

E-Commerce Adoption Among Micro, Small, and Medium Enterprises in Brunei Darussalam

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ABSTRACT

The advancement of the internet has enabled firms including micro, small, and medium-sized enterprises (MSMEs) in Brunei Darussalam (Brunei) to adopt e-commerce. E-commerce has helped firms to easily buy and sell their products or services online. The advancement of the Internet and e-commerce has brought many benefits to the firms, especially the MSMEs as it could help to reduce cost, enhance the firm's relationship with their customers and/or suppliers, and increase business opportunities. To stay competitive, MSMEs must be aware of the potential benefits that e-commerce could bring. Moreover, before the firms have decided to adopt e-commerce, there are several factors that they should consider. This study aims to find the factors that could affect the MSMEs' decision to adopt e-commerce by applying the technology-organizational-environmental (TOE) framework.

KEYWORDS

Business Opportunities, Cost Reduction, Customer Relationship, Internet, TOE Framework

1. INTRODUCTION

The emergence of e-commerce has shifted the way that businesses including micro, small and medium-sized enterprises (MSMEs) to conduct their daily business activities. As the business environment is getting tougher day by day, the firm must be able to compete effectively, whether in the local or the global market. This also implies for MSMEs in Brunei as the number of micro, small and medium enterprises are increasing over the years, and their roles in contributing to the country's economic development are important. To compete in a competitive business environment, every firm must have good strategies (Ahmad et al., 2010). A few of the strategies that the local firms could implement are to expand the reachability and being able to approach a wider base of customers through the use of the Internet. The Internet has played an important role in the current business environment as Sharma (2016) stated that the availability of the Internet had enabled firms to easily gather information on which the information can be used to improve the overall business operations. The continuous growth of Internet users is also crucial in determining the success of e-commerce. Concerning Internet users

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in Brunei, Rajak (2018) stated that Internet penetrations among Bruneians are very high, where 95% of the population has access to the Internet.

Furthermore, Zhu et al., (2003); Teo (2004); Molla (2005) state that most MSMEs are now moving towards e-commerce. The main reason for adopting e-commerce is the potential benefits that it brings to the firms. Some of the benefits are that e-commerce enabled the firms to have access to a wider base of customers locally and globally, cost reduction, direct and indirect cost savings in communications and marketing, strengthen relationships with customers and suppliers as well as improving the overall business operations (Abed, Dwivedi & Williams, 2015). The other benefits include enhancing firms' profitability and widen their business opportunities (Rogers, 1995; Wanyoike et al., 2012).

Although the Internet penetration in Brunei is very high, the number of MSMEs that fully adopt e-commerce is still low. One initiative that was done by the government of His Majesty the Sultan of Brunei Darussalam in 2016 was by establishing Darussalam Enterprise (DARE). The development of DARE aims to help develop the local MSMEs as Brunei is now trying to diversify its economy from oil and gas (Borneo Bulletin Yearbook, 2019). After the establishment of DARE, there is a slight increase of MSMEs in adopting e-commerce. Currently, there are more than ten MSMEs that are actively conducting e-commerce in their daily business operations (Othman, 2018). One of DARE's initiatives in increasing the number of MSMEs to adopt e-commerce is through the "E-Commerce Boot camp". This boot camp aims to equip the local MSMEs with knowledge on how to conduct their business online (Wong, 2017). Apart from being aware of the initiatives that were provided by the government agencies, it is also important to look through the other possible factors that drive the local MSMEs decision to adopt e-commerce.

To support the utilization of e-commerce by MSMEs in Brunei, it is important to investigate factors that can influence the adoption of e-commerce by them. Therefore, this study aims to identify the factors that affect the MSMEs' decision in adopting e-commerce. The Technology, Organization and Environment (TOE) framework is widely used in the study of the adoption of e-commerce at the firm level (Zhu et al., 2003; Lertwongsatien & Wongpinunwatana, 2003; Huy et al., 2012; Rahayu & Day, 2015). Chatzoglou and Chatzoudes (2016) had confirmed that the decision of firms to adopt e-commerce could be affected by technological, organizational and environmental factors.

This study aims to find the most significant factor that affects the decision of MSMEs in Brunei to adopt e-commerce based on the TOE framework. In other words, what are the key factors that influence MSMEs in Brunei to adopt e-commerce?

The rest of the paper is organized as follows. The next section of the paper is the literature review and then followed by the research methodology. The following sections are the findings and the analysis. The last section of the paper consists of the discussion, conclusion, limitation of the overall study and providing recommendations for future studies.

2. LITERATURE REVIEW AND RESEARCH FRAMEWORK

2.1. E-Commerce

In general, e-commerce is a set of value exchange activities between two business entities (normally between sellers and buyers) over a computer network, which is nowadays mostly the Internet. The earlier e-commerce activities, which still exist, were conducted through document exchange through electronic data interchange (EDI) (Silviu, 2010). However, the main driver of the e-commerce expansion is the Internet, especially since the world wide web (WWW or the Web) was introduced in the early 90s. Toward the end of the 90s, the term e-commerce is widely accepted and very popular, and many companies provide their websites for buyers to purchase products or services from them.

According to Garrett and Skevington (1999), e-commerce is "the act of trading by the means of using advanced communication technology". They further elaborate that the act of doing business includes not just the front end but also the back end in the trading process, such as marketing, the

management of supply chain and the movement of money from one to another. In simplest terms, e-commerce is the buying and selling of goods and services over the Internet (Khan, 2016). Khan (2016) adds that from the consumer perspective, the Internet is a place for them to gather new information such as getting updated with the latest promotions and to compare prices from one seller to another. With the advancement of the Internet and the way that businesses are being conducted, e-commerce allows consumers and businesses from all over the world to engage in business activities digitally (Poong, Zaman & Talha, 2006). The benefits of e-commerce include access to the global market, reduce cost, establish closer business relationships with the clients, help improve business processes as well as in gaining competitive advantage (Abed, Dwivedi & Williams, 2015). These advantages are the drivers of e-commerce as important tools in this era of globalization.

2.2. E-Commerce and MSMEs in Brunei

According to OECD/ERIA (2018), Brunei Darussalam is one of the smallest and the second highest-income countries in ASEAN. Brunei's economy is driven by the production of crude oil and natural gas. Since the 1980s, the government of Brunei has always been actively exploring ways to diversify its economy. To lead the diversification within the country, Brunei Vision 2035 was introduced. The Brunei Vision 2035 aims "to enhance the skills and quality of life of the population and to build a dynamic and sustainable economy". One of the strategies that were implemented within Vision 2035 is to enhance the current business environment, which includes enhancing the 'ease of starting a business' (OECD/ERIA, 2018).

In 2015, there were around 5,342 enterprises that were operating in Brunei, of which 96.5% came from MSMEs (JPKE, 2016). Moreover, the research made by JPKE (2011) found that MSMEs in Brunei were mostly concentrated in the wholesale and retail sector with 34.7% in 2010, manufacturing with 12.6% and construction sector with 23%. According to the ASEAN report by Polsaram et al. (2011), the majority of businesses in Brunei are micro-sized businesses with 52.3%, small enterprises with 43.8%, medium enterprises with 2.23% whereas only 1.63% comes from large enterprises.

According to data published by Global Digital Media Consultancy "We Are Social" in 2018, Brunei has the highest Internet and also social media penetration. According to Rajak (2018), 95% of the population has access to the Internet. The high percentage of Internet penetration in Brunei acts as a strong foundation of e-commerce activities (OECD/ERIA, 2018). To increase the use of e-commerce among MSMEs, several initiatives were provided by DARE in promoting e-commerce. In 2017, DARE collaborated with one of China's leading e-commerce companies which are DHgate.com and Universiti Brunei Darussalam (UBD) to introduce an e-commerce boot camp. This boot camp aims to enhance the MSMEs' awareness of how to conduct their businesses online (Wong, 2017). Moreover, due to the high percentage of Internet penetration in Brunei, most of the small businesses utilize social media platforms to market their products.

According to Seyal and Rahman (2003), 65% of 129 MSMEs; which includes private and public companies have adopted e-commerce to a certain degree, while Looi (2005) found that 46.5% of private companies offered websites. Although Brunei has the highest internet penetration, businesses still rely on traditional methods of doing business such as brick and mortar. In fact, Brunei ranked 45th in the Networked Readiness Index (NRI); which takes into account the environment for ICTs, society readiness to use ICTs, stakeholders usage and the impact of ICTs on the economy and the society, which implies that Brunei has the capability to transition from traditional business to e-commerce (Bilbao-Osorio, Crotti, Dutta & Lanvin, 2014).

2.3. Technology Adoption

There are several theoretical frameworks developed to investigate factors that influence the adoption of technology. A notable frame is Technology Acceptance Model (TAM) (Davis, 1985 and 1993). This framework was developed from Theory of Reasoned Action (Fishbein and Ajzen, 1975) and Theory of Interpersonal Behaviour (Triandis, 1977). There many extensions of TAM, among others,

are TAM2 (Venkatesh & Davis 2000 & Venkatesh 2000), Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al. 2003), and UTAUT2 (Venkatesh et al. 2012). These frameworks are typically applied for the adoption of technology by individuals or users.

Another theoretical framework that was developed to investigate factors that influence the adoption of technology by organizations such as firms is the Technology, Organization, and Environment (TOE) framework, which was developed by Trotsky and Fleisher (1990).

2.4. Research Framework

According to Awa, Ukoha and Emecheta (2016), the TOE framework is comprehensive and industry friendly. Since our study is the adoption of e-commerce by micro, small and medium enterprises in Brunei Darussalam, the TOE framework is employed. There are several studies on the adoption of e-commerce at the firm level that employed the TOE framework (Zhu et al., 2003; Lertwongsatien & Wongpinunwatana, 2003; Huy et al., 2012; Rahayu & Day, 2015). Some other research also uses the TOE framework to investigate the influence of TOE factors in the utilization of e-business (Uze, 2008) and e-marketing (Alrousan et al., 2020). The TOE framework is also used by similar research in Malaysia done by Ahmad, Abu Bakar, Faziharudean and Zaki (2015). The TOE framework identifies three key factors that influence firms' adoption of technology innovation, which are technology, organization, and environment. This framework has been utilized by many researchers to study the adoption of technological innovation in the context of business organizations.

2.4.1. Technological Context

There are three technology-related dimensions included in the TOE framework namely perceived *relative advantage* (*perceived benefits*), *perceived compatibility*, and *perceived complexity* (Kuan & Chau, 2001; Rogers, 2003; Zhu et al., 2003).

Perceived relative advantage (*perceived benefits*). According to several studies (Kuan & Chau 2001; Seyal, Awais, Shamail & Abbas, 2004; Shah Alam, Ali & Jani, 2011; Rahayu & Day, 2015; Ahmad et al., 2015; Sin et al., 2016) perceived relative advantage has a positive relationship towards the adoption of e-commerce among SMEs. Teo (2007) mentions that e-commerce could act as a competitive advantage for firms that utilize it very well. Apart from that, Johnston, Wade and McClean (2007) state that e-commerce could help the firms to improve their overall financial activities. Every firm must take into consideration the potential benefits that the technology could bring as it, in the long run, could help increase the firm's productivity and effectiveness. Hence, the hypothesis for the study is derived as follows:

H₁: There is a positive relationship between perceived relative advantage and e-commerce adoption.

Perceived compatibility. Rogers (2003) defined perceived compatibility as “*the degree to which technological innovation is perceived as being consistent with existing operating practices, beliefs, values, and past experiences and needs*”. This was also stated by Ahmad, Abu Bakar, Faziharudean and Zaki (2015) whereby perceived compatibility refers to how well the adoption of e-commerce fits the overall process of the firms. Moreover, if the technology that the firms wanted to adopt is consistent with their overall process and infrastructure, it would enable the firms to change easily and will reduce employees' resistance to change (Mndzebele, 2013). Thus, Hong and Zhu (2006); Saffu, Walker, and Hinson (2008); Hussin, Nor and Suhaimi (2008) state that e-commerce adoption is usually being affected by the compatibility of the new technologies such as whether or not the innovation is inlined with the firm's current infrastructure and work practices. Hence, the hypothesis for the study is derived as follows:

H₂: There is a positive relationship between perceived compatibility and e-commerce adoption.

Perceived complexity. Elbeltagi (2007) defines complexity as to how difficult the adoption of new technologies to be understood and to be used by the firms. Furthermore, studies made by several researchers (Huy & Filiatrault, 2006; Jeon, Han & Lee, 2006; Mndzebele, 2013) found that there is a positive relationship between complexity and e-commerce adoption among firms. Since SMEs are mostly known to be lacking skills, for instance, technical skills and managerial skills, it could be difficult for them to successfully adopt e-commerce (Hussin, King & Cragg, 2002). Mndzebele (2013) further states that there are not many organizations that are willing to provide training to their employees as it may be time-consuming and costly. Therefore, the hypothesis formulated for the study is as follows:

H₃: *There is a positive relationship between perceived complexity and e-commerce adoption*

2.4.2. Organizational Context

There are two organizational-related dimensions included in the TOE framework, namely *e-commerce knowledge* and *management attitude toward e-commerce* (Huy & Filiatrault, 2006).

E-commerce knowledge. Huy et al. (2012) mentioned: “*the employee’s knowledge is crucial for a firm’s ability to adapt and make use of technology*”. Gable and Raman (1992) from their studies found that most SMEs fail when they are trying to adopt e-commerce because they lack in terms of knowledge and awareness regarding innovation technologies. Moreover, Looi (2005), Huy et al. (2012), and Ahmad et al. (2015) in their studies, state that there is a positive relationship between e-commerce knowledge and e-commerce adoption. This could mean that the success of e-commerce adoption is highly dependent on the manager’s and the employees’ knowledge of new technologies and e-commerce. Hence, the next hypothesis is derived as follows:

H₄: *There is a positive relationship between e-commerce knowledge and e-commerce adoption.*

Management attitude towards e-commerce. According to Low, Baharudin, and Lim (2017), firms must have management support to implement e-commerce successfully. Al-Qirim (2007) adds that the top management must provide full support in terms of motivation and make themselves involved during the process of implementation. This is mainly because, if the top management takes it positively through the changes that the firm is trying to adapt, it will indirectly affect its employees (Low et al., 2017). Similarly, Ahmad et al. (2015) and Low et al. (2017) find in their studies that there is a significant relationship between the management attitude towards e-commerce and e-commerce adoption. The attitude of the management affects e-commerce adoption, especially for MSMEs as most MSMEs operate on a smaller scale where it is much easier for the management to look after their employees. Hence, the hypothesis is as follows:

H₅: *There is a positive relationship between management attitudes towards e-commerce and the adoption of e-commerce*

2.4.3. Environmental Context

Meanwhile, the three environmental-related dimensions included in the TOE framework are *external changes agents*, *pressure from trading partners* and also *pressure from competitors* (Kuan & Chau, 2001; Zhu et al., 2003)

External change agents. According to Kuan and Chau (2001), the external change agents include the support received from the government. The authors further elaborated that government policies are also considered important as it could indirectly affect the e-commerce adoption among SMEs. A study made by Wong (2003) found out that, in Singapore itself, the rapid adoption of e-commerce

and other technological innovation is mostly driven by the support of the government policies. Looi (2005), on the other hand, finds in his study that there is a positive significance between government support and e-commerce adoption. In Brunei itself, one of the initiatives done by the government was by introducing the e-commerce boot camp for the MSMEs, where it aims to increase the MSMEs' awareness of e-commerce (Wong, 2017). Hence, the hypothesis is derived as:

H₆: There is a positive relationship between external change agents and e-commerce adoption

Pressures from trading partners. According to Barua, Whinston, and Yin (2000), the success of e-commerce adoption within firms is not only derived from the management's efforts but also the readiness of the customers, suppliers and trading partners. Dholakia and Kshetri (2004) state that in the developing countries, most of the SMEs are constantly being pressured by their trading partners such as suppliers and customers to adopt e-commerce. Moreover, Thabit, Raewf, Abdulrahman, and Younis (2016) mentioned that most of the time, the trading partners (customers and suppliers) have a crucial role in pressuring SMEs to adopt e-commerce. However, Ahmad et al. (2015) and Thabit et al. (2016) in their studies, find that there is a significant negative relationship between competitive pressures from trading partners with e-commerce adoption. Hence, the hypothesis is formulated as:

H₇: There is a positive relationship between pressure from trading partners and e-commerce adoption

Pressures from competitors. This can be defined as "the extent of the competitive atmosphere within the industry in which the firms operate" (Lertwongsatien & Wongpinunwatana, 2003). According to Kuan and Chau (2001), most of the time, firms may feel pressured if they are surrounded by competitors who are implementing new technologies within the business to stay competitive. Thus, previous studies have found that there is a significant relationship between the intensity of pressure received from the competitor with e-commerce adoption (Lertwongsatien & Wongpinunwatana, 2003; Gibbs & Kraemer, 2004; Looi, 2005; Garg & Choou, 2015; Sin et al., 2016). Therefore, the hypothesis formulated is:

H₈: There is a positive relationship between pressures from competitor and e-commerce adoption

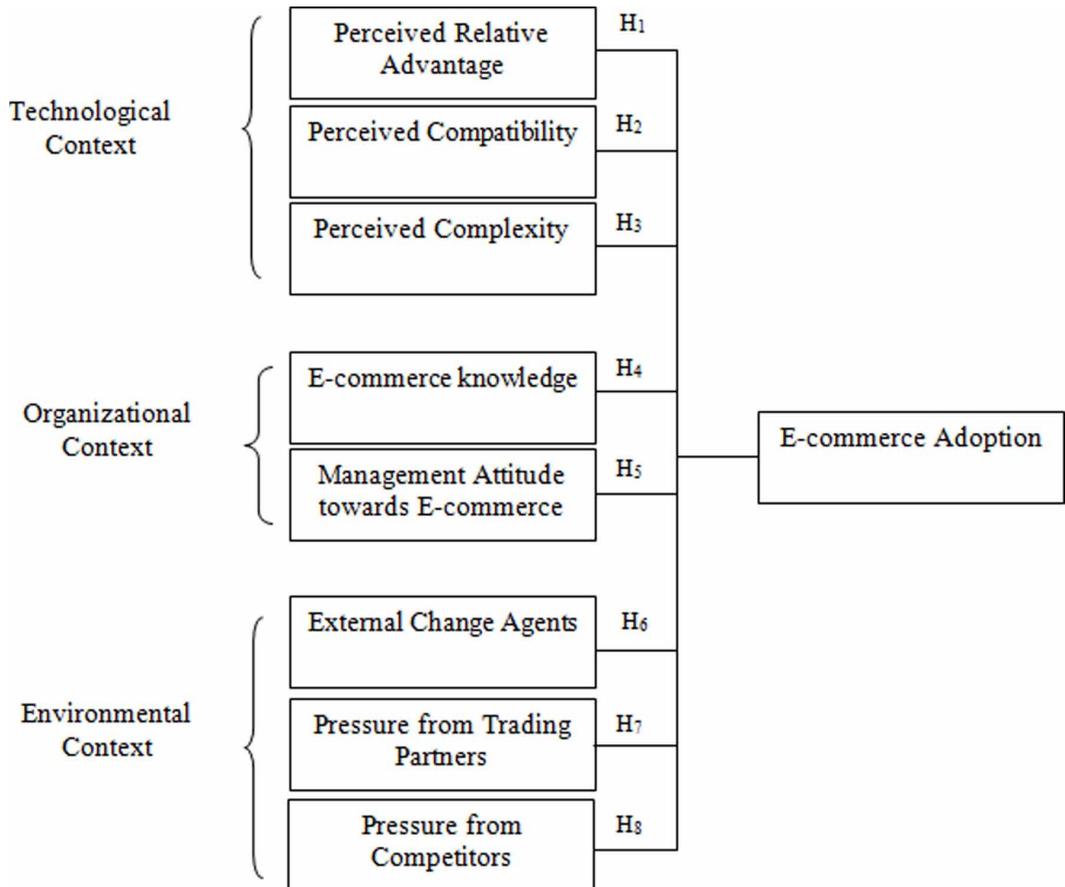
The research framework and the hypothesis can be seen in Figure 1.

3. RESEARCH METHODOLOGY

3.1. Sampling and Data Collection

The targeted respondents for the study were owners or managers of MSMEs operating in Brunei Darussalam. Most of them are from Brunei Muara, Tutong and Belait district. Snowball sampling is adopted for this study. This sampling technique was adopted mainly because it is cost-effective and convenient to obtain MSMEs to participate in this study. As reaching the target respondent can be efficiently done using emails and social media platforms, the data were collected through an online survey sent through emails and social media platforms such as *Facebook*, *Instagram*, and *WhatsApp*. We invited 150 MSMEs to participate in the online survey for two weeks; however, only a total of 55 responses were valid for analysis. Note that only one person for each MSME participates in the survey; therefore, 55 responses came from 55 MSMEs.

Figure 1. Research framework



3.2. Instrument

The study was based on a quantitative method whereby this method enabled the researchers to quantify the data gathered easily. The survey instrument contains questions derived from previous studies on the same topic as well as a few questions developed by the research team. The questionnaire was divided into two main sections, Section A and B. Section A consists of questions that are related to the demographic profile of the respondents and their firms. In this section, the respondents were only instructed to choose one answer. As for Section B, it consists of questions that are based on the factors under the TOE framework. Under the technological context, there were 13 items altogether and there were 8 items under the organizational context, whereas the technological context had 11 items. In this section, a five-point Likert scale was used whereby number 1 is considered as “*Strongly Disagree*” and number 5 considered as “*Strongly Agree*”. Table 1 below summarizes the list of variables, the measurement used for the survey and its references.

3.3. Data Analysis

The data gathered were analyzed by using SPSS software. To investigate further the relationship between independent variables (IVs) and the dependent variable (DV), the hypotheses were tested using multiple regression analysis. From the analysis made, it can be then identified from which context of the TOE framework has a significant impact on the adoption of e-commerce. Moreover, a descriptive analysis was also used in the study where this was used to describe the characteristics

of the respondents, such as their gender, age, educational background, job position and the number of employees.

4. FINDINGS AND ANALYSIS

4.1. Characteristics of the Respondents

Table 1 above shows the characteristics of the respondents that managed to answer the survey. Out of 55 respondents, 50.9% were male, and 49.1% were female. From the table, it could be seen that the majority of the respondents were aged between 21-30 years old (85.5%) followed by 12.7% from 31-40 years old and 1.8% from the age group 41-50 years old. As for the job position, 65.5% of the respondents were the director and the owner of the business, whereas 20% of the respondents were the managers of MSMEs. Of the 55 respondents, 41.8% of the respondents have a bachelor's degree or Professional, 29.1% have a Diploma or Certificates, while 23.6% have a Postgraduate Degree educational background. With regards to the number of employees, it indicates that among the 55 respondents, 49.1% of the MSMEs have 1 to 4 employees followed by 47.3% have 5 to 50 employees and 3.6% have 51 to 100 employees. This shows that the majority of the respondents come from micro and small enterprises.

4.2. Reliability and Validity

Table 3 shows the reliability analysis of the variables which was tested by Cronbach's Alpha; to test the reliability or internal consistency of the instrument (Grandon & Pearson, 2004). There were 32 items that constitute 8 constructs that were tested for reliability. Although all constructs were taken from previous studies, the reliability scores vary in all dimensions. This is because most of the questions adopted have been modified to suit the overall purpose of the research. For the constructs within the technological context, Cronbach's alpha for perceived relative advantage is .895, for perceived compatibility is .727 and for perceived complexity is .746. As for the organizational context, Cronbach's alpha for e-commerce knowledge and expertise is .349 while the management attitude toward e-commerce is .840. Lastly, for the environmental context, Cronbach's alpha for external change agent is .672, pressure from trading partners is .847, whereas pressure from competitors is .471. According to Nunnally (1978), the minimum acceptable standard alpha is .70 however, Hinton, Brownlow, McMurray, and Cozens (2004) argued that alpha value between .50 to .70 could also be considered as having moderate reliability.

From there, it could be said that Cronbach's alpha scores for all the technological context with .895 for perceived relative advantage, .727 for perceived compatibility and .746 for perceived complexity are reliable and acceptable. Also, for the organizational context, Cronbach's alpha score for management attitude toward e-commerce with .840 is considered to be reliable. Meanwhile, for the technological context, Cronbach's alpha for pressure from trading partners with .847 is reliable. Since Hinton et al. (2004) argued that alpha value between .50 to .70 could be considered to have moderate reliability, the environmental context which is external change agents with alpha .627 is also considered to be acceptable and reliable. However, two of the items are considered to be "weak" as the alpha value is less than .50, which are e-commerce knowledge and expertise with .349 and pressure from competitors with .471. This may be due to the number of items and the sample size in this research study. Hence, among all the constructs, five constructs are highly acceptable and reliable; one construct is considered to be moderately reliable. Meanwhile, two of the constructs have low reliability. The constructs with low reliability were removed from the analysis.

Table 1. Operationalization of e-commerce adoption

Variable	Measurement	Reference(s)
Perceived relative advantage	<ol style="list-style-type: none"> 1. E-Commerce provides new opportunities. 2. E-Commerce allows us to accomplish specific tasks more quickly. 3. E-Commerce allows us to enhance our productivity. 4. E-Commerce allows us to learn more about our competitors. 5. E-Commerce increases our profitability. 6. E-Commerce provides timely information for decision-making purposes. 	Al-Qirim (2007) Ghobakhloo et al. (2011)
Perceived compatibility	<ol style="list-style-type: none"> 1. E-Commerce is compatible with our preferred work practices. 2. E-Commerce created changes that are compatible with our business. 3. E-Commerce is compatible with our customers. 4. E-Commerce security is compatible with us. 	Al-Qirim (2007) Ghobakhloo et al. (2011)
Perceived complexity	<ol style="list-style-type: none"> 1. E-commerce adoption will be more complicated due to the lack of needed tools. 2. E-commerce adoption will be more complicated due to the lack of experiences. 3. E-commerce adoption will be more complicated due to not meeting industry standards. 	Huy et al. (2012)
E-commerce knowledge	<ol style="list-style-type: none"> 1. We have very little knowledge of how the Internet and e-commerce can help to improve my business and increase our sales. 2. We will use more Internet/electronic commerce if we know more about what they can do for my business. 3. We do not have the technical knowledge and skills to start using the Internet and electronic commerce. 4. We have a very good understanding of how the Internet and e-commerce can be used to help to improve my business profit. 	Thong (1999) Gable and Raman (1992) Looi (2005)
Management attitude toward e-commerce	<ol style="list-style-type: none"> 1. It is important to have a positive attitude of the leaders towards innovation. 2. It is important to have receptive leaders towards organizational change. 3. It is important to have leaders that are capable of accepting organizational change. 4. It is important to have leaders that are able to realize the necessity of e-commerce applications. 	Huy et al. (2012)
External change agents	<ol style="list-style-type: none"> 1. The Brunei government is helping to lower the cost of using the Internet and setting up e-commerce facilities. 2. The Brunei government is helping in giving all kinds of assistance to help small businesses to use the Internet. 3. The government often informs us about the good points of e-commerce and doing business using the Internet. 4. Support from the government is important to encourage us to use more of the Internet in business. 	Tan and Teo (2000) Looi (2005)
Pressure from trading partners	<ol style="list-style-type: none"> 1. Our industry is pressuring us to adopt e-commerce. 2. Our customers and buyers are pressuring us to adopt e-commerce. 3. Our suppliers are pressuring us to adopt e-commerce. 4. Our distant partners' demands for better communications and data interchange are pressuring us to adopt e-commerce. 	Al-Qirim (2007) Saffu et al. (2008) Ghobakhloo et al. (2011)
Pressures from competitors	<ol style="list-style-type: none"> 1. Many of our business competitors are already having websites and using the Internet for doing business. 2. It is important to have a large number of competitors in the same sector which has adopted e-commerce. 3. It is crucial to be operating in a sector with great competitiveness. 	Looi (2005) Huy et al. (2012)

Table 2. Characteristics of the respondents

Characteristic	Description	Count	Percent
Gender	Male	28	50.9
	Female	27	49.1
Age	21 - 30 years old	47	85.5
	31 - 40 years old	7	12.7
	41 - 50 years old	1	1.8
	More than 50 years old	0	0.0
Job Position	Manager	11	20.0
	Senior Manager	2	3.6
	Director / Owner	36	65.5
	Others	6	10.9
Level of Education	Secondary or lower	3	5.5
	Diploma / Certificate	16	29.1
	Bachelor's degree / Professional	23	41.8
	Post Graduate Degree	13	23.6
Number of Employees	1 - 4 employees	27	49.1
	5 - 50 employees	26	47.3
	51 - 150 employees	2	3.6

Table 3. Reliability analysis of research variables

Variables	No. of measures	Cronbach's alpha
Technological context		
(a)Perceived relative advantage	6	.895
(b)Perceived compatibility	4	.727
(c)Perceived complexity	3	.746
Organizational context		
(a)E-commerce knowledge and expertise	4	.349
(b)Management attitude toward e-commerce	4	.840
Environment context		
(a)External change agents	4	.627
(b)Pressure from trading partners	4	.847
(c)Pressure from competitors	3	.471

4.3. Hypothesis Testing

4.3.1. Multiple Regressions

From table 3 above, it can be seen that the regression model has an adjusted R square with a value of .998. The value indicates how much of the total variation in e-commerce adoption can be explained

Table 4. Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.999 ^a	.998	.998	.01429

a. Predictors: (Constant), Perceived Relative Advantage, Perceived Compatibility, Perceived Complexity, E-commerce Knowledge, Management Attitude towards E-commerce, External Change Agents, Pressure from Trading Partners, Pressure from Competitors

Table 5. ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.501	8	.563	2754.942	.000 ^b
	Residual	.009	46	.000		
	Total	4.510	54			

a. Dependent Variable: E-Commerce Adoption

b. Predictors: (Constant), Perceived Relative Advantage, Perceived Compatibility, Perceived Complexity, E-commerce Knowledge, Management Attitude towards E-commerce, External Change Agents, Pressure from Trading Partners, Pressure from Competitors

Table 6. Coefficients

Model		Unstandardized β	Coefficients Std. Error	Coefficients Beta	t	Sig.
1	(Constant)	-.027	.028		-.955	.344
	Perceived Relative Advantage	.161	.004	.386	35.886	.000
	Perceived Compatibility	.124	.004	.292	30.246	.000
	Perceived Complexity	.093	.003	.257	28.087	.000
	E-commerce Knowledge	.124	.004	.292	28.372	.000
	Management Attitude towards E-commerce	.138	.007	.199	21.029	.000
	External Change Agents	.119	.003	.292	35.563	.000
	Pressure from Trading Partners	.118	.003	.362	45.724	.000
	Pressure from Competitors	.090	.003	.226	32.038	.000

a. Dependent Variable: E-Commerce Adoption

by the independent variables (IVs) from the TOE context. In other words, 99.8% of the variance in e-commerce adoption is being explained by the IVs. Meanwhile, Table 4 indicates that the significant value of the regression model is .000, which means that all independent variables used in this study have a significant correlation with e-commerce adoption. Furthermore, from table 5, it can be seen that all of the variables are significant because the value is less than 0.05. To compare which variables have the highest positive effect on e-commerce adoption, the Coefficient Beta is used. From the table, it can be seen that *perceived relative advantage* has the highest beta with .386. This means that *perceived relative advantage* is the most crucial factor that MSMEs must consider before adopting e-commerce.

Table 7. Hypothesis testing results

Hypothesis	Statement	Results
H ₁ :	“There is a positive relationship between perceived relative advantage and e-commerce adoption.”	Significant
H ₂ :	“There is a positive relationship between perceived compatibility and e-commerce adoption.”	Significant
H ₃ :	“There is a positive relationship between perceived complexity and e-commerce adoption.”	Significant
H ₄ :	“There is a positive relationship between e-commerce knowledge and e-commerce adoption.”	Significant
H ₅ :	“There is a positive relationship between management attitude towards e-commerce and the adoption of e-commerce.”	Significant
H ₆ :	“There is a positive relationship between external change agents and e-commerce adoption.”	Significant
H ₇ :	“There is a positive relationship between pressure from trading partners and e-commerce adoption.”	Significant
H ₈ :	“There is a positive relationship between pressures from competitors and e-commerce adoption.”	Significant

5. DISCUSSION

From the findings and analysis, all hypotheses from H1 to H8 of the study are positively significant where all the IVs have a direct impact on the DV. Since the hypotheses tested were all significant (.000), the Coefficients Beta was used to identify which of the eight factors are the most significant among others.

Of all the factors, the most significant factor is the perceived relative advantage ($\beta = .386$). In the case of MSMEs in Brunei Darussalam, the main driver of e-commerce adoption is perceived relative advantage. This finding was inlined from previous researchers (Kuan & Chau, 2001; Seyal, Awais, Shamail & Abbas, 2004; Shah Alam, Ali & Jani, 2011; Rahayu & Day, 2015; Ahmad et al., 2015; Sin et al., 2016) where they found that perceived relative advantage has a significant positive relationship with e-commerce adoption. Therefore, every small firm must be aware of the potential benefits that e-commerce could provide them with. By being able to do so, it could indirectly increase the effectiveness of the firms on adopting e-commerce. Some of the benefits that e-commerce brings to the firms are cost reduction, increase business opportunities and enhance business profitability (Rogers, 1995; Wanyoike et al., 2012).

The other most significant factor that was found is the pressure received from the trading partners ($\beta = .362$). The findings showed that the e-commerce adoption among MSMEs in Brunei was driven by the pressure that they received from their trading partners. As mentioned by Barua et al. (2000), the success of e-commerce adoption is also driven by their customers and suppliers. Moreover, the finding was inlined with the study made by Dholakia and Kshetri (2004) where most SMEs are constantly being pressured by their trading partners. Hence, it could be said that, in the context of MSMEs in Brunei, the firm’s trading partners have an impact to pressure the firm to implement new technologies. This is because most people are now moving towards e-commerce to purchase goods or services and make transactions online (Khan, 2016). Moreover, Brunei is ranked as the 4th highest in the world for internet penetration, as 95% of the population have access to the Internet (Rajak, 2018). This can be one of the main reasons why pressure from trading partners is significant to MSMEs in Brunei.

Other than the two factors mentioned earlier, the other drivers that are also considered to be most significant are perceived compatibility, e-commerce knowledge and external change agents ($\beta =$

.292). In terms of perceived compatibility, Ahmad et al. (2015) mention that it is important for every business to be aware of how well e-commerce fits the overall process of the business. If the business does not have any infrastructure that supports the adoption of e-commerce, eventually it could lead to the failure of adopting e-commerce. Due to this, the effectiveness of e-commerce adoption is also affected by the infrastructure of the firms. This finding is also consistent with previous researchers where they found that perceived compatibility has a significant positive relationship with the adoption of e-commerce (Hong & Zhu, 2006; Saifu, Walker & Hinson, 2008; Hussin, Nor & Suhaimi, 2008). Furthermore, e-commerce knowledge is also one of the drivers for e-commerce adoption in MSMEs in Brunei. For businesses to succeed, it is also important for the owner or the managers of the firm to know about e-commerce. This is because poor knowledge regarding e-commerce would lead to failure in the adoption stage (Gable & Raman, 1992). Thus, this finding can be related to the findings by Looi (2005), Huy et al. (2012), and Ahmad et al. (2015) where they found that e-commerce knowledge has a significant positive relationship with e-commerce adoption. The external change agents, on the other hand, include the support received from the government (Kuan & Chau, 2001). This finding is similar to Looi (2005) and Ahmad et al. (2015) whereby the government has played one of the main roles in helping MSMEs in Brunei to adopt e-commerce. One of the initiatives that were done by the government is by establishing DARE where DARE has the main role in developing local MSMEs. The e-commerce boot camp was one of the activities that were done by DARE to increase the knowledge of MSMEs regarding e-commerce (Wong, 2017).

5. CONCLUSION

The Internet penetration in Brunei is very high, 95%, among the highest in the world. This means people in Brunei use the Internet to get the information that they need. This includes finding information on products and services, which eventually may lead to the purchase of products and services via the Internet. In other words, they are consumers or potential consumers of e-commerce. Many local MSMEs are transforming their business to embrace e-commerce as they are aware of benefits that it brings to them such as it enables them to have access to a wider base of customers, cost reduction, direct and indirect cost savings in communications and marketing, strengthen relationships with customers and suppliers as well as improving the overall business operations. However, it is interesting to reveal key factors that influence the adoption of e-commerce by MSMEs in Brunei.

This research is an attempt to identify factors that influence e-commerce adoption by MSMEs in Brunei. Through this research, it is found that all TOE factors have a significant and positive influence on the adoption of e-commerce by MSMEs in Brunei. This means that 1) *perceive relative advantage*, *perceived compatibility*, *perceived complexity* have a significant and positive influence on the adoption of e-commerce by MSMEs in Brunei; 2) *e-commerce knowledge* and *management attitude towards e-commerce* have a significant and positive influence on the adoption of e-commerce by MSMEs in Brunei; 3) *external change agents*, *pressure from trading partners* and *pressures from competitor* have a significant and positive influence on the adoption of e-commerce by MSMEs in Brunei.

From the TOE factors mentioned above, the most two significant factors are *perceived relative advantage*, followed by *pressure from trading partners*. These two factors are the main drivers of the adoption of e-commerce by MSMEs in Brunei. The other three important factors are *perceived compatibility*, *e-commerce knowledge*, and *External Change Agents*.

7. LIMITATION AND FUTURE STUDIES

The limitation faced is in terms of the cooperation given by the MSMEs in Brunei. There is low participation from MSMEs in this research. The researchers have contacted 150 MSMEs through Facebook, Instagram, emails, and WhatsApp, but only 55 responded to the survey and participated in this research. Cooperation is crucial in this study as it will help to give an accurate interpretation

of the results, however, due to the small sample size; the findings of this study may not be accurate and cannot be used to represent the overall e-commerce adoption among MSMEs in Brunei.

Another limitation faced while conducting this research is that most of the respondents that participated in the survey are from those MSMEs that are considered new in the market, with less than 5 years of experience in the business world. Thus, the high number of participants from newly established businesses could affect the validity of the data gathered and analyzed in this research.

Therefore, to validate research, future studies should increase the sample size of the respondents and also include the districts as part of the sample, for instance including the MSMEs that are operating in the Temburong district. This is because by including the districts, it will give different findings to the questions asked. Future studies should also take into consideration the connectivity level of the area as Temburong district may not have the same level of connectivity when compared to Brunei Muara, Tutong and Belait district. Moreover, a large amount of samples will increase the reliability of the data gathered as it is considered to be more accurate. Future studies could also implement both qualitative and quantitative methods for the study. This is because quantifying the overall results may not be accurate as being able to interview the MSMEs in Brunei, and it could help to gain a deep understanding of their current situation to whether or not they should be implementing e-commerce. By doing so, it enables the researchers to understand further the real situation of MSMEs.

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