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Communication of Innovations to Increase the Adoption of Electronic Commerce among Micro, Small and Medium-Sized Enterprises (MSME)

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Abstract

Micro, Small, and Medium-sized Enterprises (MSMEs) are crucial in achieving the Sustainable Development Goals (SDGs). In Indonesia, the adoption of e-commerce among MSMEs is still low. Problems in development communication related to the low adoption of e-commerce in MSMEs are information gaps, the unavailability of sufficient information, and the lack of campaigns with development messages to support the adoption of e-commerce in MSMEs. This study aims to investigate the influence of individual characteristics, environmental factors, business characteristics, and communication channels on the perception of e-commerce. It also examines how these perceptions influence the decision to adopt e-commerce. The research uses a quantitative and qualitative approach with a proportional, stratified sampling technique with 110 business actors. The data collection integrates primary and secondary sources, and the SEM-PLS statistical tests are used for the analysis. The results show that environmental factors and communication channels directly and significantly influence the variable perception of e-commerce. The variable perception of e-commerce directly and significantly influences the adoption decision level. Strategies must be developed for environmental factors and communication channels.

Keywords: *communication of innovation, e-commerce, communication channels, innovation perception, innovation decision level, MSMEs.*

INTRODUCTION

Micro, Small, and Medium-sized Enterprises (MSMEs) assume a pivotal role in national development, contributing to economic growth, poverty reduction, income equality, employment, and non-oil and gas exports, as well as the overall Gross Domestic Product (GDP) (Anggraeni et al. 2013; Hoque et al. 2016; Rahayu, 2016), Furthermore, MSMEs play a crucial role in achieving Sustainable Development Goals (SDGs), particularly in goals 1 (reducing poverty), 8 (ensuring livelihoods and economic growth), and 10 (reducing inequality) by bridging the gap between large and small industries (United Nations Department of Economic and Social Affairs, 2019). However, data from a recent

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e-commerce survey conducted by the Central Statistics Agency (BPS) in Indonesia reveals that only 34.10 percent of businesses engage in e-commerce activities as of September 15, 2022. This data indicates a relatively low adoption of e-commerce, with conventional business models still dominating the market (BPS 2022). Development communication issues contributing to this low adoption include information gaps, insufficient access to necessary information, and a lack of campaigns to promote the adoption of e-commerce in MSMEs (Mbuyisa & Leonard, 2017; Yaseen et al., 2015).

To overcome these challenges, innovative communication strategies are crucial to influencing the attitude and behavior of MSMEs towards the adoption of e-commerce. Following Rogers' theory of innovation adoption, which explains how innovations are communicated over time in a social system, the diffusion of innovative communication can effectively spread information about e-commerce and thereby bring about positive changes in MSMEs' perceptions and behaviors (Rogers, 2003). Strategic efforts are needed to promote the adoption of e-commerce technology among MSMEs, and one effective strategy is the use of innovative communication methods.

Exploring the communication of innovations related to the adoption of e-commerce in traditional markets is essential due to the crucial role these markets play in the Indonesian economy, especially in the micro and small-scale sectors. Traditional markets often struggle to compete with the growing popularity of modern stores and e-commerce platforms in Indonesia. Consequently, e-commerce integration is a viable solution for businesses in traditional markets to improve their competitive advantage or to meet the challenges of modern retail. E-commerce is recognized as a technological innovation and needs to be introduced and adopted by micro, small, and medium enterprises (MSMEs). In order to promote the adoption of e-commerce among MSMEs, innovative communication strategies are crucial to make these actors understand the benefits and advantages of e-commerce. This research also aims to provide insights into the factors that influence the decision-making process of MSMEs in traditional markets regarding the adoption of e-commerce, as well as to identify potential barriers they may encounter.

The basis of this study draws on references from previous research. It covers six key aspects: individual characteristics, environmental factors, business characteristics, communication channels, perceptions of innovation, and the level of innovation adoption decisions. Individual characteristics, which refer to specific attributes or demographic variables that describe an individual, have been shown to have a significant influence on e-commerce adoption among MSMEs (Awa et al., 2015).

Environmental factors include external pressures from customers, suppliers, competitors, and external support that affect e-commerce adoption (Rahayu and Day 2015). Competitive pressure positively influences innovation adoption (Sin et al. 2016). Customer pressure similarly positively affects innovation adoption (Ahani et al. 2017). Government support is critical for adopting innovations (Al-Alawi and Al-Ali 2015; Suhaeti et al. 2016; Ilin et al. 2017; AlBar and Hoque 2019). Business characteristics have been observed to positively influence the adoption of FinTech payment service innovations among MSMEs (Coffie et al., 2021) and show a significant positive relationship with adopting management accounting techniques (Dabor and Ekiomado, 2017).In the context of communication channels, Rogers (2003) delineates three types crucial in the adoption of innovations: mass media channels, interpersonal communication, and interactive communication via the Internet. The choice of communication channel significantly correlates with the perception of innovation (Manaf, 2019). Rogers (2003) further identifies five characteristics influencing innovation perception: relative advantage, compatibility, complexity, observability, and trialability. Prior research delves into the impact of these characteristics on innovation adoption, revealing that relative advantages and compatibility significantly influence adoption decisions (Ekong et al. 2012). while complexity, observability, and trialability also exhibit substantial effects (Azmi, 2020; Juniarti, 2015; Manaf, 2019; Ramdani et al.,

2013; Samsudeen et al., 2021). From this context, the study aims to analyze the influence of individual characteristics, environmental factors, business characteristics, and communication channels on the perception of e-commerce innovation among MSMEs and to analyze how these perceptions influence the decisions of MSME actors regarding the adoption of e-commerce innovation.

LITERATURE REVIEW

The integration of e-commerce innovations by Micro, Small, and Medium-sized Enterprises (MSMEs) holds significance in fostering economic growth and competitiveness. This review of literature delves into the various communication strategies employed to support the assimilation of e-commerce innovations within the landscape of Indonesian MSMEs. A multitude of studies underscores the advantages associated with the adoption of e-commerce by MSMEs, encompassing expanded market reach, heightened operational efficiency, and increased competitiveness. Nevertheless, the adoption process is intricately influenced by factors such as organizational size, available resources, and technological capabilities. Therefore, gaining insight into the specific readiness of MSMEs to embrace e-commerce becomes imperative for the formulation and implementation of effective communication strategies (Gao et al., 2023). The literature underscores the significance of employing precise and efficient communication channels for the effective transmission of e-commerce innovations to MSMEs. Traditional methods like workshops, seminars, and training programs have been widely utilized for this purpose. Contemporary research delves into the involvement of digital platforms, social media, and peer networks in the dissemination of information surrounding e-commerce innovations (Indarti & Wasnury, 2019; Kohardinata et al., 2024; Widodo et al., 2019). Assessing the effectiveness of these channels in conveying the benefits and overcoming barriers is crucial. Recognizing and mitigating perceived obstacles stands as a vital component within communication strategies. Research indicates prevalent hurdles, including lack of awareness, restricted digital literacy, apprehensions about security, and financial constraints. Customizing communication approaches to tackle these specific challenges can significantly increase the prospects of successful e-commerce adoption among MSMEs (Ausat & Peirisal, 2021; Kumar et al., 2023; Odusote, 2017).

Government initiatives and policies play a crucial role in promoting the adoption of e-commerce among MSMEs (Zainol et al., 2022). The literature examines various programs focused on providing financial incentives, training, and infrastructure support (Martin et al., 2013; Subekti et al., 2019). Assessing the effectiveness of these initiatives and comprehending how well the communication of such support reaches MSMEs is vital for optimizing government-led strategies. The Indonesian business environment is influenced by cultural and contextual factors that affect communication effectiveness. Understanding how cultural subtleties, language preferences, and regional variations impact the reception of e-commerce information is essential for tailoring communication strategies to diverse MSMEs (Shastri et al., 2022).

With the growing shift toward e-commerce, there is a risk that MSMEs may miss out on potential sales and revenue. This threat stems from the fact that many MSMEs have not capitalized on available opportunities, rendering them less competitive in an increasingly digital and online market. Those MSMEs with physical stores that embrace e-commerce stand to gain various advantages, including market expansion, enhanced competitive edge, improved operational efficiency, streamlined information transfer, optimization of consumer experiences, and adaptability to shifts in consumer behaviour. However, the adoption of e-commerce among MSMEs in Indonesia, particularly those receiving orders or conducting transactions online, remains relatively low and is still dominated by conventional business models (Farida & Sutopo, 2023; Marolt et al., 2022; Prabowo et

al., 2023)

Some development communication problems related to the low adoption of e-commerce in MSMEs are information gaps and the unavailability of sufficient information, lack of development message campaigns in supporting e-commerce adoption in MSMEs, complex language and terminology, lack of utilization of various communication channels, cultural differences and local contexts. Therefore, there is a necessity for strategic and efficient initiatives to promote the integration of e-commerce technology innovation among MSME participants. An effective approach involves employing innovative communication, which can influence the dissemination of information regarding e-commerce, ultimately shaping the attitudes and behaviors of MSMEs in adopting e-commerce.

This study draws upon Rogers' theory of innovation adoption, elucidating how innovation is communicated through specific channels over time within a social system. According to the stages of the innovation-decision process model, the decision factors of innovation adoption begin with one's knowledge. Such knowledge can be observed from socio-economic factors, individual characteristics, and business characteristics. Socio-economic factors are kept as environmental factors, namely competitive pressure. Competitive pressures have a significant effect on innovation adoption (Ramdani et al. 2013; Rahayu and Day 2015; Hamad et al. 2018; Servaes 2020; Samsudeen et al. 2021), customer pressure has a significant effect on innovation adoption (Ahani et al., 2017), and government support has a significant impact on innovation adoption.

The observed individual characteristics, i.e., age had a significant effect on the adoption of innovations (Awa et al., 2015; Chong et al., 2015; Eze et al., 2021), education level has a significant effect on innovation adoption (Eze et al., 2021; Juniarti, 2015), and business experience (Awa et al., 2015; Eze et al., 2021). Business characteristics observed are that business size has a significant effect on innovation adoption (Gómez and Vargas 2012; Colombo et al. 2013; Ramdani et al. 2013; Wamba and Carter 2014; Shim and Shin 2016) and length of effort have a significant effect on innovation adoption (Coffie et al., 2021).

Furthermore, communication channels are used by someone to get relevant and credible information about an innovation. The observed communication channels, namely frequency (duration of exposure to mass media communication channels, interpersonal communication, and interactive communication via the Internet, affect the adoption of innovations (Azmi, 2020; Sa'diyya, 2020). In the next stage, namely persuasion, persuasion observed is a person's perception of the innovation. The perception of innovation observed is in the characteristics of its innovation, namely, relative advantage, compatibility, complexity, observability, and trialability. According to Rogers (2003), the characteristics of an innovation become an essential indicator in determining a person's perception of adopting or rejecting a technological innovation. The five characteristics of innovation, according to Rogers, are relative advantage, compatibility, complexity, trialability, and observability.

Ramdani et al. (2013) explain in their research that innovation perceptions of relative advantage, compatibility, complexity, trialability, and observability have all been found to be significant factors in determining application adoption in MSMEs. This research is in line with the results of Azmi et al., namely, elements significantly related to the adoption of innovation are found in technological characteristics consisting of relative advantages, complexity, compatibility, observability, and trialability. Based on this explanation, the framework in this study consists of six variables, namely four independent variables and two dependent variables as follows: individual characteristics (X1), environmental factors (X2), business characteristics (X3), communication channels (X4), perception of e-commerce (Y1), and innovation adoption decision rate (Y2).

The indicators of each research variable are as follows: Individual characteristic variables

(X1) with observed indicators include age, education level, and business experience. Environmental factor variables (X2) with observed indicators include competitive pressure, customer pressure, and government support. Business characteristic variables (X3) with observed indicators include business size and length. Communication channel variables (X4) with observed indicators include frequency of mass media exposure, frequency of interpersonal channel exposure, frequency of interactive communication exposure (Internet), duration of mass media exposure, duration of interpersonal channel exposure, and duration of interactive communication exposure (Internet). Variables of perception of e-commerce (Y1) with observed indicators include relative advantage, compatibility, complexity, observability, and trialability. Innovation adoption decision variables (Y2) with observed indicators include the length of time used e-commerce, the amount of e-commerce used, and the volume of sales.

METHODOLOGY

This study employs a mixed-methods approach, combining quantitative methods supported by qualitative data. The quantitative aspect uses descriptive and causal survey methods, while qualitative methods complement and enhance the quantitative data. The research duration spans three months, from July to September 2023, and is conducted at Pasar Pramuka Jakarta. The study focuses on business owners or decision-makers involved in e-commerce adoption, encompassing a population of 321 business actors. With 22 indicators in consideration, a minimum of 22 x 5 or 110 respondents are required. Proportionate stratified sampling is employed, representing all business actors dealing with conventional medicines, herbal medicines, and medical devices in the traditional market.

Both primary and secondary data contribute to the research. Primary data is directly obtained through surveys, interviews, and observations, and secondary data are collected through document techniques involving the retrieval and recording of information from archives, official reports, online newspapers, PD Pasar Jaya official accounts (websites and social media), or other relevant references. Validation and reliability testing are conducted using the Smart-PLS application, and data processing and analysis involve the application of Structural Equation Models-Partial Least Square (SEM-PLS).

The study's hypotheses are outlined as follows: H1: Individual characteristics, environmental factors, business characteristics, and communication channels exert a significant influence on the perception of e-commerce innovation in MSMEs. H2: The perception of MSME business actors regarding e-commerce innovation significantly impacts the level of e-commerce innovation adoption decisions.

DISCUSSION

Analysis Structural Equation Models-Partial Least Square (SEM-PLS)

In this research, the analysis employed is Structural Equation Models-Partial Least Square (SEM-PLS), encompassing both measurement model analysis (outer model analysis) and structural model analysis (inner model analysis). The measurement model utilized is reflective, where variables such as individual characteristics, environmental factors, business characteristics, communication channels, perceptions of e-commerce, and the level of innovation decisions are measured reflectively.

Measurement Model Analysis (Outer Model Analysis)

The objective of the outer model test is to define the association between latent variables and their indicators. The assessment of the measurement model (outer model) involves examining validity and reliability values. Validity is assessed based on the Loading

Factor (LF) and Average Variance Extracted (AVE) values. Reliability testing involves evaluating Cronbach's Alpha and Composite Reliability values.

Validity

a) Loading Factor (LF)

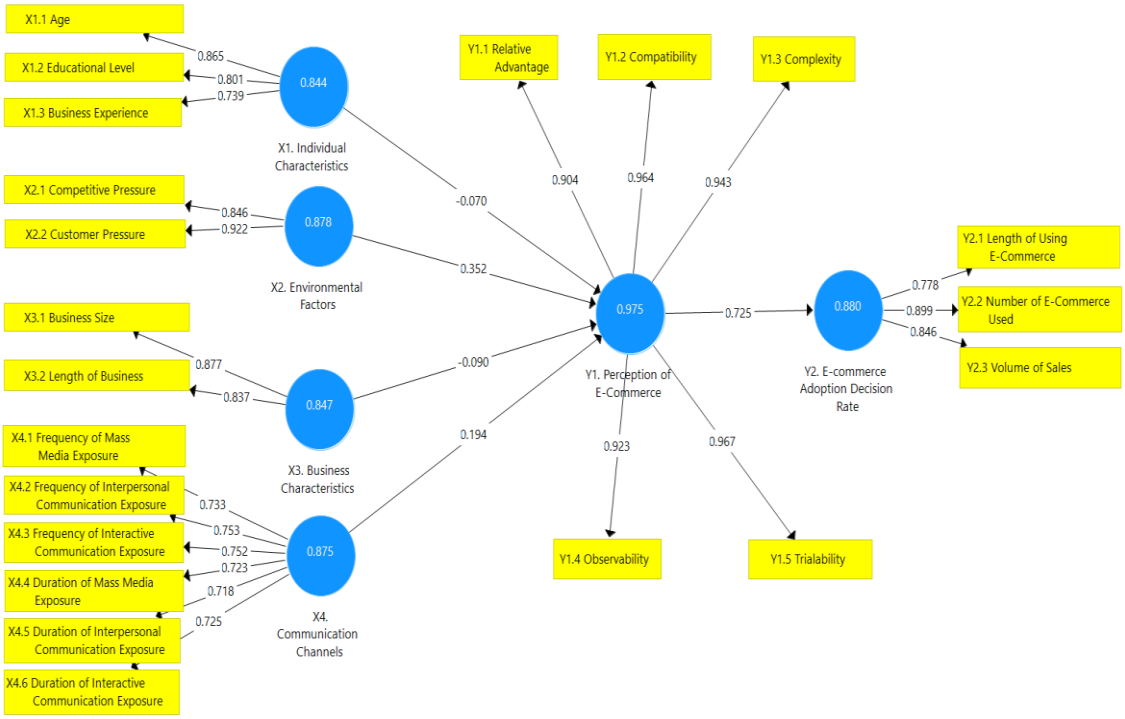

Figure 1: Outer Model Test Results

Based on the Outer Model Test using the Smart PLS application, all question items are valid after the government's support instrument on environmental factor variables is removed. Government support is invalid because no business actor receives government support in the form of information, funds, facilities, and training in supporting business actors to adopt e-commerce.

Table 1: Loading Factor

Variable	Indikator	Loading Factor	Average Variance Extracted (AVE)	Validity
X1. Individual characteristics	X1.1 Age	0.865	0.645	Valid
	X1.2 Education Level	0.801		Valid
	X1.3 Business Experience	0.739		Valid
X2. Environmental Factors	X2.1 Competitive pressure	0.846		Valid
	X2.2 Customer Pressure	0.922	0.783	Valid
X3. Business Characteristics	X3.1 Business Size	0.877	0.735	Valid
	X3.2 Length of Business	0.837		Valid
X4. Communication Channels	X4.1 Frequency of Mass Media Exposure	0.733	0.539	Valid

	X4.2 Frequency of Interpersonal Communication	0.753		Valid
	X4.3 Frequency of Interactive Communication Exposure (Internet)	0.752		Valid
	X4.4 Duration of Mass Media Exposure	0.723		Valid
	X4.5 Duration of Interpersonal Communication	0.718		Valid
	X4.6 Duration of Interactive Communication Exposure (Internet)	0.725		Valid
Y1. Perception of E-Commerce	Y1.1 Relative Advantages	0.904	0.884	Valid
	Y1.2 Compatibility	0.964		Valid
	Y1.3 Complexes	0.943		Valid
	Y1.4 Observability	0.923		Valid
	Y1.5 Trialability	0.967		Valid
Y2. E-Commerce Adoption Decision Rate	Y2.1 Length of Using E-commerce	0.778	0.710	Valid
	Y2.2 Number of E-Commerce Used	0.899		Valid
	Y2.3 Volume of Sales	0.846		Valid

Research indicators are declared valid with a minimum loading factor value of 0.7 (Singh and Chan, 2022). It can be seen that the Loading Factor (LF) value of 0.718-0.967 for all indicators is greater than 0.70, so it can be concluded that all indicators in each variable are valid convergent based on the value of the loading factor.

b) Average Variance Extracted (AVE)

The value of Average Extracted Variance (AVE) must be greater than 0.5 (Devos et al. 2013; Mehmood et al. 2020; Omrane et al. 2021). From the output above, it can be seen that all AVE values of 0.539-0.884 are greater than 0.50, so it can be concluded that all valid indicators converge based on AVE values.

Reliability

Reliability can be measured using Cronbach's Alpha and Composite Reliability values.

a) Cronbach's Alpha

Reliability can be measured by looking at Cronbach's Alpha. This value reflects the reliability of all indicators in the model. All variables are consistently reliable or reliable if Cronbach's alpha is higher than 0.6 (Ndubisi and Nwankwo 2013; Khosrow-Pour 2020; Mehmood et al. 2020; Omrane et al. 2021). Based on the study's results, Cronbach's Alpha value of 0.640-0.967 can be seen that all variables are greater than 0.60, so it can be concluded that all variables are reliable or reliable based on Cronbach's Alpha value.

b) Composite Reliability

This value indicates internal consistency; namely, a high composite reliability value

shows the consistency value of each indicator in measuring its construct. The Composite Reliability value is expected to be > 0.7 (Devos et al., 2013; Omrane et al., 2021). Based on the results of the study, the Composite Reliability value of 0.844-0.975 can be seen, and all variables are greater than 0.70, so it can be concluded that all variables are reliable or reliable based on the Composite Reliability Value.

Table 2: Cronbach's Alpha and Composite Reliability

Variable	Cronbach's Alpha	Composite Reliability	Reliability
X1. Individual characteristics	0.732	0.844	Reliable
X2. Environmental Factors	0.729	0.878	Reliable
X3. Business Characteristics	0.640	0.847	Reliable
X4. Communication Channels	0.829	0.875	Reliable
Y1. Perception of E-Commerce	0.967	0.975	Reliable
Y2. E-Commerce Adoption Decision Rate	0.795	0.880	Reliable

Structural Model Analysis (Inner Model Analysis)

Structural model analysis (inner model) can be measured by looking at the values of path coefficients, T-statistics, and P-values from direct and indirect influence hypothesis tests.

Hypothesis Test for Direct Effects

Table 3: Hypothesis Test for Direct Effects

Direct Variables	Path Coefficient	T Statistics	P Values	Information
X1. Individual characteristics -> Y1. Perception of E-Commerce	-0.070	0.805	0.422	Rejected
X2. Environmental Factors -> Y1. Perception of E-Commerce	0.352	5.294	0.000	Accepted
X3. Business Characteristics -> Y1. Perception of E-Commerce	-0.090	1.049	0.296	Rejected
X4. Communication Channel -> Y1. Perception of E-Commerce	0.194	2.171	0.032	Accepted
Y1. Perception of E-commerce -> Y2. E-Commerce Adoption Decision Rate	0.725	17.865	0.000	Accepted

Based on the results of data processing that has been carried out, it shows that individual characteristics directly negatively affect the perception of e-commerce innovation because it has a path coefficient of -0.070, and the effect is not significant or can be said to have a very small impact because the statistical results state T Statistics 0.805 < T Table 1.96 and P Value 0.422> 0.05. This data means that individuals with older age, higher education, and longer business experience tend to have a less positive perception of e-commerce, but this does not significantly affect their perception of e-commerce. Conversely, younger individuals with lower education and less business experience tend to have a positive perception of e-commerce, but this does not significantly affect their perception of e-commerce.

Environmental factors directly positively affect the perception of e-commerce innovation because it has a path coefficient of 0.352, and its effect is significant because the

statistical results state T Statistics 5.294 > T Table 1.96 and P Value 0.000< 0.05. This data can be interpreted that environmental factors, namely competitive pressure and high customer pressure, tend to increase the positive perception of business actors towards e-commerce.

Business characteristics directly negatively affect the perception of e-commerce innovation because it has a path coefficient of -0.090, and the effect is not significant, or it can be said that the effect is very small because the statistical results state T Statistics 1.049< T Table 1.96 and P Value 0.296> 0.05. This data can mean that the business characteristics of a larger number of employees and business actors who run the business longer tend to have a less positive perception of e-commerce, but this does not significantly affect their perception of e-commerce. Business characteristics of fewer employees and business actors who run businesses soon tend to have a positive perception of e-commerce, but this does not significantly affect their perception of e-commerce.

Communication channel exposure directly positively affects the perception of e-commerce innovation because it has a path coefficient of 0.194, and the effect is significant because the statistical results state T Statistics 2.171 > T Table 1.96 and P Value 0.032< 0.05. This data can be interpreted as the exposure of communication channels, namely exposure to the frequency and duration of mass media, interpersonal communication, and interactive communication (internet), which is high and tends to increase the positive perception of business actors towards e-commerce.

The perception of e-commerce innovation directly has a positive effect on the decision rate of e-commerce adoption because it has a path coefficient of 0.725, and the impact is significant because the statistical results state T Statistics 17.865 > T Table 1.96 and P Value 0.000< 0.05. This data shows that business actors' perceptions of e-commerce, namely relative advantage, compatibility, complexity, observability, and high trialability, tend to increase e-commerce adoption decisions.

Hypothesis Test for Indirect Effects (Mediation)

Table 4: Hypothesis Test for Indirect Effects (Mediation)

Indirect Variables (Mediation)	Path Coefficient	T Statistics	P Values	Information
X1. Individual characteristics -> Y1. Perception of E-Commerce -> Y2. E-Commerce Adoption Decision Rate	-0.051	0.807	0.421	Rejected
X2. Environmental Factors -> Y1. Perception of E-Commerce -> Y2. E-Commerce Adoption Decision Rate	0.255	5.472	0.000	Accepted
X3. Business Characteristics -> Y1. Perception of E-Commerce -> Y2. E-Commerce Adoption Decision Rate	-0.065	1.020	0.310	Rejected
X4. Communication Channel -> Y1. Perception of E-Commerce -> Y2. E-Commerce Adoption Decision Rate	0.141	2.081	0.040	Accepted

Mediation testing was conducted to see the role of variables of business actors' perceptions of e-commerce in mediating the influence between variables.

Individual characteristics indirectly negatively affect the decision rate of e-commerce adoption through business actors' perceptions of e-commerce as a mediating variable because it has a path coefficient of -0.051 and its influence is not significant based on statistical results stating T Statistics 0.807 < T Table 1.96 and P Value 0.421 > 0.05. This

data means that older individuals with high formal education and more extended business experience tend to have a less positive perception of e-commerce, but this does not significantly influence their decision to adopt e-commerce. Conversely, younger business people with less formal education and less business experience tend to have a positive perception of e-commerce, but this does not significantly affect their decision to adopt e-commerce.

Environmental factors indirectly positively affect the decision rate of e-commerce adoption through business actors' perceptions of e-commerce as a mediating variable because it has a path coefficient of 0.255. Its effect is significant because the statistical results state T Statistics 5,472 > T Table 1.96 and P Value 0.000 < 0.05. This data can be interpreted to mean that environmental factors, namely competitive pressure and high customer pressure, tend to increase the positive perception of business actors towards e-commerce, and this significantly affects their decision to increase e-commerce adoption.

Business characteristics indirectly negatively affect the decision rate of e-commerce adoption through business actors' perceptions of e-commerce as a mediating variable because it has a path coefficient of -0.065 and the effect is not significant because the statistical results state T Statistics 1.020 < T Table 1.96 and P Value 0.310 > 0.05. This data can mean that the business characteristics of a larger number of employees and business actors who run the business longer tend to have a less positive perception of e-commerce, but this does not significantly affect their decision to adopt e-commerce. Conversely, enterprises with fewer employees and business actors who run businesses for a short time tend to have a positive perception of e-commerce, but this does not significantly affect their decision to adopt e-commerce.

The exposure of communication channels indirectly has a positive effect on the decision rate of e-commerce adoption through business actors' perception of e-commerce as a mediating variable because it has a path coefficient of 0.141, and the impact is significant because the statistical results state T Statistics 2.081 > T Table 1.96 and P Value 0.040 < 0.05. This data can be interpreted that the high exposure of communication channels, namely exposure to the frequency and duration of mass media, interpersonal communication, and interactive communication (internet), tends to increase the positive perception of business actors towards e-commerce. It also significantly affects their decision to increase e-commerce adoption.

CONCLUSION AND RECOMMENDATION

The results showed that the variables of business actors' perceptions of e-commerce were directly positively and significantly influenced by two variables, namely environmental factors and communication channels. In contrast, the variable of business actors' perception of e-commerce is not directly affected by two variables, namely individual characteristics and business characteristics. The level of adoption decision is directly and significantly influenced by the variable of business actors' perception of e-commerce. The perception variable towards e-commerce is able to mediate the influence of environmental factors and communication channel exposure on the level of e-commerce adoption decisions. In contrast, the variable of business actors' perception of e-commerce is not able to mediate the influence of individual characteristics and business characteristics on the level of e-commerce adoption decisions. The conclusion is that environmental factors and exposure to communication channels play a greater role in shaping the perceptions and decisions of business actors regarding e-commerce adoption.

Based on the study's findings, it is recommended that businesses focus on strengthening communication strategies to influence the perception of e-commerce positively. Given the significant impact of environmental factors on this perception, integrating environmentally conscious practices into business strategies is crucial. Additionally,

implementing customized training programs that address specific needs related to individual and business characteristics can enhance understanding and foster a more positive attitude toward e-commerce. Advocacy for supportive policies aligned with identified environmental factors is also recommended to create a conducive ecosystem for e-commerce adoption. Businesses should continuously monitor and evaluate their approaches. Lastly, collaborative initiatives with other enterprises, industry experts, and government agencies can facilitate a collective effort to overcome challenges and capitalize on opportunities, ultimately promoting the successful adoption of e-commerce.

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