Applied Information System and Management (AISM)
Volume 8, (2) 2025, p. 175–182
P-ISSN: 2621-2536; E-ISSN: 2621-2544; DOI: 10.15408/aism.v8i2.46657

Uncovering The Barriers and Business Impacts of E-Commerce Non-Adoption Among SMEs: A TOE Framework Perspective

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***Abstract*—This study investigates barriers in technology, organization, and environment that prevent Indonesian SMEs from adopting e-commerce and examines their effects on business sustainability. Using the TOE framework, this research adopts a quantitative cross-sectional method, with data from 320 SMEs analyzed using PLS-SEM. Results reveal that technological and environmental barriers significantly hinder e-commerce adoption, negatively affecting sustainability, while organizational barriers have no significant impact. These findings highlight the need for targeted interventions to address technological and environmental challenges. The study provides valuable insights for policymakers to foster supportive environments, enhance SME competitiveness, and promote digital inclusion. By addressing these barriers, SMEs can access digital markets more effectively, improve performance, and contribute to economic growth. This research underscores the importance of policies supporting SME growth and digital transformation, offering guidance to improve e-commerce adoption and business sustainability in the digital era.**

***Index Terms*—Technological barriers, organizational barriers, environmental barriers, non-adoption e-commerce, negative business sustainability.**

I. Introduction

Over the past two decades, research in international entrepreneurship has focused on investigating ways small companies can begin to pursue international business opportunities, with an emphasis on patterns of rapid early internationalization [1]. The modality of trade using e-commerce allows small companies to participate in conducting international commercial transactions through internet services that can be accessed by anyone and anywhere [2]. In the past, the e-commerce ecosystem was dominated only by large companies, but now there are similar opportunities that can be exploited by small entrepreneurs to gain new markets in this new business model [3].

Like other nations, Indonesia has encouraged SMEs to adopt e-commerce [4], yet Kemenkop UKM (the Ministry of Cooperatives and Small and Medium Enterprises) reports that just 30.4% of 59.2 million SMEs have used it for product marketing [5]. There are a number of obstacles that make some SMEs hesitant to adopt e-commerce, although e-commerce adoption continues to grow [6]. According to [7], lack of technical knowledge about e-commerce, absence of top management support and small organizational size with limited resources, and absence of pressure from business competitors in its environment are barriers for SMEs to adopt e-commerce. Reference [8] stated that slow e-commerce adoption in developing nations is often due to SMEs preferring traditional marketing, distrust of online platforms, and worries over payment security.

Currently, there have been many studies that discuss how SMEs in developing countries can adopt e-commerce [4], [9], [10], but studies that discuss what makes SMEs decide to non-adopt e-commerce, as well as what consequences SMEs will face when choosing non-adoption e-commerce are still very rarely discussed. Also, [2] explained that not doing behavior is not just the opposite of doing behavior, because both are done for different purposes. This creates a research gap in the form of a lack of studies that focus on the reasons why some SMEs in developing countries choose non-adoption e-commerce and how it impacts it, especially in the context of business consequences.

To address this gap, the study applies the Technology-Organization-Environment framework (TOE) [11] to examine SMEs' reluctance to adopt e-commerce from an organizational perspective. Unlike TAM or UTAUT, which focus on individual behavioral intentions, TOE offers a holistic perspective by considering technological, organizational, and environmental factors collectively, making it more suitable for this research. While TOE is commonly used to explain innovation adoption, this study extends its application to non-adoption by incorporating Negative Business Sustainability [12] to examine the consequences of rejecting e-commerce. This approach enables a deeper analysis of SMEs' reluctance toward digital transformation by examining internal and external barriers. Using the TOE framework, the study seeks to identify the causes and effects of e-commerce resistance, offering insights into SMEs' adaptation to

Received: 7 May 2025; Revised: 1 June 2025; Accepted: 12 June 2025.
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technological shifts and their impact on long-term business sustainability.

This study is theoretically grounded as prior research has often explored e-commerce adoption in SMEs in fragmented ways. For instance, [9] and [10] investigated adoption drivers, while [13] and [14], emphasized its benefits. Meanwhile, [15] examined SME growth from a financial angle. However, non-adoption is not merely the inverse of adoption [2]. Thus, this research fills a critical gap by analyzing SME e-commerce non-adoption—a less explored area—while also assessing its broader implications for businesses.

This study aims to understand why SMEs resist adopting e-commerce by using the TOE framework, which is usually applied to innovation adoption but rarely to non-adoption resistance. It explores the factors influencing e-commerce non-adoption through technological, organizational, and environmental aspects. This is done because studies focusing on barriers in product purchasing behavior have been conducted by [16], while those focusing on individual behavior in using e-commerce were conducted by [17] dan [2]. Although using a different approach, this study practically supports sustainable development goals in the digital era, as demonstrated by [18]. Identifying barriers to e-commerce adoption also contributes to increasing e-commerce utilization among SMEs in Indonesia, which currently stands at only 30.4% of 59.2 million SMEs [5].

II. Related Work & Hypothesis

A. Adoption E-Commerce and TOE Framework

E-commerce is growing as a vital platform for businesses of all kinds, even more so for SMEs that have limited geographical coverage and do not have access to potential market share that can be reached through the Internet [19]. Although awareness of digitalization benefits is growing, many business managers still struggle to adopt it [20]. The specific drivers influencing SME managers' decisions to embrace or resist e-commerce in transformative business practices remain poorly understood [21]. Moreover, [22] noted that the TOE framework has been widely utilized in studies examining Business Information Systems adoption, particularly in e-commerce research. This framework was selected due to its effectiveness in analyzing organizational innovation adoption [23], [24]. The TOE framework complements Rogers' Diffusion of Innovation (DOI) theory [25] as it examines both internal and external organizational factors, offering stronger explanatory power than alternative adoption models [26]. While DOI theory is frequently applied to SME technology adoption studies, its focus remains restricted to organizational and environmental aspects, omitting critical technical dimensions of innovations like e-commerce [27]. In contrast to individual-centric models such as TAM or UTAUT, the TOE framework holistically integrates technological, organizational, and environmental determinants of e-commerce adoption at the firm level, rendering it particularly appropriate for this investigation. The TOE framework helps companies to understand how innovation can be adopted successfully, so they can make more informed decisions regarding technology adoption that suits their needs and goals [22].

B. Technological Barriers

A study [11] established that the TOE framework encompasses three key dimensions: technological, organizational, and environmental contexts. Notably, technological factors consistently demonstrate a strong positive correlation with e-commerce technology adoption [28]. The tangible benefits of technology greatly influence MSMEs' decision to adopt and implement e-commerce [29]. These results imply that companies that have a deep understanding of IT tend to be more active in using e-commerce technologies. Research by [30] and [24] further confirmed the significant impact of technological factors on e-commerce adoption. Therefore, it is assumed that the existence of *technological barriers* quite high, it will affect the desire of SMEs not to use the e-commerce platform.

H1: *Technological barriers significantly and positively influence SMEs' decision to non-adopt e-commerce.*

C. Organizational Barriers

Organizational context represents a company's key characteristics and capabilities [11]. An organization's readiness is an important driver of a company's tendency to adopt information technology applications, such as e-commerce [24]. Relevant skills enhance innovation capability by supporting the adoption of new technology and accelerating its implementation within the organization [31]. Reference [19] explained that organizational context plays the most important role in shaping e-commerce adoption by companies. Then, [23] has also ascertained the importance of organizational factors, as certain characteristics of the company and its owners significantly affect the sustainability of adopting e-commerce. Prior studies confirm that organizational context significantly impacts e-commerce adoption [30], [32]. Given this influence, we posit that stronger organizational barriers in SMEs will further hinder their e-commerce adoption.

H2: *Organizational barriers significantly and positively influence SMEs' decision to non-adopt e-commerce.*

D. Environmental Barriers

Previous study [33] identified that two TOE framework contexts—environmental and organizational factors—most strongly influence e-commerce adoption among Indonesian SMEs. The environmental context, encompassing external pressures [11], includes government support and competitive dynamics, which drive SMEs to adopt e-commerce for market survival [34]. Studies by [30] and [32] confirmed the significant positive impact of environmental factors on adoption, further supported by [23]. Given this demonstrated importance, this study hypothesizes that environmental barriers will conversely deter SMEs from e-commerce adoption.

H3: *Environmental barriers significantly and positively influence SMEs' decision to non-adopt e-commerce.*

E. Consequences of Non-Adoption of E-Commerce

E-commerce adoption enhances SME performance by enabling sustainable business practices [34]. Business sustainability as a major performance indicator for SMEs [35], [36] can be achieved through sustainable technology innovation [37]. The e-commerce platform helps maintain sustainability by creating additional business values [36].

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Previous studies understood that the sustainability of SME businesses can be determined by the adoption of technological innovations, which in this case adopted e-commerce. We assume the opposite can be true, namely SMEs that send for non-adoption e-commerce will experience problems in business continuity. This is in line with what was conveyed by [38], explained that as new technologies develop more rapidly, reluctance to adopt technological innovations often limits business continuity.

H4: *SMEs' decision to non-adopt e-commerce has a significant positive effect on negative business sustainability.*

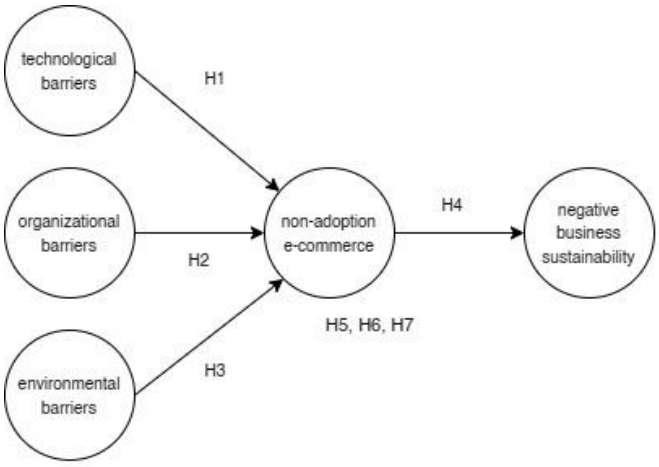

Fig. 1. Research theoretical model framework [11].

Prior sections have established the direct impact of TOE framework contextual factors on SMEs' e-commerce non-adoption. While, [8] conveyed, companies need to consider technology, organization, and the environment because these factors will drive the improvement of company performance. However, the indirect effects of technological, organizational, and environmental contexts on SME performance remain understudied [39]. As [40] noted, these contextual factors may shape e-commerce adoption decisions, subsequently impacting business performance. This study develops a theoretical framework examining how TOE factors—mediated by e-commerce non-adoption—affect SME sustainability negatively.

H5: *Technological barriers, mediated by e-commerce non-adoption, have a significant positive indirect effect on negative business sustainability for SMEs.*

H6: *Organizational barriers, mediated by e-commerce non-adoption, have a significant positive indirect effect on negative business sustainability for SMEs.*

H7: *Environmental barriers, mediated by e-commerce non-adoption, have a significant positive indirect effect on negative business sustainability for SMEs.*

III. Research Method

This research utilizes a quantitative, descriptive methodology with cross-sectional design, employing primary data gathered through structured online surveys. The target population comprises SMEs uninterested in adopting e-commerce for online sales. Non-probability and accessibility sampling methods are used following [41] and [42]. While non-probability sampling may limit generalizability, potential biases were minimized by defining respondent criteria, ensuring diverse SME representation, and incorporating demographic and business-related control variables. The questionnaire includes a screening question to confirm respondents have never used e-commerce directly or indirectly, alongside demographic and socioeconomic details as control variables to strengthen causal inference.

The study's constructs were operationalized through 26 Likert-scale items (1 = strongly disagree to 5 = strongly agree). Measurement scales were developed by adapting the TOE framework to the research context, rather than using standardized TOE dimensions. Construct technological barriers measured using 6 questions based on [29], the construct of organizational barriers involves 6 questions arranged based on [24], while the Environmental Barriers construct also uses 6 questions taken from [32]. Non-Adoption E-Commerce decisions are taken from [7] by using 4 questions, and for the consequence construct, namely negative business sustainability is taken from [35] with 4 questions as well.

The research instruments were tested for validity and reliability with an initial group of 30 respondents. This initial testing helped refine the questionnaire by identifying ambiguous or irrelevant items before full-scale data collection. After validation, a survey was conducted from September to December 2023, distributing 400 questionnaires to SME owners or managers in Yogyakarta City, Sleman Regency, and Bantul Regency, whose businesses had operated for at least two years. A total of 320 valid responses were collected, fulfilling the sample size guidelines suggested by [43]. The data were analyzed using structural equation modeling (SEM) with partial least squares (PLS) estimation, covering confirmatory factor analysis (CFA) for assessing variable validity and reliability, as well as model parameter estimation for testing variable relationships.

IV. Result

A. Characteristics of Respondents

According to the survey that has been shared, demographically the majority of SME owners are men (55.14%), aged 27 to 42 years (50.16%), with education dominated by undergraduate graduates (37.07%). Although male respondents dominate, the number is not far adrift from female respondents (44.55%). Based on age, the survey results are as submitted by [44], where SMEs run by millennial and generation Z business people open up great potential for Golden Indonesia in improving the economy through the SME sector. The results of educational characteristics are quite

surprising, because usually SMEs in Indonesia are dominated by high school graduates. While socioeconomically, it is known that most SMEs are those with business types in the form of product sales (79.44%) and business operating hours ranging from 5 to 10 years (60.75%). Related to the type of business, this seems to be a common thing found in SMEs in Indonesia. If you look at the age and education of SME owners, it will be very reasonable if businesses that operate for more than 10 years are the least in number. This is because they only complete their education at the age of 22 and usually prefer to try to work in a formal company first before starting a business (Table 1).

Table 1.
Respondent Characteristics

Characteristic	Criterion	Frequency	(%)
Gender	Man	177	55.14
	Woman	143	44.55
Age (years old)	17 to 26	78	24.30
	27 to 42	161	50.16
	43 to 58	48	14.95
	59 to 77	33	10.28
Education	Junior High School	38	11.84
	Senior High School	100	31.15
	Diploma	29	9.03
	Undergraduate	119	37.07
	Postgraduate	34	10.59
Business type	Product Goods	255	79.44
	Service Products	65	20.25
Duration of operations	< 5 years	85	26.48
	5 to 10 years	195	60.75
	> 10 years	41	12.77

B. Structural Model Validation

Validation of the structural and construct models was conducted through confirmatory factor analysis (CFA) to evaluate convergent and discriminant validity. Convergent validity was assessed using several indicators, including outer loading, average variance extracted (AVE), composite reliability (CR), and Cronbach's alpha. According to an acceptable outer loading value should exceed 0.7. As shown in Table 2, all constructs demonstrated outer loading values greater than 0.7. The AVE value, representing the degree of variable convergence to its construct, is deemed valid if it exceeds 0.5, following the criteria of Fornell and Larcker [42]. All constructs in this study achieved AVE values above 0.5, as presented in Table 2, confirming that convergent validity was established.

Table 2.
Analysis of Reflective Measurement Model

Constructs	Item	Loadings (>0.7)	CA (> 0.7)	CR (> 0.7)	AVE (>0.5)
Technological barriers (TEC)	E-commerce isn't useful for SMEs.	0.902	0.953	0.963	0.811
	E-commerce doesn't boost sales.	0.901			
	E-commerce is hard to use.	0.905			
	E-commerce is too complex.	0.869			
	E-commerce doesn't meet business needs.	0.916			
	E-commerce isn't suitable for this business.	0.908			
Organizational barriers (ORG)	SME owners won't invest in e-commerce.	0.860	0.913	0.931	0.693
	SME owners won't spend enough time on e-commerce.	0.907			
	We lack skilled staff for e-commerce.	0.844			
	Staff lack IT knowledge.	0.808			
	We don't have enough staff for e-commerce.	0.761			
	We lack the infrastructure for e-commerce.	0.806			
Environmental barriers (ENV)	Competitors don't use e-commerce.	0.747	0.87	0.902	0.608
	E-commerce isn't needed to compete.	0.821			
	Most customers don't buy online.	0.863			
	Customers don't need online buying options.	0.762			
	Government training doesn't reach us.	0.756			
	The Government doesn't fund e-commerce.	0.719			
Non-Adoption E-Commerce (NAC)	E-commerce isn't important for marketing.	0.969	0.972	0.98	0.923
	E-commerce isn't needed in our business.	0.958			
	I don't want to use e-commerce for marketing.	0.970			
	I won't use e-commerce for marketing.	0.946			
Negative business sustainability (NBS)	No e-commerce means no sales growth.	0.975	0.931	0.951	0.831
	No e-commerce means no profit growth.	0.956			
	No e-commerce leads to unhappy customers.	0.934			
	No e-commerce means no need for local IT experts.	0.767			

To further assess convergent validity, CR was utilized to measure the accuracy and quality of constructs [42]. CR values above 0.7 indicate convergent validity, and in this study, all constructs recorded CR values greater than 0.7. Internal consistency analysis using Cronbach's alpha also produced results exceeding the recommended threshold, with Cronbach's alpha values above 0.7. Therefore, the analysis confirmed good internal consistency in this study (refer to Table 2).

Discriminant validity analysis is used to confirm differences between constructs and show the degree of differentiation among research constructs. In this study, we used criteria proposed by Fornell Larcker [42]. The square root of the AVE for each construct was found to be greater than its correlations with other constructs in the model (see Table 3), clearly indicating successful discriminant validity. Thus, based on all analysis results, the proposed model can be considered successfully validated.

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P-ISSN: 2621-2536; E-ISSN: 2621-2544; DOI: 10.15408/aism.v8i2.46657

Table 3.
Discriminant Validity Based on Fornell and Larcker

		1	2	3	4	5
1.	TEC	**0.900**				
2.	ORG	0.749	**0.832**			
3.	ENV	0.754	0.683	**0.879**		
4.	NAC	0.813	0.654	0.845	**0.961**	
5.	NBS	0.598	0.662	0.795	0.616	**0.912**

C. Data Analysis

The proposed structural model was evaluated using SEM-PLS analysis. The initial step in model assessment involved presenting all control variables along with the endogenous constructs (non-adoption of e-commerce and negative business sustainability). Model fit was measured through the coefficients of determination (R^2) and predictive relevance (Q^2). The findings indicate that the model fit levels for non-adopted e-commerce are $R^2 = 0.786$ and $Q^2 = 0.784$, and for negative business sustainability, $R^2 = 0.380$ and $Q^2 = 0.378$. Furthermore, multicollinearity was examined using the variance inflation factor (VIF). In this study, all VIF values ranged between 2.097 and 4.714, which are acceptable and demonstrate that the model is properly estimated. The next step was conducting hypothesis testing without the inclusion of control variables, with detailed results shown in Table 4.

The third step involved hypothesis testing while including the control variables identified as not significant in the first step, namely the type of business and duration of operation. The lack of significance in the control variables' results implies that the endogenous variables exhibit no meaningful differences regardless of whether the control variables are included. The results from this third step produced the final model, as illustrated in Table 4. In the third procedure, the significance of relationships was confirmed through bootstrapping using SmartPLS. The results of testing hypotheses 1, 3, 4, 5, and 7 were accepted at the 5% significance level, both with and without control variables. However, hypotheses 2 and 6 did not receive support. Therefore, the research findings remain consistent and do not reveal differing results, as observed in this context.

To accurately grasp the impact of one construct on another, it is crucial to control other variables and separate their effects. Hence, analyzing control variables in causal links is essential, since they are part of endogenous constructs. Control variables potentially affect endogenous constructs, so their presence must be accounted for to reflect the unique impact of one construct on another [42]. This is clarified by the lack of impact from the control variables of business type and duration of operation on e-commerce non-adoption and negative business sustainability (p-value >0.05).

Table 4.
Assessment of the structural model

		Without Controls		With Control		
	Relations	β	P-Val	β	P-Valu e	Result
H1:	TEC→ NAC	0.429	0.000	0.431	0.000	S
H2:	ORG → NAC	-0.048	0.140	-0.045	0.162	NS
H3:	ENV → NAC	0.559	0.000	0.552	0.000	S
H4:	NAC → UNS	0.617	0.000	0.614	0.000	S
H5:	TEC → NAC → NBS	0.264	0.000	0.265	0.000	S
H6:	ORG → NAC → NBS	-0.030	0.147	-0.028	0.162	NS
H7:	ENV → NAC → NBS	0.345	0.000	0.339	0.000	S
Control Variable						
Business Type → NAC		-	-	-0.003	0.458	NS
Business Type → NBS		-	-	0.077	0.056	NS
Duration of Operations→ NAC		-	-	-0.007	0.385	NS
Duration of Operations → NBS		-	-	0.013	0.380	NS

Note: R^2 NAC= 0.786; Q^2 NAC= 0.784; R^2 UNS= 0.380; Q^2 NBS= 0.378; S= Supported, NS= Not Supported.

D. Discussion

Research findings confirm that technological barriers significantly influence SMEs' reluctance to adopt e-commerce, consistent with prior studies [28], [29]. SME owners who perceive e-commerce as lacking benefits, being complex, or unsuitable for their business tend to resist adoption. However, this study highlights that the impact of technological challenges varies based on SMEs' perceptions of digital transformation. Compared to developed nations, SMEs in developing countries face additional hurdles, such as infrastructure limitations and digital literacy gaps, reinforcing their hesitation. Interestingly, organizational barriers do not significantly affect e-commerce non-adoption, contradicting research by [24] and [19]. They argued that the organizational context plays a crucial role in driving e-commerce adoption among SMEs, including internal readiness, managerial support, and the availability of adequate resources to effectively implement digital technology. While leadership commitment and resources are often seen as critical, this study aligns more with [45], suggesting that SMEs may reject e-commerce due to external rather than internal factors. This finding challenges the assumption that organizational readiness is a primary determinant of adoption decisions [30], [32]. Environmental barriers emerge as a key factor in non-adoption, as the absence of competitive pressure, weak customer demand, and inadequate government support discourage SMEs from digitalization. While prior studies [32], [34] emphasize these factors as adoption facilitators, this study demonstrates that their absence actively deters SMEs. The absence of government support, such as training programs that do not reach SMEs and the lack of funding for e-commerce adoption, calls for more inclusive and structured policy interventions. Solutions may include digital training, financial incentives, and partnerships with e-commerce platforms.

The findings of this study support the TOE framework proposed by [11], demonstrating its applicability not only in predicting innovation adoption decisions but also in explaining non-adoption behaviors, such as the refusal to adopt e-commerce platforms. By integrating the concept of Negative Business Sustainability [14], the study provides insights into the long-term impacts on SMEs. This research extends the TOE framework by explicitly showing that the same technological, organizational, and environmental factors influencing adoption

also contribute to resistance to innovation. By analyzing how these barriers lead to non-adoption and its consequences, this research provides a structured approach to understanding SME reluctance in embracing digital transformation. These findings underscore the importance of modifying the TOE framework to capture not only adoption processes but also resistance mechanisms, thus offering a sharper theoretical view on how contextual elements drive strategic technology choices in SMEs.

The results further reveal that SMEs' decision not to adopt e-commerce can lead to a decline in performance, reflected in negative business sustainability. This aligns with [34], who found that using e-commerce platforms in marketing significantly enhances SME performance. Similarly, [37] emphasized that business sustainability in SMEs can be achieved through sustainable innovation, particularly by leveraging information technology. The decision to avoid e-commerce adoption may disrupt SMEs' economic and social continuity. Therefore, SME owners are encouraged to adopt e-commerce as a strategy to boost performance and invest in long-term sustainability.

Technological barriers, particularly e-commerce non-adoption, can significantly impact the sustainability of SMEs, contributing to their unsustainability, as per the findings of [40], who state that SMEs' decisions to adopt e-commerce are shaped by specific contextual factors that help realize their performance potential. Furthermore, the analysis reveals that SMEs' non-adoption of e-commerce does not mediate the relationship between organizational barriers and negative business sustainability. In other words, e-commerce non-adoption does not serve as a significant link between organizational barriers and conditions of unsustainability in SME businesses. This finding contrasts with the views of [34], who suggest that e-commerce usage can mediate organizational contexts such as management support for company performance. On the other hand, environmental barriers mediated by the decision not to adopt e-commerce positively and significantly affect the state of unsustainability in SME businesses. Environmental barriers, such as lack of competition, low customer demand, and limited government support, discourage SMEs from adopting e-commerce, thereby affecting their business sustainability. This result aligns with [34], who found that environmental pressures encourage SMEs to adopt e-commerce and enhance their performance.

Ultimately, when organizational barriers are excluded—since they show no significant effect on e-commerce non-adoption decisions or on negative business sustainability—technological and environmental barriers remain significant positive predictors of e-commerce non-adoption. Furthermore, these barriers, through the mediation of non-adoption decisions, significantly impact the negative sustainability of SMEs. These findings highlight the urgent need for SMEs to identify and mitigate technology- and environment-related obstacles to prevent decisions against adopting e-commerce.

E. Theoretical Implications

This research significantly advances our understanding of why This study makes a substantial contribution to understanding why SMEs opt against adopting e-commerce. It extends the TOE framework by illustrating how resistance to e-commerce adoption and its consequences fit within the model. The findings confirm that technological and environmental barriers are critical in influencing non-adoption decisions, supporting the views of [28], [29], [32], and [39]. Additionally, the research demonstrates that avoiding e-commerce adoption leads to lower SME performance and reduced business sustainability. These results expand Tornatzky and Fleischer's TOE framework [11], showing its ability to predict not only adoption but also resistance to innovation, such as e-commerce. The study also reveals that organizational barriers neither affect e-commerce non-adoption decisions nor contribute to negative business sustainability. This highlights the need to explore other factors that might affect the link between organizational barriers and business sustainability to better understand what drives negative outcomes in SMEs.

F. Practical Implications

This research shows that Technological and environmental barriers influence SMEs' decision to avoid e-commerce, affecting business sustainability. Addressing these barriers through government-led digital programs, industry-specific training, and financial support can encourage adoption. Governments and industry associations can offer subsidized training, financial institutions can provide low-interest loans, mentorship programs, and knowledge-sharing platforms. Collaboration between policymakers and business agencies is crucial for improving digital infrastructure, fostering competitive markets, and providing direct e-commerce support.

V. CONCLUSION

Although numerous studies examine e-commerce adoption among SMEs in developing nations, little research explores the reasons for non-adoption and its implications, warranting further attention. While some researchers [4], [9], [10] have examined e-commerce adoption strategies, little is known about why most SMEs in developing countries reject e-commerce and how this affects their operations—a gap rarely addressed.

The results indicate that technological barriers positively influence e-commerce non-adoption, whereas organizational barriers show no significant impact. Similarly, environmental barriers also drive non-adoption. Furthermore, both technological and environmental barriers—mediated by non-adoption decisions—negatively affect business sustainability. The inclusion of control variables confirms the robustness of these findings. This is because when using or without control variables, it is proven not to produce a noticeable difference in the results presented.

This study confirms that technological and environmental barriers significantly influence SMEs' decisions not to adopt e-commerce, supporting hypotheses H1, H3, H5, and H7. Technological barriers—such as perceptions of complexity and the lack of perceived benefits—serve as primary obstacles, while environmental barriers—including the absence of competitive pressure, limited customer demand, and insufficient government support—further reinforce resistance. Environmental barriers, particularly the lack of competitive

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P-ISSN: 2621-2536; E-ISSN: 2621-2544; DOI: 10.15408/aism.v8i2.46657

pressure, customer demand, and government support, significantly hinder SME e-commerce adoption, highlighting the need for inclusive policies such as digital training, financial incentives, and platform partnerships. However, contrary to H2 and H6, organizational barriers—such as internal readiness and managerial support—do not have a significant impact, indicating that external contextual factors are more critical for Indonesian SMEs. These findings extend the TOE framework by demonstrating that the same technological and environmental factors that facilitate adoption can also hinder innovation. Furthermore, the decision not to adopt e-commerce (H4) is shown to negatively affect business sustainability, particularly through decreased performance and reduced competitiveness.

The practical implications of this study emphasize the need for policy interventions focused on addressing technological and environmental challenges, such as accessible digital training, financial incentives, and collaboration with e-commerce platforms. As organizational barriers are found to be insignificant (rejecting H6), efforts should be directed toward improving digital infrastructure, literacy, and supportive ecosystems. These findings also highlight the necessity of modifying the TOE framework to incorporate innovation resistance analysis, not solely adoption. For SMEs, e-commerce adoption is a key strategy for achieving business sustainability, while governments and stakeholders must reinforce environmental factors through inclusive policy measures. This study fulfills its objective by identifying the barriers to non-adoption and their impacts, while validating five out of seven tested hypotheses—except for H2 and H6, which warrant further investigation.

Although this study offers valuable insights, its findings are based on SMEs in Yogyakarta City, Sleman Regency, and Bantul Regency, providing a strong regional perspective. Future research could broaden the geographic scope to enhance generalizability while maintaining analytical depth. Nonetheless, SMEs should proactively address technological and environmental challenges to facilitate e-commerce adoption. A deeper understanding of non-adoption's impact on business sustainability is crucial for developing risk mitigation strategies and fostering a supportive business environment, where stakeholders play a vital role in enabling digital transformation.

This study has several limitations, including limited geographic and sectoral coverage, potential response bias due to online questionnaires, and the need for further investigation into factors affecting e-commerce adoption decisions. Future studies should expand sample diversity and use mixed-method data collection to strengthen findings. Additionally, addressing organizational leadership, e-commerce training, mentoring, and trust could improve SME business sustainability.

ACKNOWLEDGMENT

Alhamdulillahirabbil'alamin, the Lord of the Universe, whose boundless mercy has been graciously bestowed upon us. We extend our sincere gratitude to everyone who contributed to this research—from the SME actors who generously shared their data, to the author's academic institution for its continuous support, and to UIN Syarif Hidayatullah Jakarta for providing the platform to publish this research.

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