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BENEFICIAL EXPLANATION FOR SME's E-COMMERCE ADOPTION: THE SEQUENTIAL STAGES OF ORGANIZATIONAL, INDUSTRIAL AND NATIONAL READINESS

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ABSTRACT. This study investigates small and medium-sized enterprises' e-commerce adoption (e-CA) in Indonesia. This study differs from all the previous research on this topic, which was designed using linear models, since this study uses a structural data set and an equation model. It comprehensively outlines a new model with sequentially ordered readiness. Moreover, this research presents critical reasoning for this new model. This study rearranges organizational, industrial, and national readiness into a sequential model. The new model could explain and describe the small and medium-sized enterprises' e-CA better than all the previous research had done. It means that organizational, industrial, and national readiness influence their stages consecutively and result in e-CA. From a methodological perspective, industrial and national readiness work as intervening variables. This suggests that each readiness is not a mutually exclusive construct, but it relates to the others in the sequential order. Therefore, this study infers that national strategic policies to enhance the small and medium-sized enterprises' e-CA should be applied during the first, initial stage, starting from organizational to industrial and ending with national readiness. It also means that SMEs should construct their enterprises to be sequential and structural.

JEL Classification: L16, O31, O43

Keywords: organizational, industrial, national, readiness, diffusion of innovation, Indonesian SME, e-commerce adoption, structural data set, equation model

Introduction

This study investigates small and medium-sized enterprises' e-CA with a new structural model. It was designed by transforming what all the previous research models had proposed into a new structural one. In an earlier study, Kurnia et al. (2015) showed that factors on each level had impacted the application of e-commerce in developing countries differently. This research considers that organizational, industrial, and national readiness are not ordinary linear factors that influence e-CA, as Kurnia et al. (2015) suggested. Rapid changes and developments in the industry result from diffuse, sophisticated innovations in the

information technology used by small and medium-sized enterprises (SMEs) (Rogers, 1995). However, this study believes that all the readiness factors are related consecutively and structurally. The organizational, industrial, and national readiness structurally associate and result in e-CA. The elements of SMEs' organizational readiness and environment are essential matters that developing countries need to consider (Kurnia et al., 2015). This study argues that structural associations are based on the authors' critical reasoning by acquiring relational constructivism. Gash (2014), Leask and Younie (2001), Leask and Younie (2001), and M. W. Kraus and Tan (2015) all suggested that humans perceive the existence and occurrence of a process by focusing on relational conditions. Therefore, this study rearranges all the ordinary and linear factors of readiness, which relate to each other, called a structural model. This research believes that the new model could explain and describe SMEs' e-CA better than all the previous models.

This study proposes a new and unique model supported by some critical reasoning as follows. First, this study initially designed a new model consisting of organizational, industrial, and national readiness, which affected e-CA in a structural association. Therefore, this is structuralist research because all the previous studies did not construct it. This research designed a new model and proposed concepts and theories explaining its sequences and structure using relational constructivism. Furthermore, it revealed that this relational construction is determined by the added combinations of the SMEs' diffusion of innovation and governmental facilitation. Second, this study posits the new idea of relational constructivism to explain the new model's structure (Kraus & Tan, 2015; Leask & Younie, 2001; Leask & Younie, 2001). It reveals that e-commerce users usually focus on the relationship between the environment, the current conditions, and the facilitation offered. Furthermore, most previous research stated that organizational, industrial, and national readiness are flat, but they should be rather seen as sequential and structural. Moreover, one of them should become the first impetus that affects the others in a sequence, which should be organizational readiness.

Third, this study was conducted in Indonesia, an emerging economy with more than a million of SMEs. As an emerging country, the annual income per capita is only, on average, around 1,600 USD. The low income per capita, in comparison with other countries, forces Indonesian people to struggle to fulfill their needs. Most Indonesians, therefore, set up their SMEs. Mobile phone users in Indonesia account for approximately 65,000,000 people, which is almost 25% of the population. Based on the data from the Indonesian Statistical Bureau as of 2016, around 5.85% of these users are SMEs. This study also notes that a mobile phone is not a luxury goods but a necessity for Indonesian people. Most SMEs in Indonesia have used e-commerce applications on their mobile phones. It means that the use of e-commerce applications has been a habitual behavior for people and companies in Indonesia. This research, however, also explains that most Indonesian SMEs face sluggish growth opportunities at the same time.

This research posits some relevant concepts and theories: relational constructivism, the diffusion of innovation, readiness, and e-CA. Abramson and Abramson (1999) suggested that their study achieved its critical reasoning with a valid constructed model. This study plans and then modifies the structures of all the extant research. It, therefore, creates its new idea, which complements the limitations of the previous research. This study initially used relational constructivism, as argued by Leask and Younie (2001) and B. Kraus (2014). It rearranged the factors influencing e-CA from the previous research, which was linear, to a new structural model. Secondly, this research posits the diffusion of the innovation theory to explain SMEs' motivation to adopt e-commerce. This theory suggests that SMEs would probably adopt e-commerce because they need communications media to transfer knowledge and create

innovations (Rogers, 1995). Thirdly, this study takes into its induced discussion the readiness theory, as suggested by Spencer and Gómez (2004), D. Hung and Chen (2003), Rodgers (2003), Hislop (2003), Lai and Chen (2013), K.-Y. Lin and Lu (2011), and J. S. C. Lin and Hsieh (2006). This readiness theory will explain that SMEs want to use e-commerce because they benefit from its knowledge repositories. Finally, this study uses e-CA as a concept that explains that SMEs could enhance their comparative advantage (Choshin & Ghaffari, 2017; W.-H. Hung et al., 2014; Ramanathan et al.

This research primarily expects to present evidential results that the new structural model outperforms all the previous models. From the previous structuralism research (Fosnot, 2013; Fosnot & Perry, 1996; Rawls, 1980), it is proposed that the new structural model can explain critical reasoning better than some extant studies. Besides, this study also contributes to the conclusion that all types of readiness affect e-CA. It, moreover, infers that relational constructivism (Fosnot, 2013; Rawls, 1980) could explain SMEs' e-CA in stages. This means that e-CA considers the relationships among the environments, conditions, and government facilitation, which could be on the levels of organizational, industrial, and national readiness.

This study consists of five sections. Section 1 highlights the literature review, which includes relational constructivism, the diffusion of innovation, and the readiness theory. In this section, this study used all the theories to construct the hypotheses. Section 2 explains the research methods, from sampling to the hypotheses' testing. The authors propose a new sequential relationship model and the further transformation model derived from the ordinary least square one. Section 3 discusses the descriptive statistics, analysis, and the findings. In this section, the authors focus on the critical reasoning inferences from the models' comparison. Finally, Section 4 infers the research findings and implications. The last section covers the conclusions and offers suggestions for future research.

1. Literature review

Relational constructivism

Relational constructivism argues that people perceive an object and all the related conditions that arrange its structure (M. W. Kraus & Tan, 2015). People take action connected with some states by comparing their inputs and outputs. It means that people see an object by perceiving its structure (Jonassen, 1997). In other words, people learn with their cognitive experience to build a new structural belief. Then, they use this to solve any following problems with their cognitive structure. In the context of e-CA, users typically relate to all the conditions that construct how and why they use it. Therefore, the users develop the input factors needed for their adoption of e-commerce. This study posits all the previous research structures explaining e-CA. However, this research found that this structure is a flat linear model (Kurnia et al., 2015) because it has not considered relational constructivism.

This study initially structures e-CA by using relational constructivism. It begins with the organizational readiness that the users perceive as its origin. Secondly, the users of e-commerce relate organizational readiness with industrial readiness. They relate both constructs because when an SME is established at the organization level, it remains within a particular industry. The SMEs enter into the industries that posit relational constructivism in their communities, which is the grand theory of relational constructivism (Leask & Younie, 2001; Leask & Younie, 2001). Thirdly, the users of e-commerce relate industrial readiness with national readiness and their adoption of e-commerce. Both relationships also posit relational constructivism (Leask & Younie, 2001; Leask & Younie, 2001). Lastly, SMEs associate national readiness with their adoption of e-commerce. This relational structure

occurs because SMEs have established themselves nationally. This research proposes that this last readiness has to be developed by what these SMEs want to do themselves. On the other hand, a national construction for the SMEs' readiness would be better if the Indonesian regulator supported it (Fosnot, 2013; Fosnot & Perry, 1996; Rawls, 1980). It means that SMEs grow slowly and never achieve the national level, from their management, operations, marketing, and financing, except for their widespread environmental support. This study further elaborates that the SMEs' readiness in these three levels needs the involvement of the Government of Indonesia (GoI). The needs' fulfillment could accelerate and accentuate the SMEs' willingness to compete internationally (Fosnot, 2013; Rawls, 1980). Consequently, they would not consider their national readiness. It means that this study has constructed the chronological structure of the readiness levels in a new model.

Diffusion of innovation

The SMEs which adopt e-commerce innovated by using their organizational knowledge. We considered that Ax & Bjørnenak (2005) employed the diffusion of innovation to change the traditional performance measurement into a balanced-scorecard one. An organization improves its readiness after it diffuses knowledge for changing and enterprising its business activities. Most SMEs in emerging countries adopted e-commerce after they judged they could capture the potential human, business, and natural resources (Molla & Licker, 2005; Rogers, 1995). Molla & Licker (2005) recognized that e-CA would probably fail because of business and environmental complexities. This research inferred specific argumentation of Poorangi et al. (2013), suggesting that organizations had tried and observed readiness themselves. In other words, Poorangi et al. (2013) had considered that organizations had thought about their human resources and environmental readiness. Moreover, Oliveira et al. (2014) suggested that organizational experiences support implementing e-commerce enterprises. This research believes that Oliveira et al. (2014) offered organizational readiness for when some firms would deploy e-commerce applications. We also infer that an organization makes its users' experiential values. Then, these experiential values improve the users' trust in succeeding with the e-commerce implementation (Rogers, 1995).

However, some SMEs have not adopted e-commerce yet because they do not have enough organizational knowledge to innovate. This study infers that an organization could accelerate its innovation because it accumulates and then disseminates its expertise among its members. It means that this organization facilitates its members to diffuse the knowledge it uses to enhance its capacity. This study, therefore, infers that innovation continuously supports new knowledge's creation by the organization (Molla & Licker, 2005; Rogers, 1995). The design of information and communications technology can change both the internal and external adoption processes. Thus, an organisation's decision to adopt a particular innovation has to be made carefully (van de Weerd et al., 2016). Moreover, the cumulative knowledge gained by an organization determines its adaptive level with environmental uncertainties (Molla & Licker, 2005; Mustonen-Ollila & Lyytinen, 2003; Rogers, 1995). Most SMEs adopt e-commerce so that they can innovate their businesses activities.

This study posits that SMEs should have the ability to grow (Molla & Licker, 2005; Mustonen-Ollila & Lyytinen, 2003; Rogers, 1995). The persuasive skills involved with innovations are usually found in the supply chains and customer relationship management (Choshin & Ghaffari, 2017). Molla and Licker (2005) suggested that an organization enhances its innovation by adopting superior information technology, such as e-commerce. This study infers that e-commerce's adoption, as conducted by SMEs, shows that they have performed interactionism. It argues that the Indonesian SMEs had communicated, via their

social systems, from the lowest in the organization to the highest in this nation (Kester et al., 2018; Khurshid et al., 2019; Zhang et al., 2018). It means that these SMEs had communicated with their network about the enlargement of their enterprises (Carreiro & Oliveira, 2019; Khurshid et al., 2019). As a matter of course, these enlargement processes were suited to their organizational needs. It argues that partnerships among the SMEs themselves and the government could facilitate the SMEs to innovate. In other words, some SMEs can grow their businesses and beat national or international competitions.

Readiness theory

A person would always adopt an information system because he/she expects it to help accomplish his/her goals. SMEs are like humans; they want to achieve their mission efficiently by adopting information technology. It means that a person uses information technology because of their cognitive fit. Similarly, an organization such as an SME uses e-commerce because of the organization's cognitive fit (Hislop, 2003; Hsieh et al., 2015; D. Hung & Chen, 2003; Lai & Chen, 2013; J. S. C. Lin & Hsieh, 2006; K.-Y. Lin & Lu, 2011; Parasuraman, 2000; Rodgers, 2003; Spencer & Gómez, 2004). This study argues that managing SMEs needs a level of expertise to efficiently connect all the related chains (Spencer & Gómez, 2004). When an SME is aware of adopting information technology that can relate to it, it has a higher readiness level (Spencer & Gómez, 2004). This study, therefore, argues that an organization will adopt e-commerce when it has gained the necessary readiness level.

SMEs' management is aware that their organizations operate in a specific industry. SMEs usually want to integrate their organizations into their particular industry. This integration is how SMEs ascertain their businesses' sustainability (K.-Y. Lin & Lu, 2011). It means that these organizations have gained their industrial readiness because they behave as if their environment had supported their activities. In other words, these organizations are compatible with their industry. Therefore, this study argues that SMEs dare to align with their external environments; they perceive their readiness to be industrial. Moreover, they would always integrate into their industry's technology. It means that each organization has an industrial readiness level.

Most of the SMEs' managers perceive that industrial factors improve their businesses and the nation. They tend to enlarge their management paradigm to support their businesses' sustainability and growth opportunities (Busenitz et al., 2000). This study posits that the national environment helps the business improvements made by SMEs (Spencer & Gómez, 2004). A nation generally applies some policies which encourage and support SMEs to be more innovative (Beddewela et al., 2017). This study, therefore, infers that some of the SMEs' managers gain benefits from their national managerial perspective. Before most SMEs gain any advantage, they should prepare their innovativeness and optimism (Doh & Kim, 2014; Farjou & Eslami, 2016). This study proposes that the SMEs' innovativeness and confidence would like to develop step by step (Doh & Kim, 2014; Farjou & Eslami, 2016), following the organizational, industrial, and national readiness. Both innovativeness and optimism allowed the Indonesian SMEs to achieve a higher level of readiness, in which these SMEs utilized their resources and knowledge to attain national readiness. The stepped SMEs' readiness is dependent on their resources and expertise and their network to help them make the national level. It means that they have perceived their incremental readiness levels, including the national one. Moreover, the SMEs' management, who should have extensive views, have readiness levels that are higher than those at the regional level.

e-Commerce's adoption

Most of society acknowledges that e-commerce is the best information and communications technology (ICT) (Zarnowitz & Braun) that can be applied to business activities. ICT supports a business's growth and economic development. Moreover, ICT increases operational efficiency and facilitates the country's unity, primarily in developing countries. Both individuals and organizations are tempted to use ICT because they could achieve their missions and goals. When they can adopt an ICT system, such as e-commerce, they gain many benefits (Choshin & Ghaffari, 2017). The SMEs could gain positive benefits that support their business activities (Kurnia et al., 2015). Moreover, e-commerce facilitates innovative methods to acquire and employ all the societal resources (Ramanathan et al., 2012). E-commerce also develops the ability to process information within organizations, enabling greater cooperation among companies, and lowers uncertainty (Alsaad et al., 2017).

The SMEs could leverage their businesses by adopting e-commerce since it facilitates them to develop their business chains (Choshin & Ghaffari, 2017; Hoque & Boateng, 2017; Kabanda & Brown, 2017; Kurnia et al., 2015). Companies adopting e-commerce usually gain many benefits because they get comparative advantages. Consequently, SMEs always consider renewing their adoption whenever new e-commerce systems present more excellent capabilities to support their businesses. Moreover, e-commerce provides services that allow SMEs to use their resources more efficiently (Ramanathan et al., 2012). This study argues that SMEs have chosen to implement cost-cutting strategies, and hence they have adopted e-commerce. This study constructs that e-commerce's adoption starts with an SME's organizational readiness. Then, the SME's management gradually perceives its compatibility with the environmental fit (called industrial readiness). The SME's management may still be able to bring themselves to a higher level than the industrial readiness, in the nation's view.

Hypotheses development

Organization readiness and e-CA

This study develops the first hypothesis using research model-1, that SMEs' organizational readiness influences their adoption of e-commerce. Hameed et al. (2012), Hislop (2003), D. Hung and Chen (2003), Lai and Chen (2013), J. S. C. Lin and Hsieh (2006), K.-Y. Lin and Lu (2011), Ananthanarayanand Parasuraman (2000), and Tan et al. (2007) suggested that the indication of organizational readiness was when an SME's management succeeds in connecting its suppliers and customers. Hameed et al. (2012) argued that organizational readiness is the most significant factor in the process of information technology's adaptation, the success of which is determined by this level since organizations are dealing first-hand with new applied technology. From another perspective, when the owners or management of SMEs innovate their business processes with information technology, they have a high technological readiness (Rodgers, 2003). Moreover, they have organizational readiness too. This study posits the logical reasoning from all the previous research. It means that SMEs, whose management perceive e-commerce as engineering tools, have high organizational readiness. Moreover, the SMEs' management transforms their businesses by increasing their supply chains and customer relationships. Therefore, this study develops the first hypothesis as follows:

H1: SMEs' organizational readiness positively influences e-commerce's adoption.

Industrial readiness and e-CA

Most SMEs create their business networks among themselves in the form of collaborations. They perceive the industrial interest by entering into the industry. A new SME could participate in a specific industry because it protects and maintains to achieve its mission and goal (W.-H. Hung et al., 2014; K.-Y. Lin & Lu, 2011). In another argument, the new SME enters a specific industry to maintain its sustainability. Farjou & Eslami (2016) have shown in their research that an enterprise should encourage each business unit to innovate and adopt e-commerce. Support and encouragement to accept innovation will likely result in industrial readiness. This study posits the arguments suggested by W.-H. Hung et al. (2014). This study also argues for the critical reasoning that SMEs whose management capture the potential benefits from the industry have a high readiness level and usually tend to adopt e-commerce. In other words, these SMEs have innovativeness and commitment to their industry, in which their resources and knowledge are used for their incremental improvement. This study, therefore, highlights SMEs which have high industrial readiness. Thus, this study develops the second hypothesis in model-1 as follows:

H2: SMEs' industrial readiness positively influences e-commerce's adoption**.**

National readiness and e-CA

SMEs could take benefits from the information technology facilities provided by the government. Moreover, SMEs could capture more significant gains than other types of businesses; they have a degree of national readiness. This study explains that existing policies and regulations help the owners of SMEs to adopt information technology. In another paradigm, when SMEs can empower their business activities via the government's facilitation of information technology, they innovate (Doh & Kim, 2014). Then, this study argues that the SMEs' management that captures the benefits from the government's assistance with information technology have higher national readiness. The authors argue that the government usually facilitates this readiness level. In other words, the needs of Indonesian SMEs for enhancing their readiness are matched by the government's facilitation so that these SMEs can achieve their national readiness. It means that SMEs could empower their business activities at the national level, funded by information technology resources from the government. Therefore, this study develops the third hypothesis in model-1 as follows:

H3: SMEs' national readiness positively influences e-commerce's adoption**.**

Association between Organizational and Industrial Readiness

This section constructs the hypotheses development for research model-2. This study starts to posit the relational constructivism (Jonassen, 1997; M. W. Kraus & Tan, 2015), diffusion of innovation (Rogers, 1995), and readiness (D. Hung & Chen, 2003; Spencer & Gómez, 2004) by bundling them into critical reasoning. Kurnia et al. (2015) elaborated that industrial readiness is related to the interaction between the adopters of technological innovation in an organization, the external institutions, and their dependency and relation. This study proposes that SMEs, whose organizational readiness is high, tend to increase their perceptions about capturing business opportunities through industrial readiness. It means that the SMEs' management enlarges their knowledge constructivism step by step, and they also gradually get benefits. They take profits progressively because business enlargement does not usually happen quickly. In other words, the SMEs could capture their future potential cash

inflows, starting from their own industries. They typically start as a regional industry, then move to a national one. Moreover, the SMEs themselves share their knowledge, or they undertake the diffusion of innovation through their businesses networks. This also means that they held their diffusion of innovation to be a piece of innovativeness and optimism. Therefore, this study develops the fourth hypothesis in model-2 as follows:

H4: SMEs' organizational readiness positively influences their industrial readiness**.**

Association between industrial and national readiness

This study used the fourth hypothesis to develop the fifth one. Once an SME is established in an industry, the SME goes on to capture benefits from the national information technology. Information technology and its systems enable a company to coordinate its business activities. It also assists the company with its industrial operating activities (Fathian et al., 2008). It means that SMEs adopt e-commerce whenever they reach the summit of their industry. In other words, they would take another potential opportunity at the national level. This study explains the use of the relational constructivism between industrial and national readiness, as suggested by Jonassen (1997), Leask and Younie (2001), Leask and Younie (2001). Therefore, this study proposes that SMEs, whose industrial readiness increases their perceptions, will capture business opportunities at the national level. This study concludes that the SMEs' management gradually enlarges their knowledge constructivism from organizational, industrial, and national ideas. Most Indonesian SMEs usually find that their awareness multiplies to accomplish their mission and goal in the national business arena. On the other hand, this research argues that the government facilitates the Indonesian SMEs to have the required innovativeness and commitment to enlarge their businesses. Therefore, this study develops the fifth hypothesis in model-2 as follows:

H5: SMEs' industrial readiness positively influences their national readiness**.**

Research design and the modeling

This study, firstly, posits all the previous research models such as those by Choshin and Ghaffari (2017), Hoque and Boateng (2017), Kabanda and Brown (2017), and Kur. It means that this study used all the previous research models. They constructed their hypotheses of H1, H2, and H3 using the flat linear model. This study presents them in research model-1, seen in Figure 1. Secondly, this study rearranges research model-1, which has been transformed into model-2. This transformation was explained in the hypotheses of H3, H4, and H5. Moreover, the transformation processes considered relational constructivism. It disclosed the same hypothesis H3 in research model-1 and model-2. It, therefore, means that this study develops a structural model to explain the SMEs' e-CA based on relational constructivism, the diffusion of innovation and the three kinds of readiness.

This study considered structural equation modeling (SEM) due to the ordered-sequential method, which could determine and investigate the relationship among the variables structurally. SEM is also used for interpreting the substantive meaning of these relationships in a model (Bentler, 1989). It can explain the social phenomena and whether the researchers could, or could not, capture primary concepts directly. The researchers could not explain the fundamental concepts in a model because many social science relationships are inherently latent. This study proposed that construct validity and a well-designed method would be necessary for social research (Bollen, 1989; Westland, 2010). This study, therefore, used SEM to explain e-CA as a latent variable.

This study diagnosed the relationship between the proposed constructs under SEM, which is a tool that can improve the model‘s specifications. It argues that SEM is suitable for graphical displays and explains the associated variables that are resulted from statistical tests (Sánchez et al., 2009). SEM offers a modeling system that researchers could specify with a graphical method due to its closeness to their conceptual ideas. In other words, researchers could describe the relationships that are emphasized in a model (Adèr, 2008). This study proposes that the Indonesian SMEs adopt e-commerce progressively through the three readiness stages with their measurements. It presents all the models below.

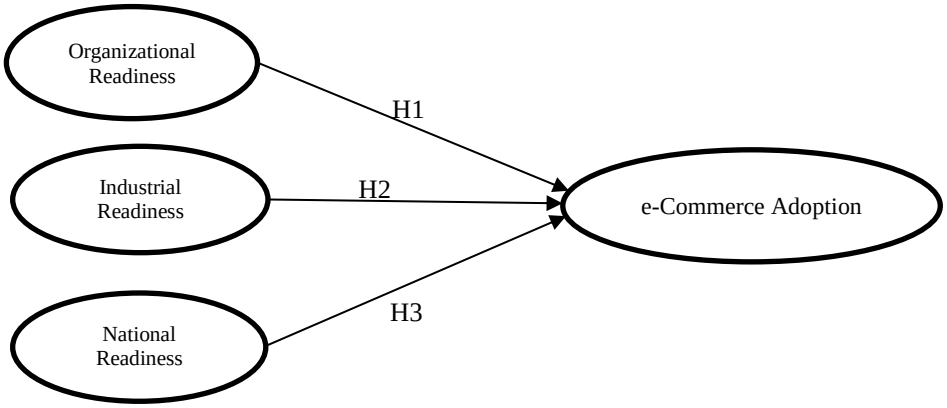

Figure 1. Research Model-1

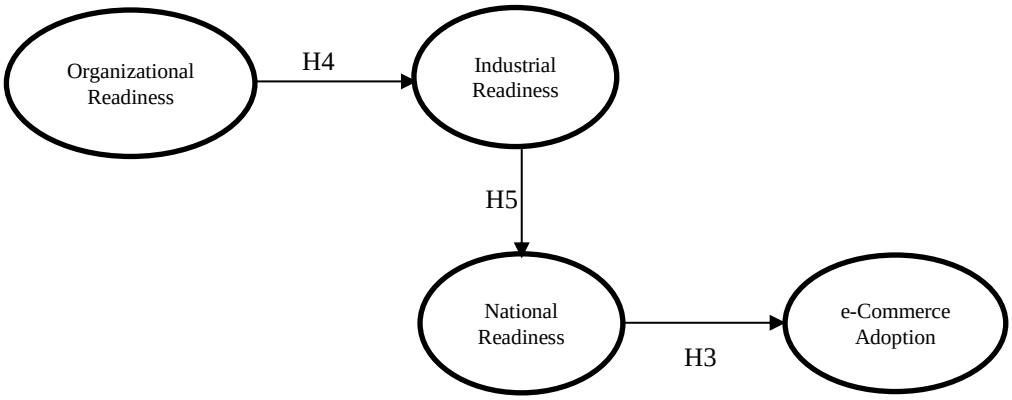

Figure 2. Research Model-2

2. Methodological approach

This study had an SME data population in Indonesia country, which numbered approximately 57,895. It randomly chose five regencies out of 34 from the whole of Indonesia. Besides, those chosen were also highlighted as areas where SMEs can grow their businesses and spread out to Indonesia's cities. This study identified that the SMEs' use of e-commerce for their business activities was about 5.85% or approximately 3,386. This research used a method of purposive random sampling. The authors considered using the Slovin test to measure the sample number for this research (Indarti et al., 2017). Based on this test, this study had to collect 358 respondents. The researchers had considered sampling measurements with the SEM’s calculator for the minimum data needed (Soper, 2020). This study used four latent variables and 28 observed variables (Westland, 2010, 2016). Based on (Soper 2020; Westland, 2010, 2016), this research had to collect 400 respondents as the minimum. The

selection criteria determined these: First, either the SME or the owner and the CEO were in Yogyakarta (which is in Indonesia). Second, the SME had used e-commerce for more than a year. Third, the respondents should be the owner or the CEO and must deal with all the organizational authorizations or controls.

This study used an organizational unit of analysis. It analyzed that an SME is calculated in one respondent's data in this study. Data collection were conducted face to face to ascertain its purposive sampling method. The authors intended to collect samples from people who used information and communication technology. It meant that this study inspected the input validity (Hair et al., 2013; Indarti et al., 2017) in which all the SMEs' respondents used ICT. This study collected and tabulated the data in a spreadsheet. It then examined the data for validity, reliability, and the goodness of fit of the model. The tests were conducted for both research model-1 and model-2. Finally, this study took statistical inferences from all the test results.

This research employed the variables and questions used by Choshin and Ghaffari (2017), Hoque and Boateng (2017), Kabanda and Brown (2017), Kurnia et al. (2015), Busenitz et al. (2000), Kurnia et al. (2015), Spencer and Gómez (2004), Wolfgang Koenig and Rolf T. Wigand (2004), and Ramanathan et al. (2012). However, it combined all the questions and eliminated those that had the same meaning. Table 1 shows all the questions and the four variables employed by this research. The entire contents of the research's questionary are presented in Appendix 1.

Table 1. Item questions and four variables

Variables	Items	Definition	References
Organizational Readiness	9	This study designed this variable with nine items. They are about organizations' belief that e-commerce can create an opportunity for them. SMEs' management believes that e-commerce could accelerate their growth and development.	(Choshin & Ghaffari, 2017; Kabanda & Brown, 2017; Kurnia et al., 2015; Rogers, 1995).
Industrial Readiness	9	Designed with nine items. The contents are about the relevance compatibility of the goals and interests among SMEs' partners; their willingness to develop together within the industries.	(Hoque & Boateng, 2017; Kurnia et al., 2015; A. Parasuraman, 2000; Shen & Khalifa, 2009).
National Readiness	9	Designed with nine items. They are about institutional structures that influence a country's entrepreneurial activity, especially the implementation of the SMEs' e-CA.	(Busenitz et al., 2000; Kurnia et al., 2015; Spencer & Gómez, 2004).
e-Commerce Adoption	2	Designed with two items. The contents are about the types of e-commerce used by SMEs and the reason why they use it.	(Wolfgang Koenig & Rolf T. Wigand, 2004; Kurnia et al., 2015; Ramanathan et al., 2012).

Source: own compilation

3. Data analysis and results

Data analysis

The authors collected data by distributing the questionnaires directly to either SMEs or their groups in five provinces. In the final data collection, this research gathered 436 respondents, but seven were not eligible for further analysis. Lynn (2008) recommended minimizing non-response biases with several methods. This study, however, could achieve an excellent respondents' response rate of 98.39% due to the use of a respondent-friendly survey questionnaire, and its brevity helped increase the response rate (Tarran, 2010). Therefore, this

research finally had 429 respondents to analyze statistically. The number of respondents had met the minimum standard of Slovin's test and Soper's data calculator, which had been explained in the research method. It reemphasized that the unit analysis of this research was an organizational unit. It meant that, although the respondent was the owner of an SME, this study recognized that the respondent acted on behalf of the SME's organization. Table 1 shows that the male proportion was 48.48%, and the female was 51.52%. We inferred that the proportion between males and females was statistically representative because more business entrepreneurship is displayed by Indonesian women, who create and find SMEs. Meanwhile, the fashion business dominated this research sample, with 27.74% of the replies coming from this industry. The respondents' demographic information is presented in Table 2 below.

Table 2. Respondents' demographic information

Classification	Characteristics	Number	Percentage
Gender	Male	208	48.48%
	Female	221	51.52%
Business Type	Fashion	119	27.74%
	Culinary	84	19.58%
	Crafts	53	12.35%
	Retailer	51	11.89%
	Service	35	8.16%
	Beauty Care	26	6.06%
	Information Technology	25	5.83%
	Tourism	21	4.90%
	Farming - Husbandry	15	3.50%
Location: Five Selected Regencies	Yogyakarta City	113	26.34%
	Sleman	106	24.71%
	Kulon Progo	78	18.18%
	Bantul	66	15.38%
	Gunung Kidul	66	15.38%
Connection Type:	Internet	201	46.85%
	e-mail	13	3.03%
	EFT	37	8.62%
	Internet & e-mail	65	15.15%
	Internet & EFT	62	14.45%
	E-mail & EFT	4	0.93%
	Internet, e-mail & EFT	47	10.96%

3.1. Reliability and validity analysis

Statistical analysis showed that all the data collected for each variable were highly reliable. All variables in the adoption of e-commerce had a Cronbach's alpha value of at least 0.601. This variable meant that organizational, industrial, and national readiness were reliable enough for further analysis. The variable of e-commerce's adoption was also suitable. Before this study sent the questionnaires to the respondents, it tested the face and content validities in a mini-pilot test, part of the survey stage. This pilot test was to ascertain that the language used in the questionnaires meant what each question was intended to interpret. The authors argued that the respondents easily understood all the items. On the other hand, this study presented two versions of the questionnaire, which could determine the logical sequence and instruct how to answer correctly (Andres, 2012). We infer that there were no errors in the translation from English to the Indonesian language. Moreover, this study conducted a second validity test using an exploratory and confirmatory analysis.

All the items in the questionnaire had loaded factors because they might conform to the proposed variable differently. It meant that these reliability tests supported both the

convergent and discriminant validities. We note that ORG7 had the lowest value of 0.504, but this study still used it because it did not influence the statistical results. Meanwhile, most of these values were less than 0.600, which meant they met the eligibility and validity standards. This study, finally, used all the replies to the questions in the subsequent statistical analysis, which was undertaken with a structural equation model (Hair et al., 2013). Table 3 shows the reliability and validity of the tests' results.

Table 3. The reliability and validity tests' results

Variables	Items	KMO	MSA	Factor Loading	Cronbach's Alpha	Composite Reliability
Organizational Readiness (OR)	OR1	0.809	0.833	0.582	0.749	0.817
	OR2		0.813	0.564		
	OR3		0.824	0.620		
	OR4		0.804	0.604		
	OR5		0.784	0.509		
	OR6		0.792	0.505		
	OR7		0.790	0.504		
	OR8		0.822	0.642		
	OR9		0.809	0.648		
Industrial Readiness (IR)	IR1	0.674	0.778	0.515	0.668	0.776
	IR2		0.721	0.507		
	IR3		0.745	0.566		
	IR4		0.707	0.553		
	IR5		0.788	0.581		
	IR6		0.795	0.583		
	IR7		0.573	0.579		
	IR8		0.547	0.510		
National Readiness (NR)	NR1	0.849	0.855	0.593	0.791	0.844
	NR2		0.841	0.610		
	NR3		0.819	0.635		
	NR4		0.860	0.568		
	NR5		0.838	0.635		
	NR6		0.844	0.567		
	NR7		0.884	0.571		
	NR8		0.851	0.643		
	NR9		0.859	0.682		
E-commerce Adoption	EA1	0.500	0.500	0.846	0.601	0.834
	EA2		0.500	0.846		

3.2. Structural equation analysis

The result of the data's analysis showed that research model-2 had better goodness of fit than model-1. The authors posit Revelle (2016), stating that the model's goodness of fit could be classed as either marvellous, meritorious, middling, mediocre, or miserable. Although both models were at the meritorious level (Revelle, 2016), these models were still good enough to be statistically inferred. Four criteria, i.e., GFI, AGFI, TLI, and CFI support model-2, and are higher than in model-1. The higher the requirements are, the better the model. Additionally, two criteria, i.e., CMIN/DF and RMSEA, support model-2 and are lower than in model-1. The lower the requirements are, the better the model. Table 4 presents the complete results for both the models as follows.

This study infers from Table 4 that both models had slightly different goodness of fits. Furthermore, this study showed a slight differentiation between the ordinary linear and the relational structure. It notes that comparisons among the models could be held by matching all

the criteria (Hair et al., 2013; Indarti et al., 2017) due to them using the same data. The two models' statistical results are presented in Table 5, as follows.

Table 4. The recommended and actual values of fit indices

Goodness of Fit	Recommended Value	Model-1	Model-2
Chi-squared	Small	1,484.235	1,038.153
Probability	≥ 0.05	0.00	0.00
GFI	≥ 0.90	0.79	0.83
CMIN/DF	≤ 5.00	4.27	2.99
RMSEA	≤ 0.08	0.09	0.07
TLI	≥ 0.95	0.58	0.74
CFI	≥ 0.95	0.61	0.76
AIC	-	3,368.009	3,368.009

Table 5. The hypotheses tests' results

	Hypothesis	Model 1			Model 2		
		β	C.R	Sig.	β	C.R	Sig.
H1 (+)	OR →e-CA	0.577	5.843	0.000***	-	-	-
H2 (+)	IR →e-CA	0.538	4.816	0.000***	-	-	-
H3 (+)	NR →e-CA	0.614	6.224	0.000***	0.862	10.253	0.000***
H4 (+)	OR → IR	-	-	-	0.910	6.489	0.000***
H5 (+)	IR → NR	-	-	-	0.910	6.775	0.000***

Table 5 shows the statistical results of SEM-AMOS's for hypotheses testing. SEM supports Tukey's statement that standardized statistical co-relationships are alternative concepts in determining the hypotheses' signs (Tukey, 1954). The analytical results from the SEM described the standardized coefficient shown in column β, which this study used to explain the hypotheses direction. This study supports Hypothesis H1 in research model-1. It is statistically significant at the level of 1.00%. The beta coefficient value is 0.577, and its CR value is 5.843. This finding reflects that SMEs in Yogyakarta consider their organizational readiness to be the first factor in their adoption of e-commerce. It means that they use information technology for their business activities. The SMEs' organizational maturity will further increase their trust in information technology. Therefore, they will acquire benefits because they are well-prepared for this information technology and can employ it as a business tool. This study's results support the previous research by Hameed et al. (2012), Kurnia et al. (2015), and Tan et al. (2007).

This statistical result supports Hypothesis H2 in research model-1. The beta coefficients in the two models are 0.538. This model is statistically significant, with CR values of 4.816 at the level of 1.00%. The SMEs usually adopt e-commerce, which requires synergy among them, for meeting their goals and interests. They could collaborate with technological support in an industry that combines the group interests. This study argues that e-commerce enhances knowledge transfer among SMEs as a part of technological innovation. It could also create many new business relationships within an industry. The research results support previous studies by Farjou and Eslami (2016), Fathian et al. (2008), and Kurnia et al. (2015).

This study supports Hypothesis H3 in both research model-1 and model-2. The beta coefficients in the two models are 0.614 and 0.862, respectively. Both models are significant, with CR-values of 6.224 and 10.253, respectively. Both models are also statistically significant at the level of 1.00%. These findings reflect that the level of national readiness represents the business environment's maturity in this country. It means that Indonesia should serve SMEs with market expansion supported by Internet-based opportunities. In other words, this nation supports SMEs, and they will feel confident to adopt and use e-commerce for their

businesses. The study's results support the previous studies by Bishop (2015), Dlodlo and Dhurup (2013), W.-H. Hung et al. (2014), and Jerman-Blažič (2008).

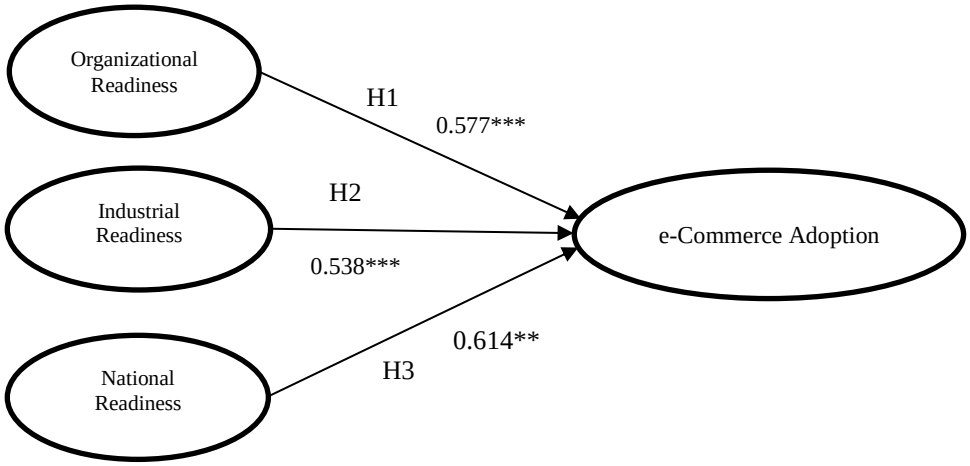

Figure 3. Research Model-1 Results

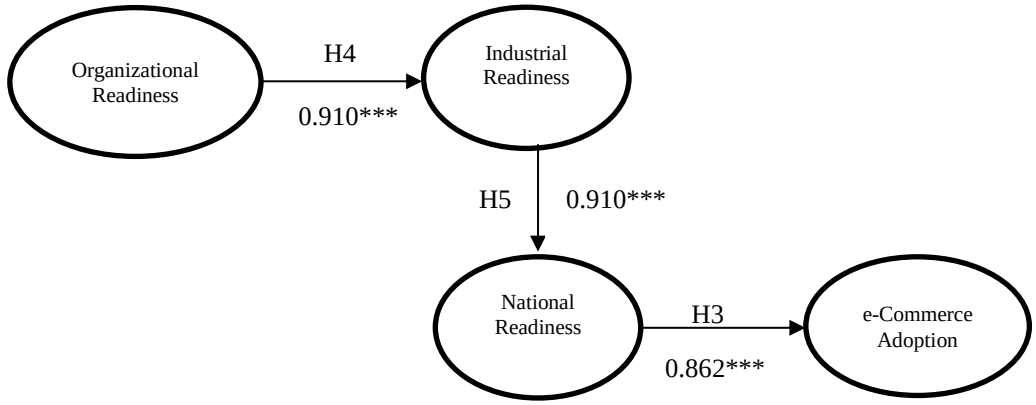

Figure 4. Research Model-2 Results

The statistical analysis supports Hypothesis H4 in research model-2, and it is significant at the level of 1.00%. The coefficient value of H4 is 0.910. The model is substantial, with a CR value of 6.849. This finding reflects that industrial development benefits the surrounding environment by providing efficient, fast, and preferential e-commerce access. The industry offers information and communications technology, construction of the institutional and financial sectors, and the penetration and reliability of the supporting facilities. Thus, the industrial readiness will leverage to accelerate the process for organizations to adopt e-commerce for their businesses (D. Hung & Chen, 2003; Jonassen, 1997; M. W. Kraus & Tan, 2015; Molla & Licker, 2005; Rogers, 1995; Spencer & Gómez, 2004).

The statistical results support Hypothesis H5 in model-2, and they are significant at the level of 1.00%. The beta coefficient value of Hypothesis H5 in model-2 is 0.910, with a CR value of 6.775. These results reflect that government support will help industries determine the extent to which their organizations participate in e-commerce. As national readiness is well-formed, the SMEs' owners or management in each industrial segment will be convinced to adopt e-commerce. It means that this nation simultaneously has high industrial and national readiness. This result supports the previous studies conducted by Jonassen (1997), M. W. Kraus and Tan (2015), Leask and Younie (2001), Leask and Younie (2001).

3.3. Discussions and findings

The research findings show that organizational, industrial, and national readiness increase Indonesian SMEs' willingness to adopt the e-commerce system relevant to their businesses' missions. Kurnia et al. (2015) suggested that the SMEs' readiness levels and business environments' fit are critical aspects, especially in developing countries. The readiness level represents the SMEs' visions, missions, and goals that will influence their businesses' development (W.-H. Hung et al., 2014). Research model-1 shows that organizational, industrial, and national readiness are directly associated with e-commerce's adoption. Moreover, this association is an ordinary linear one. This study infers that research model-1 is a holistic view and explains the Indonesian SMEs' e-CA (Kurnia et al. 2015) phenomenon. This study's findings support the theories from research model-1 (Jonassen, 1997; M. W. Kraus & Tan, 2015; Leask & Younie, 2001; Leask & Younie, 2001).

Research model-2 found that the organizational, industrial, and national readiness are in relational constructivism, where organizational readiness acts as the first trigger influencing the others (Kester et al., 2018; Khurshid et al., 2019; Zhang et al., 2018). This research highlights that the SMEs' diffusion of innovation should accompany the first trigger for gaining their readiness (Carreiro & Oliveira, 2019; Khurshid et al., 2019). This study proposes that the Indonesian SMEs could increase their innovativeness when their readiness is at the industrial and national stages. Meanwhile, industrial readiness is associated with national readiness. Finally, both industrial and national readiness affect the SMEs' e-CA. In other words, industrial and national readiness become the mediating relationship between organizational and national readiness. At a later stage, national readiness was remediating between national readiness and the SMEs' e-CA in model-2. Moreover, national readiness has the same mediating relationship between either organizational or industrial readiness and the SMEs' e-CA. The study's findings suggest that relational constructivism has a role in explaining the transformation from a linear-direct structure into a relational design.

This research infers that organizational readiness influences industrial readiness, making SMEs adopt e-commerce more quickly. This study indicates that SMEs could maximize their organizational readiness and use it to enhance their industrial and national readiness due to their commitment (Kester et al., 2018; Khurshid et al., 2019; Zhang et al., 2018). This adopting process means that the SMEs' owners or management enlarge their knowledge constructivism (Fosnot, 2013; Fosnot & Perry, 1996; Rawls, 1980), where all the readiness types are in a relational structure. The SMEs execute their business practices to generate their future cash inflows in gradually structured concepts (Jonassen, 1997; M. W. Kraus & Tan, 2015). The authors infer that the Indonesian SMEs might have improved their businesses through their stepped structures, which did not loop into the adoption of e-commerce. We noted that Indonesian SMEs increased their use of e-commerce when they had reached either the industrial level or just entered the national one.

This study found in research model-2 that the national readiness strengthened the mediating associations between industrial readiness and the SMEs' e-CA. It occurred whenever the SMEs showed their industrial willingness; they probably captured business opportunities frequently and from various sources. They, then, should probably be at the national readiness level. The SMEs' achievement of their readiness level was accomplished with what they had gained from their diffusion of innovation. It meant that these SMEs had taken into account commitments to innovativeness and optimism in their organizations and their respective industrial sectors (Carreiro & Oliveira, 2019; Khurshid et al., 2019). Nevertheless, extensive business opportunities for these Indonesian SMEs will exist when the

country can facilitate well-organized national readiness by promoting them through ICT to empower their networks (Leask & Younie, 2001; Leask & Younie, 2001).

The study's result shows that research model-2 is better than model-1. This result is offered by all the models' criteria (Hair et al., 2013; Revelle, 2016). This study found that SMEs would get more benefits if they adjusted their readiness levels gradually during the expansion of their businesses. SMEs with high organizational readiness tend to capture fresh business opportunities through industrial readiness. It means that the SMEs' management can enlarge their knowledge constructivism step by step to gradually benefit (Leask & Younie, 2001; Leask & Younie, 2001). They should take these benefits slowly because business enlargement does not usually occur rapidly. In other words, the SMEs' businesses could capture their future potential cash inflows starting from their organizational environments, industry, and then the national one. Moreover, they typically begin with regional commerce then move to the national level. This study, finally, infers that the last achieved level for these SMEs is due to the combination of their relational constructivism, the diffusion of innovation, and government facilitation.

3.4. Implications

Previous research focused only on the direct linear associations between all the readiness levels and the SMEs' e-CA. However, this research investigates the ordered stages of readiness better to understand the connection between readiness levels and e-CA. This research offers a new collaboration among relational constructivism, the diffusion of innovation, and readiness theories.

This study provides an understanding of the readiness level by considering the subsequent relative order of the SMEs. It means that when a country wants to accelerate its e-CA, it should enhance its SMEs' knowledge gradually. Moreover, the SMEs' organizational, industrial, and national readiness are relevant to their awareness. They could conduct a diffusion of innovation step by step from a limited scope into a broader one. From another perspective, this innovation starts with internal organizational readiness, where knowledge sharing also begins. Then, both knowledge sharing and innovation would be enlarged and spread throughout their respective industries. The country, moreover, could support the SMEs' businesses in Indonesia by producing better mutual opportunities for their development. It means that the state must facilitate the knowledge sharing and national innovation used in international competition (Doh & Kim, 2014; Farjou & Eslami, 2016). The authors, moreover, argue that the state should facilitate knowledge sharing media for Indonesian SMEs to help them with the process of innovation and optimism. It would probably be the sluggishness of the Indonesian SMEs that prevents them from gaining immense growth opportunities.

The implication for the regulators is that SMEs would increase their business levels if they are pushed to do so. The regulators should measure the level of their organizational readiness first. This level determines how well the management and organization operate their businesses using e-commerce information technology. Second, the regulators should control where the SMEs have positioned their respective industries: a new entrant or a well-established company. On the other hand, this study shows that many faults occur when most SMEs enter an industry's and the nation's business scopes. The SMEs' readiness is probably the most influential factor in the management's and the organization's flexibility to compete in extended market segments. This study posits Pfefer and Salancik (1978) by suggesting that most Indonesian SMEs would be dependent on each other for their resources, networks, and knowledge. Nevertheless, it can be inferred that Indonesian SMEs would like to achieve a

higher level of readiness in either their industry or nationwide while still depending on each other. When SMEs increase their input-output ratios, they become more dependent on others. It means that they need a full e-CA to achieve national readiness.

Conclusion, limitation and future research

This research had provided an integrated view of e-CA by SMEs in Indonesia. It differs explicitly from all the previous research, which was designed and undertaken with a linear-direct model, whereas this study used a new structural one. This research comprehensively outlines the new model with sequentially ordered readiness. It structurally relates three readiness factors that are organizational, industrial, and national in a sequential association.

This research posits three theories to explain why SMEs adopt e-commerce. They are relational constructivism, the diffusion of innovation, and the readiness theory, and these construct the behavioral adoption of e-commerce. The main central point of the research's discussion is the relational constructivism theory. This theory describes organizational readiness as the starting point for SMEs' e-CA. Then, with their enhanced capabilities and competencies in knowledge dissemination, they can diffuse their innovation. This study noted the SMEs' high motivation to accomplish their mission and goals. These SMEs have been developing their readiness at the industrial and national levels. The study's findings contain several implications for the country's strategic policies to further the adoption of e-commerce. The implication is that the country, as the regulator, should measure and control each readiness level.

Academically, this study provides critical reasoning for the SMEs' e-CA in developing countries, especially in Indonesia. This research also offers fresh insights into new research models, which are different from those in the previous studies. It, therefore, could explain the fundamental structural factors influencing the SMEs' e-CA process. This study provides an understanding of the readiness levels: organizational, industrial, and national. Full attention should be paid to all of them, so the improvement and continuation of e-commerce in SMEs are quicker. The application of supporting technology for SMEs will accelerate the development process and make it more advanced and innovative. For policymakers, this study identified some factors within their policies to increase the SMEs' e-CA. Positive impacts in the development of SMEs in Indonesia could be achieved by their level of internal organizational readiness, their interaction within their industry, and the government's full support. The government should facilitate gradual steps to increase the SMEs' awareness of industrial and national standards and structures. In other words, the government should encourage SMEs to improve their quality so that they are eligible to enter the industrial and national levels. It means that it needs to facilitate the SMEs with relational constructivism in their communities, either industrial or national (Leask & Younie, 2001; Leask & Younie, 2001).

This study has two limitations. This study argues that SMEs adopt e-commerce based on their awareness by having posited relational constructivism. It means that this study refutes that relational constructivism could be from instructional and destructive powers (B. Kraus, 2014). In other words, it solely believes that SMEs construct their perceptions depending on their individual and organizational awareness. Consequently, this study allows future research into staged-relational constructivism based on instructive power, primarily from state policies. We noted that this relation has no destructive power. Secondly, the authors consider that the SMEs' readiness is due to their knowledge dissemination. In other words, the SMEs did the diffusion of innovation using an ideal transformation process. It means that this relationship is

perfect, as Figure 2 shows. Consequently, future research may expose those other relations with national readiness to influence organizational and industrial readiness.

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Abbreviations

SME: Small and medium-sized enterprise; e-CA: e-commerce adoption; CEO: chief executive officer; ICT: information & communications technology; SEM: structural equation model; AMOS: analysis of moment structure; GFI: goodness-of-fit index; AGFI: adjusted GFI; CFI: comparative fit index; TLI: Tucker-Lewis index; CMIN/DF: the minimum sample discrepancy function - degree of freedom; RMSEA: root-mean-square error of approximation.

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Appendix 1

Organizational Readiness (OR)

Perceived Benefits (PB)

- Our organization is convinced that e-commerce is compatible with our culture, values, needs, and practices
- Our organization realizes the opportunities and threats from e-commerce's adoption
- Our organization understands e-commerce's potencies and benefits

Perceived Organisation Resources and Governance (PO)

- Our organization can support e-commerce's implementation
- Our organization has financial sources to adopt e-commerce
- Our organization has technical resources to adopt e-commerce

Compatibility (CO)

- Our organization has financial support, technology, management understanding, and human resources expertise.
- E-commerce is compatible with the operational activity needs in our company
- E-commerce is consistent with the supplier's and customer's needs for the business process

Industrial Readiness (IR)

Awareness (AW)

- Our industry has a database and online portal (website, blog, and others) to facilitate e-commerce's growth
- Our organization pays attention to other organizations which have already adopted e-commerce
- Other organizations know that our organization adopted e-commerce

Affective Social Presence (AS)

- Other organizations can be affected by the development of the e-commerce adoption process in our organization
- Our organization can be influenced by the development of other organizations' e-commerce adoption processes
- Our organization assumes that all organizations in an industry can influence each other

Cognitive Social Presence (CS)

- Our organization knows the development of the e-commerce adoption processes in our industry
- Other organizations understand the development of our organization's e-commerce adoption process

National Readiness (NR)

Normative Institutions (NI)

- E-commerce is a business technology innovation that is accepted in this country
- In Indonesia, innovative and creative thinking are some of the keys to success
- Indonesian societies support SMEs that adopt e-commerce

Cognitive Institutions (CI)

- Every SME knows how to protect new businesses legally
- SMEs who start adopting e-commerce know how to deal with the various risks
- SMEs who start adopting e-commerce know how to manage the risks

Regulatory Institutions (RI)

- The government has made regulations that support the SMEs adoption of e-commerce
- Local and national governments offer exceptional support for SMEs that want to adopt e-commerce
- Government organizations in Indonesia help SMEs to adopt e-commerce as a support for their business

E-Commerce Adoption (e-CA)

- We use e-commerce to support general marketing activities
- We use e-commerce to conduct B2C transactions