Journal of Asian Scientific Research
ISSN(e): 2223-1331
ISSN(p): 2226-5724
DOI: 10.55493/5003.v14i2.5063
Vol. 14, No. 2, 251-265.

URL: www.aessweb.com

Beyond transactions: Understanding the determinants of e-satisfaction in online shopping

Iston Dwija Utama[1+]
Ivan Diryana Sudirman[2]
Dian Kurnianingrum[3]

[1,2,3]*Entrepreneurship Department, BINUS Business School Undergraduate Program, Universitas Bina Nusantara, Jakarta, Indonesia.*
[1]*Email: iston.utama@binus.edu*
[2]*Email: ivan.diryana@binus.ac.id*
[3]*Email: dian_k@binus.ac.id*

(+ Corresponding author)

Article History
Received: 5 December 2023
Revised: 8 February 2024
Accepted: 26 February 2024
Published: 29 April 2024

Keywords
Application design
E-Commerce
E-Commerce security
E-Satisfaction
Merchandise attributes
Transaction capabilities.

ABSTRACT

This study aims to investigate the factors influencing e-commerce satisfaction, focusing on application design, merchandise attributes, transaction capabilities, and security and privacy. Internet penetration has massively changed the behavior of the customer, especially their buying behavior, from traditional to online through various channels such as e-commerce. The key finding from the quantitative approach with purposive sampling is the highly positive relationship between application design and e-satisfaction. The findings of the study demonstrate a moderate association between merchandise attributes and e-satisfaction, emphasizing the significance of product variety and presentation. Furthermore, the study has recognized other significant variables that lead to e-satisfaction, such as fast transaction capabilities and adequate security and privacy protections. The findings provide theoretical insights as well as practical guidelines, implying that e-commerce platforms may improve their customer satisfaction by prioritizing user-friendly, ease-of-use, and appealing application designs, broad product offers, streamlined transaction processes, and robust security and privacy. This study also provides future research recommendations and limitations.

Contribution/ Originality: This study contributes to e-commerce research by revealing a strong positive relationship between application design and e-satisfaction, emphasizing the critical role of UI/UX. Furthermore, our findings extend existing literature by offering detailed, actionable insights for e-commerce platforms, particularly in improving user interfaces and transaction processes and ensuring robust security.

1. INTRODUCTION

The rapid global expansion of the Internet has significantly contributed to e-commerce growth, drastically affecting modern consumer behavior. In 2022, e-commerce transactions soared by 56%, with projections estimating a value of approximately 8.1 trillion dollars by 2026 [1]. Notably, Indonesia emerged as a critical player in this domain, boasting one of the fastest-growing e-commerce markets. Predictions suggest a 10.41% growth in Indonesian e-commerce sales between 2023 and 2027, slightly below the global average of 11.16% [2]. This growth underscores the importance of e-satisfaction-the overall contentment of consumers with their online shopping experience, encompassing pre-and post-purchase phases [3-5].

Despite extensive research in the e-commerce area, such as literature studies by Chen, et al. [5] and Wang, et al. [6], there is room for deeper understanding, particularly in the Indonesian context. According to Statista [2]

Indonesia has a huge market of e-commerce consumers, which is dominated by productive ages millennials and Generation Z. Indonesia is one of the biggest countries that has a large number of active e-commerce users, with a forecast reach of 128.27 million users in 2028, and total transaction projected to reach 86.81 billion by 2028, which means a growth rate of 10.4%.

Previous research has extensively explored the impact of e-satisfaction on consumer behavior [7, 8] including its correlation with repurchase behavior in e-commerce [6, 9]. However, the dynamics of consumer satisfaction within Indonesian e-commerce remain underexplored. For instance, one study examined evaluation models and influential factors in a broader context of e-commerce [10] while another study focused on the role of e-service quality in e-satisfaction [11]. Moreover, e-commerce competition in Indonesia is increasingly high, so increasing customer satisfaction becomes increasingly important [12, 13].

Therefore, this study aims to explore the factors affecting e-satisfaction in Indonesia's burgeoning e-commerce market. By gaining a deeper understanding of consumer satisfaction, businesses can develop tailored strategies to enhance consumer experiences and gain a competitive edge in the digital realm.

2. LITERATURE REVIEW

To measure the e-satisfaction of e-commerce, the literature review that has been done emphasizes 4 elements that construct satisfaction, such as website design, merchandise attributes, transaction capabilities, and online payment process [5, 14-17].

2.1. Application Design

In recent research, the influence of website design on customer satisfaction in e-commerce has gained significant attention [18, 19]. The study provided a holistic perspective on online shopping customer satisfaction, laying a foundational understanding of the factors affecting consumer behavior in digital environments [16]. This finding study also complements the work that emphasized the importance of user interface design in e-commerce and its impact on consumer trust [20]. Further study explored the effects of online service quality, information quality, and usefulness of e-commerce websites on user satisfaction, highlighting the critical role of digital service features. Concurrently, studies on e-service quality have underscored the importance of online service quality and information quality, which influence customer satisfaction and trust [21]. Research in online shopping has shown that various factors, including website design, affect customer satisfaction and loyalty at varying e-commerce applications, which means that managers need to maintain and check the website design regularly because it helps customers navigate and find relevant information easily [17]. In a recent study, Pang and Pang [10] developed an evaluation model to measure satisfaction with e-commerce platforms, finding that website design is key influencing factor. Another study found that how well e-commerce sites handle orders and provide service after the sale is important for customer satisfaction and is influenced by the website's functionality, appearance, and safety [22]. Furthermore, research indicates that a shopping site's usability, trustworthiness, and design greatly affect customer satisfaction and loyalty [23, 24]. These findings highlight how website design and service quality play a complex role in customer satisfaction in e-commerce.

Based on the previous study, we propose the following hypothesis.

H_1: Web design influences e-satisfaction.

2.2. Merchandise Attributes

The significance of merchandise attributes as a variable in e-commerce research is well established, highlighting how product attributes and quality are crucial in influencing consumer satisfaction. Hidayat and Anasis [11]; Hristoski, et al. [25] and Tontini, et al. [26]. Liu, et al. [16] provided a comprehensive view in their empirical study on online shopping customer satisfaction in China, where they also touched upon the importance of

product attributes. This study's findings align with the research showing that merchandise attributes such as information and product variety implicitly address the impact of merchandise attributes on e-customer satisfaction in the online environment [14, 27]. Similarly, another study explored the relationship between customer loyalty, satisfaction, trust, and service quality in an e-commerce setting, highlighting how product attributes significantly shape customer trust and satisfaction [28, 29]. Recent studies explore the nuances of merchandise attributes and their impact on customer satisfaction in e-commerce. Mofokeng [17] study examined product variety and process delivery as key antecedents forming satisfaction, emphasizing the importance of information quality, which affects customer loyalty. Another study proposed a conceptual model focusing on differences between perceived and actual product experiences in an online environment, specifically in terms of direct e-store and indirect e-store contexts, showing higher satisfaction with direct e-stores than indirect ones [30]. Merchandise attributes can also be identified as channel options, as a study shows that channel options are critical factor in the customer experience, especially in satisfaction in the online environment [31, 32].

Based on the previous study, we propose the following hypothesis.

H_2: merchandise attributes influence e-satisfaction.

2.3. Transaction Capability

The efficiency and ease of transaction processes on e-commerce platforms significantly contribute to e-satisfaction among consumers [4, 33]. This variable shapes consumer perceptions and experiences in online marketplaces such as e-commerce, according to Kerkhof and van Noort [34]. Liu, et al. [16] conducted an empirical study of online shopping customer satisfaction in China, highlighting the predictive nature of transaction capability in influencing online shopping customer satisfaction. The study emphasized the significance of transaction capability as one of the key factors contributing to customer satisfaction in the e-commerce environment.

Various e-commerce setting have explored the impact of transaction capability on e-satisfaction. For instance, a study investigated the influence of transaction capability on customer satisfaction on cross-border e-commerce platforms, emphasizing the need for efficient and user-friendly transaction processes to enhance customer satisfaction [35, 36]. Additionally, the study explores the factors affecting customer satisfaction in mobile commerce, highlighting transaction convenience as a critical determinant of customer satisfaction in the mobile commerce domain [37, 38].

The role of transaction capability in shaping consumer perceptions and behaviors has been a focal point of research. A study explored the impact of transaction capability on customer loyalty in e-commerce, emphasizing the link between efficient transaction processes and customer satisfaction and loyalty [39, 40]. Additionally, the study examined the influence of transaction capability on customer repurchase intention, underscoring the pivotal role of transaction efficiency in driving repeat purchase behavior among e-commerce consumers [38, 41].

Based on the previous study, we propose the following hypothesis.

H_3: Transaction capability influences e-satisfaction.

2.4. Security and Privacy Transaction

The online payment process's convenience and security significantly impact e-satisfaction levels among e-commerce consumers [16, 28]. The online payment process is a critical component of the overall e-commerce experience, and its efficiency and security directly influence consumer satisfaction [9, 42].

Cao, et al. [37] studied mobile payment users' continuance intention from a trust transfer perspective, highlighting the security and trust in those payment systems. Trivedi and Yadav [9] emphasized that trust in online payment systems is a key factor for consumer satisfaction in e-commerce, especially for Generation Y. Furthermore, Guo, et al. [23] and Wisna, et al. [43] highlighted how the quality of e-services, especially security

in payment methods, affects customer satisfaction in e-commerce. Furthermore, researcher explored the integration of the e-service quality model and service convenience model to measure e-payment performance and its implication for consumer satisfaction [34, 44]. A study regarding the impact of the payment system environment on purchase intention highlights the evolving landscape of online payment systems and their influence on consumer behavior [6, 45].

Thus, according to the previous study, we propose the following hypothesis.

H_5: Security and privacy transactions influence e-satisfaction.

2.5. E-Satisfaction

The definition of e-satisfaction is grounded in the customer satisfaction literature, as satisfaction is defined as a response from a consumer to fulfilling the consumer's needs or desires. So, a consumer's satisfaction level is the consumer's assessment and experience related to the perceived product features [46]. Thus, e-satisfaction in the context of e-commerce refers to the level of contentment and fulfillment experienced by consumers in their online shopping interactions [3]. The e-commerce platform's overall satisfaction encompasses various factors such as service quality, transaction processes, and the overall online shopping experience. E-satisfaction is a critical component in understanding consumer behavior and loyalty in the digital marketplace [10, 16, 17].

Previous studies found that e-satisfaction is influenced by several factors, such as web design, merchandise attributes, security or privacy, and transaction capability [14-16]. A similar study, also conducted by Anderson and Srinivasan [3] explored the contingency framework of e-satisfaction and e-loyalty, highlighting the interplay between trust and perceived value, and their impact on e-satisfaction and subsequent customer loyalty. The study underscored the complex and interconnected nature of e-satisfaction and its role in fostering customer loyalty in the digital marketplace. A recent study also supports the previous research that finds website design, merchandise attributes [17, 23] security or privacy, and transaction capability [17, 43, 47] have a significant impact on e-satisfaction. Thus, the literature on e-satisfaction in e-commerce encompasses a diverse array of studies that collectively contribute to a comprehensive understanding of the factors influencing e-satisfaction and its implications for customer loyalty and retention in the digital marketplace.

Based on the previous study, literature, and hypothesis development, the research model is given (Figure 1).

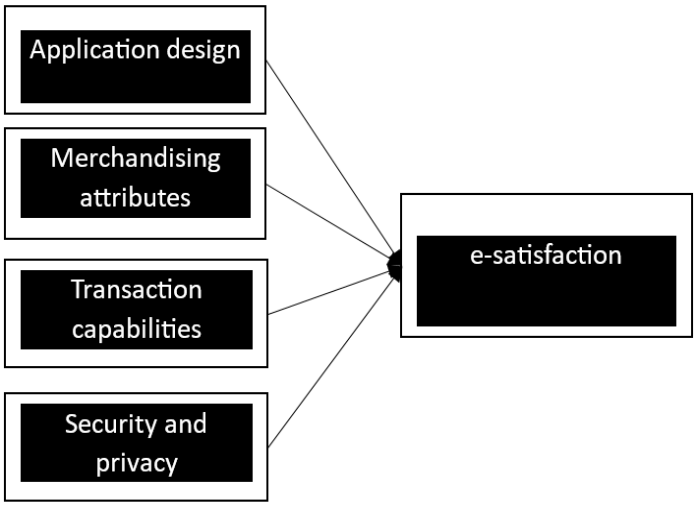

Figure 1. Research model.

3. METHODOLOGY

This study is a cross-sectional study in which data collection is specific to one time and gathers multiple respondents [48, 49]. We use non-probability sampling with a purposive sampling approach to achieve our

research objectives. The criteria of respondents in our study are: 1) have experience and account in an e-commerce application for a minimum of 2 years, 2) use and have routine transactions in the e-commerce application. A quantitative approach using a Likert scale ranges from 1 to 7. By using the quantitative approach, the study must have a valid reliability and validity test of the model [50, 51].

The construct of variables to measure e-satisfaction was adopted from the previous research study, such as the design of an application, merchandising, security and privacy, and transaction capabilities [14-17]. and the construct for the e-satisfaction indicators, we also adopt from the previous study, such as happiness and enjoyment [15, 17, 46]. The minimum sample if researchers use the Partial Least Square-Structured Equation Model (PLS-SEM) is 10 times the indicators [52] or they can also use the inverse square root method by calculating the number of arrows pointing at the construct, with the number of arrows being 4 and r squared being 0.1. Hence, the minimum sample is 137 respondents [53]. This study uses seventeen indicators; thus, the minimum number of samples in this study is 170 respondents. Our study collected 189 valid respondents that met our criteria for meeting the research objectives.

We also use Smart-PLS version 3 to look at the research model. There are two steps to the analysis: 1) the measurement of the model, such as validity and reliability, and 2) the structural model by conducting hypothesis testing [54].

Table 1 shows the operationalization of the variables and the literature references.

Table 1. Construct variable.

Variable	Indicators	Code	Source(s)
Merchandise attributes	Product variety	M1	Cao, et al. [14]; Cho and Park [15]; Liu, et al. [16] and Mofokeng [17]
	Various promotion	M2	
	Good price plus delivery	M3	
	Number of products	M4	
Application design	User friendly	D1	Cao, et al. [14]; Cho and Park [15]; Liu, et al. [16] and Mofokeng [17]
	Easy to find product or service	D2	
	Informative applications	D3	
	Have a good color combination	D4	
Transaction capabilities	Delivery duration	T1	Cao, et al. [14]; Cho and Park [15]; Liu, et al. [16] and Mofokeng [17]
	Variety of payment method	T2	
	Fast process	T3	
	Load pages fast	T4	
Security and privacy	Trusted application	SP1	Cao, et al. [14]; Cho and Park [15]; Liu, et al. [16] and Mofokeng [17]
	Protect personal data	SP2	
	The application has an adequate security system	SP3	
e-satisfaction	Overall satisfaction	Sa1	Cho and Park [15]; Mofokeng [17] and Oliver [46]
	Enjoy	Sa2	
	Happy	Sa3	

4. RESULT

4.1. Demographic of Respondent

Table 2 represents the respondent profile that is included in this research, which has experience with e-commerce applications and routine transactions. Most of our respondents also came from Generation Millennials (50%) and Z (44%) and most of them are heavily internet active and buy from e-commerce [55-57]. From the gender, both male and female generate relatively the same contributions, and for the regional distributions, the result is that most of the respondents (88%) come from Java Island, which is the regions with the highest penetration of internet and e-commerce transactions [58, 59].

Table 2. Respondent profile.

Gender	Percentage
Male	41%
Female	59%
Socio-economic status (SES)	
SES A	9%
SES B	15%
SES C1	23%
SES C2	20%
SES D	23%
SES E	10%
Range age	
18-24	44%
25-30	25%
31-35	15%
36-40	10%
41-45	5%
Regions / Area of respondents	
Jakarta	19%
West Java	17%
Central Java	21%
East Java	23%
Yogyakarta	7%
Others	12%

4.2. Measurement Model Analysis

To analyze the validity and reliability model, we can measure the individual reliability of each indicators, the reliability of construct, and the value of discriminant validity [60]. Table 3 shows that the value of Cronbach's Alpha, rho_A, and Composite Reliability for all variables are higher than their critical value (0.7), and the value of Average Variance Extracted (AVE) for all variables also exceeds its critical value (0.5) means that the model is valid and reliable [61].

Table 3. Summary of construct measurement.

Indicators	Exploratory loading factors	Confirmatory factor loading	Cronbach's α	CR	AVE
D1	0.749	0.748 (20.32)	0.878	0.917	0.736
D2	0.867	0.867 (41.99)			
D3	0.909	0.908 (63.58)			
D4	0.896	0.894 (55.26)			
M1	0.896	0.891 (27.16)	0.914	0.932	0.938
M2	0.898	0.898 (46.10)			
M3	0.884	0.885 (39.44)			
M4	0.881	0.876 (25.30)			
SP1	0.954	0.852 (4.727)	0.921	0.914	0.938
SP2	0.897	0.816 (4.096)			
SP3	0.888	0.811 (3.478)			
Sa1	0.897	0.896 (46.69)	0.877	0.880	0.925
Sa2	0.917	0.917 (63.33)			
Sa3	0.874	0.874 (46.23)			
T1	0.669	0.662 (12.84)	0.702	0.727	0.835
T2	0.833	0.830 (21.01)			
T3*	0.233	0.357 (8.77)			
T4	0.866	0.866 (42.33)			

Note: *) removed due to low exploratory loading factor value.

The outer loading of each indicator is also measured in this model to measure the correlation between the item score and the construct score, the outer loading score must be higher than 0.7 [62]. As represented in Table 3 the score of T3 is far below 0.7, so we removed the indicators and re-ran the model, resulting in all indicators having outer loading values higher than 0.7 except the T1 indicator with a score of 0.669. However, even though the score is below 0.7, as long as the Composite Reliability (CR) and AVE scores (Table 3) of variables are higher than their critical scores, researchers can still keep the indicators [54, 63], so the indicator T1 can still be used in this model.

There are several approaches to measuring the discriminant validity of models, such as the Fornell-Larcker criterion, cross-loadings, and the Heterotrait-Monotrait (HTMT) ratio [64]. This model uses Fornell-Larcker and HTMT approaches, which resulted in Table 4. As shown in Table 4, an HTMT score below 1 is still acceptable [60, 65] even though the best result is if the score of HTMT is below 0.9 [52].

Based on Table 3, the construct validity of the model is valid because the loading factors, Cronbach's alpha, CR, and AVE, meet the minimum thresholds. The reliability construct of the model also met the minimum thresholds by seeing the value of HTMT and the Fornell-Larcker ratio.

Table 4. Reliability test result (Fornell-Larcker and HTMT).

Construct	Application design	Merchandise	Security and privacy	Transaction capabilities	e-satisfaction
Fornell-Larcker					
Application design	0.858				
Merchandise	0.251	0.890			
Security and privacy	0.121	0.009	0.913		
Transaction capabilities	0.310	0.293	0.074	0.794	
e-satisfaction	0.521	0.292	0.097	0.680	0.896
HTMT					
Construct	Application design	Merchandise	Security and privacy	Transaction capabilities	
Merchandise	0.262				
Security and privacy	0.114	0.069			
Transaction capabilities	0.804	0.361	0.072		
e-satisfaction	0.836	0.316	0.077	0.857	

4.3. Structural Model Assessment

To evaluate the endogenous constructs' linear regression effects on one another, a structural model can be used to identify the patterns of relationships between the different constructs [54].

4.3.1. Collinearity Assessment

To investigate the collinearity in the structural model, we can see the value of variance inflation factor (VIF) criteria as a primary criterion, the VIF value below 5 indicates that the indicators have no collinearity issues [61, 66]. From Table 5, all indicators have a value below 5.0, which means that the structural model has no collinearity issues.

4.3.2. Determination of Coefficients and Effect Size

To assess the influence of each independent variable on the dependent variable, we use the F^2 values which if the F^2 values less than 0.15 indicating a weak effect size, 0.15 to 0.35, indicating a moderate effect size, and greater than 0.35, indicating a high effect size [67]. The coefficient of determination shows how much variation in the dependent variable(s) can be explained by the independent variables. A value between 0 and 1 means that the structural model is better at predicting the future [62]. Table 6 indicates that variable merchandise and transaction capabilities have a moderate effect on e-satisfaction, while application design has a strong effect on e-satisfaction. Meanwhile, security and privacy variables have a weak effect on e-satisfaction. The R^2 value in this structural model

is 0.698, which indicates that the independent factors in the structural model explain 69.8% of the e-satisfaction variable, with the remaining 21.2% explained by additional independent variables not explored in this structural model.

Table 5. Collinearity assessment.

Indicators	VIF
D1	1.533
D2	2.375
D3	3.395
D4	3.198
M1	2.296
M2	2.812
M3	2.512
M4	2.596
SP1	3.053
SP2	3.502
SP3	3.212
Sa1	2.589
Sa2	2.796
Sa3	2.092
T1	1.165
T2	1.737
T4	1.730

Table 6. Coefficient determination and effect size.

Variable	e-satisfaction	R^2
Application design	0.737	0.698
Merchandise	0.252	
Security & privacy	0.132	
Transaction capabilities	0.165	

4.3.3. Effect of Hypothesis Testing

We used the bootstrapping technique to determine the path coefficient and the study's hypothesis. As shown in Table 7 and Figure 2, all hypotheses in this study are valid.

Table 7. Structural model evaluation and verification.

Relationship	Path coefficients	Standard deviation (STDEV)	T stat.	P values	Fitness
Application design -> e-satisfaction	0.675	0.052	13.011	0.000	SRMR: 0.075 NFI:0.958 RMS theta: 0.081
Merchandise -> e-satisfaction	0.370	0.047	1.893	0.000	
Security & privacy -> e-satisfaction	0.082	0.052	2.030	0.016	
Transaction capabilities -> e-satisfaction	0.181	0.053	3.416	0.001	

To determine the significance of the path from the coefficients model and verify the hypothesis regarding the relationship between variables, we conduct the bootstrapping technique using the SmartPLS tools. The result of this analysis is represented in Figure 2 and Table 7, which show the p-value of all hypotheses below 0.05, which means the hypotheses are accepted and have a positive effect on the application design and have the biggest T statistic value (13.011), followed by merchandise (0.370), transaction capabilities (0.181), and security and privacy (0.082). This result shows that e-satisfaction is influenced by application design, merchandise, transaction capabilities, security, and privacy.

The measurement of the goodness of fit model also revealed satisfactory data in this study, with Standarized Root Mean Square Residual (SRMR) value below the threshold of 0.08 [68, 69] Normed Fit Index (NFI) value above 0.9, and Root Mean Square Theta (RMS_theta) value less than 0.12 [63].

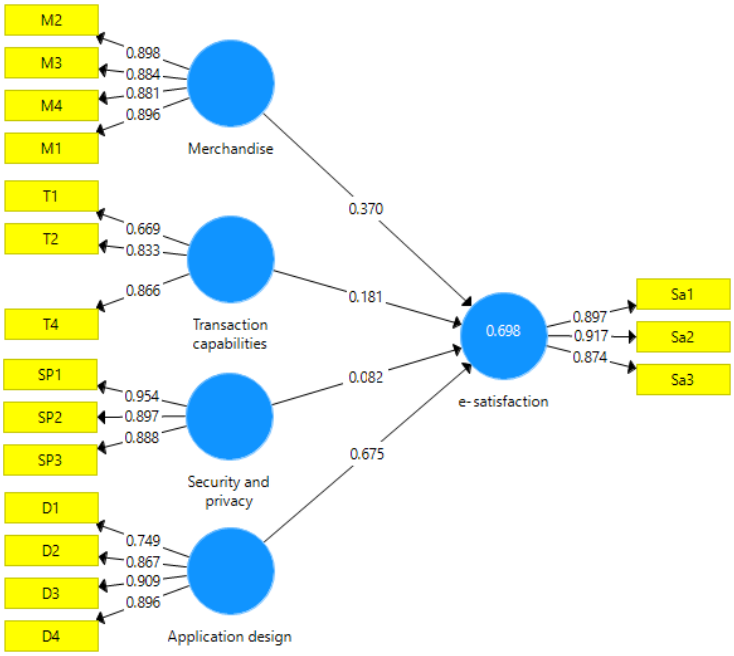

Figure 1. Result of structural model.

5. DISCUSSION

The most significant finding is the strong positive relationship between application design and e-satisfaction, which has a path coefficient of 0.675 and a high t-statistic of 13.011, indicating a robust and statistically significant relationship. This finding is supported by Liu, et al. [16] and Mofokeng [17] who emphasized the importance of website design in influencing online shopping customer satisfaction in China, providing a holistic view of customer satisfaction in the e-commerce context. Furthermore, this finding also strengthens the role of forming a good User Interface/ User Experience (UI/UX) of customer applications, which affects their satisfaction through good human computer interaction [70, 71]. A study found that a positive UX can significantly enhance customer engagement and satisfaction. This includes aspects like ease of navigation, intuitive layout, and responsive design that adapts to different devices [20, 24]. The e-commerce designs should also seamlessly integrate aesthetic elements of UI with the functional aspects of UX. This ensures that the application is not only visually appealing but also practical and easy to use [72, 73].

The impact of merchandise attributes on e-satisfaction is also significant, with a moderate relationship (path coefficient: 0.370, t-statistic: 1.893). This finding aligns with the previous study, which explored the effects of retail organizations designing their e-catalog appropriately to attract customers and create customer satisfaction and loyalty through a merchandising attributes approach [74-76]. These attributes directly influence the customer's shopping experience and satisfaction levels. The findings resonate with studies like those of Cao, et al. [37] which indicated that merchandise attributes such as product information and variety significantly impact customer satisfaction in online environments. This suggests that e-commerce platforms should continuously improve product variety and focus on enhancing their product appearance, offerings, and related attributes to not only improve but also increase customer satisfaction.

Regarding the influence of transaction capabilities on e-satisfaction (path coefficient: 0.181, t-statistic: 3.416), your findings resonate with the broader e-commerce literature, as highlighted in studies like [9] which investigated the role of e-satisfaction in mediating online repurchase intentions. Efficient, user-friendly, and smoother

transaction processes are crucial and should be a focus area for e-commerce platforms [15, 16]. This supports the notion that in e-commerce, the convenience and speed of transactions are key drivers of customer satisfaction [14, 37]. The result also aligns with studies like those of Manaf, et al. [33] which emphasized the significant role of transaction capability in shaping consumer experiences and satisfaction in online shopping.

Lastly, the relationship between security and privacy and e-satisfaction in your study, though the weakest among the factors studied, remains significant (path coefficient: 0.082, t-statistic: 2.030). This aspect is crucial in the e-commerce context, as emphasized by various studies focusing on the impact of security and privacy on customer satisfaction and trust [5, 6]. e-commerce platforms must have adequate security systems to protect customer data and their privacy [77, 78]. While the impact of security and privacy on e-satisfaction in our study is less pronounced compared to other factors like application design, it remains a crucial element for building customer trust and loyalty [17, 20, 37]. Moreover, the growing emphasis on data protection and privacy in the digital age is a major concern for consumers who are already aware of their personal information's security [79, 80].

6. CONCLUSION, LIMITATIONS, AND RECOMMENDATIONS

This study contributes significantly to the understanding of e-satisfaction in e-commerce, with a particular emphasis on the major factors influencing customer satisfaction, by expanding on the existing literature, particularly the works of Liu, et al. [16] and Mofokeng [17] and by providing a deeper understanding of the role of UI/UX in online consumer satisfaction. The findings offer both theoretical insights and practical guidelines for enhancing the online shopping experience, ultimately benefiting both e-commerce platforms and their customers.

This study offers theoretical knowledge of e-satisfaction in e-commerce by emphasizing the importance of application design, merchandise attributes, transaction capabilities, and security and privacy. The most significant finding is a major positive association between application design and e-satisfaction, underscoring the importance of UI/UX in online buying situations. This research integrates and expands prior work by Liu, et al. [16] and Mofokeng [17] providing a more nuanced understanding of how application design influences customer satisfaction through successful human-computer interaction.

From a business perspective, this study provides useful information for e-commerce platforms. According to the research, prioritizing user-friendly and visually beautiful application design may greatly boost customer happiness. Furthermore, the significance of merchandise attributes along with quick transaction capabilities emphasizes the necessity for e-commerce platforms to prioritize a variety of products, presentations, and facilitated transaction procedures. The report also emphasizes the importance of strong privacy and security protections to foster client trust and loyalty.

Even though the major contribution is both theoretical and practical, this study has several limitations that should be noticed. The scope of the study is restricted to certain e-commerce platforms, and the findings may not apply to all online purchasing situations. Furthermore, the study focuses primarily on quantitative indicators, which may not adequately reflect the qualitative components of consumer satisfaction.

Future studies should explore the impact of emerging technologies like augmented reality and artificial intelligence on e-satisfaction and employ qualitative methods to gain deeper insights into consumer experiences. The findings of this research have significant implications for the e-commerce industry, particularly in digital marketing and consumer engagement strategies, highlighting the transformative potential of application design in revolutionizing online shopping experiences. As the online marketplace continues to grow, the insights from this study could be pivotal in shaping more intuitive, engaging, and satisfying online shopping experiences for users globally.

Funding: This research is supported by Bina Nusantara University (Grant number: 20240115T084903-230).
Institutional Review Board Statement: The Ethical Committee of the Research and Technology Transfer of Bina Nusantara University, Indonesia has granted approval for this study (Ref. No. 2024-04-30-PUBLICATION-005).
Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.
Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

REFERENCES

[1] Statista, "Global retail e-commerce sales 2026, Statista," Retrieved: https://www.statista.com/statistics/379046/worldwide-retail-e-commerce-sales/. [Accessed Nov. 27, 2023], 2022.

[2] Statista, "Global: E-commerce retail sales CAGR 2023-2027, Statista," Retrieved: https://www.statista.com/forecasts/220177/b2c-e-commerce-sales-cagr-forecast-for-selected-countries. [Accessed Nov. 27, 2023], 2023.

[3] R. E. Anderson and S. S. Srinivasan, "E-satisfaction and e-loyalty: A contingency framework," *Psychology & Marketing*, vol. 20, no. 2, pp. 123-138, 2003. https://doi.org/10.1002/mar.10063

[4] T. M. Nisar and G. Prabhakar, "What factors determine e-satisfaction and consumer spending in e-commerce retailing?," *Journal of Retailing and Consumer Services*, vol. 39, pp. 135-144, 2017. https://doi.org/10.1016/j.jretconser.2017.07.010

[5] Q. Chen, S. Rodgers, and Y. He, "A critical review of the e-satisfaction literature," *American Behavioral Scientist*, vol. 52, no. 1, pp. 38-59, 2008. https://doi.org/10.1177/0002764208321340

[6] D. Wang, Y. Zha, G. Bi, and Y. Chen, "A meta-analysis of satisfaction-loyalty relationship in E-commerce: Sample and measurement characteristics as moderators," *Wireless Personal Communications*, vol. 103, pp. 941-962, 2018. https://doi.org/10.1007/s11277-018-5488-9

[7] J. J. Cronin Jr, M. K. Brady, and G. T. M. Hult, "Assessing the effects of quality, value, and customer satisfaction on consumer behavioral intentions in service environments," *Journal of Retailing*, vol. 76, no. 2, pp. 193-218, 2000. https://doi.org/10.1016/s0022-4359(00)00028-2

[8] B. J. Pine and J. H. Gilmore, *Welcome to the experience economy* (no. 4). Cambridge, MA, USA: Harvard Business Review Press, 1998, pp. 97-105.

[9] S. K. Trivedi and M. Yadav, "Repurchase intentions in Y generation: Mediation of trust and e-satisfaction," *Marketing Intelligence & Planning*, vol. 38, no. 4, pp. 401-415, 2020. https://doi.org/10.1108/mip-02-2019-0072

[10] X. Pang and Y. Pang, "Evaluation model and influencing factors of consumer satisfaction with E-commerce platform," *Ingenierie des Systemes d'Information*, vol. 27, no. 6, p. 983, 2022. https://doi.org/10.18280/isi.270615

[11] R. Hidayat and N. S. Anasis, "Analysis of E-service quality on website E-commerce on E-customer satisfaction," in *Proceedings of the First International Conference on Applied Science and Technology (iCAST 2018), Manado, Indonesia: Atlantis Press. https://doi.org/10.2991/assehr.k.200813.022*, 2020.

[12] A. Febransyah and J. I. Camelia Goni, "Measuring the supply chain competitiveness of e-commerce industry in Indonesia," *Competitiveness Review: An International Business Journal*, vol. 32, no. 2, pp. 250-275, 2022. https://doi.org/10.1108/cr-05-2020-0059

[13] Y. Ginting, T. Chandra, I. Miran, and Y. Yusriadi, "Repurchase intention of e-commerce customers in Indonesia: An overview of the effect of e-service quality, e-word of mouth, customer trust, and customer satisfaction mediation," *International Journal of Data and Network Science*, vol. 7, no. 1, pp. 329-340, 2023. https://doi.org/10.5267/j.ijdns.2022.10.001

[14] Y. Cao, H. Ajjan, and P. Hong, "Post-purchase shipping and customer service experiences in online shopping and their impact on customer satisfaction: An empirical study with comparison," *Asia Pacific Journal of Marketing and Logistics*, vol. 30, no. 2, pp. 400-416, 2018. https://doi.org/10.1108/apjml-04-2017-0071

[15] N. Cho and S. Park, "Development of electronic commerce user-consumer satisfaction index (ECUSI) for internet shopping," *Industrial Management & Data Systems*, vol. 101, no. 8, pp. 400-406, 2001. https://doi.org/10.1108/eum0000000006170

[16] X. Liu, M. He, F. Gao, and P. Xie, "An empirical study of online shopping customer satisfaction in China: A holistic perspective," *International Journal of Retail & Distribution Management*, vol. 36, no. 11, pp. 919-940, 2008. https://doi.org/10.1108/09590550810911683

[17] T. E. Mofokeng, "The impact of online shopping attributes on customer satisfaction and loyalty: Moderating effects of e-commerce experience," *Cogent Business & Management*, vol. 8, no. 1, p. 1968206, 2021. https://doi.org/10.1080/23311975.2021.1968206

[18] C. N. Faisal, M. Gonzalez-Rodriguez, D. Fernandez-Lanvin, and J. de Andres-Suarez, "Web design attributes in building user trust, satisfaction, and loyalty for a high uncertainty avoidance culture," *IEEE Transactions on Human-Machine Systems*, vol. 47, no. 6, pp. 847-859, 2016. https://doi.org/10.1109/thms.2016.2620901

[19] M. Zviran, C. Glezer, and I. Avni, "User satisfaction from commercial web sites: The effect of design and use," *Information & Management*, vol. 43, no. 2, pp. 157-178, 2006. https://doi.org/10.1016/j.im.2005.04.002

[20] W. Aslam, A. Hussain, K. Farhat, and I. Arif, "Underlying factors influencing consumers' trust and loyalty in E-commerce," *Business Perspectives and Research*, vol. 8, no. 2, pp. 186-204, 2020. https://doi.org/10.1177/2278533719887451

[21] G. Sharma and W. Lijuan, "The effects of online service quality of e-commerce websites on user satisfaction," *The Electronic Library*, vol. 33, no. 3, pp. 468-485, 2015. https://doi.org/10.1108/el-10-2013-0193

[22] M. A. Camilleri, "E-commerce websites, consumer order fulfillment and after-sales service satisfaction: The customer is always right, even after the shopping cart check-out," *Journal of Strategy and Management*, vol. 15, no. 3, pp. 377-396, 2021. https://doi.org/10.1108/jsma-02-2021-0045

[23] J. Guo, W. Zhang, and T. Xia, "Impact of shopping website design on customer satisfaction and loyalty: The mediating role of usability and the moderating role of trust," *Sustainability*, vol. 15, no. 8, pp. 1-16, 2023. https://doi.org/10.3390/su15086347

[24] O. Saoula *et al.*, "Building e-trust and e-retention in online shopping: The role of website design, reliability and perceived ease of use," *Spanish Journal of Marketing-ESIC*, vol. 27, no. 2, pp. 178-201, 2023. https://doi.org/10.1108/sjme-07-2022-0159

[25] I. Hristoski, P. Mitrevski, T. Dimovski, and Z. Kotevski, "Evaluating e-customers' satisfaction in B2C e-commerce: The case of macedonian students," in *Proccedings of the ICAIIT2016, University "St. Kliment Ohridski" Bitola, Macedonia, Jun. 2016*, 2016, pp. 382–389.

[26] G. Tontini, J. C. da Silva, E. F. S. Beduschi, E. R. M. Zanin, and M. d. F. Marcon, "Nonlinear impact of online retail characteristics on customer satisfaction and loyalty," *International Journal of Quality and Service Sciences*, vol. 7, no. 2/3, pp. 152-169, 2015. https://doi.org/10.1108/ijqss-02-2015-0021

[27] A. N. Nusifera, M. Najib, and K. Kirbrandoko, "Factor affecting user satisfaction in agricultural e-commerce applications: Facing the new normal," *Journal of Innovation in Business and Economics*, vol. 4, no. 02, pp. 49-60, 2020. https://doi.org/10.22219/jibe.v4i02.12954

[28] N. B. C. Nawi, A. Al Mamun, and N. A. Raston, "Examining customer satisfaction at the point-of-purchase phase: A study on Malaysian e-consumers," *Asian Social Science*, vol. 11, no. 16, p. 88, 2015. https://doi.org/10.5539/ass.v11n16p88

[29] Y. F. Susanti, A. Hasudungan, and A. W. Prasetyo, "Relationship between customer loyalty, customer satisfaction, customer trust, and service quality in E-commerce setting: Case study of Lazada in Indonesia," *International Journal of Business Studies*, vol. 2, no. 2, pp. 93-104, 2018.

[30] Y. Rao, A. Saleem, W. Saeed, and J. Ul Haq, "Online consumer satisfaction during COVID-19: Perspective of a developing country," *Frontiers in Psychology*, vol. 12, p. 751854, 2021. https://doi.org/10.3389/fpsyg.2021.751854

[31] L. Geng and Y. Chang, "The effects of utilitarian value on omnichannel continuance intention: The moderating role of product involvement," *Baltic Journal of Management*, vol. 17, no. 4, pp. 484-500, 2022. https://doi.org/10.1108/bjm-09-2021-0332

[32] M. Ylilehto, H. Komulainen, and P. Ulkuniemi, "The critical factors shaping customer shopping experiences with innovative technologies," *Baltic Journal of Management*, vol. 16, no. 5, pp. 661-680, 2021. https://doi.org/10.1108/bjm-02-2021-0049

[33] P. A. Manaf, I. Rachmawati, M. Witanto, and A. Nugroho, "E-satisfaction as a reflection of e-marketing and e-sequal in influencing e-loyalty on e-commerce," *International Journal of Engineering & Technology*, vol. 7, no. 4.44, pp. 94-98, 2018. https://doi.org/10.14419/ijet.v7i4.44.26870

[34] P. Kerkhof and G. van Noort, *Third party internet seals: Reviewing the effects on online consumer trust. In Encyclopedia of e-business development and management in the global economy*. IGI Global. https://doi.org/10.4018/978-1-61520-611-7.ch069, 2010.

[35] H. M. Kuo, S. L. Hwang, and E. Min-Yang Wang, "Evaluation research of information and supporting interface in electronic commerce web sites," *Industrial Management & Data Systems*, vol. 104, no. 9, pp. 712-721, 2004. https://doi.org/10.1108/02635570410567702

[36] Z. Li, "The impact of logistics service quality of cross border E-commerce business on customer satisfaction," *BCP Bus Management*, vol. 29, pp. 130–134, 2022. https://doi.org/10.54691/bcpbm.v29i.2203

[37] X. Cao, L. Yu, Z. Liu, M. Gong, and L. Adeel, "Understanding mobile payment users' continuance intention: A trust transfer perspective," *Internet Research*, vol. 28, no. 2, pp. 456-476, 2018. https://doi.org/10.1108/intr-11-2016-0359

[38] U. Tandon, R. Kiran, and A. Sah, "Analyzing customer satisfaction: Users perspective towards online shopping," *Nankai Business Review International*, vol. 8, no. 3, pp. 266-288, 2017. https://doi.org/10.1108/nbri-04-2016-0012

[39] S. Arrahmani, Y. Durachman, E. Khudzaeva, and U. A. Matin, "Transactional quality, relational quality and customer loyalty aspects in transactional e-commerce," presented at the 2020 8th International Conference on Cyber and IT Service Management (CITSM), 2020.

[40] I. Qureshi, Y. Fang, E. Ramsey, P. McCole, P. Ibbotson, and D. Compeau, "Understanding online customer repurchasing intention and the mediating role of trust–an empirical investigation in two developed countries," *European Journal of Information Systems*, vol. 18, pp. 205-222, 2009. https://doi.org/10.1057/ejis.2009.15

[41] X. Wu and H. Tan, "Research on the construction of consumption experience dimensions for the E-commerce offline store," *Open Journal of Social Sciences*, vol. 7, no. 3, pp. 408-417, 2019. https://doi.org/10.4236/jss.2019.73034

[42] A. Anand, "E-satisfaction--a comprehensive framework," presented at the Second International Conference on Internet and Web Applications and Services (ICIW'07), Morne, Mauritius: IEEE, 2007. https://doi.org/10.1109/ICIW.2007.30, 2007.

[43] N. Wisna, R. B. Kotjoprayudi, A. Widayant, and R. Sukawati, "The impact of customer satisfaction with e-commerce system," *Business Excellence & Management*, vol. 12, no. 4, pp. 65–75, 2022. https://doi.org/10.24818/beman/2022.12.4-05

[44] N. Kassim and N. Asiah Abdullah, "The effect of perceived service quality dimensions on customer satisfaction, trust, and loyalty in e-commerce settings: A cross cultural analysis," *Asia Pacific Journal of Marketing and Logistics*, vol. 22, no. 3, pp. 351-371, 2010. https://doi.org/10.1108/13555851011062269

[45] R. W. Attar, M. Shanmugam, and N. Hajli, "Investigating the antecedents of e-commerce satisfaction in social commerce context," *British Food Journal*, vol. 123, no. 3, pp. 849-868, 2021. https://doi.org/10.1108/bfj-08-2020-0755

[46] R. L. Oliver, "A cognitive model of the antecedents and consequences of satisfaction decisions," *Journal of Marketing Research*, vol. 17, no. 4, pp. 460-469, 1980. https://doi.org/10.1177/002224378001700405

[47] T. T. N. Nguyen, "Developing and validating five-construct model of customer satisfaction in beauty and cosmetic E-commerce," *Heliyon*, vol. 6, no. 9, p. e04887, 2020. https://doi.org/10.1016/j.heliyon.2020.e04887

[48] P. Schindler, *Business research methods*, 14th ed. New York, USA: McGraw-Hill, 2021.

[49] U. Sekaran and R. Bougie, *Research methods for business*, 7th ed. West Sussex, UK: John Wiley & Sons, 2019.

[50] C. D. Mellinger and T. A. Hanson, "Methodological considerations for survey research: Validity, reliability, and quantitative analysis," *Linguistica Antverpiensia, New Series–Themes in Translation Studies*, vol. 19, pp. 172–190, 2020. https://doi.org/10.52034/lanstts.v19i0.549

[51] L. Sürücü and A. Maslakci, "Validity and reliability in quantitative research," *Business & Management Studies: An International Journal*, vol. 8, no. 3, pp. 2694-2726, 2020.

[52] J. F. Hair, W. C. Black, B. J. Babin, and R. E. Anderson, *Multivariate data analysis*, 8th ed. Andover, Hampshire: Cengage, 2019.

[53] N. Kock and P. Hadaya, "Minimum sample size estimation in PLS-SEM: The inverse square root and gamma-exponential methods," *Information Systems Journal*, vol. 28, no. 1, pp. 227-261, 2018. https://doi.org/10.1111/isj.12131

[54] J. F. Hair, G. T. M. Hult, C. M. Ringle, and M. Sarstedt, *A primer on partial least squares structural equation modeling (PLS-SEM)*, 2nd ed. Thousand Oaks, CA: SAGE Publications, Inc, 2017.

[55] T. Chakraborty and J. Balakrishnan, "Exploratory tendencies in consumer behaviour in online buying across gen X, gen Y and baby boomers," *International Journal of Value Chain Management*, vol. 8, no. 2, pp. 135-150, 2017. https://doi.org/10.1504/ijvcm.2017.085483

[56] S. Dhanapal, D. Vashu, and T. Subramaniam, "Perceptions on the challenges of online purchasing: A study from "baby boomers", generation "X" and generation "Y" point of views," *Contaduría y Administración*, vol. 60, pp. 107-132, 2015. https://doi.org/10.1016/j.cya.2015.08.003

[57] S. Lissitsa and O. Kol, "Generation X vs. Generation Y–A decade of online shopping," *Journal of Retailing and Consumer Services*, vol. 31, pp. 304-312, 2016. https://doi.org/10.1016/j.jretconser.2016.04.015

[58] BPS, "ECommerce statistics 2022/2023, central bureau of statistics, 8101004," Retrieved: https://www.archive.bps.go.id/publication/2023/09/18/f3b02f2b6706e104ea9d5b74/statistik-ecommerce-2022-2023.html. 2023.

[59] Datanesia, "10 largest E-commerce Regions in Indonesia," Retrieved: https://drive.google.com/file/d/1koO_ruuHzAcWQvGawQOckzhUvoAWwQsn/view?usp=sharing&usp=embed_facebook. [Accessed Dec. 04, 2023], 2022.

[60] J. Henseler, C. M. Ringle, and M. Sarstedt, "A new criterion for assessing discriminant validity in variance-based structural equation modeling," *Journal of the Academy of Marketing Science*, vol. 43, pp. 115-135, 2015. https://doi.org/10.1007/s11747-014-0403-8

[61] J. F. Hair, J. J. Risher, M. Sarstedt, and C. M. Ringle, "When to use and how to report the results of PLS-SEM," *European Business Review*, vol. 31, no. 1, pp. 2-24, 2019. https://doi.org/10.1108/ebr-11-2018-0203

[62] J. F. Hair Jr, M. C. Howard, and C. Nitzl, "Assessing measurement model quality in PLS-SEM using confirmatory composite analysis," *Journal of Business Research*, vol. 109, pp. 101-110, 2020. https://doi.org/10.1016/j.jbusres.2019.11.069

[63] T. K. Dijkstra and J. Henseler, "Consistent partial least squares path modeling," *MIS Quarterly*, vol. 39, no. 2, pp. 297-316, 2015. https://doi.org/10.25300/misq/2015/39.2.02

[64] C. Peukert and S. Kloker, "Trustworthy AI: How ethicswashing undermines consumer trust," presented at the WI2020 Zentrale Tracks, GITO Verlag. https://doi.org/10.30844/wi_2020_j11-peukert, 2020.

[65] G. Franke and M. Sarstedt, "Heuristics versus statistics in discriminant validity testing: A comparison of four procedures," *Internet Research*, vol. 29, no. 3, pp. 430-447, 2019. https://doi.org/10.1108/intr-12-2017-0515

[66] S. Wang, J.-H. Cheah, C. Y. Wong, and T. Ramayah, "Progress in partial least squares structural equation modeling use in logistics and supply chain management in the last decade: A structured literature review," *International Journal of Physical Distribution & Logistics Management*, 2023. https://doi.org/10.1108/IJPDLM-06-2023-0200

[67] J. Cohen, *Statistical power analysis for the behavioral sciences*, 2nd ed. Routledge. https://doi.org/10.4324/9780203771587, 1988.

[68] M. O'Bryant, P. Natesan Batley, and A. J. Onwuegbuzie, "Validation of an adapted version of the statistical anxiety scale in English and its relationship to attitudes toward statistics," *SAGE Open*, vol. 11, no. 1, pp. 1-15, 2021. https://doi.org/10.1177/21582440211001378

[69] G. Pavlov, A. Maydeu-Olivares, and D. Shi, "Using the standardized root mean squared residual (SRMR) to assess exact fit in structural equation models," *Educational and Psychological Measurement*, vol. 81, no. 1, pp. 110-130, 2021. https://doi.org/10.1177/0013164420926231

[70] I. Fedorko, R. Bacik, and B. Gavurova, "Technology acceptance model in e-commerce segment," *Management & Marketing. Challenges for the Knowledge Society*, vol. 13, no. 4, pp. 1242-1256, 2018. https://doi.org/10.2478/mmcks-2018-0034

[71] M. Petre, S. Minocha, and D. Roberts, "Usability beyond the website: An empirically-grounded e-commerce evaluation instrument for the total customer experience," *Behaviour & Information Technology*, vol. 25, no. 2, pp. 189-203, 2006. https://doi.org/10.1080/01449290500331198

[72] E. N. Abdullah, S. Ahmad, M. Ismail, and N. M. Diah, "Evaluating E-commerce website content management system in assisting usability issues," presented at the 2021 IEEE Symposium on Industrial Electronics & Applications (ISIEA), 2021.

[73] A. Bilgihan, J. Kandampully, and T. Zhang, "Towards a unified customer experience in online shopping environments: Antecedents and outcomes," *International Journal of Quality and Service Sciences*, vol. 8, no. 1, pp. 102-119, 2016. https://doi.org/10.1108/ijqss-07-2015-0054

[74] D. Gupta, "The recent fundamental growth scenarios of the Asian E-commerce-an analysis," *Scholedge International Journal of Business Policy & Governance*, vol. 3, no. 1, pp. 5-8, 2016. https://doi.org/10.19085/journal.sijbpg030102

[75] E. B. Kim and S. B. Eom, "Designing effective cyber store user interface," *Industrial Management & Data Systems*, vol. 102, no. 5, pp. 241-251, 2002. https://doi.org/10.1108/02635570210428276

[76] R. Sebastianelli, N. Tamimi, and M. Rajan, "How shopping frequency and product type affect consumers perceptions of E-tailing quality," *Journal of Business & Economics Research*, vol. 5, no. 1, pp. 1-12, 2007. https://doi.org/10.19030/jber.v5i1.2515

[77] N. Chawla and B. Kumar, "E-commerce and consumer protection in India: The emerging trend," *Journal of Business Ethics*, vol. 180, no. 2, pp. 581-604, 2022. https://doi.org/10.1007/s10551-021-04884-3

[78] G. J. Udo, "Privacy and security concerns as major barriers for e-commerce: A survey study," *Information Management & Computer Security*, vol. 9, no. 4, pp. 165-174, 2001. https://doi.org/10.4324/9781315246017-11

[79] S. Kokolakis, "Privacy attitudes and privacy behaviour: A review of current research on the privacy paradox phenomenon," *Computers & Security*, vol. 64, pp. 122-134, 2017. https://doi.org/10.1016/j.cose.2015.07.002

[80] K. D. Martin, A. Borah, and R. W. Palmatier, "Data privacy: Effects on customer and firm performance," *Journal of Marketing*, vol. 81, no. 1, pp. 36-58, 2017. https://doi.org/10.1509/jm.15.0497