Apollo: Journal of Tourism and Business
Vol 3, Issue 1, January 2025, Page 332-345
ISSN: 2985-5810 (Media Online)
DOI: https://doi.org/10.58905/apollo.v3i1.430

Analyzing the Key Drivers of E-Commerce Adoption in MSMEs: an Empirical Research in Indonesia

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Abstract. Micro, Small, and Medium Enterprises (MSMEs) play a crucial role in Indonesia's economy, significantly contributing to the Gross Domestic Product (GDP). However, the shift in consumer behavior from traditional shopping to online shopping necessitates MSMEs to adapt to information technology, particularly e-commerce. This study aims to identify the factors supporting e-commerce adoption by MSMEs, including competitive pressure, entrepreneurial mindset, perceived benefits, and owner/HR knowledge. This research employs a quantitative approach using Partial Least Square (PLS) methods to analyze data from 358 MSMEs respondents in Bandung, Yogyakarta, Denpasar, and Mataram. The results indicate that all independent variables (competitive pressure, entrepreneurial mindset, perceived benefits, and knowledge) significantly influence e-commerce adoption. These findings provide practical contributions for SMEs in developing effective e-commerce adoption strategies.

Keywords: E-Commerce, MSMEs, Technology Adoption, Performance

1 Introduction

Micro, Small, and Medium Enterprises (MSMEs) constitute a vital foundation for strengthening Indonesia's economy. As of the latest data, Indonesia hosts approximately 64.2 million MSMEs, contributing 61.07% to the national GDP—equivalent to IDR 8,573.89 trillion (Coordinating Ministry for Economic Affairs, Republic of Indonesia, 2021). MSMEs also account for 97% of the total employment and absorb 60.4% of national investment. Given this substantial contribution, enhancing MSME performance is essential, especially amid increasingly intense market competition.

In the context of a highly dynamic and competitive environment, it is crucial for MSMEs to develop market responsiveness and agility to detect and react to external environmental changes. One significant shift that demands immediate attention is the transformation of consumer behavior from traditional in-store purchases to online shopping. This shift poses both a challenge and an opportunity for business actors, including MSMEs.

Adopting information technology—particularly e-commerce—is one of the key strategies for MSMEs to respond to this behavioral change. E-commerce adoption offers significant advantages in terms of convenience, and efficiency in time, labor, and cost. Alberto and Fernando (2007) argue that e-commerce can enhance business competitiveness by leveraging internet technologies, allowing MSMEs to compete on equal terms with larger enterprises in both domestic and international markets.

Nevertheless, the adoption of e-commerce among MSMEs is not without challenges. Scupola (2009) found that technological implementation can be costly and often becomes a barrier for MSMEs due to resource constraints. Thus, resource availability becomes a critical determinant of technology adoption. Many MSMEs lack the internal capacity to invest in modern technology, which adversely affects their ability to adopt and utilize e-commerce platforms (Van Akkeren & Harker, 2003). According to Costa and Castro (2021), barriers to e-commerce adoption in MSMEs can be classified into two broad categories: internal and external factors. In

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addition to technological constraints, other limiting factors include competition, regulatory conditions, entrepreneurial mindset, perceived benefits, and human resource knowledge. Empirical studies suggest that MSMEs must transform their business models towards e-commerce to ensure long-term survival (Costa & Castro, 2021). Digital transformation is increasingly viewed as a necessary pathway for MSME sustainability. Accordingly, MSMEs with higher levels of technological experience are expected to demonstrate higher adoption rates. However, Costa and Castro (2021) also emphasize that managers and business owners must possess adequate technological literacy and an understanding of organizational change to ensure successful implementation.

The adoption of e-commerce by MSMEs is highly relevant in the context of increasingly intense business competition. While a substantial body of literature has investigated e-commerce adoption among MSMEs in relation to various supporting factors, such as competitive pressure (Sin et al., 2016; Sin & Sin, 2020), entrepreneurial mindset (Nasutian et al., 2021; Gallant et al., 2025), perceived benefit (Hossain et al, 2022; El Said, 2017), and knowledge (Chau et al., 2020), a comprehensive understanding of how a synergistic interplay of these factors collectively influences e-commerce adoption remains underexplored. This gap is particularly pronounced within the dynamic and resource-constrained context of developing economies like Indonesia.

Moreover, research findings on these specific factors remain varied. For instance, studies highlighting the influence of competitive pressure on e-commerce adoption in SMEs show that environmental factors, including competitive pressure, play a significant role in e-commerce adoption in South Africa (Garg & Choeu, 2015). However, a study by Ramayah et al. (2016) found that external pressure does not always result in a strong impetus for continued information technology usage in Malaysia. Similarly, regarding the entrepreneurial mindset factor, Amofah & Chai (2022) identified various factors influencing e-commerce adoption, but did not explicitly explore the impact of an entrepreneurial mindset on e-commerce adoption outcomes. Furthermore, in the context of perceived benefit, there is a significant lack of research explaining how the perceived benefits of e-commerce adoption are actually measured and interpreted by MSMEs. In term of perceived benefit, Hidayati et al. (2019) verified that factors such as organizational support and technological competence play a crucial role in the influence of perceived benefit on adoption of e-commerce, although further research is needed to understand how various MSMEs owners subjectively define and measure these benefits. A similar situation applies to the managerial knowledge variable, where its role in strengthening e-commerce adoption among MSMEs remains underexplored. In many studies, this factor is only implicitly measured without a detailed understanding of how managers in MSMEs utilize this knowledge to drive e-commerce adoption decisions (Hidayati et al., 2019). Based on the identified research gap, the following research questions can be formulated: What is the comprehensive influence of competitive pressure, entrepreneurial mindset, perceived benefit, and managerial knowledge on e-commerce adoption among MSMEs in Indonesia?.

In light of the importance of e-commerce adoption among MSMEs, this study seeks to identify the key enabling factors, including competitive pressure, entrepreneurial mindset, perceived benefits, and managerial or human capital knowledge. The findings are expected to contribute both to the practical understanding of e-commerce implementation in MSMEs and to policy formulation by providing strategic recommendations to support MSMEs development. This study offers a novel and significant contribution to the literature on digital transformation of MSMEs, particularly within the dynamic Indonesian context. While existing research has explored external drivers of e-commerce adoption in MSMEs (Koe & Sakir, 2020; Lekmat, 2018; Xiao et al., 2021), this study developed a comprehensive model simultaneously investigating the interplay of external factor (competitive pressure) and internal factors (entrepreneurial mindset, perceived benefit, and managerial knowledge). This comprehensive approach aims to empirically demonstrate their combined influence on e-commerce adoption among MSMEs. By integrating these multifaceted internal and external factors, our research fills a crucial theoretical gap, providing a holistic understanding of how MSMEs in a rapidly digitizing economy, like Indonesia, navigate the complexities of e-commerce integration.

2 Literature Review and Hypothesis Development

2.1 Technology Acceptance Model (TAM) and Theory of Planned Behavior (TPB)

Empirical validation of e-commerce adoption involves testing and validating specific frameworks for organizational e-commerce adoption, based on various grand theories related to technology use and human behavior. The Technology Acceptance Model (TAM) (Davis, 1989) serves as the foundational framework in this research to support the study's objective of exploring MSMEs owners' willingness to adopt technology for business development. TAM is widely regarded as the foundational and most prominent traditional adoption theory within the domain of information technology (Awa et al., 2011). Specifically, it offers a strong foundation for exploring how external factors influence technology adoption decisions, drawing its core tenets from economic, utilitarian, and attitudinal principles. To further enhance TAM's explanatory power, the Theory of Planned Behavior (TPB) has been integrated, allowing for the inclusion of specific usage contexts and additional

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external variables pertinent to the technology adoption process. A key contribution of TPB is its introduction of perceived behavioral control, which theorizes that human actions are shaped by three distinct types of beliefs: behavioral beliefs, regulatory beliefs, and control beliefs. Together, these beliefs provide a framework for understanding and influencing individual actions (Ajzen, 1991; Montano & Kasprzyk, 2015). Ultimately, TPB's versatility has led to its extensive application in modeling the acceptance of diverse technologies, virtual environments, and various systems, consistently proving its effectiveness in predicting the intention to adopt e-commerce (Dakduk et al., 2017).

2.2 E-Commerce Adoption

The definition of e-commerce has evolved in line with the increasing academic interest in this area. Initially, e-commerce was defined as the process of buying and selling goods via the internet (Govinnage, 2019). Later, it came to be understood as encompassing all processes and activities that facilitate the exchange of financial and non-financial information in an electronically mediated environment between a firm and its stakeholders through computer networks (Chong, 2008; Chaffey, 2009; Rainer & Cegielski, 2011; Turban et al., 2017). Agwu (2015) identifies three core actors in e-commerce: businesses, individual consumers, and governments. Based on the interactions among these actors, e-commerce is categorized into several models: Business-to-Business (B2B), Business-to-Consumer (B2C), Consumer-to-Business (C2B), Consumer-to-Consumer (C2C), Customer-to-Government (C2G), Business-to-Government (B2G), and Government-to-Consumer (G2C).

E-commerce adoption refers to the use of information and communication technologies and related applications to support management, decision-making, and business operations. Numerous studies have explored e-commerce adoption, revealing that it is influenced by both internal and external factors, which can either facilitate or hinder the process within MSMEs.

External factors describe an organization's environmental context, which significantly affects its decision to adopt e-commerce (Chiu et al., 2017). Scupola (2009) notes that environmental factors include government roles, business partner preferences, supply chain characteristics, logistical and telecommunications infrastructure, political and economic instability, human rights issues, business culture, and natural disasters such as floods and earthquakes, along with macroeconomic policies. Gorla (2017) highlights that price competition is a key environmental factor influencing e-commerce interest. Hayati and Andrawina (2019) classify environmental factors into institutional, economic, sociocultural, and technological contexts. Al-Tit (2020) distinguishes between external drivers and inhibitors of e-commerce adoption. External drivers include formal and informal regulations, partner readiness, global and local competition, and sociocultural factors, while inhibitors include regulatory issues, consumer unpreparedness, transaction trust, social status, and language. Chandra and Kumar (2018) group environmental factors into consumer readiness and competitive pressure.

2.3 The Effect of Competitive Pressure on E-Commerce Adoption

Competitive pressure refers to the level of competition within the industry in which a firm operates (Lertwongsatien et al., 2003). Organizations are more likely to adopt innovations when operating in highly competitive environments. In this dynamic market, firms, including MSMEs, must adopt informed and innovative e-marketing strategies to remain distinctive and successful in domestic and international markets (Sin et al., 2016). Competitive conditions push organizations to allocate resources for innovative products or services in response to rival actions.

Many empirical studies have demonstrated that stronger competitive pressure is positively associated with higher innovation adoption. For instance, Zhu et al. (2003) found that European firms adopting e-business technologies faced greater competitive pressure than non-adopters. Similarly, Lertwongsatien et al. (2003) found that SMEs in Thailand were more likely to adopt innovative systems in competitive environments.

Looi (2005) suggests that competitive intensity in an industry encourages firms to innovate, including in technology adoption. The structure of the industry and the prevalence of technology use influence the urgency for adoption, as firms aim to stay ahead (Chandra & Kumar, 2018). Competitive pressure increases environmental uncertainty and drives innovation (Ettlie, 1983; Ettlie & Bridges, 1982). According to Porter and Miller (1985), the five competitive forces-threat of new entrants, threat of substitutes, bargaining power of buyers, bargaining power of suppliers, and rivalry among current competitors—can be strategically managed through information technology adoption. Consistent with prior theoretical foundations, our first hypothesis is, therefore, posited as:

H1: Competitive pressure has a positive effect on e-commerce adoption.

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2.4 The Effect of Entrepreneurial Mindset on E-Commerce Adoption

An entrepreneurial mindset refers to a way of thinking characterized by being proactive, innovative, risk-taking, and opportunity-oriented. Entrepreneurship and innovation are key to the success of individuals and organizations in the modern economy. Kuratko et al. (2021) define the entrepreneurial mindset as a perspective that enables individuals to generate new ideas, solve problems, create innovative solutions, and act on opportunities. Unlike a managerial mindset, shifting to an entrepreneurial mindset can yield sustainable competitive advantages (Wright et al., 2000).

Research shows that entrepreneurial traits—such as opportunity recognition, risk-taking, and innovation-significantly increase the likelihood of MSMEs adopting e-commerce technologies (Abebe, 2014). Entrepreneurially oriented MSMEs are more adept at implementing e-commerce strategies, leading to enhanced customer engagement and operational effectiveness. Furthermore, Awiagah et al. (2016) emphasize the role of supportive government policies in shaping MSME owners' behavior and mindset towards e-commerce adoption, indicating that a conducive environment fosters entrepreneurial thinking. This body of evidence suggests that cultivating an entrepreneurial mindset equips MSMEs with the necessary skills to navigate the complexities of e-commerce and adopt strategic technology solutions for sustainable growth. In line with existing theoretical tenets, we thus propose our second hypothesis as follows:

H2: Entrepreneurial mindset has a positive effect on e-commerce adoption.

2.5 The Effect of Perceived Benefit on E-Commerce Adoption

In economic literature, the willingness to enter a new market is often driven by the perceived benefits of doing so. Perceived benefit is defined as the advantages or improvements obtained from operating business transactions through e-commerce applications (Agwu & Murray, 2015; Rahayu & Day, 2015). Nikolaeva (2006) identifies market growth, stock price appreciation, and advertising intensity as indicators of perceived benefit. According to Rahayu and Day (2015) and Govinnage (2019), perceived benefit is a significant factor influencing technology adoption. Both perceived usefulness and ease of use positively shape attitudes and behavioral intentions toward e-commerce, ultimately encouraging actual usage. Consistent with prior theoretical foundations, our third hypothesis is, therefore, posited as:

H3: Perceived benefit has a positive effect on e-commerce adoption.

2.6 The Effect of Knowledge on E-Commerce Adoption

Knowledge about the benefits and use of e-commerce is a major determinant of MSMEs' willingness to adopt such technologies. This knowledge-adoption link is vital for enabling MSMEs to adapt to technological advancements in the market. A solid understanding of e-commerce practices allows MSMEs to effectively manage online transactions, marketing, and customer engagement. For example, Widyastuti et al. (2023) emphasize that targeted e-commerce training enhances MSME knowledge, empowering them to expand market reach and optimize sales strategies. Higher levels of e-commerce knowledge correlate positively with MSMEs' willingness to adopt it, showing that comprehensive understanding facilitates smoother adoption and reduces barriers. Guided by the preceding theoretical discussion, the following constitutes our fourth hypothesis:

H4: Knowledge has a positive effect on e-commerce adoption.

The formulation of hypotheses, based on prior theoretical frameworks, consequently leads to the development of the research model, as presented in Figure 1.

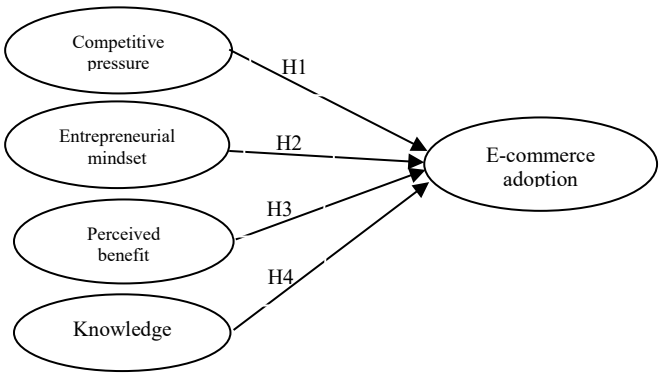

Figure 1. Research Model

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3 Research Methodology

This study is designed as a quantitative research project aimed at verifying the effects among variables established in the research model. The model was developed to test the proposed hypotheses, as illustrated in Figure 1. Based on theoretical frameworks and previous studies, the research includes four independent variables—competitive pressure, entrepreneurial mindset, perceived benefit, and knowledge—and one dependent variable, namely e-commerce adoption.

Data analysis was carried out in stages, including reliability testing, validity testing, and Partial Least Squares (PLS) analysis to draw conclusions. The research was conducted among micro, small, and medium enterprises (MSMEs) located in Bandung, Yogyakarta, Denpasar, and Mataram given that many micro and small enterprises are located in these cities. However, data collection revealed that the majority of respondents are micro-enterprises. According to Articles 35 and 36 of Government Regulation (PP) No. 7 of 2021 concerning Ease, Protection, and Empowerment of Cooperatives and Micro, Small, and Medium Enterprises, the classification for a micro-enterprise is having a business capital of up to IDR 1,000,000,000.00 (one billion Rupiah), excluding land and buildings used for business. A convenience sampling approach was employed to collect data from the target respondents.

The operational definitions for the variables employed in this study, accompanied by their corresponding seminal literature, are delineated in Table 1. Pertaining to their measurement, all constructs were assessed using multiple items, anchored to a five-point Likert scale. Respondents rated each statement based on the following scale: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. A five-point scale with a neutral midpoint was used to provide a broader range of responses. If the results of a pre-test revealed a central tendency bias with over 30% of responses in the neutral category, the scale was adjusted to a forced-choice even scale to prompt more decisive responses. Through an online questionnaire distribution, a total of 358 valid responses were obtained and subsequently analyzed for hypothesis testing.

Table 1. Definitions of Variables

Variable	Definition	Literature
E-commerce adoption	The scope of explicit, purposeful strategies devised for e-commerce utilization	Bock et al. (2005)
Competitive Pressure	The level of competitive intensity characterizing the operating environment of firms within their respective industry	Lertwongsatien et al. (2003)
Entrepreneurial Mindset	A viewpoint that enables and equips individuals to conceive novel ideas, address challenges, devise innovative solutions, and proactively seize opportunities	Kuratko et al. (2021)
Perceived Benefit	the advantages or improvements obtained from operating business transactions through e-commerce applications	Agwu & Murray (2015)
Managerial Knowledge	knowledge-adoption to adapt to the technological advancements in the market	Widyastuti et al. (2023)

4 Results and Discussion

4.2 Demographic Characteristics of Respondents

This study successfully collected and analyzed **358 valid responses**. The demographic characteristics of the respondents' businesses are summarized in Table 21.

Table 2. Demographic Characteristics of Respondents by Business Profile

Variable	Category	Frequency	Percentage
Business Sector	Fashion	60	16.8%
	Food & Beverage (F&B)	179	50.0%
	Agriculture	59	16.5%
	Basic Necessities	16	4.5%
	Handicrafts	35	9.8%
	Footwear	9	2.5%
	Others	27	7.5%

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Years in Business	≤ 3 years	93	26.0%
	3–6 years	132	36.9%
	7–10 years	63	17.6%
	> 10 years	43	12.0%
Monthly Revenue	< IDR 10 million	172	48.0%
	IDR 10–50 million	104	29.1%
	IDR 60–100 million	63	17.6%
	> IDR 100 million	19	5.3%
Asset Value	< IDR 10 million	124	34.6%
	IDR 10–50 million	172	48.0%
	IDR 60–100 million	48	13.4%
	> IDR 100 million	14	3.9%
Number of Employees	< 5	278	77.7%
	5–10	59	16.5%
	> 10	21	5.9%

4.3 Data Analysis Results

4.3.1 Validity Test

The validity test is used to measure the level of validity or accuracy of an instrument. According to Sugiyono (2017), an instrument is said to be valid if it can measure what is intended and reveal data from the variables being studied accurately. The higher the validity of the instrument, the more accurate the data collected. The detailed results of the validity test of the research instrument can be seen in Table 3.

Table 3. Results of the Validity Test for Variables

Indicator	Corrected Item-Total Correlation	Description
Competition Pressure (X1)		
CP 1	0.579	Valid
CP 2	0.610	Valid
CP 3	0.642	Valid
CP 4	0.349	Valid
Entrepreneurial Mindset (X2)		
EM 1	0.656	Valid
EM 2	0.610	Valid
EM 3	0.519	Valid
EM 4	0.662	Valid
EM 5	0.482	Valid
EM 6	0.552	Valid
Perceived Benefits (X3)		
PB 1	0.748	Valid
PB 2	0.799	Valid
PB 3	0.678	Valid
Knowledge (X4)		
KN 1	0.669	Valid
KN 2	0.523	Valid
KN 3	0.585	Valid
E-Commerce Adoption (Y)		
EC 1	0.772	Valid
EC 2	0.818	Valid
EC 3	0.802	Valid

The result of the validity test on each variable show the calculated r values of the corrected item-total correlation (from 0.349 to 0.818) > r-table (0.113) for 358 respondents at a 5% significance level (alpha), so all instruments on all variables in this study are declared valid.

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4.3.2 Reliability Test

The results of the reliability test for all variable dimensions show Cronbach's Alpha values ranging from 0.747 to 0.897, which are above the cut-off of 0.6, indicating that all variables in this study are reliable. The detailed results of the reliability test can be seen in Table 4.

Table 4. Results of the Reliability Test for Variables

No.	Variable	Cronbach's Alpha	Description
1	Competition Pressure (CP)	0.747	Reliable
2	Entrepreneurial Mindset (EM)	0.810	Reliable
3	Perceived Benefits (PB)	0.861	Reliable
4	Knowledge (K)	0.757	Reliable
5	E-Commerce Adoption (EA)	0,897	Reliable

4.3.3 Classic Assumption Violation Test

4.2.3.1 Normality Test

The normality test is conducted to determine whether the data collected comes from a normally distributed population. A good regression model should be normally distributed or close to normal. If the data does not follow a normal distribution pattern, it will lead to biased estimations. Normality testing was conducted using the Kolmogorov-Smirnov test. Using SPSS 25 software, the results are shown in Table 5.

Table 5. Normality Test Results

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		311
Normal Parameters[a,b]	Mean	0.0000000
	Std. Deviation	0.45826477
Most Extreme Differences	Absolute	.152
	Positive	.069
	Negative	-0.152
Test Statistic bn		.152
Asymp. Sig. (2-tailed)		0.000[c]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.

Based on the Kolmogorov-Smirnov method, normality is required if the Asymp. Sig. value is above the maximum error limit of 0.05. Since the Asymp. Sig. value obtained is < 0.05, it can be concluded that the variable is not normally distributed. However, according to Wonnacot and Wonnacot (2017), the normal distribution assumption in statistical hypothesis testing about averages is not very sensitive. For n > 20, the normality assumption no longer significantly affects the sampling distribution. Therefore, in statistical hypothesis testing for a sufficiently large sample, the normality of the population is not very critical.

4.2.3.2 Multicollinearity Test

Multicollinearity occurs when some or all of the independent variables are highly correlated. To detect multicollinearity, Variance Inflation Factors (VIF) are used. Using SPSS 25 software, the results are shown in Table 6.

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Table 6. Multicollinearity Test

Coefficients[a]			
No	**Model**	**Tolerance**	**VIF**
1	Competition Pressure	0.461	2.168
	Entrepreneurial Mindset	0.579	1.726
	Perceived Benefits	0.611	1.636
	Knowledge (K)	0.571	1.752

a. Dependent Variable: E-commerce Adoption (EA)

From the output above, it can be seen that the VIF values are less than 10, so it can be concluded that there is no multicollinearity in the data.

4.2.3.3 Heteroscedasticity Test

The heteroscedasticity test aims to test whether there is unequal variance of residuals from one observation to another. If the variance of residuals remains constant, it is called homoscedasticity. To test for heteroscedasticity, each independent variable is correlated with the absolute residual value using the Spearman Rank correlation. Using SPSS 25 software, the results are shown in Table 7.

Table 7. Heteroscedasticity Test

Correlations			
			Unstandardized Residual
Spearman's rho	CP	Correlation Coefficient	-.101
		Sig. (2-tailed)	.075
		N	311
	EM	Correlation Coefficient	-.111
		Sig. (2-tailed)	.050
		N	311
	PB	Correlation Coefficient	-.070
		Sig. (2-tailed)	.215
		N	311
	K	Correlation Coefficient	-.085
		Sig. (2-tailed)	.136
		N	311

From the output above, there is no significant correlation, as indicated by the p-value (Sig) greater than 0.05. Therefore, it can be concluded that there is no heteroscedasticity in the regression model.

4.2.4 Multiple Linear Regression Analysis

To assess the impact of the independent variables such as Competitive Pressure (X1), Entrepreneurship Mindset (X2), Perceived Benefits (X3), and Knowledge (X4) on the adoption of E-Commerce (Y), multiple linear regression analysis was conducted. The regression equation is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon_i$$

Where:

Y = E-Commerce Adoption
X_1 = Competitive Pressure
X_2 = Entrepreneurship Mindset
X_3 = Perceived Benefits
X_4 = Knowledge
β_0 = Constant
$\beta_1, \beta_2, \beta_3, \beta_4$ = Regression Coefficients
ε_i = Error term

The results from the SPSS 25 software are presented in Table 8.

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Table 8. Multiple Linear Regression Analysis

Variabel	Regression Coefficient	Std. Error	t	Sig.
(Constant)	-0.313	0.282	-1.111	0.268
X1	0.266	0.068	3.903	0.000
X2	0.184	0.079	2.335	0.020
X3	0.362	0.048	7.476	0.000
X4	0.250	0.073	3.430	0.001

Based on the calculation results, the multiple linear regression equation is as follows:

$$Y = -0{,}313 + 0{,}266\ X_1 + 0{,}184\ X_2 + 0{,}362\ X_3 + 0{,}250\ X_4 + \varepsilon_i$$

The regression coefficients for the independent variables indicate how changes in the independent variables affect the dependent variable as showed by each regression coefficient, assuming the other independent variables remain constant.

4.2.5 Coefficient of Determination (R^2)

The coefficient of determination indicates the goodness of a model, whose value is between 0 to 1. A value of one indicates that all independent variables provide almost all the information needed to predict the variation of the dependent variable, and vice versa. The coefficient of determination produced in this study can be seen in Table 9.

Table 9. ANOVA

Model Summary[b]				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
	.727[a]	.528	.522	.46125

a. Predictors: (Constant), CP, EM, PB, K
b. Dependent Variable: E-commerce Adoption

Table 8 shows an R^2 value of 0.528. This means that all independent variables contribute as much as 52.8% to E-Commerce adoption. The remaining 47.2% is contributed by other variables not included in the analysis.

4.2.6 Overall Hypothesis Testing (F-Test)

An F-test was performed to determine whether the independent variables together significantly influence the dependent variable (E-Commerce adoption). The F-test results are presented in Table 10.
Hypotheses:

H0 : There is no significant effect of Competitive Pressure (X1), Entrepreneurship (X2), Perceived Benefits (X3), and Knowledge (X4) on E-Commerce adoption (Y).

Ha : There is a significant effect of Competitive Pressure (X1), Entrepreneurship (X2), Perceived Benefits (X3), and Knowledge (X4) on E-Commerce adoption (Y).

α=5%
Statistical test :

$$F = \frac{R^2\left(n-k-1\right)}{k\left(1-R^2\right)}$$

Criteria Test:

- Accept H0 if F calculated < F table
- Reject H0 if F calculated ≥ F table

F tabel = $F_{\alpha\ ;\ (df1,\ df2)}$; df1 = k , df2 = n-k-1

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Table 10. Overall Hypothesis Testing (F-Test)

F calculated	df	F table	Sig	Description	Conclusion
85.566	df1 = 4	2.401	0.000	Ho rejected	Significant effect

4.2.7 Partial Hypothesis Testing (t-Test)

A t-test was conducted to determine whether each independent variable has a significant partial effect on the dependent variable. The results of the t-test are presented in Table 11.

Hypotheses:

$Ho_1 : \beta_1 = 0$ Competitive pressure has no significance effects on e-commerce adoption
$Ha_1 : \beta_1 \neq 0$ Competitive pressure has significance effects on e-commerce adoption
$Ho_2 : \beta_2 = 0$ Entrepreneurship mindset has no significance effects on e-commerce adoption
$Ha_2 : \beta_2 \neq 0$ Entrepreneurship mindset has significance effects on e-commerce adoption
$Ho_3 : \beta_3 = 0$ Perceived benefit has no significance effects on e-commerce adoption
$Ha_3 : \beta_3 \neq 0$ Perceived benefit has significance effects on e-commerce adoption
$Ho_4 : \beta_4 = 0$ Knowledge has no significance effects on e-commerce adoption
$Ha_4 : \beta_4 \neq 0$ Knowledge has significance effects on e-commerce adoption

$\alpha = 5\%$

Statistical Test :

$t_{hit} = \dfrac{b}{Se(b)}$, degrees of freedom = n-k-1

Table 11. Partial Hypothesis Testing (t-Test)

Variable	t calculated	df	t table	Sig	Description	Conclusion
X1	3.903	306	1.968	0.000	Ho rejected	Significant
X2	2.335			0.020	Ho rejected	Significant
X3	7.476			0.000	Ho rejected	Significant
X4	3.430			0.001	Ho rejected	Significant

Based on the t-test results, all independent variables have a calculated t-value greater than the t-table value. Therefore, H_0 is rejected for all variables, indicating that each of the variables-Competitive Pressure (X1), Entrepreneurship Mindset (X2), Perceived Benefits (X3), and Knowledge (X4)-has a significant effect on E-Commerce adoption (Y).

4.3 Discussion

This study aims to identify the factors that drive MSME actors' interest in adopting e-commerce. The driving factors in this research include competitive pressure, entrepreneurship mindset, perceived benefits, and knowledge.

4.3.1 The Effect of Competitive Pressure on the Intention to Adopt E-Commerce

The results of this study indicate that competitive pressure has a positive and significant effect on E-Commerce adoption. This means that the greater the competitive pressure faced by MSME actors in the market, the more likely they are to adopt E-Commerce. Competitive pressure in this study has four dimensions: (1) competition encourages MSME actors to engage in online trade, (2) the desire to become a market leader forces MSME actors to implement online trade, (3) the need to survive in competition encourages MSME actors to apply online trade, and (4) the desire to collaborate with other MSME actors.

High competitive pressure pushes MSMEs to use all available media and strategies to remain competitive, and online trading becomes the best medium to use, as it expands market reach and overcomes distance and location barriers. The ease of using online trading platforms also helps MSMEs challenge competitors and even lead the market within their niche by innovating promotional media. Competitive pressure drives MSMEs to use online media for collaboration with other actors, particularly in terms of supply chains and business models they wish to

Apollo: Journal of Tourism and Business
Vol 3, Issue 1, January 2025, Page 332-345
ISSN: 2985-5810 (Media Online)
DOI: https://doi.org/10.58905/apollo.v3i1.430

develop. Thus, the higher the competitive pressure, the greater the intention of MSMEs to adopt E-commerce. These findings are consistent with Looi's (2005) study. However, studies by Rahayu and Day (2015), Chandra and Kumar (2018), and Sin and Sin (2020) show contrary results, where competitive pressure did not drive MSMEs to adopt E-commerce.

4.3.2 The Effect of Entrepreneurship Mindset on E-Commerce Adoption

The results of this study show that entrepreneurship mindset has a positive and significant effect on E-Commerce adoption. This means that the stronger the entrepreneurship mindset held by MSME actors, the greater their intention to adopt E-Commerce. Entrepreneurship mindset in this study consists of six dimensions: (1) MSMEs have a willingness to innovate, (2) MSMEs have entrepreneurial orientation, (3) MSMEs are willing to take risks, (4) MSMEs have the ability to seize market opportunities, (5) MSMEs have the courage to dominate the market, (6) MSMEs have a never-give-up attitude.

The willingness to innovate causes MSME actors to always think about change and their ability to follow changes, including in trade methods. The more innovative the MSMEs, the higher their intention to adopt E-Commerce. MSMEs with a strong entrepreneurial orientation will always be creative, adaptive, and progressive, responding positively to advances in information technology related to trade. Therefore, they will respond positively to the advent of E-Commerce. MSMEs with an entrepreneurial mindset are willing to take risks, including trying new methods, exploiting market opportunities, and even trying to dominate the market with innovations that they expect will expand their market share. These findings align with the research of Rahayu and Day (2015). However, the study by Ramdansyah and Taufik (2017) found that entrepreneurship mindset did not drive MSMEs to adopt E-Commerce.

4.3.3 The Effect of Perceived Benefits on E-Commerce Adoption

The results of this study indicate that perceived benefits have a positive and significant effect on E-Commerce adoption. This means that the greater the perceived benefits by MSME actors, the higher their intention to adopt E-Commerce. Perceived benefits in this study have three dimensions: (1) MSMEs believe that using online trade applications will increase sales, (2) MSMEs believe that using online trade applications will increase profits, (3) MSMEs believe that using online trade applications will make business operations more efficient.

These findings are in line with research by Rahayu and Day (2015) and Ramdansyah and Taufik (2017). However, the study by Govinnage and Sachitra (2019) found that perceived benefits did not encourage MSMEs to adopt E-Commerce.

4.3.4 The Effect of Knowledge on E-Commerce Adoption

The results of this study indicate that knowledge has a positive and significant effect on E-Commerce adoption. This means that the greater the knowledge possessed by MSME actors, the higher their intention to adopt E-Commerce. Knowledge in this study consists of three dimensions: (1) MSMEs have a desire to learn new knowledge, (2) MSMEs are willing to share knowledge with fellow business actors, (3) MSMEs are motivated to apply their knowledge for business development.

A strong curiosity about technological innovations in trade and their benefits leads MSMEs to become learners who consistently try to use their knowledge in trading methods. They also share knowledge and experiences with other MSMEs. Therefore, the more knowledge MSMEs have about online trade, the greater their intention to adopt E-Commerce. These findings align with research by Brand and Huizingh (2008), Al-Tit (2020), and Sin and Sin (2020). However, Chandra and Kumar's (2018) study found that knowledge did not drive MSMEs to adopt E-Commerce.

This study significantly advances the understanding of e-commerce adoption in developing economies by offering a more holistic and contextually specific perspective on its driving forces. While existing literature often examines isolated factors or broad frameworks, this study combines both an external market imperative (competitive pressure) with critical internal capabilities and orientations (entrepreneurial mindset, perceived benefit, and managerial knowledge. The consistent positive influence of all these variables on e-commerce adoption in developing economies, particularly in the Indonesian context, provides nuanced insights into the multi-faceted decision-making processes of MSMEs in resource-constrained yet rapidly digitizing environments.

The findings of this study indicate that perceived benefit is the independent variable found to have the largest regression coefficient, thereby establishing it as the most significant contributor to e-commerce adoption (Hair et al., 2014). MSMEs, particularly in developing countries, often operate with limited resources (capital, time, and labor). Any new investment, including the adoption of e-commerce, represents a substantial and risky decision.

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ISSN: 2985-5810 (Media Online)
DOI: https://doi.org/10.58905/apollo.v3i1.430

Consequently, for these enterprises, the choice to embrace change or adopt new technologies is overwhelmingly driven by pragmatic considerations: what tangible benefits will I gain? If these benefits are not clearly discernible or significantly perceived (e.g., increased sales, wider market access, operational efficiency, cost reduction, or improved image), then the motivation for adoption will remain exceptionally low, regardless of competitive pressure or entrepreneurial spirit.

5 Conclusions

The results of this study demonstrate that competitive pressure, entrepreneurship mindset, perceived benefits, and knowledge positively and significantly influence MSMEs' adoption of E-commerce in Indonesia. In this increasingly digital era, MSMEs must have the ability to adopt technology in their business operations. The unavoidable competitive pressure pushes MSMEs to expand their knowledge in e-commerce, as well as strengthen their entrepreneurial mindset to continuously develop their businesses. The perceived benefits of adopting e-commerce will encourage MSMEs to use it, as well as increase the knowledge supporting e-commerce adoption, ultimately improving business performance. This study has limitations, including its focus on the driving factors of e-commerce adoption. Future research could delve deeper into the challenges MSMEs face in adopting e-commerce. For instance, analyzing the barriers to e-commerce adoption would help better understand the phenomenon of technology adoption by MSMEs.

References

Abebe, M. (2014). Electronic commerce adoption, entrepreneurial orientation and small-and medium-sized enterprise (SME) performance. *Journal of Small Business and Enterprise Development*, *21*(1), 100-116.

Agwu, E. M., & Murray, P. J. (2015). Empirical study of barriers to electronic commerce adoption by small and medium scale businesses in Nigeria. *International Journal of Innovation in the Digital Economy*. *6*(2), 1-19.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179-211.

Alberto, B. M., & Fernando, L. L. (2007). A firm-level analysis of determinants of ICT adoption in Spain. *Technovation*, *27*, 352-366.

Amofah, D. O., & Chai, J. (2022). Sustaining consumer e-commerce adoption in Sub-Saharan Africa: do trust and payment method matter?. *Sustainability*, *14*(14), 8466.

Awiagah, R., Kang, J., & Lim, J. I. (2016). Factors affecting e-commerce adoption among SMEs in Ghana. *Information Development*, *32*(4), 815-836.

Al-Tit, A. A. (2020). E-commerce drivers and barriers and their impact on e-customer loyalty in small and medium-sized enterprises (SMES). *Business: Theory and Practice*, *21*(1), 146–157. https://doi.org/10.3846/btp.2020.11612

Awa, H., Eze, S., Urieto, J. & Inyang, B. (2011). Upper echelon theory: a major determinant of information technology (IT) adoption by SMEs in Nigeria. *Journal of Systems and Information Technology, 13*(2), 144-162.

Benbasat, I. & Barki, H. (2007). Quo vadis, TAM?. *Journal of the Association for Information Systems. 8*(4), 211-218.

Bock, G. W., Zmud, R. W., Kim, Y. G., & Lee, J. N. (2005). Behavioral intention formation in knowledge sharing: Examining the roles of extrinsic motivators, social-psychological forces, and organizational climate. *MIS quarterly*, 87-111.

Brand, M. J., & Huizingh, E. K. (2008). Into the drivers of innovation adoption: What is the impact of the current level of adoption?. *European Journal of Innovation Management*, *11*(1), 5-24.

Chandra, S & Kumar, K. N. (2018). Exploring factors influencing organizational adoption of augmented reality in e-commerce: empirical analysis using technoloy-organization-environment model. *Journal of Electronic Commerce Research*, *19*(3), 237-265.

Chaffey, D. (2009). *E-Business and E-Commerce Management - Strategy, Implementation and Practice*. Fourth Edition. Prentice Hall.

Chau, N. T., Deng, H., & Tay, R. (2020). Critical determinants for mobile commerce adoption in Vietnamese small and medium-sized enterprises. *Journal of Marketing Management*, *36*(5-6), 456-487.

Chiu, C., Chen, S., & Chen, C. (2017). An integrated perspective of TOE framework and innovation diffusion in broadband mobile applications adoption by enterprises. *International Journal of Management, Economics and Social Sciences*, *6*(1), 14-39.

Chong, S. (2008). Success in electronic commerce Implementation, A cross-country study of small and medium-sized enterprises, *Journal of Enterprise Information Management*, *21*(5), 468-492

Costa, J. & Castro, R. (2021). SMEs must go online—e-commerce as an escape hatch for resilience and survivability. J*ournal of Theoretical and Applied Electronic Commerce Research*, *16*, 3043-3062. https://doi.org/10.3390/jtaer16070166.

Dakduk, S., Ter Horst, E., Santalla, Z., Molina, G., & Malavé, J. (2017). Customer behavior in electronic commerce: a Bayesian approach. *Journal of Theoretical and Applied Electronic Commerce Research*, *12*(2), 1-20.

Davis, F. D. (1989). Technology acceptance model: TAM. *Al-Suqri, MN, Al-Aufi, AS: Information Seeking Behavior and Technology Adoption*, *205*(219), 5.

El Said, G. R. (2017). A cloud computing-based model of e-commerce adoption for developing countries. *Journal of Electronic Commerce in Organizations (JECO)*, *15*(3), 64-82.

Gallant, N. D., Amadi-Echendu, A. P., & Esterhuyzen, E. (2025). Exploring SME owners' motivation to learn and acquire new skills for the adoption of e-commerce. *The Southern African Journal of Entrepreneurship and Small Business Management*, *17*(1), 900.

Garg, A. K., & Choeu, T. (2015). The adoption of electronic commerce by small and medium enterprises in Pretoria East. *The Electronic Journal of Information Systems in Developing Countries*, *68*(1), 1-23.

Gorla, N., Chiravuri, A., & Chinta, R. (2017). Business-to-business e-commerce adoption: An empirical investigation of business factors. *Information System Frontier*, 19, 645–667.

Govinnage, D. Y., & Sachitra, K. M. V. (2019). Factors affecting e-commerce adoption of small and medium enterprises in Sri Lanka: Evidence from retail. *Asian Journal of Advanced Research and Reports*, *6*(2), 1-10.

Hair Jr, J.F., Black, W.C., Babin, B.J., Anderson, R.E. (2014). *Multivariate Data Analysis seventh edition.* Essex: Pearson Education Limited.

Hayati, I., & Andrawina, L. (2019, August). Comprehensive framework of E-commerce adoption in Indonesian SMEs. In *IOP Conference Series: Materials Science and Engineering* (Vol. 598, No. 1, p. 012065). IOP Publishing.

Hidayati, R., Permatasari, R. K., & Fajry, A. N. (2019). Impact of organizational support and technology competence in e-commerce adoption on SMEs performance in jabodetabek region. *Jurnal Cendekia Niaga*, *3*(1).

Hossain, M. B., Al-Hanakta, R. Y., Hervie, D. M., Nor, K. M., & Illes, C. B. (2022). Exploring the key success factors for sustainable e-commerce adoption in SMEs. *Polish Journal of Management Studies*, *25*(1), 162-178.

Kementerian Koordinator Bidang Perekonomian Republik Indonesia. (2021). UMKM Menjadi Pilar Penting dalam Perekonomian Indonesia. Siaran Pers HM.4.6/103/SET.M.EKON.3/05/2021. https://ekon.go.id/publikasi/detail/2969/umkm-menjadi-pilar-penting-dalam-perekonomian-indonesia

Koe, W. L., & Sakir, N. A. (2020). The motivation to adopt e-commerce among Malaysian entrepreneurs. *Organizations and Markets in Emerging Economies*, *11*(1), 189-202.

Kuratko, D. F., Fisher, G., & Audretsch, D. B. (2021). Unraveling the entrepreneurial mindset. *Small Business Economics*, *57*(4), 1681-1691.

Lekmat, L. (2018). Antecedents of e-commerce adoption in Thai SMEs. *UTCC International Journal of Business and Economics*, *10*(2), 219-244.

Looi, H.C. (2005). E-Commerce adoption in Brunei Darussalam: A quantitative analysis of factors influencing its adoption. *Communications of the Association for Information Systems*,15, 61-81.

Lertwongsatien, C., & Wongpinunwatana, N. (2003). E-commerce adoption in Thailand: an empirical study of small and medium enterprises (SMEs). *Journal of Global Information Technology Management*, *6*(3), 67-83.

Montano, D. E., & Kasprzyk, D. (2015). Theory of reasoned action, theory of planned behavior, and the integrated behavioral model. *Health Behavior: Theory, Research and Practice*, *70*(4), 231.

Nasution, M. D. T. P., Rafiki, A., Lubis, A., & Rossanty, Y. (2021). Entrepreneurial orientation, knowledge management, dynamic capabilities towards e-commerce adoption of SMEs in Indonesia. *Journal of Science and Technology Policy Management*, *12*(2), 256-282.

Rahayu, R., & Day, J. (2015). Determinant factors of E-commerce adoption by SMEs in developing country. Evidence from Indonesia. *Procedia - Social and Behavioral Sciences*, *195*, 142–150.

Rainer, K., & Cegielski, C. (2011). *Introduction to Information Systems: Enabling and Transforming Business. 3rd Edition*. John Wiley & Sons Inc.

Ramayah, T., Ling, N. S., Taghizadeh, S. K., & Rahman, S. A. (2016). Factors influencing SMEs website continuance intention in Malaysia. *Telematics and Informatics*, *33*(1), 150-164.

Ramdansyah, D. A., & Taufik, H. E. R. (2017). Adoption model of E-commerce from SMEs perspective in developing country evidence–case study for Indonesia. *European Research Studies Journal*, *20*(4 part), 227-243.

Scupola, A. (2009). SMEs' E-commerce Adoption: Perspectives from Denmark and Australia. J*ournal of Enterprise Information Management*, *22*(1/2), 52-166.

Sin, K. Y., Osman, A., Salahuddin, S. N., Abdullah, S., Lim, Y. J., & Sim, C. L. (2016). Relative advantage and competitive pressure towards implementation of e-commerce: Overview of small and medium enterprises (SMEs). *Procedia Economics and Finance*, *35*, 434-443.

Sin, K. Y., & Sin, M. C. (2020). Factors influencing e-commerce adoption: Evaluation using structural equation modelling (SEM). *International Journal of Business & Society*, *21*(3).

Turban, E., Whiteside, J., King, D., & Outland, J. (2017). *Introduction to Electronic Commerce and Social Commerce, Fourth Edition*. Springer Texts in Business and Economics. Springer International Publishing

Van Akkeren, J., & Harker, D. (2003). The mobile internet and small business: an exploratory study of needs, uses and adoption with full-adopters of technology. *Journal of Research and Practice in Information Technology, 35*(3), 205-220.

Widyastuti, L. Y., Maulana, H., Erik, E., Izzah, K. A., & Azzahra, Y. C. (2023). Perluasan potensi pasar produk lokal dengan e-commerce pada pelaku usaha mikro, kecil, dan menengah (UMKM). *Jurnal Pembelajaran Pemberdayaan Masyarakat (JP2M)*, *4*(2), 376-389.

Wright, M., Hoskisson, R. E., Busenitz, L. W., & Dial, J. (2000). Entrepreneurial growth through privatization: The upside of management buyouts. *Academy of Management Review, 25*(3), 592–593.
https://doi.org/10.5465/amr.2000.3363522

Xiao, Y., Zhu, L., & Li, X. (2021). A review on trust and reputation management systems in e-commerce and P2P network. In 2021 2nd international conference on E-commerce and internet technology (ECIT) (pp. 58–62).

Zhu, K., Kraemer, K. L., & Xu, S. (2003). Electronic business adoption by European firms: a cross-country assessment of the facilitators and inhibitors. *European Journal of Information Systems*, *12*(4), 251-268.
doi: 10.1057/palgrave.ejis.3000475

Zhu, K., Kraemer, K. L., & Xu, S. (2002). A cross-country study of electronic business adoption using the technology organization-environment framework. *Center for Research on Information Technology and Organizations UC Irvine*, *19*(3), 237-348.