Investigating the Factors on E-commerce Adoption among SMEs: A View of Technology Acceptance Model

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Abstract **- The adoption of e-commerce has become crucial for organizations, particularly among small and medium-sized enterprises (SMEs), to gain a competitive edge in the market since the emergence of the World Wide Web. Although previous research has investigated e-commerce adoption in different countries, there still needs to be studies, particularly in the Malaysian e-commerce industry, which has experienced accelerated growth due to the consumers' increased online shopping in response to the nationwide lockdown and movement restrictions. To address this gap, this study utilized the Technology Acceptance Model (TAM) to examine the relationships between organizational awareness (OA), perceived usefulness (PU), perceived ease of use (PEOU), and e-commerce adoption (EA) among SMEs in Johor. The study employed a quantitative approach and distributed an online questionnaire to the targeted respondents, resulting in 384 data sets that were analyzed using Statistical Packages for Social Sciences (SPSS) software, including descriptive and correlation analysis. The findings indicated that organizational awareness (OA), perceived usefulness (PU), and perceived ease of use (PEOU) had significant effects on e-commerce adoption (EA) among Johor SMEs. The results could assist the Johor State Government in developing and enhancing policies for the Digital Economy agenda and contribute to a better understanding of the factors that affect e-commerce adoption among SMEs in Johor. Finally, the study suggested future research directions based on the limitations and implications of the research.**

Keywords **-** *E-commerce adoption, organizational awareness, perceived usefulness, perceived ease of use*.

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I. Introduction

Small and medium enterprises (SMEs) are crucial to the growth of any economy, either in developed or developing countries, because they boost the economy and business, significantly reduce unemployment, and are necessary for economic development (Nasuredin *et al.*, 2018; Rashid *et al.*, 2023). Askarzai, Lan, and Unhelkar (2014) explained that SMEs are essential for economic health in low- and high-income economies. Ale Ebrahim, Ahmed, and Taha (2009) then agreed that the growth and development of SMEs are inextricably linked to economic growth and national wealth. In light of this, it is critical for SMEs to embrace and leverage e-commerce to survive and remain competitive and innovative (Pearson & Grandon, 2005).

Malaysia contributed to approximately 1.2 percent of the Asia-Pacific region's total Internet population, which was far behind compared to the United States' 30 percent, Australia's 18 percent, and Singapore's 14 percent. However, between 2018 and 2019, Malaysia has experienced rapid growth in total e-commerce activities in ASEAN (46.5 percent), followed by Indonesia (28.1 percent) and Thailand (17.3 percent) (Austrade, 2020). Based on the SME Annual Report 2018/19 (SME Corp Malaysia, 2018), majority of the SMEs (83.6 percent) used computers in their daily business operations, followed by smartphones or tablets (82.3 percent) and internet services (73.7 percent). Further elaborated, 37.9 percent of SMEs conducted online business, up from 28.0 percent the previous year during the 3Q Survey 2017 SME Survey, accounting for an average of 30.0 percent of total business sales. Facebook dominated the chart with 87.7 percent of all online platform usage, followed by WhatsApp (73.5 percent) and Instagram (64.9 percent) (SME Corp Malaysia, 2018).

On the other hand, the vast majority of online businesses were focused on the domestic market. However, the remaining SMEs have yet to embrace the online business, which demonstrates that it is not essential for their operations and, therefore, the conventional way of conducting business is much preferred. According to Tan *et al*. (2009), the slow-moving growth of e-commerce among Malaysian SMEs can be attributed to risky and technically savvy challenging elements of e-commerce applications. In 2018, SME Corp Malaysia found that only 37.9 percent of SME entrepreneurs conducted online businesses (SME Corp Malaysia, 2018). However, in 2019, the COVID-19 pandemic occurred globally and showed significant changes in e-commerce adoption. The Department of Statistics Malaysia (DOSM, 2020) reported that e-commerce contributed 11.5 percent of GDP or RM163.3 billion in 2020, compared to 8.5 percent in 2019 (RM129.2 billion). Meanwhile, SME Corp Malaysia in 2021 revealed that the pandemic has resulted in a permanent shift in digital adoption in Malaysia, where 94 percent of consumers continue to use digital services and 98 percent plan to continue during post-pandemic (SME Corp Malaysia, 2022).

In the context of Johor state, among the initiatives of the state government launched during the COVID-19 pandemic was Johor E-Marketplace, a platform for Johor entrepreneurs to distribute their products in collaboration with Shopee Malaysia. However, again, various challenging elements of e-commerce applications can contribute to the slow growth of e-commerce among them (Tan *et al*., 2009). Furthermore, with the state of the telecommunications infrastructure being quite deplorable, it has also led to the attitude and behavior of SMEs toward using e-commerce.

This research aimed to investigate the factors that significantly affected the adoption of e-commerce among Johor SMEs. Previous studies proved that among the factors that contributed to the e-commerce adoption among SMEs included perceived usefulness (PU), perceived ease of use (PEOU), and compatibility, as well as organizational readiness, top management support, and technological factors (Lim & Trakulmaykee, 2018, Sujatha & Karthikeyan, 2021). Incentives such as cost savings and improved customer service could also contribute to e-commerce adoption, while barriers such as lack of resources and security concerns could hinder the process (Wymer & Regan, 2005).

Some of the widely used theories for measuring information technology (IT) adoption are the Technology Acceptance Model (TAM), Technology Organization Environment (TOE), Theory of Planned Behavior (TPB), Diffusion of Innovation (DoI), Unified Theory of Acceptance and Use of Technology (UTAUT) and many more. Among them, TAM is most likely used in the studies to investigate the factors that influenced the adoption of e-commerce in the organization (Nurqamarani, Sogiarto & Nurlaeli, 2021). Therefore, for this research, TAM was used to determine the relationships between its variables, namely perceived usefulness (PU), perceived ease of use (PEOU), and organizational awareness, with the adoption of e-commerce among Johor SMEs. TAM is a widely used model in e-commerce adoption studies, effectively predicting technology adoption behavior (Nyoro *et al*., 2015).

II. Literature Review

The Evolution of the Technology Acceptance Model (TAM)

TAM was developed by Davis in 1986, which consisted of three factors that contributed to the users' motivation, namely perceived ease of use (PEOU), perceived usefulness (PU), and attitude. The purpose of TAM is to explain perceived usefulness and ease of use from the perspective of social influence and cognitive instrumental processes (Momani & Jamous, 2017). Venkatesh and Davis then extended the model in 1996 and upgraded the original framework occasionally to enhance and forecast future phenomena with current practice (Chuttur, 2009). Currently, TAM is a well-known model often cited by researchers when discussing user acceptance of technology (Jauk *et al*., 2021).

Technology Acceptance Model (First Model)

The TAM theory was inspired by the Theory of Reason Action (TRA) model proposed by Ajzen and Fishbein (1980) and suggested that people's behavior is considered by their great intention toward what they believe (Davis, 1986). Additionally, in TAM, it was proposed that behavioral intention could be determined by considering the individual's attitude toward the actual behavior and the subjective norm associated with the particular behavior (Chuttur, 2009). To develop TAM, Davis used the same model (TRA) and integrated it with

the context of user acceptance of the information system after ten years of introducing TRA (Chuttur, 2009). In developing TAM, Davis believed the Theory of Reason is applicable to describe and forecast behavior. The significant changes that Davis had transformed from TRA to TAM consisted of two aspects. First, he did not use subjective norms when making predictions about real-life behavior (Chuttur, 2009). As Davis (1986) pointed out, it is the attitude a person has towards a particular behavior that matters in his TAM model. Secondly, Davis (1986) used several additional studies to show that perceived usefulness (PU) and perceived ease of use (PEOU) were the only two distinct beliefs required to predict a user's attitude toward using a system. Then, to determine the attitude towards particular behavior, he considered many personal beliefs instead of evaluating them on their own merits.

Consequently, Davis (1986) concluded that individuals tend to use and not to use the system to the extent that they believe the system will help them perform their job better (perceived usefulness). They believed that the effort required to use the system directly affects system usage behavior (perceived ease of use). Furthermore, he defined perceived usefulness as a degree to which an individual believes that using a particular system would enhance their job performance, while perceived ease of use can be defined as an individual belief that using a specific system makes them feel free of physical and mental effort (Davis, 1986). Figure 1 illustrates the original TAM by Davis (1986).

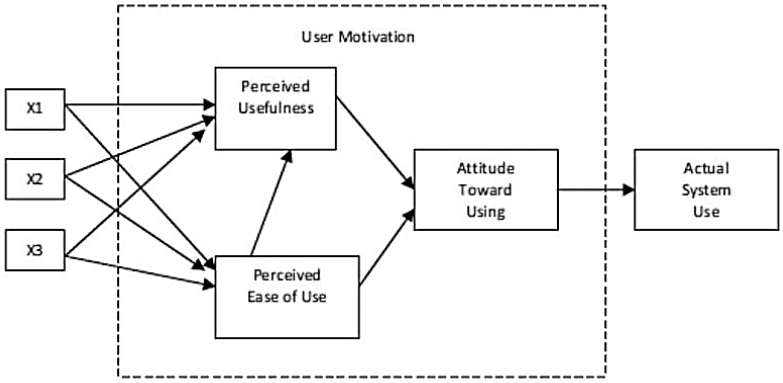

Figure 1: Original Technology Acceptance Model (Davis, 1986)

Technology Acceptance Model (TAM) (Final Model)

Davis, Bagozzi, and Warshaw (1989) proposed that TAM should include a new variable, namely behavioral intention, which a system's perceived usefulness (PU) would influence. They also suggested that there might be situations where an individual has a solid intention to use the system without having any attitude influenced by perceived usefulness (PU). They revised the original TAM and presented a new model in Figure 2.

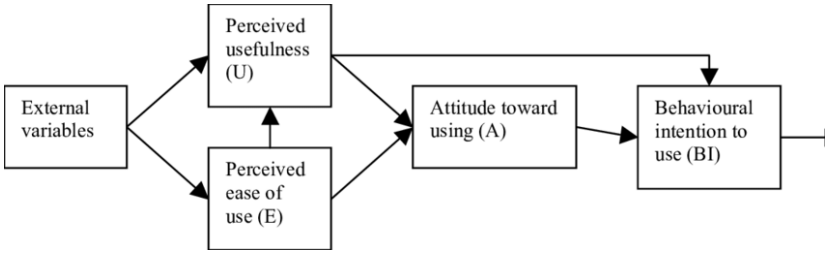

Figure 2: First Modified Version of TAM (Davis, Bagozzi & Warshaw,1989)

Davis then further evaluated the perceived usefulness (PU) and ease of use (PEOU) in 1989 to better understand scale impact. After discovering that he expected previously unimportant relationships to be significant, Davis also found others, as demonstrated in Figure 3.

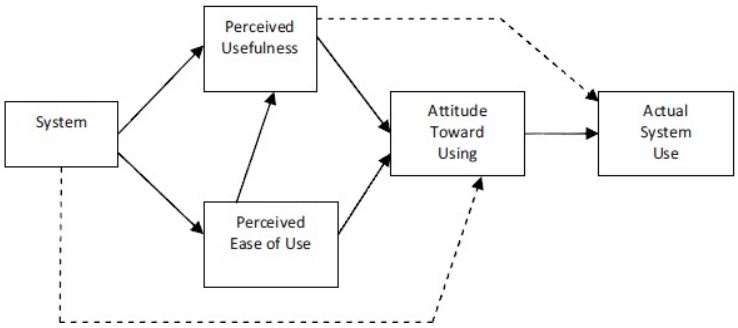

Figure 3: New Relationship Formulation in TAM (Davis, 1993)

In 1993, Davis suggested a shift in perspective regarding the influence of perceived usefulness (PU) on actual system use, proposing that a direct effect on system behavior could offset this influence. Figure 4 shows Venkatesh and Davis (1996) sought to remove the attitude construct from the model, eliminating any unexplained direct effect.

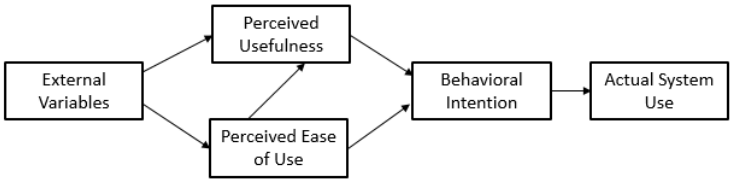

Figure 4: Final Version of TAM (Venkatesh & Davis, 1996)

In conclusion, Ma, Gam, and Banning (2017) claimed then that the TAM, with or without modifications, has successfully been applied to numerous empirical studies, predicting and explaining the acceptance and adoption of a wide range of technologies such as electronic banking (Hussain *et al*., 2021), mobile education (Mugo, Njagi, Chemwei & Motanya, 2017), and social networks (Weerasinghe & Hindagolla, 2018), as well as to study customer markets for technological products and services such as online shopping (Wu & Song, 2021) and mobile shopping (Vahdat *et al*, 2021)

Hypothesis Development and Theoretical Framework

Several independent studies have verified that TAM has been established and supported by proof and serves as an ideal theoretical foundation for the use of e-commerce (Andrina et al., 2022, Azizah, Nur & Putra, 2022, Valencia *et al*., 2019) To back this claim up, previous studies confirmed that it is appropriate to make analogies between e-commerce adoption and TAM's component. This is because the model was used extensively in numerous studies that examined user behavior on the internet. Thus, it explains why users accept or reject the website and how their usage behavior responds to that.

According to Wu and Song (2021), ease of use and usefulness were both highly related to attitude, and these factors, in turn, influenced a customer's likelihood to purchase items online using an e-commerce platform. The original TAM included a mediator (attitude) between user perception and behavioral intention. However, this could be attributed to the construct's role being underdeveloped in the model, and Davis and Venkatesh (1996), therefore, eliminated the need for the attitude construct from the model. The attitude was omitted from the research model based on its lack of relationship with behavioral intention, as ElKheshin and Saleeb (2020) showed. Reducing all sorts of feelings related to TAM from people's minds will give us a more objective, accurate assessment of the correlation between ease of use and usefulness and how these elements affect behavioral intentions (Liu, 2010). Thus, to be consistent with the previous model, the researcher decided to use the first version of TAM.

Several researchers have identified organizational awareness as a critical factor influencing e-commerce adoption, particularly in facilitating collaboration and knowledge sharing among dispersed workers (Kim, Gibbs & Scott, 2019). Oduro (2020) highlighted the importance of organizational awareness in promoting the innovation of new products and services. In addition, employee awareness and practice are thought to be critical components of channel selection. Figure 5 displays the conceptual framework of the study. Mainly, three independent variables (IV) were adopted, namely organizational awareness (OA), perceived usefulness (PU), perceived ease of use (PEOU), and e-commerce adoption (EA) as the dependent variable (DV).

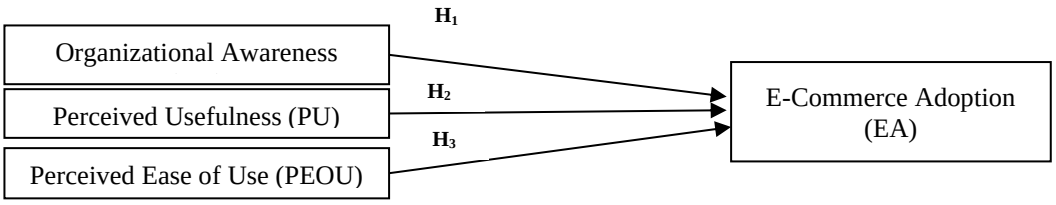

Figure 5: Conceptual Framework

Therefore, the following hypotheses could be postulated:
H_1: There is a significant relationship between organizational awareness (OA) and e-commerce adoption (EA)
H_2: There is a significant relationship between perceived usefulness (PU) and e-commerce adoption (EA)
H_3: There is a significant relationship between perceived ease of use (PEOU) and e-commerce adoption (EA)

III. Methodology

This study used a quantitative method involving survey questionnaires. Based on SME Corp Malaysia (2022), there were 97,963 establishments of SMEs in Johor, which consisted of manufacturing, services, and others. Hence, to represent the total population, the researcher collected data from 384 SMEs throughout the Johor state as a sample for this study (Krejcie & Morgan, 1970). A simple random sampling technique was used to select respondents from the target population of Johor SMEs to ensure that each participant had an equal chance of selection.

Due to the impact of COVID-19 and Movement Control Order (MCO) enforcement, the researcher decided to use the electronic survey to avoid any uncontrollable events. Two online platforms were used to connect with the respondents, namely SurveyMonkey and social media platforms such as Facebook group and WhatsApp, targeting specifically Johor SMEs with the assistance of SME Corporation Malaysia Johor, Malaysian Communications and Multimedia Commission (MCMC, 2021), Pusat Ekonomi Digital (PEDi), and Perbadanan Usahawan Johor Berhad (PUJB), where each of them has a different method of marketing and businesses.

The questionnaire was divided into three sections, namely Section A, B, and C. Section A was divided into three subcategories: e-commerce adoption (EA), organizational awareness (OA), perceived usefulness (PU), and perceived ease of use (PEOU). Meanwhile, Section B contained demographic profiles of respondents, including information on their age, ethnicity, marital status, educational level, occupation, and years of working experience. Section C then contained the company profiles. The 7-point Likert Scale was used in Section A, and the data collected from the respondents were analyzed using SPSS software version 26. Basic statistics such as frequency, mean, standard deviation, and percentages were used to analyze and clarify the particular phenomenon. Besides that, reliability analysis, descriptive analysis, and correlation analysis were also conducted to determine the objectives of the research.

IV. Results and Discussion

Reliability Analysis

A reliability test was done to assess Part A of the questionnaire using Cronbach's Alpha. Items with specified dimensions have a high degree of consistency, as indicated by the value of 0.7 and above using Cronbach's Alpha reliability criteria. Table 1 shows the reliability test gathered from 30 respondents during the pilot test.

Table 1: Reliability Test

	Variables	Cronbach's Alpha (N=30)	N of Items
EA	E-Commerce Adoption	0.729	6
OA	Organizational Awareness	0.864	7
PU	Perceived Usefulness	0.912	6
PEOU	Perceived Ease of Use	0.905	6

Table 1 illustrates that all the variables had remarkable internal consistency with Cronbach's Alpha of e-commerce adoption (EA) at 0.729, organizational awareness (OA) at 0.864, and perceived ease of use at 0.905. Perceived usefulness (PU) achieved the highest Cronbach's Alpha with 0.912.

Descriptive Analysis

384 questionnaires were collected from the target respondents, giving a response rate of 100 percent. Based on the respondents' demographic profiles (Part B), the findings showed that 21.9 percent were aged 31-35 years old, 20.3 percent 36-40 years old, 19.8 percent 26-30 years old, 16.8 percent 41-50 years old, 11.2 percent 25

years and below, 7.0 percent 46-50 years old, and 2.9 percent were aged above 50 years. Most respondents were married (60.9 percent), while single and others each recorded 38.0 percent and 1.0 percent, respectively. Other than that, Malay represented 82.8 percent, Chinese 7.6 percent, Indian 6.8 percent, and others (2.9 percent). The results also showed that 47.4 percent of the respondents were First Degree holders, followed by Diploma (22.4 percent), Master (19.4 percent), secondary school (10.4 percent), and others (0.5 percent). Besides that, most of the respondents were business owners (52.1 percent), followed by managers (39.0 percent) and top management/directors (8.9 percent). Most of the respondents also had working experience between 1-5 years (34.6 percent), 11-15 years (19.8 percent), 6-10 years (15.9 percent), above 20 years (12.2 percent), less than one year (8.6 percent) and 16-20 years (8.6 percent). Other than that, 44.0 percent of the respondents have working experience with their current company for 1-5 years, followed by 6-10 years (29.2 percent), less than one year (12.2 percent), 11-15 years (10.4 percent), above 20 years (3.1 percent) and 16-20 years (1.0 percent). Table 2 illustrates the demographic profiles of 384 respondents.

Table 2: Demographic Profiles

Item	Frequency	Percentage (%)
Age		
25 years old and below	43	11.2
26 - 30 years old	76	19.8
31 - 35 years old	84	21.9
36 - 40 years old	78	20.3
41 - 45 years old	65	16.9
46 - 50 years old	27	7.0
Above 50 years old	11	2.9
Marital Status		
Single	146	38.0
Married	234	60.9
Others	4	1.0
Race		
Malay	318	82.8
Chinese	29	7.6
Indian	26	6.8
Others	11	2.9
Education Level		
Primary	0	0.0
Secondary	40	10.4
Diploma	77	22.4
First Degree	182	47.4
Master	74	19.3
PhD	0	0.0
Others	2	0.5
Current Position		
Manager	150	39.0
Top Management/Director	34	8.9
Business Owner	200	52.1
Working Experience		
Less than one year	34	8.9
1 - 5 years	133	34.6
6 - 10 years	61	15.9
11 - 15 years	76	19.8
16 - 20 years	33	8.6
Above 20 years	47	12.2
Working Experience with the Current Company		
Less than one year	47	12.2
1 - 5 years	169	44.0
6 - 10 years	112	29.2
11 - 15 years	40	10.4
16 - 20 years	4	1.0
Above 20 years	12	3.1
TOTAL	**384**	**100.0**

Next, according to the results from Part C (company profile), it was found that most of the company aged between 5 to 10 years (40.4 percent) followed by less than five years (29.7 percent), 16-20 years (8.9 percent), above 25 years (7.3 percent), 11-15 years (7.0 percent) and 21-25 years (6.8 percent). Moreover, 57.8 percent of the companies were sole proprietorships, 33.3 percent were private limited, and 8.9 percent were partnerships. Of the total respondents, 85.9 percent were actively involved in the operation, while 14.1 percent were not. For organization size, by looking at the total employees, most of the companies had less than five employees (51.8 percent), while those having below 75 employees were 34.6 percent, and less than 200 were 13.5 percent. Finally, 65.6 percent of the companies were from the service sector, while 34.4 percent were from the manufacturing sector. Table 3 illustrates the respondents' company profiles.

Table 3: Company Profiles

Item	Frequency	Percentage (%)
Firm Age		
Less than five years	114	29.7
5 - 10 years	156	40.4
11 - 15 years	27	7.0
16 - 20 years	34	8.9
21 - 25 years	26	6.8
Above 25 years	28	7.3
Ownership Structure		
Sole proprietorships	222	57.8
Partnership	34	8.9
Private Limited	128	33.3
Actively Involved in the Operation		
Yes	330	85.9
No	54	14.1
Organization Size (No. of Employees)		
Less than 5	199	51.8
5 - 75	133	34.6
More than 75 - 200	52	13.5
Sector		
Manufacturing	132	34.4
Service	252	65.6
TOTAL	**384**	**100.0**

Correlation Analysis

In this study, the measure of skewness for all variables falls between -0.947 and -0.377. Based on the general statistical measure of skewness ranging from -1.0 and 1.0 is considered normally distributed, and thus, further analysis was conducted to test the hypotheses. Table 4 shows the correlations between OA, PU, PEOU, and EA.

Table 4: The Correlations between OA, PU, PEOU, and EA

	EA	OA	PU	PEOU
EA	1			
OA	0.801**	1		
PU	0.645**	0.549**	1	
PEOU	0.555**	0.423**	0.559**	1

Note: *Significant correlation at the 0.01 level (2-tailed)
**Significant correlation at the 0.05 level (2-tailed)

Results in Table 4 indicated that the entire dimensions had significant relationships with the e-commerce adoption (EA) among Johor SMEs. Organizational awareness (OA) showed the highest relationship ($r=0.801$, $p<0.05$), followed by perceived usefulness (PU) ($r=0.645$, $p<0.05$) and perceived ease of use (PEOU) ($r=0.555$, $p<0.05$). Table 5 then shows the hypothesized model for all the variables.

Table 5: Hypothesized Model

Hypothesis	Relationship		SD	β	R^2	p-Value
H_1	OA ▼	EA	0.756	0.533	0.304	0.520
H_2	PU ▼	EA	0.832	0.320	0.393	0.348
H_3	PEOU ▼	EA	0.911	0.195	0.456	0.186

Table 6: Hypothesis Result

Hypothesis	Description	Result
H_1	There is a significant relationship between organizational awareness (OA) and e-commerce adoption (EA) among Johor SMEs.	Supported
H_2	There is a significant relationship between perceived usefulness (PU) and e-commerce adoption (EA) among Johor SMEs.	Supported
H_3	There is a significant relationship between perceived ease of use (PEOU) and e-commerce adoption (EA) among Johor SMEs.	Supported

Based on the above analysis, it is evident that the hypotheses of this study, namely H_1, H_2 and H_3, were supported (Table 6). Therefore, it can be concluded that organizational awareness (OA), perceived usefulness (PU), and perceived ease of use (PEOU) positively impact the intention to adopt e-commerce or e-commerce adoption (EA) among the SMEs in Johor.

V. Discussion and Implications

Based on the above outcome, it is clear that all the independent variables, namely organizational awareness (OA), perceived usefulness (PU), and perceived ease of use (PEOU), are sufficient to influence the adoption of e-commerce among the SMEs in Johor. Hence, due to the fact that e-commerce allows businesses to expand and sustain their operations, it is very crucial to increase the awareness of the technology among the SMEs (Sirisukha, 2017), or otherwise, they will remain behind and unable to compete on a more comprehensive scale.

Some collective effort and strategy are also required, particularly in government policy, to make e-commerce an additional tool for SMEs' performance. This is to empower the participation of SMEs further to stimulate the Malaysian economy. As for the implications to the SMEs, this study undoubtedly could raise awareness of the importance of IT usage or e-commerce technology in expanding businesses and sustaining operations (Mohd Zain *et al*., 2020). Otherwise, SMEs will remain behind and unable to compete more comprehensively.

Despite some limitations during the study, mainly due to the COVID-19 pandemic, several recommendations can be considered for future research on e-commerce adoption among SMEs. These recommendations can be utilized to encourage and influence respondents from various ethnic backgrounds in Malaysia to participate in the survey actively. One is for the researcher to incorporate face-to-face data collection methods and surveys in future studies to increase the diversity of the represented ethnicities in the questionnaire responses. Additionally, the researcher could consider utilizing an online platform for survey administration even during face-to-face sessions. Next, when describing the connection between independent factors, gender should be regarded as a variable in any future research investigating this topic to further understand the patterns and perceptions from various points of view (Abdul Ghafar, Mahmood & Zahiruddin, 2023).

VI. Conclusion

This research successfully understood the factors that influence the adoption of e-commerce among SMEs in Johor, Malaysia, based on the variables of organizational awareness (OA), perceived usefulness (PU), and perceived ease of use (PEOU). In the future, the researchers have high hopes that this study will be helpful to the organization in determining the needs and desires of their company to enhance the quality of service they provide to their customers.

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