



Case Study

Determinants of E-commerce Adoption on Business Performance: A Study of MSMEs in Malang City, Indonesia

Abu Muna Almaududi Ausat¹, Tepi Peirisal²

¹ Universitas Brawijaya, Jalan Veteran, Lowokwaru, Malang, 65145, Indonesia

² Universitas Subang, Jl RA Kartini KM 3, Pasirkareumbi, Subang, 412825, Indonesia

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CORRESPONDENCE

Phone : +62 813 57 026104
 E-mail : abumuna742@gmail.com

ABSTRACT

This study aims to identify and analyze the impact of e-commerce adoption on the performance of micro, small and medium enterprises (MSMEs). The TOE model framework is used, but the individual context is added as a criticism of the framework as an influential factor in e-commerce adoption. Six intriguing variables were examined with five hypotheses. The questionnaires were distributed to 191 MSMEs in the food and beverage industry using Google forms and sent via WhatsApp application in order to derive their opinions or assessments, which were used as the data collection method in this study. In this study, structural equation modeling-partial least squares (SEM-PLS) was used as an analytical tool. The results of the study show that there is a significant relationship between technology, organizations and individuals and the variable e-commerce adoption, which is expected to have a significant impact on MSME performance. MSMEs should be better able to take advantage of the opportunities presented by the business environment to improve their performance through the use of e-commerce. As a result, MSME owners are advised to use explicit competitive strategies through various activities carried out by the functional departments of the organization, such as emphasizing their advantages or expertise. In addition, the government must continue to take steps to improve human resource skills in e-commerce through various coaching, competency and training opportunities.

INTRODUCTION

It is undeniable that technological advancement is accelerating. This massive movement had an impact on business and trade as well. Everything today cannot be avoided due to the use of technology and the internet, including buying and selling transactions conducted by the general public. The emergence of electronic commerce systems is a form of technological progress that is rapidly advancing. Businesspeople in Indonesia, particularly in Malang City, are attempting to establish an e-commerce site that offers online services with the assistance of information technology and the availability of an internet network. In Malang City, e-commerce is growing rapidly. According to the Malang City Cooperatives and Micro, Small and Medium Enterprise (MSME) Service, 30% of the existing 70,000 MSMEs were online in 2019. Furthermore, Malang City continues to support the entry of MSME products into the market. A dedicated team works around the clock and is in charge of market analysis. "MSMEs contribute to positive economic growth. Credit expansion is the indicator. Economic growth has reached 3.70 percent and is now approaching 4 percent." The online trade sector, or e-commerce, and fresh food products,

which experienced a 123% increase in transactions, contributed to this growth, according to the Mayor of Malang. He went on to say that the Malang City government's online trade policy is in line with the smart city concept, in which the infrastructure in the urban village is built with free internet. This is now resulting in improved regional performance. There has been some research that shows that e-commerce is a two-edged sword. Nugroho and Arijanto [1] explain that e-commerce has a variety of benefits, such as shorter transaction processes, attracting more customers, encouraging service provider creativity, lowering operational costs, and increasing customer satisfaction. Adoption of e-commerce can boost business performance by increasing online sales. According to Alzahrani [2], the adoption of e-commerce has an impact on the strategy of SMEs. The advent of e-commerce has altered business plans and strategies. According to the findings of Nurlinda and Fathimah's [3] research, the implementation of electronic commerce had a significant positive impact on the performance of MSMEs. The main reason that affects the implementation of electronic commerce is that business organizations can increase the quality and speed of service, make it easier to access information needs, and respond that through the online way business organizations will get more

significant utility than conventional and can increase cost efficiency, which has a positive impact on increasing sales and profit. Furthermore, e-commerce services include market expansion, productivity enhancement, product and service customization, 24-hour trading, and knowledge exchange Alamro [4]. According to Tiwari and Singh [5], one of the benefits of e-commerce is that it saves energy and time. These aspects, however, are also associated with negative consequences, such as pollution, waste of materials, resources, and energy. According to Tiwari and Singh [5], it is difficult to determine which impact is more dominant than e-commerce, whether it is a positive or negative impact. It all comes down to the Internet user and how they use it. If used properly, it will be beneficial to society; if not, it may be a reason to harm future generations.

In theory, there are two major theories that are frequently adapted in various literatures to explain the relationship between the factors that influence the implementation of technological innovation in an organization or MSMEs. The theories are the Technology-Organization-Environment Framework and the Theory of Diffusion of Innovation (DOI). Tornatzky et al. introduced the TOE framework in Rahayu and Day [6]. According to this theory, three factors can influence technological innovation in an organization: technological context, organizational context, and environmental context. Meanwhile, DOI theory explains the fundamental approach to analyzing the diffusion of new technologies. Rogers et al. [7] proposed the DOI theory, which states that the adoption and use of innovation by companies or organizations is influenced by two factors: innovation characteristics and organizational characteristics. Innovation characteristics can explain 49-87 percent of the variation in a company's or organization's innovation adoption rate Ilin et al. [8]. Furthermore, Ilin et al [8] found that the theoretical framework owned by TOE theory overlaps and is related to DOI theory in his research (Figure 1). There are similarities between these two theories in terms of innovation characteristics and technological context, as well as organizational characteristics and organizational context. However, these two theories differ in that the TOE theoretical framework does not include individual characteristics such as top management support. Meanwhile, unlike the TOE theoretical framework, the DOI theory does not take into account the impact of environmental factors. Ilin et al. [8] developed a new research model by interpolating the attributes of top management support in the organizational context and incorporating the environmental context, which is measured using several indicators, including industry pressure, government resource support, and government regulatory support. Furthermore, Rahayu and Day [6] conducted research using the developed model based on the TOE framework. In addition to the TOE framework, his research includes individual context as an influential factor in the adoption of e-commerce by SMEs in developing countries (Indonesia).

As a result, we will develop research based on the findings of Rahayu and Day [6], which examine the factors influencing the adoption of e-commerce by Small and Medium Enterprises (Figure 2). Rahayu and Day [6] investigated the impact of technological, organizational, environmental, and individual factors on e-commerce adoption. It has not, however, taken into account the impact of e-commerce adoption on the performance of MSMEs, particularly in developing countries. So, in this study,

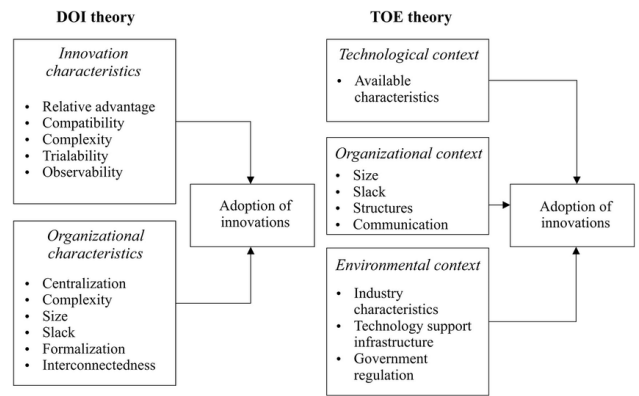


Figure 1. DOI & TOE Framework
Source: Hsu et al. in Ilin et al. [8]

we will include the MSME Performance variable to determine the adoption of e-commerce, which is influenced by various factors on MSMEs, and their impact on their performance in one of the developing countries' (Indonesia's) cities, namely Malang, due to the city's advanced IT adoption and IT literacy of MSMEs.

METHOD

Theoretical Framework

According to Ilin et al. [8], the theoretical framework owned by TOE theory overlaps and is related to DOI theory. There are similarities between these two theories in terms of innovation characteristics and technological context, as well as organizational characteristics and organizational context. There are, however, differences between these two theories, with the TOE theoretical framework excluding individual characteristics. Meanwhile, unlike the TOE theoretical framework, the DOI theory does not take into account the impact of environmental factors. Furthermore, Rahayu and Day [6] conducted research using a model developed from the DOI and TOE framework. Their research also includes individual context as a factor in e-commerce adoption.

In the proposed research, we will expand on Rahayu and Day's [6] research by taking into account the impact of e-commerce adoption on MSME performance. Figure 3 depicts the research conceptual model (see Appendix for indicators definition). The first is the technology variable, which refers to factors such as perceived benefits (X1.1), compatibility (X1.2), and cost (X1.3) that influence e-commerce adoption. According to Oliveira and

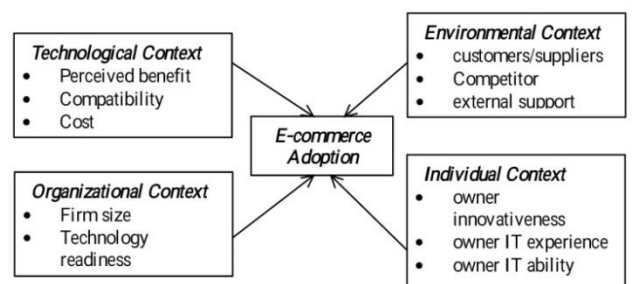


Figure 2. Rahayu and Day's Research Model [6]

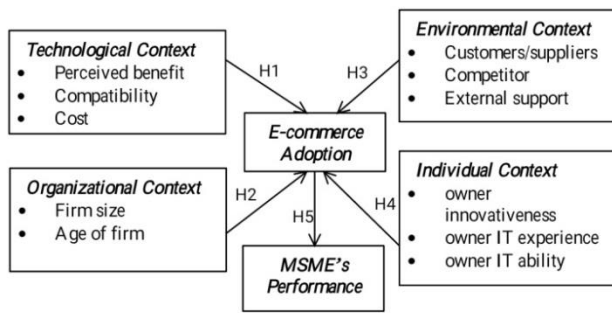


Figure 3. Conceptual Framework

Martins [9], perceived benefits are based on the level of use of the unavoidable profits that can be obtained from technology electronic commerce for organizations. Greater managerial understanding of the perceived benefits of adopting e-commerce increases the likelihood of business organizations allocating resources to adopt e-commerce, including managerial resources, technological resources, and financial resources. The term compatibility refers to how well e-commerce fits into the business organization's technology infrastructure, culture, values, and work practices [10]. Innovation will be easily recognized in an organization if it is consistent with the main authority's quality, can solve organizational problems, and is compatible with the organizational culture. The alignment of technological innovation and organizational policies would make it easier to describe innovation in a more familiar context [7]. In this study, cost is another factor that influences MSMEs' adoption of e-commerce. Generally, the lower the cost of a particular technology, the greater the adoption and application of that technology in MSMEs.

The second type of variable is organizational variables, which are based on MSMEs' characteristics and can contribute to the adoption of electronic commerce technology. One of the organizational indicators proposed in this study as a determinant factor affecting MSMEs' use of e-commerce is firm size (X2.1). This is due to the fact that firm size is related to business skills in acquiring resources such as human resources. A larger business is often able to provide certain resources more easily, and it is more likely to adopt technology such as electronic commerce. The age of the firm (X2.2) in the organizational variable is another attribute that is carried as a determining factor for the adoption of electronic commerce by MSMEs. Age influences how MSMEs think, act, and behave in carrying out modern business operations such as e-commerce in an effort to remain relevant in changing times.

The third category is environmental variables, which refer to the impact of external factors such as supplier/customer pressure (X3.1), competitor pressure (X3.2), and external support (X3.3) on e-commerce adoption. In this study, supplier/customer pressure is related to the level of pressure felt by MSMEs from customers/suppliers. Customers/suppliers have the ability to put pressure on MSMEs to adopt certain types of technology in many cases. Multinational corporations, for example, frequently encourage their branches and suppliers to use e-commerce technology to connect to their global production [6]. Wal-Mart has asked and encouraged its suppliers to use recyclable packaging [11]. As a result, MSMEs that face greater competition from trading partners are more likely to adopt certain

technological innovations in order to maintain their competitive advantage [12]. The level of pressure from competitors in the industry as perceived by the company is referred to as competitor pressure [13]. When competitors begin to use technology e-commerce, more companies will be encouraged to use technology e-commerce in order to gain a competitive advantage. As a result, the industry's level of competition is increasing, and the greater the certainty that greater implementation of electronic commerce will be achieved [13]. In addition to pressure from customers/suppliers and competitors, external support such as government assistance and IT vendors are viewed as determinants of MSMEs' adoption of e-commerce in this study. It is well known that MSMEs have limited resources, such as financial and IT skill resources, as well as government support through policies or regulations that can provide protection to various parties involved in business transactions, such as internet regulation to serve as a non-dangerous transaction medium. The use of e-commerce through the provision of incentives to MSMEs or IT vendor support, all of which are thought to be driving businesses, particularly MSMEs, to adopt IT technology [6].

The fourth type of variable is an individual variable, which is derived from or refers to a person's internal factors in a company organization. Individual variables in relation to e-commerce adoption in an organization are excluded from the TOE framework. However, another theory contends that individual factors can also influence an organization's willingness and ability to implement e-commerce systems in their business activities, particularly in MSMEs [6]. This is logical because the MSMEs structure is centralized, so the owner/role manager's in every decision is critical [14]. As a result, it can be stated that the decision to adopt or not adopt system e-commerce can be influenced by the individual context. Furthermore, the individual context in the form of managerial understanding in terms of the relative advantage of electronic commerce adoption is the ability of business organizations to allocate managerial resources, financial resources, and technological resources [6].

In this study, three individual contexts were identified as determinants influencing MSMEs' adoption of e-commerce: Owners' innovativeness, Owners' IT ability, and Owners' IT experience. The innovation is defined as the rate at which people in the same social context adopt an innovation faster than others. An innovative manager is one who finds solutions to problems by changing the structure of the problem. This means that innovative managers prefer to seek out solutions that have never been tried before, and thus are more risky. E-commerce is also a risky technological innovation, particularly when used by MSMEs, particularly in developing countries. The more innovative the MSME owners are, the more likely they are to adopt e-commerce applications [10]. MSMEs in this study also determine the owner's IT capabilities and IT experience. As is well known, one of the most common problems for small businesses is a lack of IT skills. If the owners of MSMEs have more IT skills and experience, they will rely on IT and reduce risk and uncertainty in technology adoption. Furthermore, it believes that user ability and knowledge can contribute to and accelerate technology adoption [6]. More importantly, it assumes that if the manager/owner understands the benefits and advantages of implementing electronic commerce, they will be more enthusiastic about doing so.

Research Hypotheses

Technology and E-commerce Adoption

There are three indicators identified in Rahayu and Day's research [6] in the technology variable that influence Indonesian SMEs' adoption of e-commerce, namely perceived benefit, compatibility, and cost. According to the findings of this study, perceived benefit has a positive and significant effect on e-commerce adoption, implying that perceived benefit is an indicator of determining e-commerce adoption by Small and Medium Enterprises. Meanwhile, it was discovered that cost had no significant correlation with e-commerce adoption. Technology variables, as measured by indicators of perceived benefit, have a positive and significant effect on e-commerce adoption, according to Al Alawi and Al Ali [16].

H1: Technology has a significant positive impact on e-commerce adoption

Organization and E-commerce Adoption

According to Al Alawi and Al Ali [16], organizational factors with indicators of top management support have a significant positive impact on the adoption of e-commerce in MSMEs Kuwait. According to Wang and Ahmed [17], firm size is an indicator of MSMEs' adoption of e-commerce in the UK. When small businesses struggle with resources, he believes that the larger the company, the more likely it is that they will enjoy using IT resources.

H2: Organization has a significant positive impact on e-commerce adoption

Environment and E-commerce Adoption

According to Al Alawi and Al Ali [16], environmental factors with indicators of government regulation had a significant positive effect on MSMEs' adoption of e-commerce in Kuwait. According to Duan et al. [12], the greater the pressure from trading partners on MSMEs, the more likely it is that MSMEs will adopt certain technological innovations to maintain their businesses' and companies' competitive position. Furthermore, Al-Rawabdeh [18] found that environmental factors (regulatory environment, competitive pressure, governmental pressure, support industries pressure, social influence, and customer pressure) have a significant positive effect on the level of m-commerce adoption at Jordan's telecommunications company.

H3: Environment has a significant positive impact on e-commerce adoption

Individual and E-commerce Adoption

Mohammed and Tejay [19] investigated the impact of internet safety perception, privacy concern, and personal internet on e-commerce acceptance, discovering that personal variable interest had a significant impact on e-commerce acceptance. Rahayu and Day's [6] research also shows that individual contexts such as owner innovativeness, owner IT experience, and owner IT ability can positively and significantly influence electronic commerce adoption in Indonesian MSMEs.

H4: Individual has a significant positive impact on e-commerce adoption

E-commerce Adoption and MSMEs Performance

The level of ability to increase sales, earn profits, and increase consumer satisfaction is used as a barometer to measure the performance construct. Nuvriasari and Udjang [20]. According to Love and Irani [21], the use of e-commerce or online business is more effective in assisting MSMEs to achieve excellence in their work capacity, particularly in assisting to improve implementation in general. This phenomenon is also linked to the findings of Karagozoglu and Lindell [22], who discovered that electronic commerce has a positive and significant impact on the progress of the client base, thereby increasing the degree of performance of MSMEs. This result is also supported by the findings of Lesmono [23], who demonstrated the use of internet business or e-commerce in the transaction to find a response to the user, particularly as acceptance or rejection. Users of e-commerce play a critical role in the success of electronic commerce implementation. This means that the harder a deserving user works, the better MSMEs perform in growing their businesses. According to Yulimar [24], the use of electronic commerce has a positive impact and is significantly capable of improving the performance of MSMEs, as evidenced by an increase in transaction/sales turnover and profits obtained by the organization following the use of e-commerce as a result of the development of business or organizational connections.

H5: E-commerce adoption has a significant positive impact on MSME performance

Data Collection

This research was conducted on MSMEs in the food and beverage processing sector in Malang City for 5 months, from November 2020 to March 2021. Respondents in this study must meet the following criteria: 1) MSMEs are acquainted with e-commerce. 2) E-commerce marketing via social media/platforms 3) Employing a minimum of 5 and a maximum of 99 people. A total of 191 samples with appropriate characteristics were used as respondents. The questionnaires (Tabel 1) were distributed via Google Forms and sent via WhatsApp application containing their opinions or assessments are primary data sources. In the meantime, relevant books, articles, and journals serve as secondary data to supplement the research. There are 203 responses with data in the Google Form table. However, after the process was filtered, 12 of the 203 data points entered had to be removed because the respondents did not meet the expected criteria, such as never having used or adopted e-commerce. There were 191 pieces of data used in the subsequent analysis process.

The proposed hypothesis was then tested using SEM-PLS statistical techniques and SmartPLS software 3.0. Ghazali [15] claims that a construct test that predicts whether there is a correlation between the constructs is partial least squares-component-based structural equation modeling. SEM-PLS has been perfected as a data and theory tester that is relatively weak but is able to do a job efficiently even on a small sample and the complexity of a model and is most appropriate for use in research aimed at confirming and developing theory. The SEM-Partial Least Squares analysis test is divided into two stages. The first stage is the outer model test, which is used to assess the construct's validity and reliability. The structural model/inner model is then used to test the correlation between latent variables.

Tabel 1. The questionnaires Description

Factors	Indicators	Description
Technology (X1)	Perceived benefits (X1.1)	The significance of the perceived benefits of using technology for organizations in implementing e-commerce.
	Compatibility (X1.2)	The e-commerce technology employed is consistent with the MSMEs business processes that I manage.
	Cost (X1.3)	The costs of implementing e-commerce technology in the MSMEs that I manage are quite high (expensive).
Organization (X2)	Firm size (X2.1)	The company's asset base large enough to allow it to more easily adopt new technologies such as e-commerce.
	Age of firm (X2.2)	This company has been in operation for a long time; It has an impact on the mindset of using e-commerce to support business
Environment (X3)	Customer/supplier Pressure (X3.1)	Customers/suppliers put pressure on MSMEs to procure goods needed for business, such as the adoption of e-commerce.
	Competitor (X3.2)	There is competition with other similar MSMEs for consumers, so they must adopt e-commerce.
	External support (X3.3)	The government provides assistance to MSMEs in developing technology and transitioning to e-commerce transactions in order to improve business performance, such as counseling, policies, and funding incentives.
Individual (X4)	Owner innovativeness (X4.1)	Owners are constantly coming up with creative, innovative ways to grow MSMEs through the use of e-commerce.
	Owner IT experience (X4.2)	Owners have prior experience with information technology, allowing them to implement e-commerce.
	Owner IT ability (X4.3)	Owners are capable of operating information technology that will or has been used by MSMEs.
E-commerce Adoption (Y1)	Internet use for product sales process (Y1.1)	Internet facilities in business transactions have relatively good (fast) access, so that e-commerce transactions are not hampered.
	Readiness of human resources in e-commerce (Y1. 2)	The workforce's proficiency in utilizing technology in e-commerce is extremely beneficial to business growth.
	Responding to customers online in a timely manner (Y1.3)	Adoption of e-commerce simplifies business operations, both in terms of responding quickly to consumer purchases and other operations.
MSMEs Performance (Y2)	Increased sales (Y2.1)	As long as implementing e-commerce has a positive impact on sales.
	Increased profits (Y2.2)	Because costs can be reduced, the use of e-commerce increases profits.
	Increased consumer satisfaction (Y2.3)	Adoption of e-commerce can speed up the service process and increase customer satisfaction.

RESULT AND DISCUSSION

Validity and Reliability Test

The principle that a measure (indicator) of a construct must have a high correlation. Testing the convergent validity of reflexive indicators using the program is SmartPLS 3.0 shown through the loading factor value for each mandatory construct manifest variable which is higher than 0.60 Chin (1998) in Ghozali [15].

From the obtained analysis output, it can be seen in Table 2 that the loading factor value generated by all indicator variables > 0.60 which indicates that all indicators of the research construct have been valid and have met convergent validity and can be used as a measurement tool. In addition, in convergent validity, the AVE value must be above 0.50 so that it meets the convergent validity contained in Table 2. Each square root of Average Variance Extracted (AVE) is compared to the correlation value

between constructs. If the AVE square value is greater than the correlation value between constructs, it is declared to meet the discriminant validity criteria Ghozali [15]. It can be seen from the values in bold in Table 3 (discriminant validity) that all of the indicators arranged as forming variables have entered the provisions of discriminant validity.

If Cronbach's Alpha and Composite Reliability are greater than 0.60 in the reliability test, the variable with reflexive indicators is declared to have passed Rakhmawati et al. [25]. Table 4 shows how to obtain the reliability test.

The R-square value is used to calculate the contribution of exogenous constructs to endogenous constructs. The R-square results are summarized in Table 5. R-square value 0.505 is the first. So, technology, organization, environment, and individual variables can explain 50.5 % of the variable of e-commerce adoption, while the remaining 49.5 % is due to the contribution of other factors outside of this study that are not explained. R-

Table 2. Outer Loading (Convergent Validity)

Variable	Indicator	Loading Factor
X1	X1.1	0,748
	X1.2	0,882
	X1.3	0,876
X2	X2.1	0,970
	X2.2	0,966
X3	X3.1	0,918
	X3.2	0,920
	X3.3	0,858
X4	X4.1	0,908
	X4.2	0,944
	X4.3	0,845
Y1	Y1.1	0,694
	Y1.2	0,893
	Y1.3	0,883
Y2	Y2.1	0,875
	Y2.2	0,683
	Y2.3	0,777

Table 3. Discriminant Validity (Outer Model)

Indicator	X1	X2	X3	X4	Y1	Y2
X1.1	0,748	0,106	0,115	-0,013	0,434	0,346
X1.2	0,882	0,229	0,078	-0,014	0,491	0,325
X1.3	0,876	0,214	0,121	-0,020	0,689	0,389
X2.1	0,227	0,970	0,385	0,012	0,298	0,266
X2.2	0,207	0,966	0,410	0,067	0,280	0,332
X3.1	0,090	0,346	0,918	0,506	-0,029	-0,002
X3.2	0,061	0,383	0,920	0,474	-0,026	-0,019
X3.3	0,083	0,387	0,858	0,487	-0,021	0,009
X4.1	-0,039	0,071	0,539	0,908	-0,181	-0,161
X4.2	-0,037	-0,031	0,459	0,944	-0,214	-0,235
X4.3	0,052	0,103	0,486	0,845	-0,117	-0,109
Y1.1	0,876	0,212	0,120	-0,019	0,694	0,391
Y1.2	0,427	0,241	-0,098	-0,256	0,893	0,705
Y1.3	0,374	0,282	-0,081	-0,206	0,883	0,875
Y2.1	0,374	0,282	-0,081	-0,206	0,883	0,875
Y2.2	0,310	0,134	0,038	-0,099	0,330	0,683
Y2.3	0,308	0,270	0,116	-0,116	0,443	0,777

square of the performance variable is 0.653, according to the second value in the table. So, the variables of technology, organization, individual environment, and e-commerce adoption can explain 65.3 % of the performance variable of MSMEs, while the remaining 34.7 % is the contribution of other factors outside of this study that are not explained. As a result, if the total value of R² (R-square) is greater than 0.33, SEM models are said to be appropriate and robust Ghozali [15].

The following step is to specify the F-square conditions. According to Harum et al. [26], the value of f² (F-square) is a value that indicates the average value of the value of R², and this value is present on any paths between the latent variables/constructs. With F-square values of 0.02, 0.15, and 0.35, it can be conclude that the predictors of latent variables have small, medium, and large structural correlations [15].

Table 5 shows the results based on these criteria: 1) Technology on the adoption of e-commerce has an impact on the value of F² of 0.747, indicating a significant influence; 2) Organizational

Table 4. Reliability Test

Variable	Cronbach's Alpha	Composite Reliability	AVE
X1	0,791	0,876	0,702
X2	0,933	0,968	0,937
X3	0,882	0,927	0,808
X4	0,885	0,927	0,810
Y1	0,763	0,866	0,686
Y2	0,732	0,824	0,612

Table 5. R-square & F-square Test

No	Variable	R-square
1	(Y1)	0,505
2	(Y2)	0,653

F-Square

Variable	(Y1)	Y2
X1	0,747	
X2	0,060	
X3	0,008	
X4	0,030	
Y1		1,881

adoption of e-commerce has an impact on the value of F² of 0.060, indicating a significant influence; 3) The environment has an impact on the adoption of e-commerce, with a value of F² of 0.008, indicating a minor impact; 4) The adoption of e-commerce by individuals has an effect on the value of F² of 0.030, which means medium; and 5) The adoption of e-commerce on performance has an effect on the value of F² of 1.881, which was classified as large.

The value of Q² is used to test structural models (Predictive Relevance). If the value of Q² is greater than 0 Ghozali [15], the model is said to be good enough and predictive. The following is the formula for calculating Q²:

$$Q^2 = 1 - (1 - R1^2) (1 - R2^2)$$

$$Q^2 = 1 - (1 - 0.505) (1 - 0.653)$$

$$Q^2 = 1 - 0.171765$$

$$Q^2 = 0.828235$$

Q² is calculated to yield a value of 0.828235. According to Ghozali [15], the value of Q² can be used to assess how well the model generates observed values as well as parameter estimates.

Hypothesis Testing

The significance value used (two-tailed) p-value is less than 0.05 (significance) in testing the hypothesis table 6, provided that the path coefficient value is greater than 0.1 (Positive). Furthermore, in Figure 4, the T-statistical value of each variable's indicator is used as an additional reference to discuss the study's findings.

Technology's Impact on E-Commerce Adoption

This study discovered that the technology variable has a significant positive impact on e-commerce adoption. In this study, three indicators based on the technology variable influence MSMEs in Malang City's adoption of e-commerce, namely perceived benefit, compatibility, and cost. In this study, it was

Table 6. Hypothesis Testing Results

Hypothesis	Path Coefficient	P-Value	Conclusion
X1->Y1	0,624	0,000	Supported
X2->Y1	0,198	0,001	Supported
X3->Y1	-0,083	0,284	Not supported
X4->Y1	0,149	0,021	Supported

discovered that cost had the highest t-statistic value, 57,489. This finding contradicts the findings of Rahayu and Day [6], Ilin et al. [8], who found that the technology variable, as measured by the indicator cost, is not significantly correlated with e-commerce adoption. They claim that the organization believes that using the Internet in business will not incur significant implementation, operating, or maintenance costs. Furthermore, while e-commerce and e-business may be costly in some cases, they are still less expensive than traditional business methods. However, the current study's findings are consistent with the findings of Zhu and Kraemer [13], who discovered that cost has a positive and significant impact on e-business adoption. That is, there is a price that is not prohibitively expensive for MSMEs in the city of Malang that is linked to the software and hardware of e-commerce technology. The cost of hardware and software has fallen rapidly and continues to fall as a result of the emergence of personal computers, tablets, mobile phones, and various applications that can be used to help MSMEs market their products, as well as the availability of friendly users and ready-to-use software packages.

Organization's Impact on E-Commerce Adoption

This study discovered that organizational variables have a significant impact on e-commerce adoption. In this study, two indicators were determined based on organizational variables that affect MSMEs in Malang City in adopting e-commerce, namely the age of MSMEs and the size of MSMEs. Firm size was found to have the highest t-statistic value in this study, with a value of 138,223. This finding contradicts the findings of Rahayu and Day's [6] study, which found that the organizational variable, as measured by the indicator firm size, has a negative and insignificant correlation with e-commerce adoption. According to him, Indonesian SMEs do not know the size of the company as a factor that influences it in the implementation of e-commerce because most Indonesian SMEs are still at a lower level in the

implementation of e-commerce, with most of them only having static or interactive websites or even only email. This technology is unquestionably less expensive than alternatives such as Electronic Data Interchange. However, the current study's findings are consistent with previous research indicating that organization (firm size) is a determining factor in influencing e-commerce adoption Ochola [27]. The reason for the decline is that large corporations are known to have a lot of resources, whereas small businesses find it extremely difficult to obtain such systems due to limited resources. Larger businesses are more likely than smaller businesses to adopt more complex e-commerce. While Dhewanto et al. [28] discovered that the size of the organization influences information technology adoption, the smaller the business, the less desire to benefit from information technology. This is due to a lack of resources, financial constraints, a lack of competitiveness, and a lack of human resources. This means that larger companies are more likely to focus on a broader range of businesses, and greater ICT capacities are incentives for e-commerce investment. In terms of firm size and e-commerce adoption, the findings of this study indicate that organizational size has the potential to influence e-commerce adoption decisions. Larger corporations are known to have a plethora of resources at their disposal, whereas smaller corporations will find it extremely difficult to acquire such a system due to limited resources. Furthermore, it was discovered that larger companies are more likely to adopt more complex e-commerce systems than their smaller counterparts.

Environment's Impact on E-Commerce Adoption

In this study, it was discovered that there was an insignificant negative relationship between environmental variables and e-commerce adoption. All indicators have low t-statistic values. These findings indicate that customer/supplier pressure, competitor pressure, and external support are not regarded as optimal by MSMEs in Malang City, Indonesia in the adoption of technology e-commerce as attributes that influence it. This finding contradicts the findings of studies by Al Alawi and Al Ali [16], Nurrohmah and Alfianur [29], Ilin et al. [8], Moreno et al. [30], Lim et al. [31], and Kartiwi et al. [32], which found that environmental variables such as customer pressure, competitors, trading partner attitude, and government support have a positive and significant correlation to electronic commerce adoption. The customer pressure in question is that micro or small businesses must be willing to adapt to changes in consumer shopping trends, such as joining the marketplace, in order to attract consumer attention and encourage them to spend more money and shop more comfortably. The current findings, however, are consistent with studies that show that environmental factors, such as customer pressure, competitor pressure, and external support, have no effect on MSMEs' adoption of e-commerce in Indonesia Rahayu and Day [6]. According to them, pressure from customers/suppliers, pressure from competitors, and external support are not perceived as indicators of the impact of implementing technology e-commerce by Indonesian MSMEs. The majority of customers in Indonesia are recognized as "conventional online shoppers" [33], where the products offered are only seen by customers when visiting online sites, and if interested, conventional orders via telephone, fax, or even face to face they did face. As a result, businesspeople in general, and MSMEs in particular, are not required to use advanced technology or technology to expand electronic commerce.

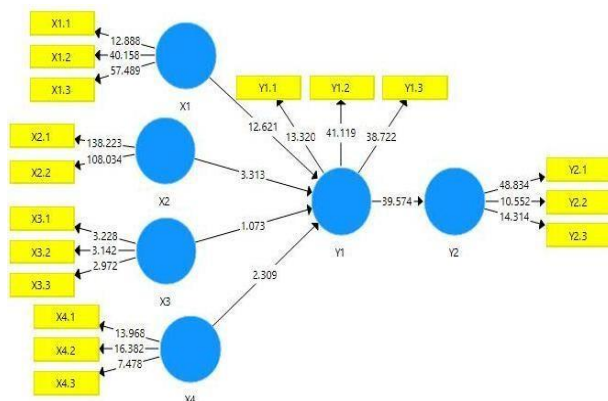


Figure 4. T-statistics (Bootstrapping)

Individual's Impact on E-Commerce Adoption

Individual variables discovered in this study have a significant positive impact on e-commerce adoption. Owner innovativeness (X4.1) of 13,968, owner of IT experience (X4.2) of 16,382, and owner of IT ability (X4.3) of 7,478 all have different t-statistic values. This finding is consistent with the findings of Rahayu and Day's [6] study, which found that individual variables such as owner innovativeness, owner IT experience, and owner IT ability are determinants of Indonesian SMEs' adoption of e-commerce. This means that MSME business owners are critical to the adoption of e-commerce technology. Because MSMEs are structurally centralized, the owner/manager is the most important decision-maker in all business decisions. As a result, in order for MSMEs to have a competent workforce, MSMEs owners must be innovative and have adequate IT skills that can be imitated and taught to employees. If MSMEs' owners are more competent and have extensive IT experience, their confidence will increase and they will be able to reduce risk and uncertainty in the adoption of information technology. Ghobakhloo et al. [10], on the other hand, believe that skills and knowledge can aid and accelerate technology adoption. More importantly, it assumes that if managers/owners understand the functions and benefits of implementing e-commerce, they will be more likely to do so.

E-commerce Adoption's Impact on MSMEs Performance

The determination of the owner or top manager of MSMEs in Malang City in implementing new ideas regarding e-commerce as a system to realize business transactions comprehensively is the adoption of electronic commerce. Sales, shopping processes, product transfers or bartering, and information services delivered via automated electronic networks and the internet are all examples of electronic commerce. In this study, the indicators used to measure e-commerce variables are a) internet use for product sales (Y1.1), b) readiness of human resource in e-commerce (Y1.2), and c) Responding to customers online in a timely manner (Y1.3). All indicators in the e-commerce adoption variable are expected to have an impact on MSMEs performance as measured by a) increased sales (Y2.1), b) increased profits (Y2.2), and c) increased consumer satisfaction levels Nuvriasari and Udjang [20].

According to the findings of this study, the use of e-commerce has a significant positive effect on the performance of MSMEs. The t-statistic value for the indicator of HR readiness in e-commerce (Y1.2) is 41,119. This result is also supported by the findings of Lesmono [23], who discovered that the use of internet business or e-commerce in dealing results in a response to the user, particularly as acceptance or rejection. The success of e-commerce implementation is closely related to user adoption as people who use electronic commerce. That is, the more feasible users work, the better MSMEs perform in growing their businesses. This study demonstrates that the use of e-commerce has a significant positive effect on MSMEs' performance, as evidenced by an increase in sales turnover with a t-statistic value of 48,834, profits or profits obtained by MSMEs with a t-statistic value of 10,552, and the ability to achieve MSMEs goals with a t-statistic value of 14,314. This finding is consistent with the findings of Love and Irani [21], Yulimar [24], and Lesmono [23], who discovered that the use of e-commerce has a significant impact on the sales turnover and profit performance of MSMEs.

CONCLUSIONS

Based on the description of the research findings. So the first conclusion is that the technology variable has a significant positive impact on e-commerce adoption. Cost is the indicator with the highest t-statistic value. That is, the lower the cost required, the faster a technological innovation is adopted and implemented in an organization or SME. Second, organizational factors have a significant impact on e-commerce adoption. Firm size is the indicator with the highest t-statistic value. That is, when small businesses struggle with resources, larger companies are more likely to benefit from the use of IT resources. The third, positively and insignificantly, environmental variables influence e-commerce adoption. This condition supports the findings of previous research by Rahayu and Day [6], which found that the environment has a negative and insignificant effect on SMEs' adoption of e-commerce. According to him, environmental variables such as customer/supplier pressure, competitor pressure, and external support are not recognized as influential factors in the use of technology for electronic commerce by Indonesian MSMEs. The logical reason for this condition is that the majority of customers in Indonesia are known as "conventional online shoppers," who visit online sites only to view available products and then place orders conventionally by phone, fax, or even face to face. As a result, businesspeople in general, and MSMEs in particular, do not need to use advanced technology or technology that has expanded e-commerce. Fourth, the individual variables have a statistically significant positive effect on e-commerce adoption. That really is, the greater an individual's competence, the greater the potential for e-commerce adoption. This means that MSMEs are the primary drivers of e-commerce technology adoption. Because MSMEs are structurally centralized, the owner/manager is the most important decision-maker in all business decisions. As a result, in order for MSMEs to have a competent workforce, MSMEs owners must be innovative and have adequate IT skills that can be imitated and taught to employees. If MSMEs' owners are more competent and have extensive IT experience, their confidence will increase and they will be able to reduce risk and uncertainty in the adoption of information technology. Ghobakhloo et al. [10], on the other hand, believe that skills and knowledge can aid and accelerate technology adoption. Fifth, e-commerce adoption has a significant positive effect on MSMEs' performance. This means that MSMEs in Malang City have realized that e-commerce can provide a variety of benefits, such as reducing operational costs, attracting more customers, encouraging service provider creativity, and increasing customer satisfaction.

Suggestions for additional research a) Future researchers can use qualitative methods that are descriptive and tend to use study or analysis to explain phenomena in depth and emphasize the depth of the data if they want to measure the impact of a technology, organization, environment, or individual on e-commerce adoption or performance. Because the more detailed and in-depth the data, the higher the quality of the research. b) This study only examines five hypotheses. More research can be conducted to test nine hypotheses about the impact of technology, organization, environment, and individual on performance. As a result, it becomes a new research framework. c) This research can be used as a follow-up study with a larger sample size, focusing on individual units of analysis in MSMEs using the TPB, TAM, and UTAUT model methods, to produce better research with less

chance of generalization errors. d) This research can be expanded upon by employing the interview method as a supplement to data collection techniques. Interviews are used to test the stability and correctness of data obtained by other methods as a measure that becomes the basis for the assessment.

Then there are some recommendations for MSMEs, such as a) MSMEs should be able to capitalize on opportunities in the business environment to improve performance through the use of e-commerce. As a result, MSMEs owners are advised to employ explicit competitive strategies through various activities carried out by the organization's functional departments, such as emphasizing the organization's or MSMEs' advantages or expertise. These abilities refer to an organization's or MSMEs' ability to make its members or workers a major or important part of achieving a competitive advantage in their business environment. b) MSMEs that have used e-commerce must be followed by an understanding of access control and e-commerce security, not just the ability to use it. As a result, if the digital technology being used is still new, MSMEs owners must prepare training facilities for all existing divisions and employees right away. c) The government must continue to work to improve human resources in the field of e-commerce through various training, skill development, coaching, and other activities. Professional and qualified employees who are responsive to market demands (changes in purchasing style trends) contribute to a country's global competitiveness. The government facilitates e-commerce training at the Job Training Center. Furthermore, they will be able to jointly organize training or workshops on e-commerce for MSMEs and even the general public in Malang City, in collaboration with communities, associations, private parties, and universities.

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APPENDIX

Indicators Definition and and References

Variables	Indicator	Definition	References
Technology (X1)	Perceived benefit (X1.1)	The organization's level of acceptance and benefits from technology.	Rahayu and Day [6]
	Perceived compatibility (X1.2)	The technology's suitability (fitness) with the company's business processes.	
	Cost (X1.3)	Expenses incurred as a result of technology implementation.	
Organization (X2)	Firm Size (X2.1)	Larger assets that can be accessed more easily in e-commerce.	Rahayu and Day [6] & Al Alawi and Al Ali [16]
	Age of firm (X2.2)	Influence on the mindset of people who use e-commerce.	
Environment (X3)	Customer/Supplier Pressure (X3.1)	Customers and suppliers are putting pressure on businesses to adopt e-commerce.	Ilin et al [8] & Rahayu and Day [6]
	Competitor (X3.2)	Competitive rivalry.	
	External support (X3.3)	Government assistance is available.	
Individual (X4)	Owner innovativeness (X4.1)	The owner has creative, innovative ideas for growing the business through e-commerce.	Rahayu and Day [6]
	Owner IT experience (X4.2)	Owner's technological experience.	
	Owner IT ability (X4.3)	The ability of the owner to use technology within the organization.	

Indicators Definition (continued)

Variables	Indicator	Definition	References
E-commerce Adoption (Y1)	Internet use for product sales process (Y1.1)	Internet facilities in the transactions business.	Rahayu and Day [6]
	Readiness of human resources in e-commerce (Y1.2)	The workforce's ability to apply technology in e-commerce.	
	Responding to customers online in a timely manner (Y1.3)	The use of e-commerce streamlines operations (responds quickly to purchases by consumers).	
MSMEs Performance (Y2)	Increased sales (Y2.1)	E-commerce can increase sales.	Nuvriasari and Udjang [20] & Hanum and Sinarasri [34]
	Increased profits (Y2.2)	Adoption of e-commerce increases profits at a low cost.	
	Increased consumers satisfaction (Y2.3)	Customer satisfaction rises when service processes are expedited.	

AUTHORS BIOGRAPHY**Abu Muna Almaududi Ausat**

He is a student of the Business Administration Study Program at Universitas Brawijaya in Malang, East Java. His research interests are about e-commerce, SMEs, Entrepreneurship and

related to business attributes. He is currently waiting for his master's program graduation schedule.

Tepi Peirisal

He is a senior lecturer at Universitas Subang, West Java. His research work has been published in several nationally accredited journals, and reputable international journals such as Scopus.