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E-COMMERCE PAYMENT SECURITY AND CUSTOMER SATISFACTION IN HIGH-TECH FIRMS IN SOUTHWEST NIGERIA

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ABSTRACT
The growing reliance on digital transactions has increased the importance of secure e-commerce payment systems in enhancing customer experiences. This study examined the effect of e-commerce payment security on customer satisfaction in high-tech firms in Southwest Nigeria, drawing on the Unified Theory of Acceptance and Use of Technology. A quantitative cross-sectional survey design was adopted, and primary data were collected through structured questionnaires from users of e-commerce payment platforms across the six states in Southwest Nigeria. The data were analysed using descriptive statistics, correlation, and regression analysis. The findings revealed that e-commerce payment security has a significant positive effect on customer satisfaction, indicating that effective security mechanisms such as encryption, multi-factor authentication, and fraud detection improve users' trust and confidence in digital transactions. The study concludes that secure payment platforms play a critical role in enhancing customer satisfaction in high-tech firms. It is therefore recommended that high-tech firms prioritise the implementation of robust security protocols to safeguard digital transactions and strengthen customer satisfaction.

Keywords: E-Commerce Payment Platforms; Security; Customer Satisfaction; High-tech Firms

Introduction

The rapid growth of electronic commerce has transformed how businesses conduct transactions and interact with customers. Digital payment technologies enable faster transactions, reduce operational inefficiencies, and expand market reach beyond physical boundaries. The integration of online payment systems has significantly improved service delivery and customer experience by providing convenient and seamless transaction options (Laudon & Traver, 2021; Turban et al., 2020). As e-commerce adoption continues to expand, the reliability and security of payment platforms have become essential for sustaining digital business operations.

Security plays a crucial role in the effectiveness of e-commerce payment platforms and users' willingness to engage in online transactions. Digital payments often involve sensitive financial and personal information, making security a major concern for customers. Risks such as data breaches, identity theft, and unauthorized access can undermine confidence in online payment systems. To address these risks, secure payment platforms incorporate mechanisms such as encryption, authentication protocols, and fraud detection systems to protect user data and enhance transaction reliability (Kim et al., 2008; Oliveira et al., 2016).

Globally, cybersecurity threats such as phishing, malware, and online payment fraud continue to challenge the growth of digital commerce and undermine user trust (Kshetri, 2018). These risks are particularly significant in developing economies where digital adoption often progresses faster than cybersecurity infrastructure. As a result, payment platform security has become a critical factor in maintaining customer trust and ensuring positive digital transaction experiences.

In Africa, the expansion of mobile technology and fintech innovation has accelerated the adoption of digital payment systems. Nigeria has experienced rapid growth in electronic payments and digital wallets as part of its transition toward a cashless economy (Central Bank of Nigeria, 2023). Despite this progress, security concerns remain a major challenge. Reports of online fraud, unauthorized deductions, and transaction failures continue to affect users' confidence in digital payment platforms (Ayo et al., 2011; Hossain et al., 2024; Suteu et al., 2025).

Although existing studies have examined various aspects of e-commerce, many have focused on adoption, usability, or operational performance. Limited attention has been given to how the security of e-commerce payment platforms specifically influences customer satisfaction within high-tech firms (Akwukwuma et al., 2024; Kareet et al., 2022). Some studies have highlighted the importance of payment security for customer outcomes. For instance, Mishra et al. (2025) found that improved payment security enhances consumer trust and loyalty, while Ardiansah et al. (2023) reported that electronic payment security positively influences perceptions of transaction reliability. In Nigeria, Fijabi et al. (2024) showed that secure payment systems contribute to higher customer satisfaction in financial services, and Akisanmi et al. (2025) emphasized the importance of payment security in shaping consumer trust in e-commerce businesses.

However, despite the increasing use of digital payment platforms in Nigeria, concerns about payment security remain widespread, and empirical evidence on how payment platform security affects customer satisfaction within high-tech firms remains limited. This gap is particularly important in Southwest Nigeria, where many high-tech firms rely heavily on digital payment platforms for business operations. Therefore, this study examines the effect of e-commerce payment security on customer satisfaction in high-tech firms in Southwest Nigeria.

In order to achieve the aim and objectives of the study, the following research question is raised:

i. What is the relationship between the security of e-commerce payment platforms and customer satisfaction in high-tech firms in Southwest Nigeria?
ii. To what extent does the security of e-commerce payment platforms influence customer satisfaction in high-tech firms in Southwest Nigeria?
iii. How do security mechanisms of e-commerce payment platforms affect users' confidence and satisfaction in digital transactions within high-tech firms in Southwest Nigeria?

Hypothesis

H_0: Security of e-commerce payment platforms has no significant effect on customer satisfaction in high-tech firms in Southwest Nigeria.

Literature Review

This literature review is organized into three sections: Conceptual, Theoretical and Empirical review.

E-Commerce Payment Platforms

E-commerce payment platforms are digital systems that facilitate online financial transactions, forming a central part of modern e-commerce operations (Laudon & Traver, 2021). They enable both B2C and B2B transactions through credit and debit cards, bank transfers, mobile wallets, and emerging digital currencies (Fatonah et al., 2018; Kasowaki & Faris, 2024). Beyond transaction processing, these platforms enhance operational efficiency, convenience, and market reach, particularly in regions with increasing digital adoption, such as Southwest Nigeria.

High-tech firms rely on payment platforms as critical touchpoints for customer experience. Platforms that are reliable, intuitive, and well-integrated with business operations can directly enhance customer satisfaction and loyalty (Igudia, 2017; Masihuddin et al., 2017). Mobile payment solutions, especially, have expanded financial inclusion by allowing previously unbanked populations to participate in digital commerce (Mathur, 2017).

Thus, examining e-commerce payment platforms in high-tech firms requires not only understanding their functionality but also how their design, efficiency, and security features influence customer satisfaction in a specific regional context.

Security of E-Commerce Payment Platforms

Security is fundamental to e-commerce payment systems, encompassing encryption, authentication, fraud detection, and secure communication protocols (Sarthak, 2023; Curtis et al., 2018). Strong security builds customer trust, which is critical for transaction completion and satisfaction (Panditharathna et al., 2024). Conversely, security breaches reduce trust and discourage transactions (Curtis et al., 2018).

Specific protocols like Secure Electronic Transaction (SET) and Visa's 3-D Secure illustrate the technical mechanisms employed to protect customer data and validate transactions (Bigley & Roberts, 2021; Huang et al., 2022; Masihuddin et al., 2017). While SET faced adoption challenges due to costs and complexity, modern platforms adopt similar principles through encryption, multi-factor authentication, and fraud monitoring (Anam et al., 2020; Rishabh, 2023).

Evidence shows that security directly impacts satisfaction. Mishra et al. (2025) found that enhanced payment security increases consumer trust and loyalty, while Ardiansah et al. (2023) reported that secure payments improve perceptions of reliability. In Nigeria, Fijabi et al. (2024) and Akisanmi et al. (2025) demonstrate that security-focused payment platforms are associated with higher customer satisfaction, especially in digital commerce contexts. Security threats such as hacking, phishing, and malware further mediate the effectiveness of these platforms. Even slight delays caused by robust encryption are acceptable to customers who prioritise safety over speed, highlighting the critical role of security in driving satisfaction.

Uses and Operational Impact of E-Commerce Payment Platforms

Beyond security, payment platforms enhance operational efficiency, reduce errors, and provide insights into customer behaviour and sales trends (Go et al., 2025). Types of platforms—including hosted, integrated, API-based, and mobile gateways—offer varying degrees of customisation, user experience, and security (Zhou et al., 2022; Saad, 2024). Popular platforms such as PayPal, Paystack, Flutterwave, and Stripe exemplify how secure, efficient payment processing supports customer satisfaction and business growth in high-tech firms (Flutterwave, 2021; Saad, 2024). These operational benefits are particularly relevant in high-tech firms where digital transactions form the core business model. By combining usability, reliability, and robust security, firms can maintain customer confidence, encourage repeat transactions, and strengthen loyalty.

High-Tech Firms

High-tech firms operate in technology-intensive industries characterised by continuous innovation, advanced R&D, and adoption of emerging technologies such as AI, blockchain, and IoT (Brynjolfsson & McAfee, 2014; Davenport et al., 2022). They drive digital transformation and innovation, enhancing both operations and customer experiences.

Globally, companies such as Apple, Microsoft, Alphabet, and Samsung dominate e-commerce and IT innovation, while in Nigeria, firms like Interswitch, Paystack, Flutterwave, Jumia, Andela, 9Mobile, and MTN Nigeria provide secure digital payment solutions, improve connectivity, and facilitate talent development (Fola, 2023; Nwachukwu, 2022; Akinpelu, 2021).

High-tech firms' reliance on digital payment platforms makes security a strategic factor for customer satisfaction. Security lapses can disrupt transactions, reduce trust, and negatively impact loyalty, highlighting the importance of studying this relationship in Southwest Nigeria.

Customer Satisfaction

Customer satisfaction reflects the degree to which services meet or exceed expectations, influencing loyalty, repeat purchases, and brand advocacy (Mittal et al., 2023; Yalçınkaya & Çataldaş, 2025). In e-commerce, satisfaction depends on platform reliability, secure transactions, usability, and service responsiveness (Ihenyen et al., 2023; Beninger et al., 2021).

High-tech firms that prioritise secure, intuitive, and efficient payment platforms foster confidence, reduce transaction friction, and enhance loyalty (Akande et al., 2022; Afolabi & Akinyemi, 2023). Scalable and adaptable platforms further support satisfaction by managing high transaction volumes and adapting to evolving consumer demands (Li & Wang, 2021; Nguyen & Zhang, 2022). Research consistently links secure and reliable payment experiences to higher satisfaction and positive behavioral outcomes, reinforcing the direct relevance of security to customer satisfaction in high-tech firms (Ilieva et al., 2022; Williams & Naumann, 2011; Yum, 2024; Rita et al., 2019).

Theoretical Foundations

This study is anchored on the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), which explains how system characteristics influence user behaviour and outcomes. UTAUT identifies four key constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions that drive technology adoption and continued use.

In this study, security of e-commerce payment platforms is viewed as a critical system attribute that enhances performance expectancy by increasing users' perception of transaction safety, reliability, and usefulness. Strong security features, such as encryption, authentication, and fraud prevention build trust and confidence, which are essential for customer satisfaction.

Facilitating conditions, including technical infrastructure and seamless integration, further ensure secure and smooth transactions. Thus, UTAUT provides a clear theoretical lens to examine how platform security affects customer satisfaction in high-tech firms in Southwest Nigeria.

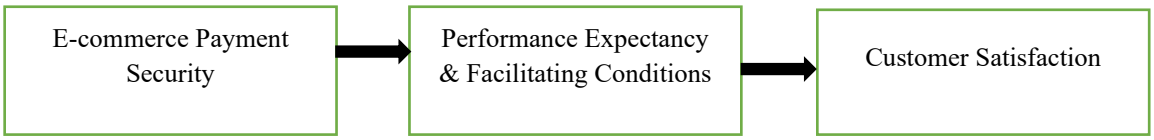

Figure 1: Conceptual Framework

Empirical Review

Several empirical studies have examined the role of security in shaping customer trust and satisfaction on e-commerce platforms, but their focus, context, and methodology differ, creating gaps that this study addresses. Aljaradat and Al Jaradat (2024) investigated the influence of cybersecurity protocols on digital payment adoption in emerging markets, surveying 350 firms. Their analysis using multiple regression revealed that stronger security measures significantly increased adoption and reduced transaction fraud, demonstrating that robust security directly enhances user trust and reliability. While this study provides evidence of the importance of security, it focused on adoption rather than customer satisfaction, and it did not consider high-tech firms or the Nigerian context. Therefore, its findings only partially inform the present study, which examines how e-commerce payment security directly affects satisfaction in technology-driven enterprises.

Widyanto et al. (2022) examined mobile payment adoption in Indonesia by extending the Unified Theory of Acceptance and Use of Technology (UTAUT) to incorporate perceived security, perceived risk, and trust. Surveying 358 everyday users, they found that perceived security indirectly influenced adoption via trust, whereas perceived risk had no direct effect. Although the study highlights the mediating role of trust, it does not focus on e-commerce users in high-tech firms, nor does it measure customer satisfaction outcomes. This makes it less directly applicable to the Nigerian high-tech context, underscoring the need for research that explicitly links security to satisfaction among e-commerce users.

Fijabi et al. (2024) explored the impact of e-payment system quality on customer satisfaction in Nigerian banking services, surveying 400 customers. Their results showed that secure and reliable payment platforms significantly enhance users' confidence and satisfaction, establishing a direct relationship between payment security and customer satisfaction. While the study confirms that security improves satisfaction in Nigeria, it is limited to financial services and does not consider high-tech e-commerce firms, highlighting a gap that the present research addresses.

Ayo et al. (2018) focused specifically on Nigerian high-tech firms, surveying 300 firms using a combination of questionnaires and interviews to assess how e-commerce platform security influences customer trust and firm performance. They found that robust security measures reduced hacking incidents and increased trust by 45%. However, the study did not measure customer satisfaction directly, nor did it examine real-time operational security mechanisms. This gap justifies the need for the present study, which directly links e-commerce payment security to customer satisfaction in high-tech firms in Southwest Nigeria.

Curtis et al. (2018) examined consumer security behaviours and trust following hypothetical data breaches using a mixed-methods experimental design with 200 participants. They found that exposure to security threats reduced trust but had minimal effect on security behaviors, reflecting a "privacy paradox." Although the study provides insight into perceived security and behavioural responses, it relied on hypothetical scenarios rather than actual e-commerce transactions, and it did not focus on high-tech firms or Nigeria. Therefore, its applicability to the current study is limited, further emphasizing the need for empirical research in a real-world Nigerian high-tech e-commerce context.

Methodology

This study employed a quantitative research design to examine the relationship between e-commerce payment security and customer satisfaction in high-tech firms in Southwest Nigeria. The population comprised customers actively using e-commerce payment platforms across Lagos, Oyo, Ogun, Osun, Ondo, and Ekiti States. According to the National Bureau of Statistics (NBS, 2024, Q1), there were approximately 45,734,074 active internet users in these states. Recognizing that not all internet users engage in e-commerce, the study focused on a subset of active e-commerce platform users, defined as customers who have made online payments through high-tech firms' platforms at least once within the past six months. A sample size of 2,400 respondents was determined using Taro Yamane's formula. To ensure representativeness, a stratified random sampling technique was applied, with strata formed based on state, so that respondents from each state were proportionally included. This method reduces sampling bias and ensures that regional variations in e-commerce adoption are captured. Of the 2,400 questionnaires distributed, 2,208 were returned and found usable, representing a response rate of 92%.

Data were collected using a structured Likert-scale questionnaire administered online via Google Forms. Google Forms was chosen because it allows for efficient distribution, secure online administration, and automatic compilation of responses, making it particularly suitable for reaching e-commerce users across multiple states. The questionnaire was validated through expert review and a pilot test to ensure content validity and reliability. All measurement scales exceeded the recommended Cronbach's alpha threshold of 0.70, indicating acceptable internal consistency. The unit of analysis was the individual customer. Descriptive statistics were used to summarize demographic characteristics and key variables, while inferential statistics included Pearson correlation and linear regression analyses to test hypotheses at a 0.05 significance level. Variance Inflation Factor (VIF) values ranged from 2.841 to 6.263, indicating moderate collinearity among some variables but not severe enough to bias the regression results.

Results

This section presents the results and analysis of quantitative data.

Descriptive Statistics

This subsection presents a brief profile of the 2,208 e-commerce users surveyed in the South-Western States of Nigeria. It explained the general characteristics of the respondents.

Table 1: *Distribution of Demographics of the respondents*

Variables (n=2208)	Categories	Frequency	Percentage (%)
Locations	Ekiti	381	17.3
	Lagos	442	20
	Ogun	362	16.4
	Ondo	313	14.2
	Osun	336	15.2
	Oyo	374	16.9
	Total	**2,208**	**100**
Age	18 – 29	248	11.2
	30 – 40	1520	68.8
	41 – 60	416	18.8
	61 and Over	24	1.2
	Total	**2,208**	**100**
Occupation Status	Government	1317	59.6
	Private	291	13.2
	Self-Employed	496	22.5
	Unemployed	104	4.7
	Total	**2,208**	**100**
Gender	Female	842	38.1
	Male	1366	61.9
	Total	**2,208**	**100**
Income level	10,001 -50,000	90	4.1
	100,001 - 150,000	652	29.5
	150,001 - 200,000	806	36.5
	200,001 - 250,000	350	15.9
	250,001 - 300,000	130	5.9
	50,001 - 100,000	172	7.8
	Less than 10,000	8	0.3
	Total	**2,208**	**100**

Source: Researcher's Computation (2025).

The socio-demographic and economic characteristics of the 2,208 respondents across the six Southwestern states were summarized narratively. Lagos State recorded the highest number of respondents (442), followed by Ekiti State (381) and Oyo State (374), while Ogun State, Osun State, and Ondo State accounted for 362, 336, and 313 respondents, respectively. The mean age was 36 years, with most respondents aged 30–40, about one-fifth aged 41–60, slightly over one-tenth aged 18–29, and few above 60. More than half were government employees (1,316), followed by the self-employed (497), private-sector employees (292), and the unemployed (103). The sample showed a male-to-female ratio of approximately 3:2. Median monthly income

clustered within ₦150,001–₦200,000, with few respondents earning below ₦50,000 or above ₦250,000. Overall, the respondents were predominantly middle-aged, government-employed males with moderate incomes, reflecting a profile consistent with active e-commerce users in Southwest Nigeria.

Test of Hypotheses:

The security of e-commerce payment platforms has no significant effect on customer satisfaction in high-tech firms in Southwest Nigeria.

Table 2: *Coefficients for Security (SEC)*

Model	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
(Constant)	1.864	.112		16.671	.000
SEC	.783	.012	.807	64.225	.000

a. Dependent Variable: CS

The coefficient results indicate that **security has a positive and statistically significant effect on customer satisfaction** ($\beta = 0.807$, $t = 64.225$, $p < 0.001$). Accordingly, the null hypothesis was rejected. The finding demonstrates that **security significantly influences customer satisfaction**, highlighting the role of secure systems in fostering user trust and confidence, which contributes to improved customer retention.

Discussion

The findings indicate that e-commerce payment security has a significant positive effect on customer satisfaction ($\beta = 0.807$, $t = 64.225$, $p < 0.001$). This suggests that when high-tech firms implement robust security measures, users feel confident transacting online, which fosters trust, encourages repeat usage, and enhances overall satisfaction. The result aligns with Kim et al. (2008), who found that perceived security positively influences online consumer trust, and with Oliveira et al. (2016), who demonstrated that secure digital payment systems reduce perceived risk and increase user engagement.

The strong effect of security in this study may be explained by the sensitive nature of financial transactions. Customers are increasingly aware of cyber threats, such as fraud, identity theft, and unauthorized access, particularly in emerging economies like Nigeria (Ayo et al., 2011). Consequently, platforms that clearly demonstrate security measures, including encryption, multi-factor authentication, and real-time fraud detection, alleviate these concerns, making users more willing to complete transactions.

Compared with previous studies, the magnitude of the effect in this research is higher than reported by Fijabi et al. (2024), who found that secure payment systems moderately improved customer satisfaction in Nigerian financial services. This difference may be due to the focus on high-tech firms' platforms, which typically integrate advanced security protocols and visible trust signals that are immediately recognized by users. Similarly, the findings support Mishra et al. (2025), who reported that visible security mechanisms, such as Secure Electronic Transaction (SET) and 3-D Secure, enhance consumer trust and loyalty in e-commerce contexts. Unlike studies that focus only on adoption behaviour, this study explicitly links security measures to satisfaction outcomes, providing a more nuanced understanding of user experience.

From a theoretical perspective, these results support the Unified Theory of Acceptance and Use of Technology (UTAUT). Security functions as a facilitating condition that enhances users' perception of platform reliability and reduces perceived risk, thereby strengthening behavioural intentions and satisfaction (Venkatesh et al., 2003). The study extends UTAUT by highlighting that security is not just a driver of adoption but also a critical determinant of user satisfaction in high-tech e-commerce settings.

Practically, the findings indicate that high-tech firms must prioritize security in platform design, not only as a technical requirement but as a strategic tool to build trust and retain customers. Firms that fail to implement visible and reliable security measures risk reducing customer confidence, which can undermine the effectiveness of other platform features, such as ease of checkout or integration with other services.

Conclusion

This study examined the effect of e-commerce payment security on customer satisfaction in high-tech firms in Southwest Nigeria. Findings show that robust security measures, including encryption, multi-factor authentication, and fraud detection, enhance trust, confidence, and loyalty, which are key drivers of customer satisfaction. By prioritizing secure payment systems, high-tech firms can reduce perceived risks, encourage repeat transactions, and strengthen competitive positioning. The study contributes to knowledge by providing empirical evidence linking payment security to customer satisfaction in the Nigerian high-tech context, extending the practical application of the Unified Theory of Acceptance and Use of Technology (UTAUT) to digital payment systems. These insights can guide managers and policymakers in designing more secure and user-focused e-commerce platforms, ultimately improving customer experiences and digital adoption in emerging economies.

Recommendations

Based on the findings of the study:

i. Enhance Security Protocols: High-tech firms should implement robust measures such as encryption, multi-factor authentication, and real-time fraud detection to protect transactions, foster trust, and improve customer satisfaction.

ii. Employee and Customer Education: Firms should provide cybersecurity training for staff managing e-commerce platforms and educate customers on safe online payment practices to reduce security risks and strengthen confidence.

iii. Regular Audits and Regulatory Compliance: High-tech firms should conduct periodic security audits and ensure alignment with national and international data protection and payment security standards to maintain platform reliability and legal compliance.

Implications

i. *Theoretical Implications*: The study extends the Unified Theory of Acceptance and Use of Technology (UTAUT) by demonstrating that security is not only a determinant of adoption but also a critical driver of customer satisfaction in high-tech e-commerce platforms. By empirically linking secure payment measures to satisfaction outcomes, the study provides new evidence for integrating security-focused constructs into technology adoption frameworks, particularly in emerging economies like Nigeria. This highlights the importance of incorporating facilitating conditions such as transaction security when evaluating digital platform effectiveness.

ii. *Practical Implications*: For managers and practitioners, the findings underscore that robust security systems directly influence user confidence and loyalty. Firms that invest in visible security protocols—such as encryption, multi-factor authentication, and fraud monitoring—can reduce perceived risks, encourage repeat transactions, and improve overall customer experience.

Additionally, training staff and educating customers on safe digital practices ensures the platform is effectively used and trusted, enhancing retention and competitive advantage in the fast-growing Nigerian digital market.

iii. *Policy Implications*: The study highlights the need for policy frameworks and regulatory oversight that enforce minimum security standards for digital payments. Policymakers can use these insights to develop guidelines, certifications, and monitoring mechanisms that protect consumers from fraud and cyberattacks while promoting the growth of secure e-commerce ecosystems. Ensuring compliance with data protection laws and industry best practices will also support a safer environment for both businesses and users, fostering broader adoption of digital payments across Nigeria.

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