The Investigation of E-Marketplace Adoption by Small Medium Enterprises Using Individual-Technology-Organization-Environment (ITOE) Framework: A Case Study in Yogyakarta Province Indonesia

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Abstract

Background: *Small and medium enterprises (SMEs) in Indonesia have been encouraged by the Indonesian government to adopt e-marketplace platforms. However, the rate of e-marketplace adoption is shown to be low. In an effort to address the underlying issues this paper reports on the application of a modified form of the Technology-Environment-Organization framework that includes attributes of individual SME owner-managers. The application of the Individual-Technology-Organization-Environment (ITOE) framework is considered necessary given the overwhelming number of micro-SMEs that have one owner-manager and employ less than ten employees. The study takes a case study approach by studying e-marketplace adoption of SMEs in the province of Yogyakarta, a major city of Indonesia.*

Method: *Using a survey instrument, data were collected using randomized sampling from SMEs in Yogyakarta and analyzed using the partial least squares method.*

Results: *The results confirm the validity of the ITOE framework to this study context. The results also indicate that the Individual construct positively affects the organization construct in predicting e-marketplace adoption. The suitability of the ITOE framework for further application to other locations in Indonesia when investigating e-marketplace adoption by SMEs is validated.*

Conclusion: *This study validates use of the ITOE framework in investigating e-marketplace adoption by SMEs in Indonesia. The ITOE framework can be operationalized for e-marketplace adoption, particularly when the research context has relevant factors to the individual context namely, where a predominance of micro-SMEs exists. Future research is to conduct a full-scale study of e-marketplace adoption in Indonesia.*

Keywords: E-marketplace, Adoption, Small Medium Enterprises, Indonesia.

Introduction

Since 2017, small and medium enterprises (SMEs) in Indonesia have been encouraged to conduct business online by the Ministry of Communication and Information Technology's initiative called the national movement of SME Go Online (Ministry of CIT of Indonesia, 2017; Ministry of CIT of Indonesia, 2018). Government has taken a leading role in assisting SMEs as SMEs often do not have the financial, human resource and information technology (IT) capabilities to embark on a course of e-commerce adoption (Budiono et al., 2018a; Irjayanti & Azis, 2012; van de Weerd et al., 2016; Wulandjani & Hatta, 2019). Many e-marketplace providers in Indonesia have used advanced IT such as cloud computing and big data analytics to assist SMEs in their e-commerce ventures (Besimi & Dika, 2013; Sfenrianto et al., 2018; Siftery, 2018; Utami, 2018). This has given encouragement to the Indonesian government to collaborate with e-marketplace providers to facilitate the adoption of e-marketplace by SMEs.

E-marketplace adoption by SMEs in Indonesia to date is not as high as expected; less than 10 percent of SMEs have reported adoption of an e-marketplace strategy since the launch of SME Go Online movement in 2017 (Ali, 2019; E-commerce Association of Indonesia, 2016; Pryanka & Yolanda, 2018; Wicaksono & Tri, 2019). Factors that inhibit the uptake of e-marketplace by SMEs can be broadly categorized into areas of technological, organizational and environmental. One can see that the e-marketplace initiatives implemented by the Indonesian government seeks to inject new technologies into the SME landscape. Collaboration between government and e-marketplace vendors is further seen to alter the environment in which SMEs operate. From an organizational perspective, government has sought to improve the knowledge of SMEs owners by providing incentives such as free coaching clinics, free technical advice and a structured development program that ultimately gives access to international markets (Ministry of CIT of Indonesia, 2018; Riandi & Maharani, 2017).

Despite these initiatives there is still much outside of the control of government to ensure the success of SME Go Online. The Technology-Organization Environment (TOE) framework is a well-established method that enables statistical assessment of the interplay between technology, organization and environment when new technologies are introduced into a social system. The literature indicates that technological factors such as complexity and security explain the slow up-take of new technologies (Abdullah et al., 2015; Abualrob & Kang, 2016; Alshamaila et al., 2013; Fariba et al., 2015; Gangwar et al., 2015). Environment factors such as immature supply chain, poor communication or competitive pressure are found to also play a role (Abdullah et al., 2015; Alshamaila et al., 2013; Boumediene et al., 2013; Rahayu & Day, 2015). When analyzing the role that organizational factors play, the literature reveals factors pertaining to organizational readiness, commercial success and importantly, organizational size (Abdullah et al., 2015; Alshamaila et al., 2013; Awa et al, 2017; Duan et al., 2010; Ghobakhloo et al., 2011).

The TOE framework enables many aspects of the current situation in Indonesia to be assessed in a reliable manner. However, one important factor of the TOE framework, organizational support, or more specifically, "top management support", emerges as problematic when considering the overwhelming numbers of micro SMEs in Indonesia. According to the latest assessments from the Ministry of Cooperatives Small Medium and Micro Enterprises of Indonesia (2018), 98.68% of SMEs in Indonesia are micro businesses. In a normative sense, the factor of "top management support" is viewed as an attribute of the organization construct that predicts level of e-commerce adoption. It broadly describes efforts that management go to encourage staff to use new technologies. This paper argues that greater elaboration of this construct through an assessment of individual owner-managers knowledge and attitudes will provide more accurate insights into underlying reasons owner-managers fail to embrace the opportunities that e-marketplace provides. Such insights potentially have great practical

importance as government seeks to better direct policy efforts to encourage uptake of e-marketplace with SME owners.

In seeking to define attributes to define the construct of individual the paper first turns to government reports which find that there are considerable differences in digital divide measures between the population of provinces in Indonesia (Ariyanti, 2016). This diversity in digital divide plays out in various ways but most notably digital literacy (Buckingham, 2015; Burton, et al., 2015; Leahy & Dolan, 2010; Njenga, 2018), user acceptance (Awa et al., 2015; Hameed et al., 2012; Tomas et al., 2018) and trust (Al-Haraizah & Choudhury, 2012; Awa et al., 2015; Duan et al., 2010). These three variables define the proposed construct of individual which feeds into the construct of top management support within the TOE framework. Accordingly, the method which is used to investigate SME Go Online in Indonesia is a modified version of the TOE framework called ITOE (Individual-Technology-Organization-Environment) framework.

Yogyakarta is a province on the island of Java and has one of the lowest digital divide indexes in Indonesia (Ariyanti, 2016). Yogyakarta also has one of the highest internet user penetration rates in Java Island (73.8% of the province total population) compared to the capital city Jakarta (80.4%) (APJII, 2018). Yogyakarta is also the province with the highest percentage of citizen's ability in computer user between 2015 and 2018 (Central Bureau of Statistics, 2018). Curiously, the rate of e-marketplace utilization for online business by SMEs in this province is still reported to be relatively low (Wicaksono & Tri, 2019). This ITOE framework is applied initially to the case study of Yogyakarta which exhibits the lowest level digital divide index indicating highest levels of ICT development outside of the capital city of Jakarta. It was reasoned that the lower digital divide in Yogyakarta will provide the strongest indication of individual and composite reliability of the individual construct that describes user acceptance, trust and digital literacy.

This leads to the research questions in this study, which are:

1. Can the individual variables significantly predict the organization construct of the ITOE framework in the uptake of e-marketplace by SMES in the Yogyakarta Province of Indonesia?

2. In what ways do the ITOE factors affect e-marketplace adoption by SMEs in Yogyakarta?

The paper is organized as follows. The next discusses the theoretical framework and hypotheses of this study, while the following section explains the data collection and analysis method. The results are then reported, which is followed by a section devoted to the discussion of results. Academic and practitioner implications are then considered. This is followed by the conclusions and future research, and finally, the limitations of the study.

Theoretical Framework and Hypothesis

The TOE framework has been used by researchers to investigate adoption of new technologies by organizations (Abdullah et al., 2015; Ghobakhloo et al., 2011; Hameed et al., 2012). This framework recognizes the complex relationships among technology, organization and the environment when e-commerce technologies are adopted. However, the literature has shown that the individuals embedded within the organizational can significantly influence adoption of e-commerce technologies, particularly if these organizations are small (Awa et al., 2015; Awa et al., 2017; Gangwar et al., 2015).

Little research has been reported that investigates how to specify constructs of an individual factor as a predictor for organizational influence within the TOE framework. Therefore, this study proposes a framework known as the ITOE framework with the goal to examine the influence of the individual construct as a predictor of organization construct in e-marketplace

adoption. The individual construct in this study is defined by the variables of user acceptance, trust in technology and digital literacy. These variables have been found to be influential in technology adoption within developing countries, including Indonesia (Awa et al., 2015; Cui et al., 2020; Beige & Abdi, 2015; Gengatharen & Standing, 2005; Puspitasari & Ishii, 2016; Sfenrianto et al., 2018). It is for this reason that user acceptance of technology, trust in technology and digital literacy level have been used to define the individual factor in a modified TOE framework called ITOE.

The following sections provides greater detail about the four constructs used in the proposed ITOE framework. These are summarized in Table 1.

Table 1 - Constructs and Factors of ITOE Framework		
Construct	**Description**	**References**
Individual		
Digital literacy (DL)	"The confident and critical use of Information Society Technology (IST) for work, leisure and communication. It is underpinned by basic skills in ICT: the use of computers to retrieve, assess, store, produce, present and exchange information and to communicate and participate in collaborative networks via the Internet"	Buckingham (2015); Burton et al. (2015); Leahy & Dolan (2010, p. 212); Njenga (2018)
User acceptance (UA)	Individual level assessment of IT innovation adoption	Awa et al. (2015); Hameed et al. (2012); Tomas et al. (2018)
Trust (TR)	Feeling of security when relying on an entity	Al-Haraizah & Choudhury (2012); Awa et al. (2015); Duan et al. (2010)
Technology		
Complexity (CX)	The degree to which an innovation is perceived as difficult to understand and use	Abualrob & Kang (2016); Alshamaila et al. (2013); Gangwar et al. (2015)
Security and Privacy (SP)	The extent to which the e-marketplace technology is able to secure the online transactions and protect unauthorized access of information	Abdullah et al. (2015); Fariba et al. (2015)
Connection Quality (CQ)	Quality of internet connection which based on the number of existing IT infrastructure facilities	Ariyanti (2016); Fathey et al. (2016); Mohammed et al. (2017)
Organization		
Top Management Support (TM)	The extent to which executive management explicitly encourage the use of new innovation and technology	Abdullah et al. (2015); Alshamaila et al. (2013); Duan et al. (2010)
Organizational Size (OS)	Turnover (annual sales) and number of employees	Awa et al. (2017); Duan et al. (2010); Ghobakhloo et al. (2011)
Environment		
Competitive pressure (CP)	The degree of pressure felt by the firm from competitors within the industry	Abdullah et al. (2015); Alshamaila et al. (2013)
Government support (GS)	Different types of government initiatives for e-marketplace adoption	Abdullah et al. (2015); Awiagah et al. (2016); Saedi & Iahad (2013a)
Stakeholder support (SS)	The availability of support from stakeholders for implementing and using ICT	Alshamaila et al. (2013); Boumediene et al. (2013); Rahayu & Day (2015)

Individual

In this study, the definition of the user acceptance refers to factors of individual perception in technology adoption (Adel et al., 2018; Al-Haraizah & Choudhury, 2012; Al Mansoori et al., 2018; Awa et al., 2015; Hameed et al., 2012). In information systems research, user acceptance is not new as demonstrated in the wide-spread use of the Technology Acceptance Model (TAM) framework such as perceived usefulness and perceived ease of use (Al-Haraizah & Choudhury, 2012; Gangwar & Date, 2016), behavioural intention (Al Mansoori et al., 2018; Awiagah et al., 2016) and attitude towards using technology (Irfan & Chendragiri, 2015).

According to Hameed et al. (2012), perceived usefulness is the most prevalent factor that has been reported in the literature when investigating user acceptance of technology adoption. Perceived usefulness is described as the user's perception to the functionality of the technology to improve user performance (Villa et al., 2018). However, the TAM framework is more appropriate for individual level of analysis as opposed to organizational level (Gangwar et al., 2014; Hameed et al., 2012). Other studies have similarly concluded perceived usefulness as the most prevalent TAM items to reflect individual user acceptance into the organizational level of analysis (Awa et al., 2015; Awiagah et al., 2016). In lower-middle income countries such as Indonesia, poor technology user experience is one of the contributing factors that can influence individual user acceptance in technology adoption (Budiono et al., 2018a). Thus, in this study, user acceptance is investigated to understand whether e-marketplace is perceived to be useful by the SMEs in supporting their businesses.

Trust is another key factor that can influence e-marketplace adoption (Duan et al., 2010; Hajli, 2013; Vatanasakdakul et al., 2004). In online shopping activities such as e-marketplace, businesses and customers consider trust to be an important factor when they decide to adopt an e-marketplace platform (Al-Haraizah & Choudhury, 2012; Awa et al., 2015; Cloete & Doens, 2008). A prior study by Budiono et al. (2018a) has shown fraudulent behavior such as security breaches and information privacy issues such as distribution of personal data are challenges faced by businesses in Indonesia. Therefore, this study will investigate whether SMEs trust the e-marketplace platform to protect online transactions from fraudulent activity.

The individual construct will be used to better elaborate the variable of top management support within the organization construct of the TOE framework. As explained in the following section dealing with the organization construct, top management is often cited as a key factor influencing technology adoption.

H1: Individual construct positively affects organization construct of TOE framework.

Technology

The influence of technology on the adoption of new ecommerce technologies centres on the concept of complexity. E-marketplace platforms often provide and include services such as customer relationship management, internal business process management, supply chain management and electronic payment (Awiagah et al. 2016; Brunn et al., 2002; Fariba et al. 2015; Ghobakhloo et al., 2011; Lavassani et al., 2008). In this regard, SMEs may view the integration of various services to be complex resulting in challenges they must overcome. This, in turn, discourages SMEs from adopting technologies such as e-marketplace due to limited IT knowledge and experience (Govindaraju & Chandra, 2011; Maryeni et al., 2012; Moertini, 2012; Xuhua et al., 2019). This perception of complexity may discourage technology adoption (Kurnia et al. 2015; Mohammed et al., 2017; Zhai & Liu, 2013). In this study, complexity will be investigated to determine its impact on e-marketplace adoption by SMEs.

Security and privacy are key technological factors that may influence e-marketplace adoption (Abdullah et al., 2015; Al-Mascati & Al-Badi, 2016; Awiagah et al., 2016). Online transactions entail good security and privacy measures (Awa et al., 2015; Mapeshoane & Pather, 2016;

Thitimajshima et al., 2018). Other threats such as denial of service attack, brute force attack, or transaction intrusion can further inhibit SMEs' adoption of e-marketplace (Dai et al., 2014; Gangwar & Date, 2016; Sawesi et al., 2013). Therefore, security and privacy will be investigated to identify whether the e-marketplace platform can provide adequate security features to protect electronic transactions.

Lack of quality internet connection can also be a problem for consumers and businesses in lower-middle income countries such as Indonesia, particularly in rural areas, where there is poor telecommunications infrastructure (Ariyanti, 2016; Budiono et al., 2018a; Onitsuka et al., 2018). For example, low quality internet connections can lead to poor user experience (Abdullah et al., 2015; Treesinthuros, 2013). Thus, this study will investigate the influence of internet connections in terms of speed, reliability, stability and coverage in e-marketplace adoption.

H2: Technology construct positively affects e-marketplace adoption by SMEs.

Organization

Top management is often cited as the key entity influencing technology adoption (Awa et al., 2017; Gangwar et al., 2014; Hameed et al., 2012; van de Weerd et al., 2016). This also applies to SMEs (Alshamaila et al., 2013; Duan et al., 2010). Top management can bring enthusiasm and commitment within the organization that can lead to technology adoption (Gengatharen & Standing, 2005; Ghobakhloo et al., 2011). Therefore, in this study, top management support is investigated for the support and interest it provides in e-marketplace adoption. This is investigated by examining factors that include encouragement to employees, providing leadership for business collaboration with suppliers and promoting the utilization of business performance analysis for improved decision making. As mentioned previously, the proposed construct of individual will be used to predict top management support.

Organizational size is also a prominent factor that influences SMEs when adopting new technology (Awa et al, 2017; Duan, et al., 2010; Ghobakhloo et al., 2011). The size of the SME, measured by annual sales and number of employees, is therefore relevant when considering adoption of e-marketplace (Berisha & Shiroka Pula, 2015; European Commission, 2015; UNDP, 1999). This study investigates whether annual sales and number of employees can affect adoption of the e-marketplace by SMEs.

H3: Organization construct positively affects e-marketplace adoption by SMEs.

Environment

Competitive pressure is viewed as a key environmental factor for technology adoption (Awa et al., 2015; Boumediene et al., 2013). For SMEs, competitive pressure has been found to influence decisions for e-marketplace adoption (Duan et al., 2010; Ghobakhloo et al., 2011). External pressure can arise from competitors, government, buyers and suppliers (Abdullah et al., 2015; Ghobakhloo et al., 2011; Kurnia et al., 2015). In this study, competitive pressure will be investigated to determine whether it promotes or hinders adoption of e-marketplace for SMEs to remain competitive.

Government support plays an important role in technology adoption, particularly in lower-middle income countries, such as Indonesia (Abdullah et al., 2015; Awiagah et al., 2016; Saedi & Iahad, 2013b). Evidence of government support can be found in the form of laws and regulations, incentives, infrastructure development, training and education (Budiono et al., 2018b; Huang et al., 2015; Sun et al., 2012; Talib & Alomary, 2016). Appropriate laws and regulations are essential to providing effective incentives for SMEs to adopt e-marketplace. Examples include secure online transaction processes, transparent financial incentives, training and education programs for the citizens (Budiono et al., 2018b; Kurnia & Ali, 2011;

Kurnia et al., 2015). Another example of government support can be provided in the form of projects designed to improve internet connections in rural areas (Budiono et al., 2018a; Khan et al., 2017). Therefore, this study will investigate whether the government has provided effective support for SMEs to adopt e-marketplace.

Stakeholder support is another important aspect of e-marketplace adoption. In this study, stakeholders include business associations, internet service providers, suppliers, delivery and logistics vendors and financial institutions (Brunn et al., 2002; Duan et al., 2010; Kian Chong et al., 2011). In lower-middle income countries such as Indonesia, lack of support from business suppliers and internet providers in rural areas can hinder electronic transaction processes (El Said, 2017; Khan et al., 2017; Yu et al., 2017). Thus, stakeholder support will be investigated to determine how well support from important stakeholders such as e-marketplace vendors, business associations, internet providers, suppliers and cloud computing providers influence e-marketplace adoption.

H4: Environment construct positively affects e-marketplace adoption by SMEs.

Construct Operationalization

Figure 1 shows the model of the ITOE framework with the related constructs, factors, items and the four hypotheses as presented in the previous section. The individual is exogenous for organization and technology, organization and environment are exogenous for e-marketplace adoption. In this study, a total of 52 indicators are operationalized to investigate the constructs of the proposed ITOE framework. See Appendix 1 for the complete questionnaires.

Figure 1 - ITOE Framework
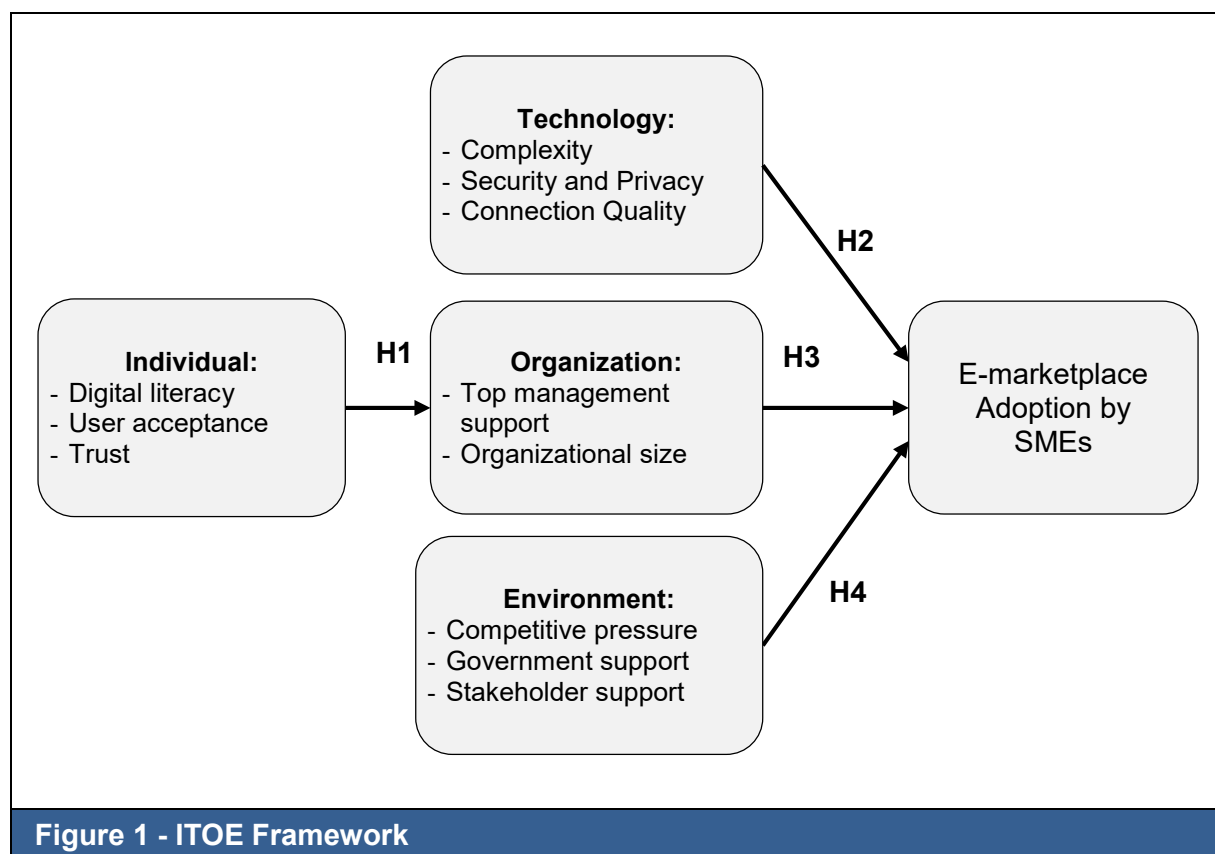
Based on the theoretical framework and hypothesis presented above, the proposed hypothesis are as follows:

H1: Individual construct positively affects organization construct of TOE framework

H2: Technology construct positively affects e-marketplace adoption by SMEs

H3: Organization construct positively affects e-marketplace adoption by SMEs

H4: Environment construct positively affects e-marketplace adoption by SMEs

Data Collection and Analysis Method

The study was conducted between 1 February 2019 and 31 March 2019. A Human Research Ethics application was approved by the authors' university prior to the conduct of the research. The Indonesia SME Go Online program has 6300 members in the Yogyakarta province. A sample of 395 SMEs was randomly selected to participate in the study.

An online survey form was prepared using Google Forms. The questionnaire is shown in the Appendix. The questionnaire uses a 5-point Likert scale (answers range from 1 - "strongly disagree" to 5 - "strongly agree"). The 5-point Likert scale is commonly used with structural equation modelling (SEM) and is particularly suited to the application of partial least squares (PLS) (Hair Jr et al., 2016). Respondents were initially approached using e-mail invitations. The e-mail invitation consisted of a brief explanation of the study, participation information sheet and the link to the online survey. Text messages and phone calls were used to remind respondents to participate in the study.

The survey collected demographic data which included organizational roles, gender, age group, highest educational level and ethnicity. Organization-specific data included the number of employees, annual sales, products and services. Respondents were also asked whether they had adopted an e-marketplace platform and, if so, they were asked to indicate which e-marketplace adoption level they perceived their organization to be at. Table 2 shows the five levels of adoption the respondent could select. If respondents indicated that their organization had not adopted an e-marketplace platform, they were asked to give reasons for not adopting e-marketplace.

We defined the level of adoption as static, interactive, transactive and integrated (Abbas et al., 2018; Abdullah et al., 2015; Molla & Heeks, 2007). We also propose a new level of e-marketplace adoption, known as 'advanced'. The advanced level indicates that SMEs not only utilize e-marketplace for collaboration with stakeholders (such as suppliers), they also use it to improve their business processes, such as through the use of the analytic services provided in the platforms.

Table 2 - E-marketplace Level of Adoption		
Level of Adoption	Description	References
Level 0: Non-adopter	Do not use e-marketplace	Abbas et al. (2018); Abdullah et al. (2015); Molla & Heeks (2007)
Level 1: Static	The e-marketplace only allows my company to show the company profile and product/service information.	Abbas et al. (2018); Abdullah et al. (2015); Molla & Heeks (2007)
Level2: Interactive	Level 1 + The e-marketplace only allows my customers to conduct simple business processes such as booking inquiries, price negotiation and communication by email.	Abbas et al. (2018); Abdullah et al. (2015); Molla & Heeks 2007)
Level 3: Transactive	Level 2 + The e-marketplace allows my customers to do online transactions, i.e. purchase products online and make online payment.	Abbas et al. (2018); Abdullah et al. (2015); Molla & Heeks (2007)

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Table 2 - E-marketplace Level of Adoption		
Level of Adoption	Description	References
Level 4: Integrated	Level 3 + The e-marketplace allows my company to integrate my internal business processes with my supply chain of my suppliers.	Abbas et al. (2018); Abdullah et al. (2015); Molla & Heeks (2007)
Level 5: Advanced	Level 4 + The e-marketplace allows my company to use business analytics to make better business decision.	

The minimum sample size in this case study follows the 'ten times rule' proposed by Hair Jr et al. (2014) which measures: firstly, ten times the largest number of formative indicators used to measure a single construct; or, secondly, ten times the largest number of arrowheads pointing to a latent-variable. Based on the ITOE framework in this study, the second condition applies. There are three constructs of the TOE framework which point to the latent variable of e-marketplace adoption. Therefore, the minimum sample size in this study is 30. We were able to receive 79 valid responses for the analysis in the study.

We use the partial least squares (PLS-SEM) method to estimate the structural equation model. PLS-SEM is appropriate to use in exploratory research or to examine new constructs or factors in a theoretical framework (Hair Jr et al., 2014). All three conditions are met in this study. The data were analyzed using SmartPLS 3.0 for Windows, a popular tool for PLS-SEM (Wong, 2013). There are no missing values in the responses.

As described by Hair Jr et al. (2011), PLS-SEM typically uses a two-step separate analysis that includes evaluation of measurement models and structural models. The evaluation of the measurement model aims to: investigate the validity and reliability of the measured constructs; factors and items in the model; and in cases where the evaluation of the structural model is intended to test a hypothesis (Hair Jr et al., 2016; Hair Jr et al., 2011).

This study uses indicator reliability and composite reliability (internal consistency) for reliability testing and convergent validity and discriminant validity for validity testing (Hair Jr et al., 2016). As this is an exploratory study, the selected criteria for evaluation of the measurement model is set to a minimum of 0.6 for indicator reliability and internal consistency. For convergent validity a minimum 0.5 average variance of the extracted (AVE) value is set. These AVE values should be higher than all other cross loadings for discriminant validity (Hair Jr et al., 2011).

The hypothesis test in this study uses the bootstrapping algorithm provided by SmartPLS 3.0. The bootstrapping algorithm, an iterative ordinary least square regression, is used by SmartPLS program to investigate the significance of the model (Hair Jr et al., 2016). This algorithm can provide the significance of a relationship between constructs in the structural model. The selected acceptance criteria are 5% of significance level, 1.96 of cut-off t-statistics value and 0.33 of the R^2 value (Hair et al., 2013; Hair Jr et al., 2011; Urbach & Ahlemann, 2010). The acceptance criteria for the R^2 value depends on the research discipline. In marketing research, R^2 of 0.75 is considered as substantial, 0.50 is moderate and 0.25 is weak (Wong, 2013). However, in IS research, 0.67 is considered as substantial, 0.33 is moderate and 0.19 is weak (Urbach & Ahlemann, 2010). We decided to use the minimum R^2 value of 0.33. In order to assess the explanatory value of the proposed variables for the individual construct toward the organization construct, a minimum R^2 value of 33% must be achieved. Similarly, the TOE constructs must also collectively achieve a minimum R^2 value of 33% when predicting e-marketplace adoption though one expects this value to be much higher due to the widespread use of TOE to predict technology adoption.

Results

Demographic Result

A total of 79 valid responses were collected from the online survey. Of the 79 responses, 50 respondents indicated they have adopted e-marketplace. Table 3 and Table 4 shows demographic data of the respondents.

Table 3 - Respondent Demographic Data			
Individual Characteristics		Number	Frequency
Respondent position	Senior manager/owner	66	84%
	Marketing/sales manager/officer	7	9%
	Administration manager/officer	5	6%
	Creative director	1	1%
	Total	79	100%
Gender	Male	21	27%
	Female	58	73%
	Total	79	100%
Group of age	18-29	18	23%
	30-39	20	25%
	40-49	27	34%
	50-59	14	18%
	Total	79	100%
Highest education	High school or lower	30	38%
	Diploma	10	13%
	Bachelor	35	44%
	Master	4	5%
	Total	79	100%
Ethnicity	Javanese	72	91%
	Other	7	9%
	Total	79	100%

As can be seen from Table 3, 84% of the respondents hold the position of senior manager-owner, indicating that the respondents were at the top management role in the organizations. Secondly, 73% of respondents are female. In addition to this, 41% of respondents are older than 30 years old, 49% of respondents hold a bachelor's degree or above and 91% of respondents are Javanese.

Table 4 - The Organizational Demographic Data			
Organizational Characteristics		Number	Frequency
Number of employee	1-9 (micro)	70	89%
	10-25 (small)	8	10%
	26-100 (medium)	1	1%
	Total	79	100%
Annual sales	≤ IDR 300.000.000,00 / ≤ US$20,133 (micro)	48	61%
	> IDR 300.000.000,00 and ≤ IDR 2.500.000.000,00 / > US$20,133 and ≤ US$ 167,774 (small)	8	10%
	> IDR 2.500.000.000,00 and ≤ IDR 50.000.000.000,00 / > US$167,774 and ≤ US$ 3,369,954 (medium)	23	29%
	Total	79	100%
	Fashion	15	19%

Table 4 - The Organizational Demographic Data			
Organizational Characteristics		Number	Frequency
Products/ Services	Food and Beverages	39	50%
	Handicraft	16	20%
	Other	9	11%
	Total	79	100%
Perception of e-marketplace adoption level	Level 0: Non-adopter	29	37%
	Level 1: Static	6	7%
	Level 2: Interactive	12	15%
	Level 3: Transactive	26	33%
	Level 4: Integrated	3	4%
	Level 5: Advanced	3	4%
	Total	79	100%

Table 4 shows demographic data for the SMEs studied in this research. 89% of respondents belong to SMEs that are micro in size and 61% of respondents report having annual sales below IDR 300 million or US$20,133. In addition, 50% of respondents are in the food and beverages industry while 20% of respondents are in clothing and handicrafts industry. Finally, 37% of respondents indicated that they have not adopted e-marketplace, 33% of respondents indicated they are at the transactive level, 15% respondents reported their adoption level to be at the interactive level, 4% of respondents believe that they have achieved the integrated level and another 4% at the advanced level.

Of the 29 respondents who indicated that they had not adopted an e-marketplace platform, 31% of this group stated that the main reasons for this decision are: lack of time; lack of awareness; and lack of appropriate platform. Only 7% of respondents indicated that the complexity of the e-marketplace platform is the main reason for their decision to not adopt an e-marketplace platform.

Evaluation of Measurement Model-Validity and Reliability Test

As explained previously, the reliability test in this study is analyzed based on indicator reliability and composite reliability, while the validity test is based on convergent validity and discriminant validity (Hair et al., 2011). As an example of research that uses reflective measurement models, indicator reliability in this study uses the value of factor loading of each item. According to Hair Jr et al. (2011), the cut-off value for factor loading is 0.7. In some circumstances it is permissible to retain factor loadings beneath 0.7 if deletion of these results affects overall factors indicator reliability (Hair Jr et al., 2011). Therefore, we decided to include all items, even items that have factor loadings between 0.6 and 0.7 (see UA1, TR1 and SP4 in Table 5).

Table 5 - Items' Factor Loadings			
Constructs	Factors	Items	Factor Loadings
Individual	Digital Literacy (DL)	DL1	0.801
		DL2	0.911
		DL3	0.877
		DL4	0.840
		DL5	0.911
	User Acceptance (UA)	UA1	0.652
		UA2	0.740
		UA3	0.840
		UA4	0.771
		UA5	0.744
	Trust (TR)	TR1	0.692
		TR2	0.868

Table 5 - Items' Factor Loadings			
Constructs	Factors	Items	Factor Loadings
		TR3	0.883
		TR4	0.888
		TR5	0.816
Technology	Complexity (CX)	CX1	0.836
		CX2	0.887
		CX3	0.868
		CX4	0.871
		CX5	0.814
	Security and Privacy (SP)	SP1	0.705
		SP2	0.764
		SP3	0.826
		SP4	0.699
		SP5	0.771
	Connection Quality (CQ)	CQ1	0.949
		CQ2	0.962
		CQ3	0.975
		CQ4	0.939
		CQ5	0.931
Organization	Top Management Support (TM)	TM1	0.815
		TM2	0.803
		TM3	0.949
		TM4	0.888
		TM5	0.894
	Organizational Size (OS)	OS1	0.957
		OS2	0.951
Environment	Competitive Pressure (CP)	CP1	0.953
		CP2	0.969
		CP3	0.941
		CP4	0.959
		CP5	0.938
	Government Support (GS)	GS1	0.855
		GS2	0.878
		GS3	0.917
		GS4	0.862
		GS5	0.863
	Stakeholder Support (SS)	SS1	0.832
		SS2	0.868
		SS3	0.847
		SS4	0.827
		SS5	0.875

Table 6 shows that the indicator reliability-factor loadings of each factor that is identified above the cut-off value of 0.7. Table 6 also shows that the score of composite reliability for each factor is above 0.86 which indicates a high reliability in the internal consistency of all factors. It is also shown in Table 6 that the AVE of all factors are above the cut-off value 0.5 which confirm the convergent validity of all factors in this study. The AVE of each item is also higher than AVE of its cross-loading items from each factor which confirms the discriminant validity. Please see Appendix 2 for the complete results. In addition, Table 7 illustrates the constructs' composite reliability and convergent validity (AVE) that are above the cut-off value of 0.6 and 0.5 respectively, which demonstrate the constructs' reliability and validity in this study.

Table 6 - Factors' Factor Loadings, Composite Reliability, Convergent Validity (AVE)			
Factors	Factor Loadings	Composite Reliability	AVE
Digital Literacy	0.835	0.939	0.755
User Acceptance	0.918	0.866	0.565
Trust	0.966	0.918	0.693
Complexity	0.673	0.932	0.732
Security and Privacy	0.884	0.868	0.569
Connection Quality	0.878	0.979	0.905
Top Management Support	0.993	0.940	0.759
Organizational Size	0.373	0.953	0.911
Competitive Pressure	0.121	0.980	0.906
Government Support	0.912	0.942	0.766
Stakeholder Support	0.942	0.929	0.722

Table 7 - Constructs' Composite Reliability and Convergent Validity (AVE)		
Constructs	Composite Reliability	AVE
Individual	0.934	0.825
Technology	0.856	0.668
Organization	0.680	0.562
Environment	0.755	0.578

## Evaluation of Structural Model-Hypothesis Test

The hypotheses test is conducted using evaluation of the structural model. Results of the evaluation of the structural model is reported in Table 8, Table 9 and Figure 2 below.

Table 8 - Bootstrapping of Structural Model				
Path	Path Coefficient	T Statistics	P Values	Significant
Individual -> Organization	0.582	4.996	0.000	Yes
Technology -> Adoption	0.547	9.113	0.000	Yes
Organization -> Adoption	0.183	2.614	0.000	Yes
Environment -> Adoption	0.482	13.019	0.000	Yes

Table 9 - Bootstrapping of Factor Loadings				
Factor	Path Coefficient	T Statistics	P Values	Significant
Digital Literacy	0.835	8.799	0.000	Yes
User Acceptance	0.918	12.632	0.000	Yes
Trust	0.966	13.846	0.000	Yes
Complexity	0.550	4.217	0.000	Yes
Security and Privacy	0.884	33.912	0.000	Yes
Connection Quality	0.878	30.390	0.000	Yes
Top Management Support	0.993	14.071	0.000	Yes
Organizational Size	0.373	0.898	0. 185	No
Competitive Pressure	0.121	0.341	0.367	No
Government Support	0.912	21.934	0.000	Yes
Stakeholder Support	0.942	32.931	0.000	Yes

Figure 2 - Evaluation of Structural Model
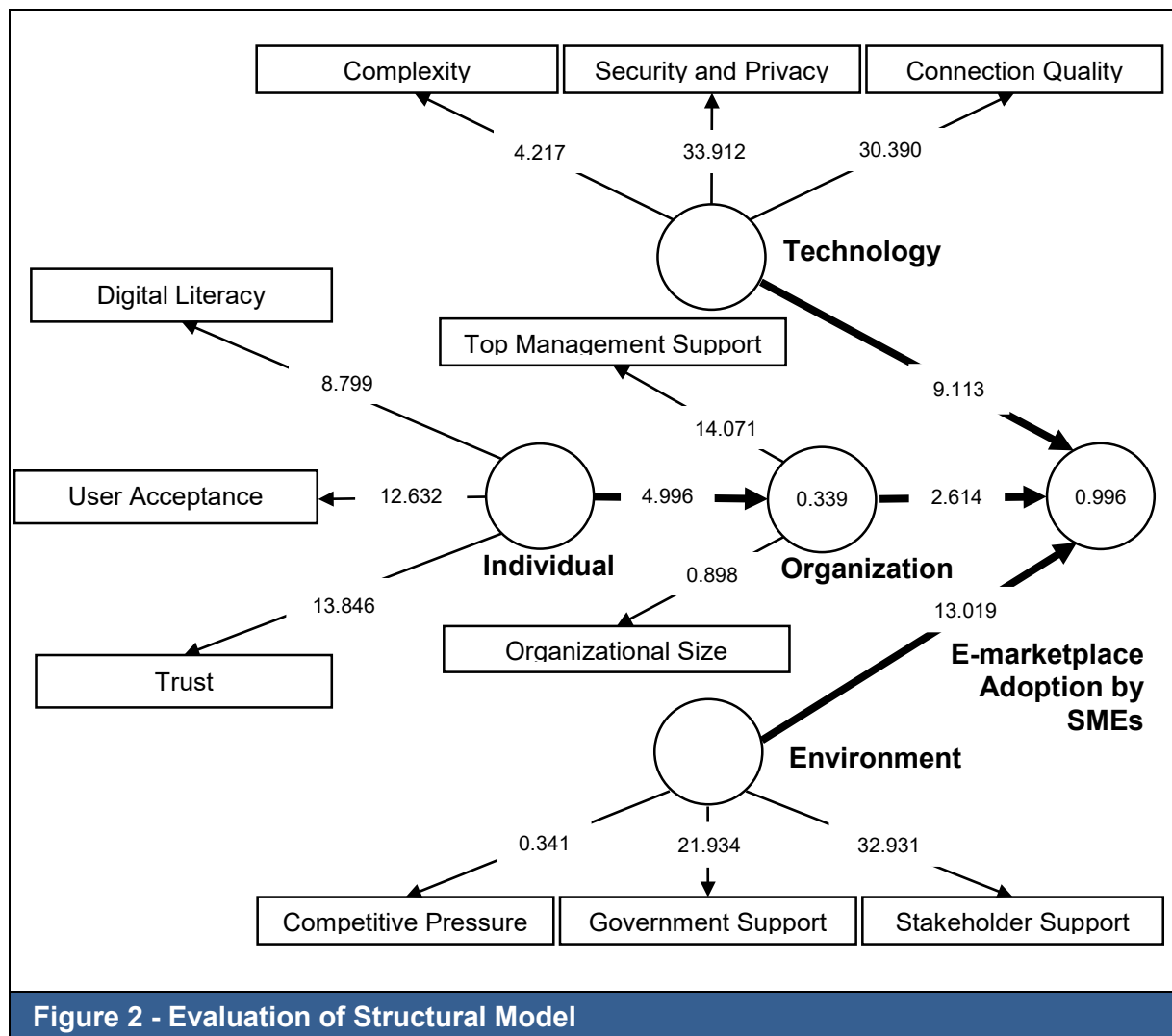
As can be seen from Table 8 and Figure 2, the t-statistics of each construct in the proposed model are significant (above the cut-off value 1.96). The t-statistic of the individual construct to the organization construct is also significant. Of all the constructs, the environment construct has the strongest effect on e-marketplace adoption, followed by the technology and organization constructs respectively.

As indicated in Table 9 and Figure 2, trust (T value is 13.846) is the strongest factor compared to other factors in the individual construct. User acceptance is also shown as a strong factor (T value is 12.632), while digital literacy is shown to have a lower effect on the individual construct (T value is 8.799).

Interestingly for the technology construct, security and privacy factors (T value is 33.912) has the strongest effect followed by connection quality (T value is 30.390). The complexity factor appears to have a lower effect on the technology construct (T value is 4.217).

Top management support is the only factor that has significant effect in reflecting the organization construct (T value is 14.071). Notably, organizational size is found to be insignificant in this case study. For the environment construct, stakeholder support (T value is 32.931) is reported to have the most followed by government support construct (T value is 21.934).

The SmartPLS 3.0 program also reports that the determinant variance of organization construct has been explained 33.9% by the individual construct (R2=0.339). The determinant

variance of e-marketplace adoption by SMEs also has been covered 99.6% (R2=0.996) by all the TOE constructs (technology, organization and environment). Therefore, these results have met the acceptance criteria selected in this study (R2 > 0.33).

Discussion

Results from this study confirm the reliability and validity of the survey instrument. The factor loadings of the indicators and the internal consistency of the constructs have met the criteria of the reliability test. The constructs also meet the convergent and discriminant criteria of the validity test. The results show a positive effect of all constructs of the TOE framework in e-marketplace adoption by SMEs in this study. The individual construct also shows that it positively affects the organization construct of TOE. Therefore, the result of this study demonstrates the validity of ITOE framework for investigating e-marketplace adoption by SMEs indicating that extending the research to other provinces in Indonesia is justified.

Although limited by a single case, it is instructive to discuss the results of this study for the purpose of research design as well as the insights it provides. This study was conducted in Yogyakarta Province, Indonesia. Yogyakarta is a province in Indonesia with the lowest digital divide index in Indonesia (Ariyanti, 2016; Budiono et al., 2018a). Citizens in Yogyakarta have higher education levels, IT skills and technological user experience compared to other provinces in Indonesia (Ariyanti, 2016). Furthermore, being an urban setting with close proximity to central government facilities and major business environment, the SMEs in Yogyakarta are able to have access to higher levels of technological support and training programs from government and business associations. For example, a business community, known as the Yogyakarta Creative House is able to provide business collaboration and support to SMEs such as coaching clinics for e-marketplace adoption (Noristera, 2019; Riandi & Maharani, 2017). This leads to some interesting insights into the data.

To begin, policy makers would be encouraged to note that 41% of respondents (n= 32) have indicated that they are at a 'transactive level' of e-marketplace adoption or above. This is consistent with the finding that many SMEs are taking advantage of the availability of e-marketplace-enabled services such as advanced business software which was not previously available. Encouragingly, 15% of respondents have reached the 'interactive' level (n= 12) while just 7% are at the 'static' level (n= 6). A large proportion of respondents, about 37%, are yet to adopt e-commerce technologies (n= 29).

The results indicate that the environment construct provides the most significant indication of e-marketplace adoption. This result is consistent with the view that it is important to gain government and stakeholder support in e-marketplace adoption (Budiono et al., 2018b; Ministry of CIT of Indonesia, 2017). This can be explained with the existence of a SME community group in Yogyakarta. As discussed above, the Yogyakarta Creative House, in collaboration with the government, provides coaching clinics to SMEs on how to use e-marketplace. They assist SMEs to solve their business problems and to create worthwhile business collaborations. Overall, this assists in improving their ability to use the e-marketplace platform (Ministry of CIT of Indonesia, 2018; Noristera, 2019; Riandi & Maharani, 2017). However, our results also show that competitive pressure does not significantly reflect the environment construct with regard to e-marketplace adoption by SMEs in Yogyakarta. This is perhaps explained by the high levels of collaboration that the Yogyakarta Creative House encourages. Instead of experiencing competitive pressure from business rivals, the SMEs in Yogyakarta seek to support each other to improve their digital skills together.

It is possible that the conventions that govern competition between stallholders in 'Centra' markets have found their way into the online environment. It is not uncommon for rival stall

holders to assist each other by informally agreeing on prices, supplying items to competitors when they have run short of stock and looking after rival stallholders' displays in their absence.

The technology construct is found to be the next most-significant construct that positively influences e-marketplace adoption by SMEs. More specifically, the results show security and privacy and connection quality have influenced e-marketplace adoption. These results are consistent with a study by Budiono et al. (2018a) which shows that SMEs in Indonesia face challenges in the areas of security and low quality of IT infrastructure. Prior studies have also shown that security and internet connection quality can contribute to technology adoption with cloud computing services such as e-marketplace (Fariba et al., 2015; Kian Chong et al., 2011). Even so, the results from this study show that complexity has a lower-than-expected influence on the technology construct. This may be due to SMEs in Yogyakarta having easy access to coaching clinics provided by the SME community group and the government. Also, the generally higher educational levels of the workforce may also contribute to this finding (Ariyanti, 2016; Noristera, 2019; Riandi & Maharani, 2017).

The organization construct is shown to positively influence e-marketplace adoption by SMEs. Top management support is shown to be significant for the organization construct in this study. This result is consistent with prior studies which show that top management support can influence technology adoption by SMEs in lower-middle income countries such as Indonesia (Awa et al., 2017; Awiagah et al., 2016; Ghobakhloo et al., 2011). Notably, business size is shown to not be a significant factor in the organization construct for e-marketplace adoption by SMEs in Yogyakarta. Many respondents in this study are classified as micro-sized SMEs, based on their number of employees and annual sales. One reason that may explain this finding is that SMEs can adopt the e-marketplace platform free-of-charge which suggests that a low-cost barrier for small SMEs is encouraging small players to adopt e-marketplace.

Finally, the individual construct is shown to positively and significantly affect the organization construct of TOE reaching an R^2 value of 0.339. The results show that the variables of user acceptance and trust are influential for organizational top management support of SMEs in Yogyakarta. As identified by APJII (2018) and Ariyanti (2016), Yogyakarta is the province with high internet penetration and a large percentage of citizens with elevated levels of digital literacy. This, in turn, may encourage their acceptance and trust in the e-marketplace to improve the performance of their businesses.

On the other hand, digital literacy is found to have a lower value factor loading compared to user acceptance and trust. This may be due to the nature of questions used to define the influence of digital literacy which asked respondents how 'easily' they could use different e-marketplace services. Given that respondents were at the beginning of their adoption journey it is likely that they still have much to learn before they are comfortable in their use of e-marketplace services. The researchers agree that it would be premature to discard this construct as it is possible that this variable will become more significant as time progresses and SME owners become more skilled in the use of various services on e-marketplace.

The findings of this study are generally in line with the findings of prior studies, particularly in the context of developing countries (Abualrob & Kang, 2016; Ahmad et al., 2015; El Said, 2017). Internal technological factors such as platform complexity and security as well as organizational factors such as top management support are significant factors that affect e-marketplace adoption. In developing countries such as Palestine, Egypt and Malaysia, these internal issues are prominent hindrance for SMEs when adopting e-marketplace (Abualrob & Kang, 2016; Ahmad et al., 2015; El Said, 2017). It is anticipated that the complexity of e-marketplace platform will eventually give way to more experienced SME owners as they learn to improve their business processes. The implications for other provinces in Indonesia and countries is that e-marketplace can be seen to be a forerunner for other Software as a Services (SaaS) offerings on the cloud (Nawaz et al., 2016; Talib & Alomary, 2016; Yu & Ni, 2013).

The decision of Indonesian government to involve e-marketplace providers in the national movement of SME Go Online appears as a good example for other developing countries to consider as they seek to promote online business engagement with SMEs. The results of this study shows that external factors such as support from government and stakeholders are essential in promoting e-marketplace adoption by SMEs and are consistent with prior studies (Abdullah et al., 2015; Awiagah et al., 2016; Rahayu & Day, 2015). Good government support is crucial to promoting the uptake of e-commerce adoption in developing countries such as through regulation, incentives and telecommunication infrastructure (Abdullah et al., 2015; El Said, 2017). The support from external stakeholders such as business communities, e-marketplace providers and internet providers is also necessary to promote e-marketplace adoption by SMEs. The example of support provided by other stakeholders such as business associations through the concept of Creative House in Yogyakarta illustrates the value that industry associations can play in facilitating the efforts of government and industry. This finding stands in contrast to the literature that finds competitive pressure in other developing countries such as Malaysia and Saudi Arabia can hinder the intention to adopt e-marketplace. It is also worth noting that these studies made no mention of similar initiatives such as Creative House in Yogyakarta (Abdullah et al., 2015; El said, 2017; Kurnia et al., 2015; Rahayu & Day, 2015).

Academic and Practitioner Implications

This study has academic and practitioner implications. This study confirms the relevance of the TOE framework to investigate e-marketplace adoption by SMEs in Indonesia. In particular, this study validates the effect of the proposed individual construct on top management support as part of the organization construct of the TOE framework. There are limited prior empirical studies that examine this relationship using the TOE framework, particularly in the context of developing countries. Therefore, the inclusion of the Individual construct is justified in proposing the Individual-Technology-Organization-Environment (ITOE) framework. This research further demonstrates that the ITOE framework can be operationalized for e-marketplace adoption in Indonesia and in other developing countries.

This study also has implications for practitioners. Firstly, the study shows that the environment construct is most significant in predicting e-marketplace adoption in Indonesia. Stakeholder support is most influential where business associations, internet service providers, e-marketplace providers are found to be important to the adoption process in this case. Secondly, the government deserves special recognition for its role in establishing much of the groundwork in the form of SME Go Online on which other stakeholders can participate in. As mentioned previously, the high levels of cooperation between stakeholders including SMEs seems to play a similar motivating role that competition is found to play in other TOE studies. There is potential to see this cooperative model being adopted by other developing countries in the Asia Pacific region.

Conclusion and Future Research Directions

This study confirms the reliability and validity of the survey instrument proposed for the ITOE framework. The results show that the individual construct positively affects the organization construct of the ITOE framework, and the technology, organization and environment constructs also positively affect e-marketplace adoptions by SMEs. In addition, the result also indicates the suitability of the ITOE framework in investigating e-marketplace adoption by SMEs predominated by small owner-manager businesses. The significant effect of individual construct to the organization construct confirms the influence of user acceptance and trust to top management support. In relation to digital literacy the predictive power is less certain given the early stage of adoption by most SMEs.

The environment construct has the strongest effect compared to the technology and organization construct for SMEs in adopting the e-marketplace. Stakeholder support and government support are two influential factors from the environment construct that speak loudest in this case. Security and privacy, connection quality and complexity are influential from the technology construct. Top management support is the only influential factor from organization construct in this case.

A full-scale study of e-marketplace adoption by SMEs in Indonesia will be conducted in future using the ITOE framework to investigate factors that affect e-marketplace adoption in Indonesia. Furthermore, the application of the ITOE framework can also be investigated in other countries, particularly in the context of developing countries that may have comparable digital divide issues to Indonesia.

Limitations

This study is limited to the case study of Yogyakarta Province in Indonesia. This province has the lowest digital divide index in Indonesia. Therefore, the results regarding the influence of each factor and construct to the e-marketplace adoption by SMEs may only be relevant to Yogyakarta Province. Therefore, further study is required and will be extended to all provinces in Indonesia to obtain a national picture of e-marketplace adoption by SMEs.

Acknowledgements

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Appendices

Appendix 1 Survey Instrument

Section A
Please tell us about yourself
1. What is your position in the company?

	Senior manager/Owner		Administration manager/officer
	IT manager/officer		Other, please specify: ………
	Sales/Marketing manager/officer		

2. What is your Gender?

	Male		Female

3. What is your age group?

	18-29		50-59
	30-39		60 or older
	40-49		

4. What is your highest education level?

	Pre-High School		Bachelor
	High School		Master
	Diploma		Doctoral

5. Which ethnicity would you identify yourself with?

	Javanese		Sasak
	Sundanese		Bima
	Acehnese		Sumbawa
	Batak		Dayak
	Minangkabau		Tionghoa
	Madura		Makassar
	Bugis		Papuan
	Malay		Ambonese
	Banjar		Kupangnese
	Balinese		Other, please specify: ………………

Please tell us about the company you are working for
6. Which province is your company located?
7. How many employees does your company have?

	1-9		201-250
	10-25		251-500
	26-100		500 or above
	101-200		

8. How much is your business annual sales?

	> IDR 2.500.000.000,00 and ≤ IDR 50.000.000.000,00
	> IDR 300.000.000,00 and ≤ IDR 2.500.000.000,00
	≤ IDR 300.000.000,00

9. Please indicate the main products/services your company sells? (you can choose more than one)

	Agriculture		Hotels
	Automotive Support		Household
	Books		ICT Services
	Cosmetic and Medicine		Medical Equipment
	Children Supply		Property
	Electronic Devices		Transportation
	Event Organiser Services		Toys and Hobbies
	Fashion		Other, please specify: …………..
	Finance		
	Food and Beverages		

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10.Have you adopted the e-marketplace?

	Yes, please continue to question number 11
	No, please move to question number 64

11.Choose the most appropriate statement that describes your business adoption of e-marketplace usage (choose one only)

Level 1: Static	The e-marketplace only allows my company to show the company profile and product/service information.
Level2: Interactive	Level 1 + The e-marketplace only allows my customers to conduct simple business processes such as booking inquiries, price negotiation and communication by email.
Level 3: Transactive	Level 2 + The e-marketplace allows my customers to do online transactions, i.e. purchase products online and make online payment.
Level 4: Integrated	Level 3 + The e-marketplace allows my company to integrate my internal business processes with my suppliers supply chain.
Level 5: Advanced	Level 4 + The e-marketplace allows my company to use business analytics to make better business decision.

Section B
For each of the statement below, please indicate to what extend do you agree with the statement and tick the box that fits your perception of the statement

No	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
12	E-marketplace is useful to promote my company profile and products/services					
13	E-marketplace is useful to facilitate my business process and customers inquiries					
14	E-marketplace is useful to have effective online transaction with my customer					
15	E-marketplace is useful to have good collaboration with my customer and suppliers					
16	E-marketplace is useful to analyse my business performance and customer needs					
17	I can use the internet and the e-marketplace services easily					
18	I can do the online transaction services using e-marketplace easily					
19	I can do the customer relationship management using e-marketplace easily					
20	I can do the supply chain management with my suppliers using e-marketplace easily					
21	I can analyse business performance and customer needs analysis in e-marketplace easily					
22	I trust e-marketplace can help me to expand my business coverage outside my local area					
23	I trust e-marketplace can provide effective services for my company to interact with my customers					
24	I trust e-marketplace can perform a trusted electronic transaction services					
25	I trust e-marketplace can help me to have an effective collaboration services with my suppliers					
26	I trust e-marketplace can provide a trusted business analytics to help me make a better business decision					
27	I find it difficult to use e-marketplace's website					
28	I find it difficult to make inquiry and business process with my customers using e-marketplace					
29	I find it takes too many steps to conduct the electronic transaction services using e-marketplace					

No	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
30	I cannot easily conduct the collaboration services such as supply chain management with suppliers using marketplace					
31	I find it difficult to apply the business performance and customer needs analysis using e-marketplace					
32	E-marketplace can guarantee the security and privacy services of my business information					
33	E-marketplace provides service availability of business process for my customer inquiries					
34	E-marketplace provides a secured electronic transaction process					
35	E-marketplace provides a secured business collaboration process with my suppliers					
36	E-marketplace can guarantee the security and privacy conducting business performance and customer need analysis for my business decision improvement					
37	The speed of internet in my area is reliable to access the e-marketplace website					
38	The stability of internet connection in my area makes it possible form my business to use e-marketplace for online business process and inquiries with customers					
39	The quality of internet connection in my area can support the online transaction using e-marketplace					
40	The coverage of internet in my area can support the collaboration with my suppliers using e-marketplace					
41	The quality of internet connection in my area can support my business to conduct business performance and customer needs analysis					
42	I am interested in the adoption of e-marketplace in my business to promote my company and expand the business coverage					
43	I have to encourage my employees in using e-marketplace for internal and external communication					
44	I aim to provide a strong leadership and engagement of electronic transaction using e-marketplace adoption in my business process					
45	I have to support the business collaboration with my suppliers using e-marketplace for business process improvement					
46	I have to encourage my company to utilize business performance and customer needs analysis using e-marketplace					
47	I am confident to adopt e-marketplace if I have enough number of employees					
48	I am confident to adopt e-marketplace if I have enough amount of annual turnover or profit					
49	The pressure from my competitors motivates me to adopt e-marketplace for my business					
50	The pressure from my competitors motivates me to adopt e-marketplace have a good interactive business process with my employees and customers					
51	The pressure from my competitors encourages me to understand the effective online electronic transaction strategy using e-marketplace					

No	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
52	The pressure from my competitors requires me to use e-marketplace to achieve good collaboration with my customers and suppliers to outperform my competitors					
53	The pressure from my competitors force me to use e-marketplace to analyse my business performance and customer needs					
54	The government has provided good support for my business such as training and financial incentive for my company to use e-marketplace to promote my business					
55	The program of national movement of SME go online is beneficial for my business to have good business interaction with my employees and my customers					
56	The government has provided supportive regulations to ensure the transaction process using e-marketplace is safe for business and customers					
57	The government has provided good support and incentives to enable me to collaborate between my company and my suppliers using e-marketplace					
58	The government has provided good infrastructure facilities to support business performance and customer needs analysis using e-marketplace					
59	The internet provider has provided a good quality internet services to promote my business using e-marketplace					
60	The e-marketplace has provided sufficient services to support effective interaction between my company and my customers					
61	All stakeholders in my business environment have provided sufficient services to support electronic transaction using e-marketplace					
62	The business association have provided clear steps for my business to improve collaboration with my suppliers					
63	The e-marketplace provider cloud computing provider has provided good services to support my business performance and customer needs analysis					

64. What is the reason of your company has not adopted the e-marketplace? (Please describe the factors)

Appendix 2 Discriminant Validity-Cross Loadings Criterion

Items	Competitive Pressure	Complexity	Connection Quality	Digital Literacy	Government Support	Organisational Size	Security and Privacy	Stakeholders' Support	Top Management Support	Trust	User Acceptance
									Factors		
CP1	0.953	0.147	0.203	0.131	0.005	-0.750	0.011	0.064	-0.390	-0.149	-0.055
CP2	0.969	0.175	0.355	0.101	0.037	-0.734	0.140	0.154	-0.246	-0.135	-0.081
CP3	0.941	0.123	0.236	0.056	-0.023	-0.734	0.103	0.037	-0.273	-0.197	-0.114
CP4	0.959	0.128	0.322	0.040	0.006	-0.784	0.053	0.081	-0.242	-0.219	-0.187
CP5	0.938	0.106	0.149	0.024	0.022	-0.820	-0.016	0.008	-0.297	-0.150	-0.109
CQ1	0.330	0.390	0.949	0.487	0.376	-0.191	0.592	0.632	0.273	0.228	0.149
CQ2	0.260	0.345	0.962	0.523	0.387	-0.105	0.672	0.649	0.328	0.302	0.257
CQ3	0.192	0.431	0.975	0.589	0.419	-0.078	0.679	0.700	0.399	0.367	0.291
CQ4	0.255	0.468	0.939	0.671	0.385	-0.181	0.656	0.646	0.346	0.441	0.329
CQ5	0.310	0.384	0.931	0.582	0.320	-0.145	0.584	0.588	0.301	0.333	0.274
CX1	0.150	0.836	0.425	0.445	0.137	-0.285	0.264	0.308	0.095	0.165	0.132
CX2	0.095	0.887	0.486	0.500	0.244	-0.136	0.423	0.348	0.298	0.297	0.272
CX3	0.078	0.868	0.248	0.395	0.155	-0.165	0.364	0.318	0.161	0.304	0.298
CX4	0.189	0.871	0.369	0.523	0.141	-0.201	0.377	0.303	0.212	0.434	0.335
CX5	0.120	0.814	0.245	0.453	0.186	-0.221	0.265	0.284	0.276	0.364	0.246
DL1	0.192	0.506	0.611	0.801	0.294	-0.192	0.430	0.556	0.275	0.478	0.316
DL2	0.084	0.593	0.630	0.911	0.291	-0.048	0.567	0.595	0.324	0.636	0.534
DL3	0.124	0.518	0.581	0.877	0.428	0.039	0.611	0.589	0.305	0.627	0.600
DL4	0.005	0.387	0.370	0.840	0.332	-0.053	0.476	0.506	0.375	0.715	0.561
DL5	-0.024	0.383	0.454	0.911	0.273	0.143	0.535	0.574	0.392	0.751	0.640
GS1	0.082	0.132	0.440	0.343	0.855	-0.060	0.577	0.613	0.390	0.421	0.380
GS2	-0.149	0.265	0.261	0.316	0.878	0.048	0.467	0.602	0.501	0.483	0.474
GS3	-0.033	0.148	0.343	0.293	0.917	0.067	0.355	0.644	0.427	0.417	0.348
GS4	0.051	0.145	0.221	0.274	0.862	0.165	0.393	0.595	0.331	0.435	0.491
GS5	0.103	0.202	0.464	0.396	0.863	0.088	0.595	0.724	0.365	0.353	0.362
OS1	-0.802	-0.271	-0.180	-0.070	0.050	0.957	0.058	0.007	0.262	0.151	0.144
OS2	-0.717	-0.170	-0.097	0.050	0.086	0.951	0.097	0.054	0.228	0.243	0.274
SP1	0.064	0.071	0.441	0.383	0.295	-0.033	0.705	0.429	0.378	0.289	0.289
SP2	0.076	0.392	0.494	0.406	0.487	0.075	0.764	0.603	0.409	0.331	0.397
SP3	0.018	0.288	0.612	0.342	0.459	0.046	0.826	0.586	0.529	0.331	0.251
SP4	0.150	0.347	0.390	0.525	0.377	0.099	0.699	0.452	0.325	0.588	0.669
SP5	-0.020	0.368	0.561	0.632	0.416	0.099	0.771	0.547	0.526	0.585	0.526
SS1	0.150	0.247	0.553	0.508	0.624	0.031	0.552	0.832	0.294	0.429	0.423
SS2	0.025	0.291	0.649	0.513	0.803	0.006	0.620	0.868	0.436	0.479	0.406
SS3	0.011	0.291	0.451	0.478	0.567	0.112	0.535	0.847	0.351	0.498	0.370
SS4	0.033	0.396	0.623	0.703	0.505	-0.026	0.558	0.827	0.351	0.503	0.363
SS5	0.145	0.344	0.592	0.569	0.558	0.011	0.707	0.875	0.411	0.523	0.448
TM1	-0.269	0.146	0.262	0.351	0.404	0.208	0.473	0.302	0.815	0.552	0.496
TM2	-0.237	0.309	0.186	0.321	0.440	0.092	0.397	0.320	0.803	0.590	0.458
TM3	-0.313	0.185	0.380	0.359	0.406	0.339	0.544	0.437	0.949	0.556	0.416
TM4	-0.257	0.089	0.245	0.298	0.365	0.266	0.487	0.370	0.888	0.596	0.439
TM5	-0.221	0.352	0.421	0.365	0.399	0.190	0.625	0.457	0.894	0.538	0.399
TR1	-0.167	0.244	0.353	0.464	0.402	0.192	0.441	0.439	0.512	0.692	0.524
TR2	-0.287	0.354	0.252	0.701	0.341	0.361	0.431	0.482	0.504	0.868	0.754
TR3	-0.088	0.344	0.348	0.612	0.455	0.040	0.488	0.496	0.580	0.883	0.757
TR4	-0.104	0.367	0.376	0.729	0.404	0.175	0.554	0.530	0.551	0.888	0.761
TR5	-0.084	0.183	0.148	0.571	0.411	0.083	0.432	0.429	0.561	0.816	0.697
UA1	0.000	0.164	0.249	0.371	0.265	0.179	0.340	0.325	0.150	0.423	0.652
UA2	-0.049	0.228	0.266	0.371	0.334	0.236	0.441	0.266	0.274	0.467	0.740
UA3	-0.236	0.350	0.247	0.596	0.376	0.284	0.541	0.472	0.467	0.767	0.840
UA4	0.060	0.128	0.145	0.429	0.295	0.032	0.383	0.250	0.298	0.636	0.771
UA5	-0.137	0.226	0.150	0.518	0.458	0.089	0.381	0.426	0.601	0.790	0.744

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