.022	0.448	Personalization (CN): 0.739
CN4	3.49	0.884	0.537	
CN5	3.36	0.961	0.405	
NT1	3.50	0.909	0.576	
NT2	3.48	0.919	0.636	
NT3	3.43	0.982	0.483	Trust (NT): 0.786
NT4	3.50	0.891	0.637	
NT5	3.41	0.984	0.498	

Variable	Mean	Standard deviation	Corrected Item - Total correlation	Cronbach's Alpha
HI1	3.47	0.935	0.649	
HI2	3.48	0.915	0.682	Perceived
HI3	3.52	0.981	0.641	usefulness
HI4	3.50	0.949	0.586	(HI): 0.833
HI5	3.60	0.944	0.609	
HL1	3.33	0.976	0.387	
HL2	3.43	0.923	0.593	Satisfaction
HL3	3.46	0.952	0.636	(HL): 0.782
HL4	3.48	0.922	0.597	
HL5	3.61	0.908	0.589	
N=321				

Table II indicates that the sample size is relatively large, which enhances the accuracy of parameter estimation. Furthermore, the differences between the maximum and minimum values across most variables reflect sample diversity. The relatively high standard deviations suggest that E-commerce factors exert a considerable influence on Gen Z's satisfaction.

Reliability analysis using Cronbach's Alpha confirmed that all measurement scales achieved acceptable reliability, with coefficients ranging from 0.734 to 0.833, surpassing the conventional threshold of 0.7. Additionally, all items reported item-total correlations above 0.3. These findings affirm that the measurement scales are sufficiently robust for subsequent analyses in this study.

Table 3. Reliability analysis of measurement scale

Factor	Variable	Factor loading	Eigenvalue	Total Variance Extracted (%)	KMO
HQ	HQ2	0.694	2.306	57.658	0.736
	HQ3	0.746			
	HQ4	0.756			
	HQ5	0.627			
BM	BM1	0.656	2.885	57.691	0.827
	BM2	0.560			
	BM3	0.601			
	BM4	0.674			
	BM5	0.633			
KD	KD1	0.667	2.449	48.975	0.747
	KD2	0.743			
	KD3	0.594			
	KD4	0.588			
	KD5	0.605			
CN	CN1	0.719	1.032	49.546	0.737
	CN2	0.769			
	CN3	0.661			
	CN4	0.702			
	CN5	0.710			

NT	NT1 NT2 NT3 NT4 NT5	2.725	54.506	0.791
HI	HI1 HI2 HI3 HI4 HI5	3.008	60.152	0.826
HL	HL1 HL2 HL3 HL4 HL5	2.710	52.204	0.778

In the Exploratory Factor Analysis (EFA) of the independent variables, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy reached 0.928 (>0.5) with a significance level below 0.05, confirming the appropriateness of the dataset for factor analysis. Factor rotation was applied, and variables with factor loadings under 0.5 were removed. Consequently, 19 observed variables (excluding HQ1) were retained and classified into four factors. The analysis accounted for 56.307% of the total variance (>50%), with all extracted factors exhibiting Eigenvalues greater than 1.

For the variables measuring Gen Z customers' trust, perceived usefulness, and satisfaction, all KMO values exceeded 0.5 with significance levels of 0.001 (< .05), confirming the suitability of the data for EFA. The total variance explained for each construct was above 50%, and all Eigenvalues were greater than 1, thereby meeting the necessary criteria for further analyses.

Table 4. Correlation coefficients between variables in the regression model

	HL	HQ	BM	KD	CN	NT	HI
HL	1						
HQ	.654**	1					
BM	.616**	.676**	1				
KD	.554**	.610**	.562**	1			
CN	.609**	.624**	.654**	.601**	1		
NT	.634**	.619**	.692**	.608**	.626**	1	
HI	.624**	.679**	.621**	.418**	.623**	.664**	1

The general descriptive statistics and the correlation matrix of the factors after the EFA analysis indicate that the Usability group (KD) has the lowest mean value, while the Usefulness group (HI) has the highest mean value. The Usability (KD) and Security (BM) variables exhibit high standard deviation values, reflecting the heterogeneous evaluations among survey respondents. The correlation analysis results reveal that the relationship between the Efficiency (HQ) and Usefulness (HI) variables is the strongest, with a correlation coefficient of r = 0.679. In contrast, the relationship between Usability (KD) and Usefulness (HI) is the weakest, with a correlation coefficient of r = 0.418.

Table 5. Statistical results of confirmatory factor analysis (CFA)

Index	Estimated Value from the Model	Threshold Value According to Hair, William, Babin, and Anderson (2010)
CMIN/DF	2.091	≤ 3
CFI	0.908	≥ 0.9

GFI	0.925	≥ 0.9
RMSEA	0.051	≤ 0.06
PCLOSE	0.050	≥ 0.05

The CMIN/DF value of the model is 2.091 (≤ 3), which is below the recommended threshold of 3 suggested by Kline (2016). This indicates that the model demonstrates a satisfactory level of fit with the collected data and that its structure is not overly complex relative to the sample size. The GFI value of 0.925 exceeds the conventional cutoff of 0.9, suggesting that the relationships between observed and latent variables are appropriately specified. Similarly, the CFI value of 0.908 surpasses the 0.9 benchmark proposed by Hair et al. (2010), further supporting the adequacy of the model. The RMSEA value of 0.051, being lower than the 0.06 threshold, indicates that the factor structure extracted from the data aligns well with the theoretical model. Additionally, the PCLOSE value of 0.050 implies that the null hypothesis of RMSEA ≤ 0.05 cannot be rejected. Collectively, these indices confirm that the CFA model employed in this study provides a good fit to the empirical data. Therefore, the proposed research model can be considered appropriate.

Table 4. Research results based on the structural equation modeling (SEM) approach

Factor	Expected Sign	Standardized Coefficient	P-Value	Hypothesis Testing Result
CN - - ->NT	Positive	2.118	0.002	Accepted
BM - - -> NT	Positive	0.138	0.012	Accepted
KD - - -> NT	Positive	0.215	0.004	Accepted
HQ - - -> NT	Positive	-1.454	0.276	Rejected
BM - - -> HI	Positive	-0.260	0.001	Accepted
KD - - -> HI	Positive	-0.120	0.050	Accepted
HQ - - -> HI	Positive	-2.839	0.023	Accepted
CN - - -> HI	Positive	4.076	0.019	Accepted
NT - - -> HL	Positive	0.035	0.009	Accepted
HI - - -> HL	Positive	1.028	0.005	Accepted
CN - - -> HL	Positive	-0.657	0.000	Accepted
HQ - - -> HL	Positive	0.206	0.006	Accepted
BM - - -> HL	Positive	0.187	0.005	Accepted
KD - - -> HL	Positive	0.280	0.007	Accepted

The examination of the causal relationships between the independent and dependent variables reveals that "Efficiency," "Security," and "Usability" exert significant positive effects on "Gen Z customer satisfaction," whereas "Personalization" demonstrates a negative (inverse) effect on the dependent construct. Following the assessment of the reliability of the measurement scales, the research team conducted a Structural Equation Modeling (SEM) analysis to validate the proposed theoretical framework. The results confirm that the model demonstrates a satisfactory fit to the empirical data, as reflected in the fit indices: CMIN/DF = 2.091, GFI = 0.925, CFI = 0.908, RMSEA = 0.051, and PCLOSE = 0.050, all of which meet the recommended thresholds (Hair et al., 2010). These findings collectively indicate that the proposed research model is both

statistically robust and theoretically appropriate for explaining the determinants of Gen Z customer satisfaction in the context of E-tourism.

According to Ronald A. Fisher (1925) and based on Figure 2, a 95% confidence level (corresponding to a significant level of 5% = 0.05) is employed, whereby the p-value is compared against the threshold of 0.05. If $p < 0.05$, the regression coefficient is deemed statistically significant, indicating a meaningful causal relationship. Conversely, if $p > 0.05$, the regression coefficient is considered statistically insignificant, suggesting the absence of a meaningful causal relationship. In the results presented, the relationship between Efficiency (HQ) and Trust (NT) yields a *p*-value of 0.276 (> 0.05), indicating that this causal effect is not statistically significant. All other relationships, however, are statistically significant with $p \leq 0.05$. Based on the standardized regression coefficients, the relative influence of the independent variables on the dependent variable can be evaluated. For the dependent construct of Customer Satisfaction (HL), the order of influence among the independent variables is as follows: Personalization (CN) > Usability (KD) > Efficiency (HQ) > Security (BM). Specifically, "Personalization" exerts the strongest effect on "Gen Z customer satisfaction," with an absolute standardized regression coefficient of 0.657, followed by "Usability," "Efficiency," and "Security," with standardized coefficients of 0.280, 0.206, and 0.187, respectively.
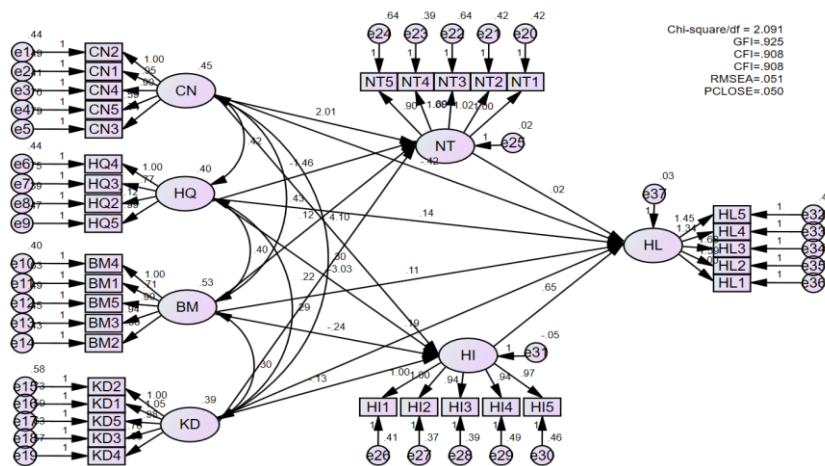

Figure 2. SEM model

IV. DISCUSSION AND CONCLUSION

Theoretical Implications

This study contributes to the body of knowledge on e-commerce and e-tourism in several key ways. First, by empirically validating the influence of established e-commerce factors on customer satisfaction in the specific context of Vietnam's e-tourism sector, our findings reaffirm and extend existing service quality models (e.g., E-S-Qual). The results confirm that traditional dimensions like system usability, efficiency, and security remain critical for customer satisfaction in the digital travel domain.

Second, our research offers a novel contribution by highlighting the paramount importance of personalization for Generation Z consumers. While previous studies have acknowledged its relevance, our structural equation modeling (SEM) results reveal that personalization has the strongest direct effect on customer satisfaction. This finding is particularly significant, as it suggests that for digital natives, a tailored, anticipatory service experience is not just a value-add but a central driver of satisfaction. This provides a crucial theoretical update to existing frameworks, emphasizing the shift in consumer expectations from functional service quality to highly personalized interactions.

Finally, the study enriches theoretical understanding by confirming the mediating roles of trust and perceived usefulness. Our results demonstrate that core e-commerce attributes are not just directly linked to satisfaction, but also indirectly influence it by first building consumer trust and fostering a perception of the platform's usefulness. This clarifies the causal pathway through which service quality translates into positive attitudinal outcomes within the complex digital tourism ecosystem. This multi-layered relationship provides a more nuanced theoretical model for future research on digital consumer behavior.

Practical Implications

The results provide important managerial implications for the online tourism industry in Vietnam, especially in major destinations such as Hanoi, Ho Chi Minh City, and Quang Ninh, ... By empirically identifying the factors that significantly influence customer satisfaction among Generation Z, this research provides a clear roadmap for strategic investment and

service improvement.

The results strongly suggest that personalization should be a top priority for e-tourism businesses aiming to capture and retain the Gen Z market. As the factor with the strongest effect on satisfaction, personalization is no longer a luxury but a core requirement. We recommend that businesses invest in technologies such as AI-driven recommendation engines, dynamic content delivery, and adaptive user interfaces that can tailor travel options and promotions based on individual user behavior and preferences. Simultaneously, system usability and efficiency must be prioritized. An intuitive, responsive, and seamless user experience, from initial search to final booking, is fundamental to reducing friction and enhancing perceived value. This involves optimizing website and app design, simplifying navigation, and ensuring fast load times.

While our findings show that security has a comparatively weaker direct influence on satisfaction, it remains a critical foundational element. In the digital realm, trust is a prerequisite for any transaction. Therefore, e-tourism providers must not neglect their security protocols. Maintaining robust data protection, implementing transparent privacy policies, and securing payment gateways are non-negotiable for building and sustaining consumer confidence. The indirect but essential role of security in fostering trust underscores its importance as a central factor. Its absence will cause significant dissatisfaction, even if its presence does not always create a strong positive effect.

In summary, to achieve long-term customer satisfaction and loyalty, tourism enterprises should adopt a balanced strategic approach. This involves a dual focus: first, on delivering a highly personalized and engaging experience that meets the high expectations of Gen Z consumers; and second, on ensuring a fundamentally reliable, efficient, and secure platform. By investing in both advanced personalization technologies and foundational service quality attributes, businesses can effectively compete in Vietnam's rapidly evolving e-tourism landscape and solidify their position with a key consumer demographic.

Limitations and Future Research Directions

Despite its contributions, this study has several limitations. First, the study's primary limitation lies in its sampling methodology. The data were collected from a non-random sample of Generation Z consumers primarily located in three major urban centers: Hanoi, Ho Chi Minh City, and Quang Ninh, thus limiting the generalizability of the findings to other regions and demographic groups. Second, the relatively modest sample size may not fully capture the diversity of online tourism customers nationwide. This approach does not account for the dynamic evolution of consumer satisfaction or how changing market conditions and technological advancements may alter the relationships between variables over time. To address these limitations, future research should expand the geographic scope and increase the representativeness of the sample. Furthermore, given the dynamic nature of consumer behavior and rapid advances in digital platforms, subsequent studies are encouraged to examine additional emerging factors such as mobile app integration, social media engagement, and AI-driven service innovations. Cross-cultural comparative studies may also offer valuable perspectives on generational differences in E-tourism adoption and satisfaction.

CONCLUSION

This research enriches the expanding literature on digital transformation within the tourism industry by presenting empirical insights into the influence of E-commerce factors on Generation Z's satisfaction with E-tourism services in Vietnam. It further offers practical implications for business managers regarding the positive role of E-commerce in enhancing E-tourism. Drawing on quantitative data from 321 valid survey responses across various Vietnamese provinces, the analysis confirms that all six examined factors (perceived usefulness, trust, personalization, efficiency, system usability, and security) exert a statistically significant impact on customer satisfaction. Among these, personalization was found to be the most decisive driver, highlighting the necessity of developing platforms that deliver genuine value and convenience to users. Usability and efficiency demonstrated moderate effects, reflecting the increasing demand for fast, responsive, and customized online experiences. Although security showed comparatively weaker effects, they remain fundamental as baseline requirements for digital platforms. Nevertheless, despite providing meaningful insights for E-tourism enterprises and policymakers, the study's scope is constrained by its limited sample size and its focus on micro-level user perceptions. Future studies could enhance external validity by incorporating larger and more representative samples and by examining macro-level determinants such as infrastructure readiness, institutional frameworks, and regional development policies.

Recommendations

The SEM results provide several actionable recommendations for advancing e-tourism and reinforcing customer satisfaction in e-tourism. *First*, personalization should be prioritized through intelligent recommendation systems and virtual assistants, as these significantly strengthen trust and perceived usefulness, consistent with successful practices of global platforms. *Second*, usability requires continuous improvement by ensuring intuitive interface design, minimizing technical errors, and maintaining stable operations to deliver seamless experiences. *Third*, efficiency should be enhanced by optimizing transaction

speed and simplifying processes, thereby meeting Gen Z's demand for fast and responsive services. *Fourth*, robust security systems—including encryption, multi-layer authentication, and transparent privacy policies—are crucial to maintain user trust and align with international standards. *Fifth*, enriching customer experience through updated destination content, immersive media, and responsive support services can foster loyalty and long-term engagement. *Lastly*, supportive policy frameworks on data privacy, digital infrastructure, and technology transfer will provide an enabling environment for innovation and sustainable growth in global e-tourism markets.

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