Technology Adoption and E-commerce Integration: A Study of Malaysian Micro, Small, and Medium Enterprises (MSMEs)

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DOI: https://dx.doi.org/10.47772/IJRISS.2025.90500037

Received: 23 April 2025; Accepted: 26 April 2025; Published: 28 May 2025

ABSTRACT

This study explored the factors influencing e-commerce adoption among Micro, Small and Medium Enterprises (MSMEs) in Malaysia, leveraging the Technology Acceptance Model (TAM). The research aimed to investigate how perceived usefulness (PU) and perceived ease of use (PEOU) affect SMEs' intention to adopt e-commerce technologies. A quantitative methodology was employed, utilizing self-administered questionnaires to collect data from Malaysian MSMEs. The study employed a quantitative approach. The data were analyzed using Statistical Package for the Social Sciences (SPSS) and analysis of correlation. Based on data findings indicated that, competitive pressure had significant influences on e-commerce adoption among MSMEs. Besides that, the analysis revealed that both PU and PEOU significantly impact adoption intention, providing valuable insights for enhancing e-commerce adoption rates. Besides, we also found that highest percentage the level of e-commerce adoption among MSMEs in Malaysia were at level 3 which is Transaction integrator. On this level MSMEs use websites for two-way communication with customers and suppliers. The findings offer practical recommendations for MSMEs to leverage e-commerce effectively, thereby contributing to the expansion and advancement of the digital economy in Malaysia.

Keywords: E-commerce, PU, PEOU

INTRODUCTION

Micro, small, and medium enterprises (MSMEs) have a role in the economy domestically and internationally. Many MSMEs can create jobs, reduce poverty, and help regional growth. Najib & Fahma (2020) emphasize that in an increasingly competitive business environment, the competitiveness of MSMEs, especially in developing countries like Indonesia, is greatly influenced by the ability to adapt to technology. Therefore, in order to facilitate commercial operations, MSMEs require technical advancements. The technology acceptance model (TAM), which may be used to analyze user adoption of technology adopted by businesses at different levels, is one technology method that MSMEs can utilize. However, MSMEs frequently require assistance with a number of issues when using a TAM approach to operate on e-commerce platforms. This strategy may lead to the following issues: MSMEs require assistance in managing intricate e-commerce platforms, such as trouble processing orders, managing inventory, and uploading products. MSMEs require additional technology resources, like hardware, reliable internet access, or technical know-how, to run their online stores.

Even with online businesses, MSMEs require assistance in order to properly sell their goods, such as by putting digital marketing techniques into practice or improving the way their products look. Different restrictions frequently apply to internet enterprises and e-commerce platforms. Different restrictions frequently apply to MSMEs' e-commerce platforms. Finding the elements impacting MSMEs' adoption and usage of e-commerce technologies might be aided by the TAM approach. These elements include how SMEs view the ease of use and advantages of e-commerce platforms as well as elements that affect their decision to embrace and utilize the platform.

The use of e-commerce platforms has grown globally due to the constantly shifting market conditions and technological advancements. Many business owners worldwide have moved their companies from physical to digital platforms (Hafiz et al., 2020), and Malaysia is no exception. Due to a surge in both commercial and

consumer online shopping, Malaysia's e-commerce is growing quickly. Adoption of e-commerce is defined as the process of using computer networks to purchase, sell, or exchange goods, services, and information (Heijden et al., 2001).

Technology adoption is defined as the first use or acceptance of the technology or product that appears. Studies on technology adoption are intended to predict, understand, and explain variables influencing adoption behavior at individual as well as organizational levels to accept and use technological innovation. Adoption of information technology (IT) enables SMEs to take a competitive advantage in the global market. The use of IT as A media for marketing and promotion will not be separated from the internet. Internet technology for sustainable trade can be done using e-commerce. MSMEs need to be encouraged to use e-commerce so they are not left behind by businesses that have adopted e-commerce.

The sale of tangible commodities to a private end user through a digital medium is known as e-commerce, or electronic commerce. This definition includes purchases made through a website or mobile application on desktop computers (including notebooks and laptops) as well as those made through mobile devices (such as smartphones and tablets). Businesses that just conduct business online as well as those that have a physical location but also sell goods or services online are included in the e-commerce market. E-commerce is a fast expanding sector of the global economy that spans a wide range of industries, from consumer products and retail to travel and hospitality. Businesses can now contact clients globally, boost sales, and provide fresh, cutting-edge goods and services thanks to the growth of e-commerce.

It is also imperative to perform quantitative research on factors affecting the e-commerce platform's adoption utilizing the Technology Acceptance Model (TAM) or its extension to better understand the extent to which these agriculture sector businesses accept e-commerce platforms (Nor Farzana & Faudziah, 2011). Using TAM as the primary paradigm, this paper aimed to fill the knowledge gap on the use of e-commerce in agribusiness. The study specifically examined the three model components - perceived usefulness, perceived ease of use, and intention to use and how they may be applied to examine Malaysian agribusiness's adoption of e-commerce.

SME in Malaysia

Malaysia is committed to expanding its economy to become a high-income and advanced economic country. The Malaysian government has been focusing on SME's development as one of the main vehicles for the economy to achieve high-income nation status. According to the World Bank Group in 2018, 77% of MSMEs in Malaysia have digitalized their businesses. However, only 25 percent of businesses are achieving advanced digitalization. Hence, the data suggests that Malaysian MSME businesses still have room for development and growth.

Through the implementation of 189 major development programs, which involved a total expenditure of RM4.9 billion, the Malaysian government has been focusing on the development of SMEs in order to increase their validity and contribution to economic growth. The initiatives that have been put in place since 2007 have produced positive results, and between 2016 and May 31, 2020, a total of 322 834 MSMEs joined the e-commerce platform. As a result, MSMEs have developed their businesses by making sure that their infrastructure, business strategies, and processes are integrated and aligned to support digital transformation.

E-commerce and Micro, Small and Medium Enterprise

According to Azuan (2006), e-commerce is defined as the exchange of business information, the maintenance of business connections, and the execution of transactions via internet-based technologies. The increasing use of technology, such as smartphones and computers, affected consumers' purchase behavior. Consumers today are more comfortable making online purchases, a trend that has fueled the meteoric rise of e-commerce platforms (Hou et al., 2016). This shift towards e-commerce platforms is driven by several factors, including the vast array of product availability, convenience, and the ability to compare prices.

Many MSMEs have utilized e-commerce in recent years to enhance their business performance and operations. E-commerce has a special place in the MSME setting, as businesses are bringing about significant changes in the retail and services sectors (Jahanshahi et al., 2013). With the development of e-commerce, consumers who

make purchases online are no longer need to be present in person for transactions to take place. It is completely different from the traditional method, which involves clients visiting the store to examine the wide range of products. With e-commerce's explosive growth changing how people purchase, Malaysia's retail scene has seen significant change in recent years. The nation's thriving economy and rising internet usage rates. The department of Statistics Malaysia (DoSM) reported a 5.4% year-on-year increase in e-commerce during the third quarter of 2023, rising from RM274.6 million to RM289.05 billion. This surge can be attributed to factors such as increased smartphone usage, improved systems and a growing awareness of the convenience offered by online shopping.

In recent years, e-commerce has grown significantly in Malaysia as more companies use it as a business option or strategy. Furthermore, the COVID-19 pandemic has accelerated the adoption of e-commerce platforms by businesses in Malaysia. The government and the pandemic have imposed various restrictions, which has forced many businesses to use e-commerce platforms because consumers are unable to move freely to shop (Yusof et al., 2021). According to Hafiz et al. (2019), Malaysia is one of the most promising countries for future e-commerce operations because of the government's policies and planning, as well as technological improvements and the pandemic. The government's recognition of the advantages of e-commerce platforms for business and economic well-being is demonstrated by policies like the My Digital Initiative and National Entrepreneurship 2030, which also demonstrate the government's commitment to advancing e-commerce in Malaysia.

The study of e-commerce is crucial as technology implementation is required to meet the company's expectations, such as the growth of the company's performance (Lee & Kim, 2019). The contextual aspects that embrace e-commerce advantages in SMEs pose knowledge gaps that require further investigation to obtain a complete and holistic understanding of SMEs' performance in an online business context.

Low e-commerce adoption by enterprises can also be attributed to the high cost of transitioning from traditional to digital company (Khatibi et al., 2003). According to Mira et al. (2018), e-commerce adoption can surely boost company performance and create new prospects, but it might not necessarily result in immediate cost savings. The cost savings from e-commerce may be more visible in specific areas of the business, such as decreasing the requirement for physical shop space or optimizing inventory management. However, companies may need to invest in other areas, including marketing and technology, to boost online growth and client engagement.

Objective

a) To examine the factors that influence the e-Commerce adoption intention among MSMEs in Malaysia.
b) To establish the mediating effect of the Technology Acceptance Model (i.e. perceived usefulness) on the e-Commerce adoption intention among MSMEs in Malaysia.
c) To establish the mediating effect of the Technology Acceptance Model (i.e. perceived ease of use) on the e-Commerce adoption intention among MSMEs in Malaysia.

LITERATURE REVIEW

The systematic use of the internet to order and buy goods and services is known as e-commerce adoption (Hamidreza Mahrieian, 2012). A series of incremental inventions typically precede the emergence of chaotic technologies like the internet and e-commerce. As a result, adopting such technologies is typically a multi-stage process rather than a one-way process (Chen L.D. et al., 2002). From a different angle, e-commerce examines business transactions conducted online, including the purchase and sale of goods, services, and information.

Studies in the past have shown that even though e-commerce is important, large firms adopt electronic commerce more rampantly than SMEs (Raven et al., 2007). This is because generally SMEs do not have large resources and technology capabilities (Ramayah et al., 2005). The use of e-commerce by businesses in Malaysia has been discussed by many researchers. However, research focusing on the adoption of e-commerce by MSMEs is still scarce, with researchers focusing specifically on customers' perspectives. The main objective was to discover what the driving factors were that encouraged the use of electronic commerce by SMEs.

Technology Acceptance Model

The use of technology has considerably enhanced task efficiency and effectiveness, resulting in considerable

changes in how work is done (Cascio & Montealegre, 2016). Given the significant impact of technology on daily life and operations, many academics have turned to the topic to investigate technology adoption across many industries, whether among businesses or consumers.

The Technology Acceptance Model (TAM) is a common theory about technological adoption. Davis (1989) developed TAM by combining Theory of Reasoned Action (TRA) and Theory of Perceived Behavior (TPB) theories. According to Davis (1989), users' ideas regarding perceived usefulness (PU) and ease of use (PEOU) impact their intention to utilize the system, ultimately determining acceptance. PU is the extent to which a person feels that utilizing a specific system will improve his or her performance, whereas PEOU is the level to which a person believes that using a specific system will require no effort. These two assumptions will shape consumers' attitudes toward technology, and as an effect, the level of usage of said technology (Davis, 1989).

Factor Influence of Organization on E-Commerce Adoption

Organizational variables are related to indicators of top management support, knowledge of information technology, and organizational size. Top management support refers to the extent of organizational leaders to recognize the essence of e-commerce. The existence of support from management means obtaining adequate allocation of technological and financial resources to adopt information technology innovations. Some studies reveal that management support is positively correlated to the widespread use of the internet and e-commerce adoption by MSMEs.

According to El-Haddade et al. (2021), top management support is defined as the degree to which managers grasp and adopt the technological capabilities of a new technology system. The ability of top management in an organization to implement highly specific new technologies ensures the company's long-term vision, commitment, and optimal resource management, as well as assistance in overcoming barriers and resistance to market trends. Furthermore, Kulkarni, Robles-Flores, and Popovic (2017) discovered the importance of top management support for e-commerce, including technological initiatives, participation in those initiatives, and the extent to which top management support advocates for technological advancement, such as increasing investment in technology and taking the risk of using new innovative technology. Thus, by extending these notions, it is postulated that the role of top management support will positively influence the e-commerce advantage of SMEs in an online business context.

Factor Influence of Environment on E-Commerce Adoption

Environmental variables consist of indicators of competitive pressure. Competitive pressure is the level of pressure from competitors in the industry perceived by the company. When competitors start using e-commerce technology, companies will be encouraged to adopt e-commerce technology more broadly in order to gain a competitive advantage. So that, the higher level of competition in the industry, the possibility of SMEs using e-commerce is getting bigger.

SMEs would be under pressure to adopt e-commerce in order to compete, especially if their competitors had already done so. Organizations that use e-commerce are more vulnerable to e-commerce adoption as competitors become more capable or acclimated to using it. Competitor pressure frequently compels firms to adopt technology in order to remain competitive in a changing environment. When competitors employ e-commerce technology, businesses are pushed to expand their use of e-commerce to acquire a competitive advantage. Therefore, SMEs are more likely to embrace e-commerce when there is greater industry competition.

Factor Influence of Technology on E-Commerce Adoption

Security concerns significantly influence e-commerce adoption by creating a barrier of distrust among potential customers, as they worry about the safety of their personal information and credit card details and the potential for fraud when making online purchases, thus discouraging them from fully embracing online shopping.

Consumers' reluctance to embrace electronic commerce today stems from a variety of factors, including their mistrust and distrust of online suppliers as well as worries about the security and privacy of their personal information. For electronic commerce to continue growing and developing, consumers' trust in online transactions is essential. Customers are exposed to a number of security threats because business-to-consumer

(B2C) e-commerce necessitates their interaction with technology.

Perceived Usefulness and E-Commerce Adoption

Perceived usefulness is defined as a person's belief that adopting a specific system will improve his or her performance. PU is described as an individual's belief that using technology will improve their job performance or overall life (Davis, 1989). PU is a cognitive assessment of technology that is thought to be based on an individual's prior experience with the technology as well as their perception of its qualities. It refers to how much a somebody believes technology will benefit them in their profession or daily lives.

This variable is thought to be a significant determinant in an individual's intention to use a technology. It is argued that if a person believes a technology is advantageous, they are more likely to embrace it. This is because individuals are more likely to adopt technology if it helps them achieve their goals or improves their performance.

Perceived Ease of Use (PEOU) and E-Commerce Adoption

PEOU can be defined as the degree to which an individual believes that using a technology can be effortless (Davis, 1989). PEOU is a cognitive and affective evaluation of technology that is thought to be based on an individual's previous experience with the technology as well as their perception of its qualities. It refers to how an individual views technology to be straightforward, easy to use, and intelligible (Davis, 1989; Venkatesh & Davis, 1996).

PEOU is a strong predictor of a person's motivation to use technology (Davis, 1989; Venkatesh & Davis, 1996). According to TAM, people are more inclined to adopt technology if they perceive it is easy to use. This is because individuals are more likely to accept technologies that they believe they can use effectively and efficiently. Furthermore, people are more likely to be satisfied with technology that they perceive is straightforward to use. Satisfaction with a technology can lead to continuous use, which increases its adoption rate.

Research Framework

The Technology Acceptance Model (TAM) is a framework used to understand and analyze the factors that influence individuals' acceptance or adoption of technology. This model was first developed by Fred Davis in 1989 (Ifeoma & Chikwado, 2019) and has been used widely in the context of researching user behavior towards technologies such as Azizah et al. (2022) and Tam et al. (2022). There are several key concepts in TAM: Perceived Usefulness, Perceived Ease of Use, Behavioral Intention to Use, Attitude Toward Using, and Actual Usage (Abdullah et al., 2016; Ritz et al., 2019).

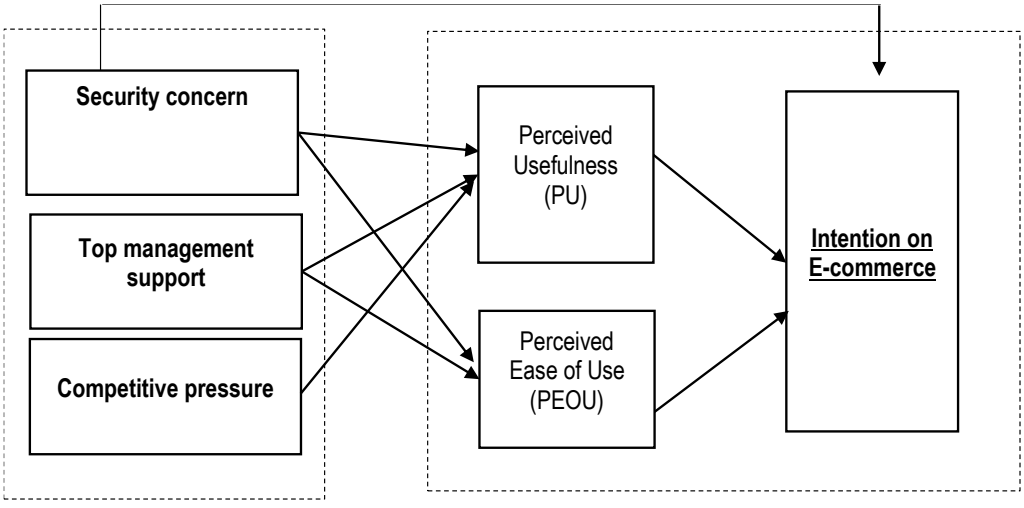

Figure 1: Research Framework

Source: Adapted from Technology Acceptance Model by Davis (1989), and Tornatzky and Fleischer's TOE framework (1990)

RESEARCH METHODOLOGY

This study uses quantitative analysis by empirically testing the prevailing research questions through primary data collections in order to achieve the research objective. The data will be collected using structured questionnaires on the SMEs in Malaysia. The sample size would be 300 SMEs in Malaysia. The data in this study will employ five-point Likert scale with 1-Strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree. This research aims to measure variables related to the adoption of e-commerce using the TAM approach by SMEs so that quantitative methods are the right way to measure variables objectively, answer research questions, and achieve the objectives set. The population of this research is all SMEs business sectors

RESULTS

Reliability Analysis

A reliability test was done using Cronbach's Alpha. All items were retained as they satisfied a high degree of consistency as indicated by the value to exceed 0.70. The internal consistency dependability of the measurement model was assessed in the analysis data using the composite reliability. A high degree of internal consistency reliability was shown by the composite reliability result, and the value is in line with the threshold level recommended by Hair, Hult, Ringle, and Sarstedt (2017) as well as Nunnally and Bernstein (1994). Accordingly, the findings imply that the constructs are satisfactorily represented by the items' internal consistency and reliability. Table 1 illustrate that all items remarkable internal consistency with Cronbach's Alpha of Ecommerce adoption (EA) at 0.936, Security concern (SC) at 0.955 emerged as the variable with the highest reliability, competitive pressure (CP) at 0.916, top management support (MS) at 0.946, perceived ease of use (PEOU) at 0.913 and perceived usefulness (PU) at 0.943. Thus, all selected indicators were retained and used to gather data in the actual survey.

Table 1: Summary of Reliability Test

Variables	No. of Items	Cronbach's Alpha (N=300)
Perceived Usefulness (PU)	5	0.943
Perceived Ease of Use (PEOU)	5	0.913
Competitive pressure	6	0.915
Security concern	9	0.955
Top management support	6	0.949
E-commerce adoption	5	0.936

Respondent Profile

300 questionnaires were collected from the target respondents. Based on the table 2, the findings shows that 52.7 percent were presented male and 47.3 percent were presentedfe male. Other than that, 59.7 percent 18 - 30 years old, 29.7 percent 31 – 40 years old, 8.0 percent 41 – 50 years old, 1.7 percent above 61 years old and 1.0 percent were aged 51 – 60 years old. Most of the respondent were single 58.0 percent, while married recorded 42.0 percent. Most of the respondent also had working experience between 6 – 10 years (34.0 percent), more than 10 years (9 percent), 1-5 years (25 percent) and more than 15 years (4 percent). Besides, 30.3percent of the respondents have working experience with their current company less than one year, followed by 3-5 years (31.3 percent), 6-10 years (19.3 percent), 11-20 years (11.7 percent), 1-2 years (6.7 percent) and more than 20 years (0.7 percent).

Table 2: Respondents' Demographic Profiles

Variable	Item	Frequency	Percentage (%)
Gender	Female	142	47.3
	Male	158	52.7
Age	18 - 30 years old	179	59.7
	31 – 40 years old	89	29.7
	41 – 50 years old	24	8.0
	51 – 60 years old	3	1.0
	Above 61 years old	5	1.7
Marital status	Married	126	42.0
	Single	174	58.0
Working experience	1 – 5 years	75	25.0
	6 – 10 years	102	34.0
	More than 10 years	58	9.0
	15 years	4	1.3
	No experience	61	20.3
Working experience with organization	Less than 1 years	91	30.3
	1 – 2 years	20	6.7
	3 – 5 years	94	31.3
	6 – 10 years	58	19.3
	11 – 20 years	35	11.7
	More than 20 years	2	0.7

Table 3 illustrates the respondent's company profiles. 71.0 percent of the companies were from services sector while 29.0 percent were from manufacturing sector. 36 percent of the respondent position as middle management, followed by 31 percent as senior management, 19.3 percent position as general worker, 9.7 percent as an owner and 1.7 percent position as manager.

Table 3: Company profiles

Variable	Item	Frequency	Percentage (%)
Sector/main business activity	Manufacturing	87	29.0
	Services	213	71.0
Position	General worker	58	19.3
	Senior management	93	31.0
	Middle management	108	36.0
	Owner	29	9.7
	Manager	5	1.7

	Other	7	2.3
No. of employee	Less than 5 employees	146	48.7
	5 and less than 20 employees	69	23.0
	20-99 employee	39	13.0
	More than 99 employees	18	6.0
	others	28	9.3

Adoption e-commerce

Table 4 describe about the level of e-commerce adoption among MSMEs. Its shows that, the highest percentage about 28.7 percent e-commerce adoption in MSMEs in Malaysia were at level 3 which is Transaction integrator. On this level MSMEs use websites for two-way communication with customers and suppliers. Providing services such as ordering, product feedback, surveys and customization. Online payment and / or an online order fulfilment. After that it was followed by level 1 which is Use websites to display information about products and services. Communication on the website is a one way (from the seller only). Other than that level 4 refers to use websites for two-way communication with customers and suppliers. Providing services such as ordering, product feedback, surveys and customization. Payment and / or an online order fulfilment. Integration of internal processes with online booking. Supplier Relationship Management (SRM) and Customer Relationship Management (CRM) while level 2 use websites for two-way communication with customers and suppliers. Provide services such as ordering, product feedback, surveys and customization.

Table 4: Level of adoption e-commerce

Level of adoption	Frequency	Percentage
Level 1	82	27.4
Level 2	28	9.3
Level 3	86	28.7
Level 4	52	17.3
Non-adopter (No website)	52	17.3

Analysis of Measurement Model

Table 5 shows the correlation between Competitive pressure (CP), Top management support (MS), Security concern (SC), Perceived usefulness (PU), Perceived ease of use (PEOU) and ecommerce adoption (EA).Based on findings, Perceived usefulness showed the highest relationship ($r=0.716$, $p<0.01$), followed by Perceived ease of use ($r=0.688$, $p<0.01$) and competitive pressure ($r=0.673$, $p<0.01$). However, all of other variables had significant relationship with the ecommerce adoption among MSMEs in Malaysia. Based on the above analysis, it can be concluded that perceived usefulness and perceived ease of use positively impact the intention to adopt e-commerce among MSMEs

Table 5: Correlation between CP, MS, SC, PU, PEOU and EA

	EA	**SC**	**MS**	**CP**	**PU**	**PEOU**
EA	1.000					
SC	.548	1.000				
MS	.575	.595	1.000			

CP	.673	.580	.560	1.000		
PU	.716	566	.583	.660	1.000	
PEOU	.688	.446	.473	.523	.637	1.000

Note: ** Significant correlation at the 0.01 level (2-tailed)

CONCLUSION

According to the study's findings, all the independent variables are sufficiently influencing the adoption of e-commerce among MSMEs in Malaysia. According to the study's findings, perceived usefulness (PU) and perceived ease of use (PEOU) along with competitive pressure significantly influenced e-commerce adoption by MSMEs in Malaysia. Meanwhile, this finding also aligned with the studies by Hakimin et al., (2021) on rural micro-entrepreneurs in Malaysia found that PEOU and PU level positively influenced their ITU e-commerce by the micro-entrepreneurs, bypassing their low level of skill and education to use e-commerce platforms in their business. Other than that, Lee and Anuar (2022) also reported that women micro entrepreneurs in Malaysia are more likely to adopt e-commerce in their business if they have better growth mindset, as the micro entrepreneurs are more likely to have higher level of PEOU and PU.

In recent years, Malaysia's e-commerce sector has grown significantly. Many businesses and consumers have grown as a result of technological advancements. shopping online. Additionally, the government has worked to encourage the growth of the e-commerce industry through programs like e-commerce adoption. It is anticipated that the use of e-commerce platforms will keep increasing as technological development and the government's acceptance and influence would encourage more people to use these platforms. Therefore, it is very crucial to increase the awareness of the technology among MSMEs or otherwise they will remain behind and unable to compete on a more comprehensive scale. This research successfully understood the factor influence the adoption of e-commerce. For the future, suggest that SME resistance to ecommerce may exist, owing to the fact that the barriers appear to be greater than the benefits. MSME’s require substantial training or learning where e-commerce is seen as difficult for the company.

Conflict of Interest: The authors declare no conflict of interest.

Funding details: This work was supported by the School of Business and Economics University Putra Malaysia 43400 Serdang Selangor, Malaysia

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