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Determinants for the Adoption of Electronic Commerce by Small and Medium-Sized Enterprises: An Empirical Study in Indonesia

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Abstract

The study seeks to identify the determinants of the adoption of e-commerce by small and medium-sized enterprises (SMEs) in developing countries, in our case, in Indonesia. The aim of this study is to examine the factors influencing e-commerce adoption. This study uses the method of quantitative data collection based on a questionnaire survey of SMEs in Indonesia. The research relies on Regional Project stipulations regarding Business Development in Indonesia, to capture businesses with a range of 5 to 100 employees that are classified as SMEs. This study randomly chose 100 SMEs in Indonesia from the IndoNetwork database. Partial least square (PLS) structural model data processing was used for path coefficients analysis. Structural equation modeling is applied in this study to analyze the determinant factors on the e-commerce adoption. The study findings reveal that four factors, namely, perceived benefits, compatibility, technology readiness, and government support, significantly influence the adoption of e-commerce, whereas customer/supplier pressure does not have influence. So, this study concludes that perceived benefits, compatibility, technology readiness, and government support had a significant and positive relationship with e-commerce adoption. Meanwhile, customer/supplier pressure had no effect on the e-commerce adoption of by Indonesia SMEs.

Keywords: E-Commerce, Technological Context, Organizational Context, Environmental Context, Indonesia

JEL Classification Code: L20, L81, M15, O32

1. Introduction

The world is becoming more sophisticated, and technology is increasingly growing, both directly and indirectly affecting the current systems of trade, transactions, and

money circulation. Previously, transactions are done traditionally, through direct interactions and exchange between the seller and the buyer, creating terms and reaching agreements. Today, with the presence of computer technology, all constraints such as facilities, distance, and time can be easily resolved. One of the information technology innovations that is developing today is e-commerce. Businesses are compelled to adopt this technology in order to retain competitive advantage in the modern economy.

The majority of studies on e-commerce were done in developed countries, up until 2008. According to Williams et al. (2009), who carried out a substantive review of 345 papers related to information technology developments between 1985 and 2007 in developing countries, 82.7 percent of information technology studies were performed. In contrast, only a few studies were performed in developed countries, and the majority of these studies still focused on large corporations only. Studies on e-commerce in developing countries have begun to be performed in recent years, but they are mostly for African and Arab countries, as well as China.

As a result, the recent rise in popularity of e-commerce has been noted. It has been shown by the growing use of

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e-commerce around the world. IDC (2011) has reported around hundred million (624 million to be exact) Internet users have made their purchases online. The online purchases have generated a total income of almost 8 trillion dollars from either business-to-business (B2B) transactions or business-to-consumer (B2C) transactions in 2009. The total increased by the end of 2013, reaching revenue transactions of more than \$16 trillion dollars. In 2015, The Internet World Statistics reported that the growth of e-commerce would rise significantly along with the dramatic increase of Internet users from 2000 to 2015, reaching \$1.56 billion in Asia. The Confederation of Indian Industry (CII) released survey results that showed that the role of Information Technology (IT) has changed the fortune segment in SMEs in India. Based on the survey results, the use of IT in SMEs has produced significant increase in revenue, in which 78% of respondents indicated increase of revenue due to the use of IT (Nofie, 2007).

In Indonesia, based on data reported on the website of BPS (2013), which is the national body of statistics, the number of SMEs in Indonesia has reached 56.5 million. A year later, it grew 2%. To date, there are at least 57.9 million recorded SMEs spread across Indonesia. The large number of business people that are engaged in the SME sector has become one of the pillars of the national economy. SMEs hold an important role in national development and the increase of gross domestic income (Purnamasari et al., 2020). Furthermore, SMEs also absorb a lot of labor and, thus, reduce the rate of unemployment.

Empirical evidence has shown that SMEs contribute more to job creations compared to larger businesses (Ayyagari et al., 2011). It also has a larger growth rate of sales and jobs (Ayyagari et al., 2011). Consequently, SME development possibly creates a large impact on the growth of global economic conversely. However, large companies are mostly responsible for the increased use of e-commerce by enterprises. Compared to large corporations, the SME e-commerce embrace is claimed to be relatively stunted (Alam et al., 2011; Govindaraju et al., 2015). Hence, this provokes an inquiry on the factors influencing SMEs to adopt e-commerce.

As stated previously, SME e-commerce adoption still lags that of large corporations. This raises a question on what factors have influenced SME e-commerce adoption. There is an urge to answer since we know that SMEs are a vital part in the economic development of most countries. They have contributed remarkably, not only in numbers, but also in providing jobs. There is a dearth of studies regarding the SMEs to adopt e-commerce mainly happening in some developing countries such as Indonesia. It provides a chance for the researcher to conduct further research. The problems explored in previous studies on e-commerce are also various. Generally, these issues can be further classified. The study

focuses on factors that support or inhibit businesses to adopt e-commerce. Referring to the previous explanation, this study aims to analyze the factors, which affect Indonesian SMEs to adopt e-commerce.

2. Literature Review

2.1. Implementation of E-Commerce

The technology adoption study is divided into two categories. It depends on the object of study, which is either large businesses or SMEs. Almost all studies done related to e-commerce focus on large businesses (Daniel & Grimshaw, 2002). However, studies of SMEs are conducted less often. This argument is further made by Parker and Castleman (2009). Their substantive research covering 51 journals published between the years 2003 and 2006 found that there are 120 papers about e-business or e-commerce adopted by SMEs. According to Hameed et al. (2012), Premkumar (2003), Quaddus and Hofmeyer (2007), the studies of technology innovation are also categorized based on the analysis rate. Hameed et al. (2012) posits that there are three levels of classifications, namely, the individual level, the group level, and the organizational level, whereas, only two fundamental levels are classified by Premkumar (2003) and Quaddus and Hofmeyer (2007); they are the individual level focusing on the individual behavior related to innovation adoption, and the organizational level focusing on factors facilitating or inhibiting organizations in the adoption of innovation. Furthermore, Hameed et al. (2012) add the impact toward the performance of the organization. As seen in the prior explanation of the theories, several are related to the organizational and individual level, and several of them are implemented in the analysis of the individual or organizational level.

Hameed et al. (2012) show that the majority of existing research was conducted in the organizational level, with only few studies done at the individual level. This is reasonable, due to the fact that the adoption of information technology innovation in organization does not only relate to specific individuals, but involves many individuals. Parker and Castleman (2009) advised the use of organizational level analysis to explain the adoption of information technology innovation, such as e-commerce, in organizations. Moreover, Hameed et al. (2012) add that studies of innovation can be categorized based on the viewpoint being taken, such as the individualist process perspective, structuralist perspective, and interactive perspective. Technology Organization Environment known as TOE is a theory that takes an immersive approach because it encompasses a wide range of situations based on Sila and Dobni (2012); Ocloo et al. (2018) and Priambodo et al. (2021) mentioned as the technological context, organizational context, environmental contexts.

2.2. Hypothesis Development

2.2.1. Technological Context

Perceived benefits (PB) explained by Tiago and Maria (2010) concern the rate of acceptance of possible profits that can be facilitated through the technology of e-commerce for organizations. In-depth managerial comprehension regarding the relative e-commerce adoption benefits increases the possibility of certain resources allocation, for instance financial, managerial, and technology resources in e-commerce technology use as stated by Tiago and Maria (2010). Perceived benefits to improve profit, efficiency, competitiveness, as well as customer and service satisfaction, have been described as a determining factor in technology adoption (Oluyinka et al., 2013; Poorangi et al., 2013). Organizations will adopt technologies if they feel that it can mitigate existing discrepancies (Duan et al., 2012). Ocloo et al. (2018), Sin et al. (2016), Rahayu and Day (2015), and Ghobakhloo and Tang (2013) discovered that perceived advantages have a positive and significantly effect on technology adoption. Thus, the following hypothesis is proposed:

H1: There is a positive association between perceived benefits and the adoption of e-commerce by SMEs.

Compatibility points out on how e-commerce becomes well-suited with the culture, values, infrastructure of technology, and practices of work which have existed in a company claimed by Choshin and Ghaffari (2017), and Morteza et al. (2011). It is said that an invention can be easily implemented if it adapts to the current principles and culture and is capable of meeting the organization's needs. Rogers (2003) explains that compatibility of organizational policies and technology innovations easily allows the innovation described in a more familiar context. According to Alam et al. (2011), compatibility is often linked to previous ideas, as well as an organization's ability to control the pace of innovation acceptance, either speeding it up or slowing it down. Several previous studies have found that compatibility delivers a relationship, which is reassuring and significant to the e-commerce adoption mentioned by Alam et al. (2011), Ahmad et al. (2015), Seyal and Rahman (2003). Thus, the hypothesis to be proposed is as follows:

H2: There is positive association between compatibility and the adoption of e-commerce by SMEs.

2.2.2. Organizational Context

According to Zhu et al. (2006), technological readiness defines how well a company's technology infrastructure,

applicable processes, and technical skills help the adoption of e-commerce. Earlier studies acknowledge that one of the influencing factors to a success of information systems is the resources of technology (Zhu & Kraemer, 2005). Thus, the more an organization possesses technology readiness, the greater opportunity for the organization to adopt information technology, and the other way around (Moldabekova et al., 2021). According to previous research, the most significant factor in e-commerce adoption is technology (Molla & Licker, 2005; Kuan & Chau, 2001; Ramdani et al. 2013). This is consistent with previous research by Zhu et al. (2006), Rahayu and Day (2015), Huynh et al. (2012), which found that technology readiness (TR) has affected the adoption of e-commerce. This explanation leads to this following hypothesis:

H3: There is positive association between technology readiness and the adoption of e-commerce by SMEs.

2.2.3. Environmental Context

Customer/Supplier Pressure (CSP) has the capacity to drive companies to adopt certain types of technology. Li et al. (2010) add that Wal-Mart is one of the examples, which has asked and driven the suppliers to use RFID technology, a technology of wireless tracking. When SMEs experience greater pressure from trade partners, they perform greater possibility to adopt an innovation of a particular technology to maintain the leverage. It is because SMEs are especially economically dependent on their larger partners to sustain themselves as explained by Duan et al. (2012). In the case of technological advances, such as e-commerce, studies by Huynh et al. (2012) and Li et al (2010) have shown that trade partner pressure is one of the factors influencing the adoption of technology for e-commerce. Thus, this hypothesis is formulated:

H4: There is positive association between customer/supplier pressure and the adoption of e-commerce by SMEs.

Government support (GS) in the sense of information technology takes three forms: legislation and policies, infrastructure, and information technology funding (Huynh et al., 2012), all of these variables have a direct and indirect stimulatory impact on the acceptance of technology and e-commerce in the business world. Moreover, through policies and regulations, the government is essentially driving businesses to adopt the technology of e-commerce. It encourages businesses, especially SMEs, to apply information technology innovations. Parties such as businesses or customers involved in business transactions are protected to control the Internet usage to render it as a media providing a safe transaction. Zhu and Kraemer (2005)

state that companies' incentives to utilize e-procurement in transactions are also provided. According to Dasgupta et al. (1999), companies operating in a world with restricted government policies have a low rate of information technology adoption. Priambodo et al. (2021) showed that GS had a significant effect on the e-commerce adoption. Several studies confirmed that the support from government delivers both reassuring and remarkable effects toward the SME e-commerce adoption (Ocloo et al., 2018; Ifidebo, 2011; Kabanda & Brown, 2017). Based on this explanation, this hypothesis is formulated:

H5: There is positive association between government support and the adoption of e-commerce by SMEs.

3. Research Method

The Indonesian SME owners or managers become the respondents in this study. There are some criteria that define a business to be a SME and the company employs less than a hundred people. Its assets are valued at less than IDR10 billion. There is not any centralized database that compiles data on all SMEs in Indonesia. Data samples were retrieved from www.indonetwork.co.id. The population of this study was estimated based on data collected from SME owners and managers. The total was estimated to be 100 respondents as a sample. The collection of as many as 80 targeted questionnaires is required.

The adoption of e-commerce was measured using seven indicators, which are: general marketing activities, communication with customers, market research, search of new suppliers, achieving international penetration, conducting B2B transactions, and conducting B2C transactions (Seyal & Rahman, 2003). Perceived benefits (PB) were adapted from Morteza et al. (2011) by using ten indicators. Compatibility refers to the professionals in specific fields of knowledge that affect the innovation decision of clients to the desired direction of the agent of change. The items were adopted from Roger (1995). Technology readiness (TR) was measured by using six indicators put forward by Molla and Licker (2005). Customer/supplier pressure (CSP) was measured by using

four indicators put forward by Sila (2013). Government support (GS) was measured by using two indicators proposed by Morteza et al. (2011). Multiple elements on a five-point Likert scale were used for all the measurements.

4. Results and Discussion

4.1. Data Analysis

This study uses the process of quantitative data collection based on questionnaire surveys for SMEs in Indonesia. We relied on Regional Project stipulations regarding Business Development in Indonesia, to capture businesses with a range of 5 to 100 employees that are classified as SMEs. This study randomly chose 100 SMEs in Indonesia from the IndoNetwork database. After ensuring that they were free of missing data, a total of 70 responses were selected (response rate of 70 percent). The instruments that were used to calculate the constructs in this analysis were taken from previous research. Also measured was the current rate of e-commerce adoption using multichotomy-type questions to operationalize it. There are 40 SMEs from the trade, hotel, and restaurant sectors (more than half of the total respondents). Some 20 SMEs were from the manufacturing industry. Then, seven SMEs were from the construction sector. The remaining three respondents were from the communication, electricity, fuel, and clean water sectors.

4.2. Empirical Results

After eliminating outlier data, 70 cases are the total data remaining used in this study. Table 1 describes the statistics of each variable such as businesses or customers based on these cases.

Moreover, mean and standard deviation were used to describe the characteristics of the study that used a ratio and interval scales. Furthermore, Muhammad et al.'s (2010) guidelines on the interpretation of average score were backed up. They suggested that a score of less than 2.33 be considered low, a score of 2.33 to 3.67 be considered moderate, and a score of more than 3.67 be considered high.

Table 1: Result of Descriptive Statistics

Variables	Total of Questions	Mean	Std. Deviation
Adoption of E-Commerce	7	4.156	0.468
Perceived Benefits	10	4.206	0.459
Compatibility	7	3.740	0.642
Technology Readiness	6	4.369	0.451
Customer/Supplier Pressure	4	4.199	0.587
Government Support	2	3.402	0.681

With that in mind, in the summary, Table 1 has shown the summary of descriptive statistics for all variables. Based on Table 1, it can be concluded that technology readiness has the highest average score of 4.37, while government support has the lowest average score of just 3.40. Regardless, all of the variables were deemed good because they were all within the pre-determined range of a high score. The results of structural model data processing for path coefficients analysis are shown in Table 2.

Table 2 shows that all variables, including PB, compatibility, TR, and GS, all have a positive effect on e-commerce adoption. This shows that only four variables positively and significantly affect adoption toward e-commerce in Indonesia. Therefore, this research proves that H1, H2, H3, and H5 are fully supported. Thus, based on this explanation, it is not surprising that in this study, perceived benefits were found to be one of the crucial factors in determining e-commerce adoption by SMEs in Indonesia. Behavioral theory used to explain this result. It is mentioned in the theory that the greater one’s belief to bring a positive impact toward oneself, the greater their belief is toward that specific behavior. In the context of this study, the greater the confidence of owners/managers in the advantages of e-commerce, the more likely they are to follow it.

The result of PLS shows that the *P*-value for this variable is 0.001. As a result, it demonstrates that SMEs in Indonesia consider compatibility to be a factor influencing e-commerce adoption. According to the theory of innovation, it is simple for an innovation to be embraced in an organization if it aligns with the organization’s principles and culture, and is able to fulfill the need of the organization. Earlier studies have discovered results related to this statement. Abou-Shouk et al. (2013), Alam et al. (2011), Ahmad et al. (2015), and Huynh et al. (2012) mentioned that, when it comes to the implementation of e-commerce technology, compatibility is crucial. It is believed that most of the participating SMEs adopt e-commerce at a high level.

Technology readiness in this study is related the technology infrastructure and human resources. The analysis results show that technology readiness holds a favorable, yet crucial connection with the adoption of e-commerce. The result shows the significance rate of 0.00. TR plays a critical role in SMEs’

adoption of technology, which becomes the result of this study. This outcome confirms that of previous studies by Zhu et al. (2006); Rahayu and Day (2015), Huynh et al. (2012), Alam et al. (2011), and Huynh et al. (2012). The literature on e-commerce states that companies that possess sufficient technology infrastructure and information technology skills, will become more confident in handling uncertainty regarding their information technology adoption, compared to those who do not present the aforementioned competencies, which becomes a reasonable argument (Tiago & Maria, 2010).

The CSP of regression coefficient and significance rate is 0.633. These values show that there is no significant relationship between CSP and the e-commerce adoption. Pressure from customers/suppliers is not strong enough to drive Indonesian SMEs to the implementation of e-commerce at a high rate (Li et al., 2010, Huynh et al., 2012). This result is in line with study conducted by Al-Qirim (2007). Moreover, customer/supplier pressure in New Zealand does not urge the small business to adopt Internet-internal emails, Internet-external emails, intranet, extranet/VPN, EDI Internet, and websites (Al-Qirim, 2007). One possible explanation is that the majority of consumers in Indonesia are classified as “online shoppers using traditional methods,” and therefore advanced technology or expanded e-commerce technology does not compel SMEs to adopt it.

The result of the analyzed questionnaires shows a significance rate of 0.00 for the regression coefficient for government support. These values show that GS positively and significantly support the adoption of e-commerce by Indonesian SMEs. This outcome is in line with previous researches related to the e-commerce adoption by SMEs (Al-Qirim, 2007; Hung et al., 2011; Li et al., 2010; Huynh et al., 2012) identifying government support as one of the determining factors that affect SMEs in the adoption of Internet-based e-commerce. It is undeniable that the government as an external party support can drive the e-commerce adoption by Indonesia SMEs. Government has the capacity to protect involved business parties’ transactions through regulations and policies. In this case, they are SMEs or customers. Government also provides companies with incentives to use e-procurement in every transaction

Table 2: PLS Path Analysis Coefficient Results

Hypothesis	Variables	Path Coefficient	T-statistics	P-values
H1	PB → E-Com	0.095	2.114	0.035
H2	C → E-Com	0.438	3.320	0.001
H3	TR → E-Com	0.492	4.204	0.000
H4	CSP → E-Com	-0.059	-0.334	0.633
H5	GS → E-Com	0.465	4.714	0.000

5. Conclusion

Generally, this study investigates whether several factors affect the various rates of the adoption of e-commerce by Indonesia SMEs. The factors were chosen based on previous studies' most common and dominant factors. Five factors consist of perceive benefits, compatibility, technology readiness, customer/supplier pressure, and government support. Based on the explanation above, this study concludes that perceived benefits, compatibility, technology readiness, and government support had a significant and positive relationship with e-commerce adoption. Meanwhile, supplier pressure had no effect on the adoption of e-commerce.

For the Indonesian government, in order to encourage SMEs to embrace e-commerce technologies, they are required to provide special assistance to SMEs' owners. This is due to the fact that SME owners in Indonesia have a significant influence on their companies. In Indonesia, SMEs are frequently managed by their proprietors. Thus, the manager, owner, and employee are the same entity. Also, owners have a great role in making decisions in SMEs. Therefore, any programs or policies implemented by the Indonesian government to develop SMEs should involve participation from SME owners. Finally, the limitation is that the study's sample size is relatively small as it covers Indonesia SMEs. Moreover, it is also recommended that further studies could test other antecedent factors.

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