The Impact of E-commerce Adoption on MSMEs Performance and Financial Inclusion (FI) in Indonesia

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Abstract

This study draws on the resource-based view of firm and transaction cost theory to empirically identify factors that affect the decision to adopt e-commerce within MSMEs, analyze the impact of e-commerce adoption to their business performance, and investigates the effect on hypothetically better MSMEs' performance to promote FI in Indonesia. Logistic and ordered logistic regression were applied. The results indicate that e-commerce adoption decision is affected by sales turnover, social media, duration, and business age. From financial inclusion perspective, it reveals that e-commerce influence on business performance represented by sales growth and competitive advantage promote financial inclusion within MSME adopter.

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1. Introduction

Innovation in Information and Communication Technologies (ICT) as the fundamental of industrial revolution 4.0 has significantly influenced how the business conduct over the years. It notably changes the behaviour between consumer and business partners (commerce), information flow and relationships among workers within a company (knowledge management), and internal business operations (Trepper, 2000; Muller, et al., 2018). In this context, e-commerce as a form of technological advancement in the business realm changes the customer's approach in doing transactions. Unlimited information access in e-commerce allowing consumers to act rational as the cost to collect information about products in terms of quality, price, and delivery is almost zero (Mittal, 2013). This advantage of utilizing e-commerce hence lead to significant growth on its transaction. In Indonesia, e-commerce transaction has already reached USD21 billion, rising 88% from USD1.7 billion in 2015. Furthermore, the value of e-commerce in Indonesia is predicted to reach USD 82 billion in 2025, contributes to 61.65% of the Indonesian digital economy (e-Conomy SEA, 2019).

The rapid growth of Internet users is the key factors that support e-commerce penetration. From 2000-2019, the global Internet users has increased by 1,156%, while Indonesia Internet users growth is 8,463% made Indonesia as the fourth highest number of Internet users country (Internetworldstats, 2019). Accordingly, e-commerce adoption become crucial for Micro, Small, and Medium Enterprises (MSMEs) that is a backbone for Indonesia's economy. However, the Ministry of Communication and Information (2019) reported that in 2017 4.7 million Indonesia MSMEs using digital platforms, or only 7.4% of all MSMEs in Indonesia. Though only a small number of MSMEs has adopted e-commerce, the growth of e-commerce adopter is remarkable. This number increased to 9.61 million in 2018 or increased by 104.4%. These figures indicate high enthusiasm of MSMEs to connect digitally on doing their business.

There are three main objectives in this study. First, we examine the adoption of e-commerce by SMEs in Indonesian context and explore the nexus between post-adoption of e-commerce and financial inclusion. Second, we introduce financial inclusion in terms of financial products as a new dimension in the examination of e-commerce adoption. Our motivation in proposing financial inclusion dimension in the model is to find out whether development of e-commerce in Indonesia also implying enhancement level of financial inclusion. Thirdly, we investigate the post-adoption behavior of MSMEs towards financial inclusion dimension. To the best or our knowledge, none of the studies have examined the third relationship when this study has been conducted.

There are several previous studies in the context of e-commerce adoption such as Kartiwi (2006), Ghobakhloo et al. (2011), Grandón et al. (2011), Ramanathan et al. (2012), Jones et al. (2013), Lertwongsatien & Wongpinunwatana (2003), Kurnia et al. (2015), Al Bakri & Katsioloudes (2015), Rahayu & Day (2015), Carvalho & Mamede (2018), and Rana et al. (2019). However, our study differs from the previous literature in the following ways: Firstly, we are focusing our study on Micro Small and Medium Enterprises (MSMEs), whereas most of the earlier studies using Small and Medium Enterprises (SMEs) as their sample (Ramanathan et al., 2012; Lertwongsatien & Wongpinunwatana, 2003, Rahayu & Day, 2015, and Carvalho & Mamede, 2018).

In this study we use logit regression to examine our first model that is the relationship between the determinant factors of e-commerce adoption. Meanwhile we use ordered logit regression to investigate the association between MSMEs performance and financial inclusion measures. Our findings suggest that the use of some financial products are significant and positively

associated with the propensity of MSMEs adopting e-commerce such as saving, mortgage, pawnshop and life insurance. We also find that MSMEs performances are related to financial inclusion measures.

This paper is organized as follows: Section 2 reviews previous literature and hypothesis development. Section 3 describes the methodology and data used for addressing the research objective, and Section 4 presents our results and analyses while Section 5 conclusion and recommendation.

2. Literature Review

2.1 Resource based view (RBV) of the firm and consumer behaviour

RBV assumes that a firm's performance depends on its resources and capabilities (Barney, 1991; Wernerfelt, 1984). These resources and capabilities must meet uniqueness requirement defined as the VRIO (valuable, rare, inimitable, and organized to capture value) to gain competitive advantages (Wernerfelt, 1984; Barney, 2002; Peteraf and Barney, 2003). From resource-based perspective, technology adoption has been identified as a potential source for competitive advantages. Many studies used RBV to explain how firms create competitive advantages from technology adoption. Success technology adoption create competitive advantages to support firm's performance (Zhuang and Lederer, 2006; Zhijun, 2011; Yang et al., 2015); synergy between IT infrastructure and e-commerce capability can produce business value more effectively (Zhu, 2004).

Despite many academic literatures on RBV application in analyzing relationships between technology adoption and firm's performance, the findings are inconclusive (Powell and Dell-Micallef, 1997; Bharadwaj, 2000; Barua et al., 2004; Ray et al., 2005; Yang et al., 2015;). However, those studies agree that technology adoption alone have not create a sustainable competitive advantage. Technology adoption use to leverage resources in firm to create competitive advantages (Powell and Dell-Micallef, 1997; Barua et al., 2004; Zhijun, 2011). Moreover, Liang et al (2010) conducted a meta-analysis of 42 academic literatures that using RBV to explain how IT resources affect firm performance. The study found that technological adoption indirectly affects firm performance through improving organizational capabilities. While IT resources cannot directly generate revenues, it will improve other business functions performance such as marketing, operational, and SCM.

Thus, Ramanathan et al. (2012) used resource-based view (RBV) to explore how the operational and marketing side affect the performance of 110 Small and Medium Enterprises (SMEs) in Taiwan. His study is confirmed by Engel-Kollat-Blackwell theory that concerns in defining customer behavior in decision making process to purchase, repurchase, or reject a product.

2.2 Transaction cost theory

Transaction costs refer to investment in resources to mitigate asymmetrical and incomplete distribution of information among economic agents in order to execute the exchange (Malone et al., 1989; Williamson, 1985; Ciborra, 1993). These costs include the specific search costs, negotiation costs, and enforcement costs of gathering information (Benjamin & Wigand, 1995; Sarkar et al., 1995; Nooteboom, 2006; Cordella, 2009). Technology adoption can reduce those imperfections through improving information access (Nooteboom, 1992; Ciborra, 1993; Barua et al., 2004).

On the other hand, Nooteboom (1992) found that the effects of technology adoption on transaction costs may vary. Some transactions costs may reduce due to technology adoption. However, new transaction costs might occur due to investment in technology adoption. Molla & Heeks (2007) found no strong evidence that support e-commerce is beneficial for firms in developing countries to address information poverty and asymmetry, control to intermediaries, lack access to global supply chain, and poor cost competitiveness. Developing countries have lower benefit from e-commerce because the countries are far behind in technology adoption timeline than developed countries. This made firms in developing countries have lower e-commerce capabilities. However, in this paper we examined the use of e-marketplace (business to customer/B2C or customer to customer/C2C) that just need small investment to make the business compatible to use it.

2.3 E-commerce adoption

E-commerce defined here as to a wide range of economic activities over the Internet including selling or buying products and services activities (Rosen, 2002; Zhu, 2004). These economic activities occur either as business-to-business (B2B), business-to-consumer (B2C), consumer-to-consumer (C2C) or consumer-to-business (C2B). We focus on business transactions occur on C2C and B2C platform that increasingly popular in recent years in Indonesia.

MSMEs is characterized by owner domination in decision process. The process of change in SMEs that dominated by the key features, their leaders (Franco & Matos, 2015; Morrison, 2003) which mostly have a low level of IT ability, IT experience, technology readiness, and innovativeness (Rahayu & Day, 2015; Kartiwi, 2006) and make MSMEs less compatible to adopt e-commerce. The most important role in initiating and promoting e-commerce by MSEMS is the CEO/owner (Scupola, 2003) as we defined as individual factor in our model. We identify individual factor attributes such as age, gender, and education defined compatible level and willingness to adopt in MSMEs.

Scupola (2003) found that explores the economic, organizational and technical factors of the adoption of e-commerce in MSMEs in southern Italy. The study found that some of the organizational context characteristics (beside CEO) like human resources, business resources, technical resources and awareness are essential on embracing e-commerce for MSMEs, similar with Molla & Licker (2005); Aghaunor & Fotoh (2006); Al-Bakri & Katsioloudes (2015). Sait et al. (2004) discover interesting perspective of e-commerce adoption in Saudi Arabia, country with local, regional, and religious traditions, Internet access, government policy regarding to e-commerce facilities and e-commerce awareness and promotion are the key areas to a successful e-commerce adoption. Similar results from Tan (2000); Sia et al. (1998), Internet user favorably the inclination to adopt e-commerce.

Thus, we conclude that organizational context as other important variables to influence the e commerce adoption. We define sources of capital and monthly sales (financial resources), the length of businesses/duration (business resources), and social media (human and technical resources) as organizational factor in the model.

Furthermore, for additional contribution to spectrum of factors that influence e-commerce adoption, we identify indirect link between financial inclusion and e-commerce adoption. The indirect link occurs because there is association between financial inclusion and financial literacy. Higher financial literacy will promote financial inclusion, sophisticated financial products needs higher financial literacy (Holzmann, 2010; Turvey & Xiong, 2017; Bongomin, 2018).

Additionally, Bongomin (2018); Holzmann (2010) stated that knowledge and education attributes are changes as people age (individual factor) and change in environment (organizational factor). These attributes promote the financial literacy. Thus, it can be concluded that more sophisticated financial inclusion may indicate higher financial literacy which entails higher education and skill. Indeed, e-commerce adoption needs compatible individual factors that associated with age and education and organizational factors that associated with human and technical resource. Moreover, people with access to financial have financial freedom to allow them to expand their business (embracing e-commerce). From these perspectives, we argue that financial inclusion occurs in MSMEs is identified as one of the e-commerce adoption factors.

Thus, in this study, the hypotheses are:

H1a : Demography such as age, gender, education influence the use of e-commerce by MSMEs

H1b : Organizational factors such as source of equity, duration, revenue, social media influence the use of e-commerce by MSMEs

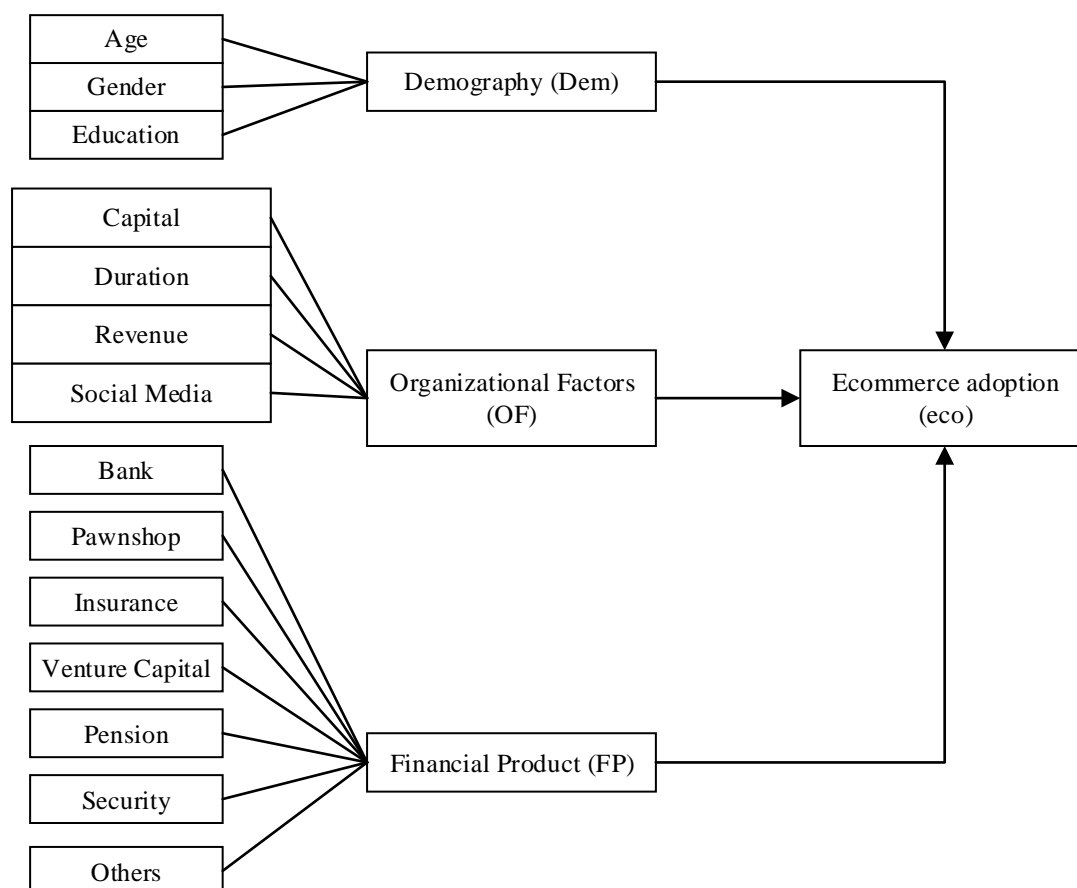**H1c** : Financial products influence the use of e-commerce by MSMEs

Figure 1. E-commerce adoption and its supporting factors

2.4 E-commerce and micro small medium enterprises (MSMEs)'s performance

Indonesian Law no. 20 of 2008 Article 6 on Micro, Small, and Medium Enterprises (MSMEs) defines micro firm as enterprise with annual sales of at most IDR 300 million or net asset (land and building excluded) less than IDR 50 million, small firm as enterprise with annual sales of more than IDR 300 million up to a maximum of IDR2.5 billion or nest asset (land and building excluded) of IDR 50 million - IDR 500 million, medium firms as enterprise with annual sales of more than IDR 2.5 billion up to a maximum of IDR 50 billion or net asset (land and building excluded) amounted from more than IDR 500 juta to IDR 10 billion. MSMEs terminology often used in developing countries while SMEs terminology used by developed countries.

E-commerce adoption has impacting MSMEs globally in sales growth, cost efficiency, improved service processes, and product quality (Daniel & Grimshaw, 2002; Santarelli & D'altri, 2003; Love & Irani, 2004). Academics observed e-commerce adoption impact to business performance from various perspectives. Customer satisfaction, sales performance, and integration between managerial relationships perspectives to examine China SMEs' performance (Wu, et al. 2003); readiness of organization, human resources, and knowledge of customer identified as significant factor for successful e-commerce adoption of Portugal micro enterprises, while company age and manager age did not (Carvalho & Mamede, 2018). Supply chain perspectives, e-commerce can improve forecasting accuracy, integrate all activities and plan the flow of goods, which consequently reducing costs and create competitive advantage. Savrul et al. (2014) investigates how e-commerce adoption increases effectiveness and efficiency to overcome new business environment problem such as complication of business process.

Ramanathan et al. (2012) concluded that e-commerce effect on operational and marketing have strong impacts on Taiwanese SMEs performance. Focus on e-commerce effect on marketing, we identify the indicators are online advertising, customer awareness, brand recognition, and exposure to product. From transaction cost theory, we derive price changes (competitive advantage), transaction speed (process enhancement), customer satisfaction, number of online customers (customer base), and sales growth as performance variables.

Based on literature studies that have been studied, the hypothesis of this research is:

H2 : E-commerce effect on marketing such as online advertising, customer awareness, brand recognition, exposure to product influence positively significant performance of e-commerce
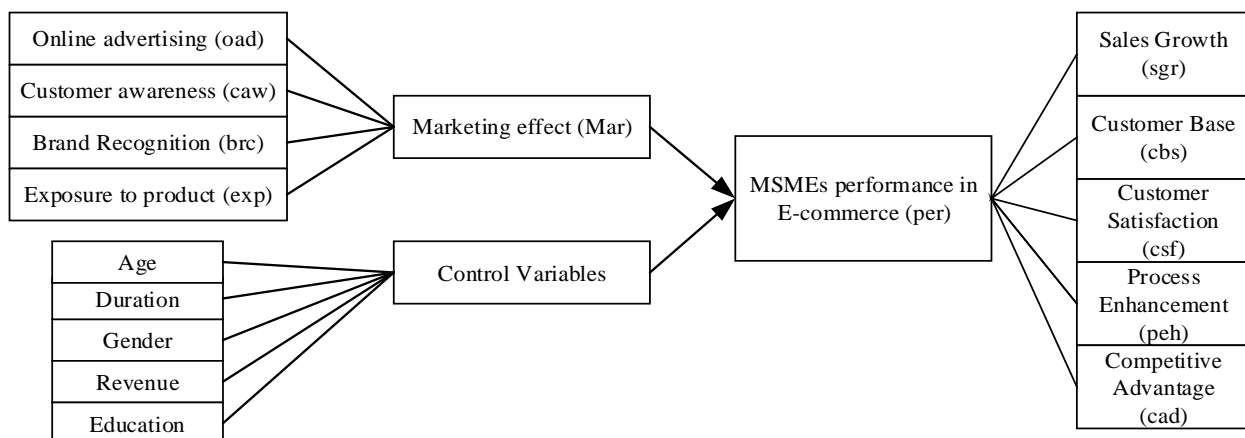

Figure 2 E-commerce effect on marketing and MSMEs performance in e-commerce

2.5 Micro small medium enterprises (MSMEs)'s performance and financial inclusion

Financial inclusion refers to several aspects of knowledge and behavior that connect individuals to manage their resources and make financial decisions (FINRAM 2009). Despite limited academic literature focus on the relation of MSMEs performance in e-commerce and financial inclusion found, consensus from prior studies is digitalization promote financial inclusion (Turvey & Xiong, 2017; Hau et al., 2018; Ozili, 2018). Moreover, Turvey & Xiong (2017); Hau et al. (2018) found that FinTech credit through e-commerce platform mitigating local credit supply problems in China's segmented credit market and extends 'frontier' of availability of the credit to firms with a low credit score.

Improvement of MSMEs adopters' performance leads the need of financing source as additional capital to ensure growth constraint. Specific financing tools such as leasing or bank loan can be useful in facilitating better access to finance even absence of well-developed institutions (Beck & Kunt, 2006). Credit on e-commerce platform and a more competitive banking structure can provide the access to finance by SMEs.

Discussion above leads us to our third hypothesis:

H3 : Performance of e-commerce such as sales growth, customer base, customer satisfaction, process enhancement, and competitive advantage influence positively significant financial inclusion (saving, investment, credit, investment on e-commerce, credit on e-commerce)
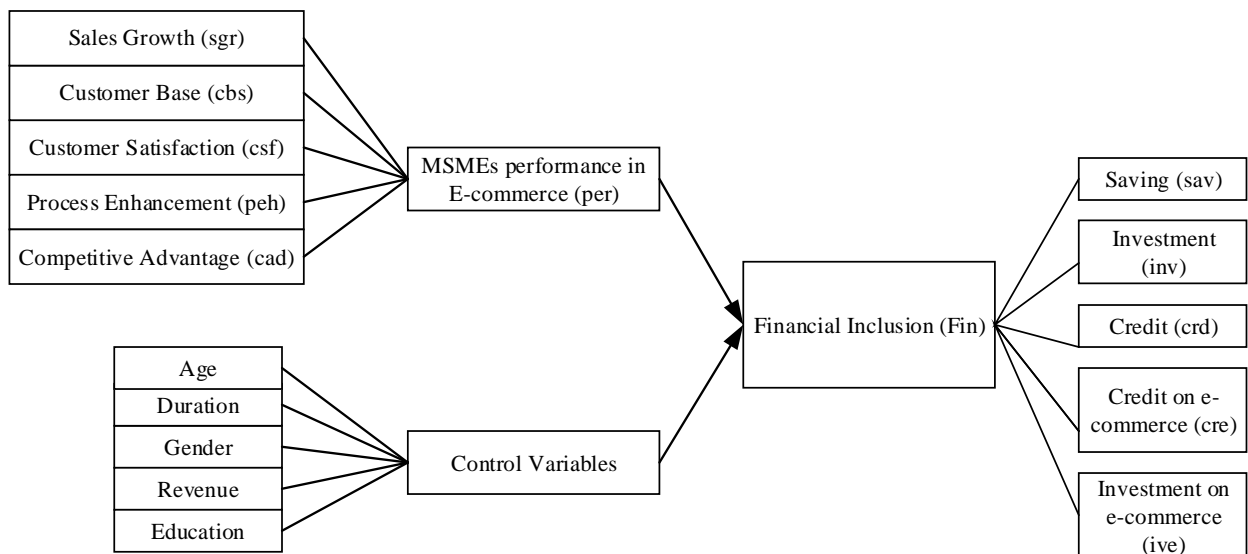
Figure 3 MSMEs performance in e-commerce and financial inclusion

3. Methodology

3.1 Sample and data collection

We construct a 1-5 scale for the questionnaires with 1 representing poor performance and 5 for best performance to measure marketing effect, MSME's performance, and financial inclusion. We also develop a questionnaire for MSMEs' non e-commerce adopter as a control. Questionnaires were collected from 739 MSME entrepreneurs through online surveys and field interviews in ten provinces in Indonesia. All respondents are MSMEs that producing goods or

items and those who use the e-commerce platform and who does not. Of 739 respondents, 338 are adopting e-commerce, while in the remaining 401 are non-user.

Table 1 Respondence

Province	e-commerce	non e-commerce
Jakarta	20	20
West Java	61	65
Central Java	77	91
East Java	59	85
Bali	12	22
North Sumatera	31	29
West Sumatera	14	19
Lampung	18	20
South Sulawesi	29	31
West Nusa Tenggara	16	19
Other	1	0
Total	338	401

The 10 selected provinces are Jakarta, West Java, Central Java, East Java, South Sulawesi, North Sumatera, West Sumatera, Bali, Lampung, and West Nusa Tenggara. A sampling of purposive was used due to the 10 provinces have the highest outstanding MSME's microcredit program in Indonesia. In total, of 338 e-commerce respondents, 80 (24%) are identified as B2B and 258 (76%) are B2C. While for not e-commerce, 70 (17%) are B2B and 331 (83%) are B2C. This shows that our sample is dominated by B2C segment. The scope of this research are aspects that related with impact of the use of e-commerce on MSMEs and the determinants of improving the performance of MSMEs that are formulated in econometrics model.

The research method used in this study is descriptive analysis to provide an overview and logistic regression. Application of logistic regression is intended to examine the relationship between the relationship and influence of independent variables on the dependent variable which will be described through research model presented in section 3.4

3.2 Type of data

The collected data inputted into the tables to classify the data as variables identified in the framework. Tabulations are categorized in three forms, namely 1) tables for basic data, 2) tables for data processing and 3) tables for data processing results that will be presented for discussion. Then, data processing is run using Stata 14 software.

3.3 Operationalization of construct and their measurements

Refer to background and research framework above, it is necessary to establish an operational definition of the variables associated with this study in order to obtain accurate measurement results so as to avoid information bias and errors in drawing conclusions.

Table 2. Operationalization of construct and their measurements

Variable	Definition	Indicator	Data Scale
Performance	Company and business entity performance can be carried out using a financial information approach that can be obtained from financial reports or other financial statements. (Ramanathan et al., 2012)	• Sales growth • Customer base • Customer satisfaction • Process enhancement • Competitive advantage	Ordinal
E-commerce effect on marketing	the impact of a social process in which individuals and groups obtain what is needed and desired by creating, offering, and freely exchanging products of value with others.	• Online advertising • Customer awareness • Brand recognition • Exposure to product/service	Ordinal
Financial Inclusion	Financial inclusion provides access to valuable and accessible financial products and services for individuals and businesses which meet their needs and are provided safely and sustainably (Nanda & Kaur, 2016).	• Saving • Investment • Credit • Credit on ecommerce • Investment on ecommerce	Ordinal
Organizational Factors	Specific factors in the organization that plays an enormous role in embracing e-commerce (Scupola, 2003).	• Capital • Duration • Revenue • Social Media	Dummy
Financial Products	Financial Institution's products that will encourage innovation and efficiency and eventually increasing growth output (Bakar and Sulong, 2018).	• Bank • Pawnshop • Insurance • Venture capital • Security • Pension • Others	Dummy

3.4 Research model

We separate the data into two group: SMEs who use e-commerce platforms as treatment group and those who sell products traditionally as control group, to capture their characteristic. Then, logistic regression model applied to prove first hypothesis regarding factors that influence the decision to adopt ecommerce. Here, we code MSME adopts e-commerce as 1 while 0 does not.

$$Eco_i = \alpha_0 + \sum_{j=1}^{n} \beta_{i,j}Dem_{i,j} + \sum_{k=1}^{n} \gamma_{i,k}OF_{i,k} + \sum_{l=1}^{n} \mu_{i,l}FP_{i,l} + \varepsilon_i$$

Where:
Eco = Ecommerce adoption (1=adopters, 0=non adopters)
Dem = Demography
OF = Organizational Factors
FP = Financial Product
$\alpha, \beta, \gamma, \mu$ = Coefficient

ε	= Residual
i	= Number of Samples
j	= Number of Demography Indicator (1=Age, 2=Gender, 3=Education)
k	= Number of Organizational Factors Indicator (1=Revenue, 2=Duration, 3=Social Media, 4= Capital)
l	= Number of Inclusion Indicator (1=Bank, 2=Pawnshop, 3=Insurance, 4=Venture capital, 5=Pension, 6=Others)

In order to investigate whether a subset of these variables has a statistically significant effect on the adoption of ecommerce, we employ a stepwise variable selection procedure. Starting with a model without variables, by means of forward selection and a backward elimination step, this method allows to iteratively include (resp. exclude) those variables with a statically significant (resp. not significant) effect on the adoption of ecommerce, until any of the remaining variables is found significant. The decision to include or exclude a variable from the model is based on the p-value associated to the corresponding likelihood ratio test and predefined significant level (α_{in} for the inclusion and α_{out} for the exclusion).

1. Forward selection step. For each available variable fit the logit regression model and compute the associated p-value for the coefficient(s). Among these values, consider the smallest one (p_{min}), if it is lower than α_{in} then include the associated variable in the model, otherwise the selection is terminated.

2. Backward elimination step. Fit the logit regression model with all the covariates selected at the previous step and compute the associated p-values for the coefficient(s). Among these values, consider the highest (p_{max}), if it is higher than α_{out} then exclude the variable from the model and repeat this step.

To prove second hypothesis, this research modified transaction cost theory and the Ramanathan et al. (2012) model to test ecommerce adoption through e-commerce effect on marketing (online advertising, customer awareness, brand recognition, and exposure to product) has positive impact on MSMEs performance in Indonesia. Performance measured by five indicators which are sales growth, customer base, customer satisfaction, process enhancement, and competitive advantage where only e-commerce user samples are estimated. Since Performance belongs to ordinal scale, we employ ordered logit model for the estimation.

$$Per_{i,m} = \alpha_0 + \sum_{o=1}^{n} \delta_{i,o} Mar_{i,o} + \sum_{p=1}^{n} \omega_{i,p} X_{i,p} + \varepsilon_i$$

Where:
Per	= Performance
Mar	= E-commerce effect on marketing
α, δ, ω	= Coefficient
X_k	= Control Variables (Age, Gender, Education, Duration, and Revenue)
ε	= Residual
i	= Number of Samples
m	= Number of Performance Indicator (1=sgr, 2=cbs, 3=csf, 4=peh, 5=cad)
o	= Number of E-commerce effect on marketing Indicator (1=oad, 2=caw, 3=brc, 4=exp)
p	= Number of Control Variables Indicator (1=age, 2=duration, 3=gender,

4=revenue, 5=education)

The positive impact of MSMEs performance in e-commerce on financial inclusion in Indonesia which is the research third hypotheses will be tested using the following model. Financial inclusion in this model has five measurement which are saving, investment, credit, credit on ecommerce, and investment on ecommerce. Similar to second model, in third model we only estimated e commerce sample. As financial inclusion is an ordinal scale form, we also use ordered logit regression model.

$$Fin_{i,q} = \alpha_0 + \sum_{m=1}^{n} \varphi_{i,m}Per_{i,m} + \sum_{p=1}^{n} \psi_{i,p}X_{i,p} + \varepsilon_i$$

Where:
Fin	= Financial Inclusion
Per	= Performance of MSMEs
α, φ, ψ	= Coefficient
X_k	= Control Variables of k (Age, Gender, Education, Duration, and Revenue)
ε	= Residual
i	= Number of Samples
m	= Number of Performance Indicator (1=sgr, 2=cbs, 3=csf, 4=peh, 5=cad)
p	= Number of Control Variables Indicator (1=age, 2=duration, 3=gender, 4=revenue, 5=education)

4. Results and Analysis

4.1 Validity and reliability test

We assessed the inside consistency of the instrument by computing the Cronbach alpha values for each theoretical variable. Furthermore, in measuring the validity of the model, a correlation analysis was employed to evaluate for each item.

Table 3. The Indicators Used to Measure Theoretical Dimensions

Variables	No	Indicators	Validity prob	Reliability Cronbanch's α
Performance	1	Sales Growth	0.00***	
	2	Customer Base	0.00***	
	3	Customer Satisfaction	0.00***	0.832
	4	Process Enhancement	0.00***	
	5	Competitive Advantage	0.00***	
Marketing	6	Online advertising	0.00***	
	7	Customer awareness	0.00***	0.537
	8	Brand recognition	0.00***	
	9	Exposure to product	0.00***	

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Financial Inclusion	10	Saving	0.00***	
	11	Investment	0.00***	
	12	Credit	0.00***	
	13	Credit on e-Commerce	0.00***	0.714
	14	Investment on e-Commerce	0.00***	

Note: all dummy variables are not included in the table

All question items show significant value in the validity test. Whereas Cronbanch alpha for performance and financial inclusion variables was accepted (> 0.7). Different results are shown by marketing variables where the variable shows a lower value which is 0.53. However, this value is still acceptable because higher than 0.50. (Perry et al. 2004).

4.2 The Factors that Support and Detain e-commerce adoption

Table 3. Factor that Support or Detain E-Commerce Adoption

Variables	e-Commerce Adoption	
	Coeff.	Std. error
Age	-0.356***	(0.1311)
Gender	-0.303*	(0.1730)
Mutual fund	-1.982**	(0.8818)
Duration	-0.339***	(0.0681)
Life insurance	0.605*	(0.3113)
Pawnshop	0.662*	(0.3580)
Bank based equity	-0.513**	(0.2184)
Pawnshop based equity	1.882*	(1.0098)
Revenue	0.330***	(0.0847)
Mortgage	0.666*	(0.3693)
Saving	1.234**	(0.5617)
Social media	1.446***	(0.1902)

Stepwise procedure (forward and backward selection) is performed for the logit regression model. The standard errors are reported in parentheses. (***), (**), and (*) indicate significance at the 1% level, 5% level and 10% level, respectively.

The results obtained by stepwise selection procedure resulted to 12 selected variables in the model that indicate a significant relation to e-commerce adoption. According to the odds ratio from the displayed results above, it can be concluded that holding the other variables constant, an increasing number of MSMEs owner's age will detain the adoption of e-commerce. Furthermore, it also can be concluded that the number of male MSME owners adopting e-commerce are significantly lower than the number of female MSME owners who are doing likewise.

On the other hand, the variables for financial inclusion such as life insurance, pawnshop, mortgage, and saving are appeared to be the factors that support e-commerce adoption in Indonesia. Meanwhile, the other variables for financial inclusion such as mutual fund, and bank-based equity displayed a negative relation to e-commerce adoption. This is contrasting to our initial hypothesis in which we assume that an access to more sophisticated financial access is in line to the higher ability of adopting sophisticated business strategy.

Lastly, it can be concluded that two organizational factor variables specifically revenue and business duration are revealed to be factors that supporting e-commerce adoption. We argue that the higher number of revenue and the longer business duration of MSMEs lead to the higher ability of business owners to perform business expansion by e-commerce. Likewise, social media usage by MSME owners also supported e-commerce adoption, in which both social media and e-commerce usage require technological expertise. By using social media in their business strategy, there is a higher likelihood of MSMEs to also adopting e-commerce as it provides efficiency for the customers to reach out the business owners, proceed the payment, and to gain information regarding the products displayed on social media.

4.3 The Impact of e-commerce on MSMEs performance in Indonesia

Table 4. displayed the result on how each variable that indicate MSMEs marketing via e-commerce impacting the performance of MSMEs adopter. Dependent variables in this model consist of five indicators (sales growth, customer base, customer satisfaction, process enhancement, and competitive advantage) which later will be regressed individually. Independent variables on this model are four measurement on e-commerce marketing which are online advertising, customer awareness, brand recognition, and exposure to product/service that represent adoption of e-commerce. In addition, age, gender, education, duration, and revenue were also included in this regression model as the control variables.

Table 4. The Result of E-commerce Adoption to MSMEs Performance

	Sales growth	Customer Based	Customer Satisfaction	Process Enhancement	Competitive Advantage
Online Advertising	0.279	-0.012	0.242	0.526**	0.804***
Customer Awareness	1.430***	2.355***	1.002***	0.947***	0.264
Brand Recognition	1.522***	1.538***	2.317***	1.709***	0.619**
Product Return	0.041	-0.18	-0.09	-0.280**	0.457***
Age	-0.082	0.251	-0.182	-0.388*	-0.125
Gender	0.25	0.332	0.037	0.086	-0.044
Education	-0.081	0.182	-0.034	0.086	-0.588***
Duration	-0.014	0.004	-0.067	-0.149	-0.146
Revenue	-0.004	0.005	0.01	0.068	-0.021

(***), (**), and (*) indicate significance at the 1% level, 5% level and 10% level, respectively.

From the Table 4. it can be concluded that the second hypothesis is proven as most indicators measuring MSMEs marketing via e-commerce significantly affecting indicators of MSMEs performance. Specifically, the results displayed above concluded that Online Advertising and Exposure to Product are significantly affecting Process Enhancement and Competitive Advantage. We argue that Online advertising inducing MSMEs adopter to be able to pass up several operational procedures which lead to the cut down of their operational cost, hence affecting process enhancement and their competitive advantage. On the other hand, the higher number of Product Return are negatively related to sales Process Enhancement done by MSMEs adopters, which are resulted from the delay of the products to be used by the customers as the products returned to the seller.

Customer awareness implying the advancement of MSMEs approach to attract new customers through e-commerce, that later will be impacting the number of their sales, prospective customers, customer satisfaction, and to reduce their marketing cost. These are resulted in the significance of customer awareness on sales growth, customer based, customer satisfaction, and process enhancement. Furthermore, brand recognition is significant to all indicators on performance. The argument regarding the result is once MSMEs brands are recognized by the customers, it induces multiplier effect on the performance as more customers started to notice the product and affecting their number of sales. MSMEs also can allocate marketing cost to the product advancement that enhance the quality of the product; hence customers would gain positive impression regarding their experience upon purchasing the products.

Furthermore, we found interesting results on control variables used in the regression. The MSME owners' age affects the process enhancement on MSMEs business. It is interpreted that the older MSME owners' age, the slower enhancement process of the business. Moreover, the education level of the owner influences the competitive advantage (price's product) of the business. It can be concluded that the higher education implicates higher level of knowledge and capability to run the business, which lead to fulfillment of economies of scale in production and meet the competitive advantage.

4.4 The Impact of e-Commerce on Financial Inclusion

Table 5 Financial Inclusion and Ecommerce

	Saving	Investment	Credit	Credit on e-Commerce	Investment on e-Commerce
Sales Growth	0.633*	0.495*	0.403	0.718**	-0.198
Customer Based	0.545	-0.341	-0.108	-1.126***	-0.759**
Customer Satisfaction	0.423	0.521*	0.319	0.183	0.499*
Process Enhancement	-0.143	0.103	-0.285	0.078	0.438*
Competitive Advantage	0.571**	0.236	0.498*	0.361*	0.459**
Age	-0.008	0.038	0.109	0.042	-0.094
Gender	-0.399*	0.295	0.119	0.045	0.104
Education	-0.365**	0.087	-0.133	-0.105	-0.127
Duration	-0.022	0.019	0.047	0.14	0.028
Revenue	0.089	0.225**	0.170*	0.075	0.189*

(***), (**), and (*) indicate significance at the 1% level, 5% level and 10% level, respectively.

Table 5 shows the relation of performance and financial inclusion in Indonesia. MSMEs Performance are measured by sales growth, customer based, customer satisfaction, process enhancement, and competitive advantage whilst financial inclusion level indicated by saving, investment, credit, credit on e-commerce, and investment on e-commerce. Sales growth has significant and positive impact into saving, investment, and credit on e-commerce, while customer-based indicator has significantly negative correlation with credit and investment through e-commerce platform. It implies that the bigger MSMEs size on e-commerce have the

smaller possibility to take on credit and to invest in e-commerce as they already have their preference to other financial access compare to the ones provided by e-commerce which facilitates are still considerably new.

Process enhancement has less correlation with all indicator on financial inclusion in which it is only affecting investment on e-commerce on 10% level of significance, while competitive advantage appeared to have the most significant result on financial inclusion. We argue that competitive advantage indicates MSMEs can adequately manage their business. This resulting to a better allocation of their profit into financial product.

Control variables used in this model consist of owner's age, gender, education level, duration of the business, and the revenue. The results displayed above indicate only several variables are significance to financial inclusion in Indonesia. Education variable shows negative correlation with saving habit, indicating that higher level of education tends to not savings. We assume that people with higher level of education prefer to allocate and investing their money on other products other than financial asset.

Revenue has three significance relation with two indicators on financial inclusion. The higher revenue of MSMEs in e-commerce has tendency to invest through banks or other financial institutions, investing either through e-commerce or non-ecommerce. Additionally, with higher revenue from e-commerce adoption, MSMEs have interest to expand their business by obtaining more capital from loan.

5. Conclusion and Recommendation

The study provides an empirical based on factor that influencing decision to adopt e-commerce using MSMEs non adopter as control group, and MSMEs adopter as treatment group. Integrated with transaction cost theory and MSMEs characteristic as business that dominated by CEOs as agent of change, we found that revenue and demographic attributes of the CEOs as individual factors and sales significantly influence the decision to adopt e-commerce. Considering indirect link between financial inclusion and e-commerce adoption, this study shows that financial inclusion significantly affects the decision to adopt. However, further study needs to be conducted to explore different impact resulted from financial inclusion factors.

We use large and spread sample to seize Indonesia MSMEs. Our finding shows that MSMEs tends to detain e-commerce adoption if owned by elderly people with female gender, seems that this type of characteristic is more traditional and avoiding technology. The age of business also consistent with the previous attributes, the longer the probability to adopt e-commerce is decreasing. The variable of interest proxies show that financial product significantly related to e-commerce adoption in two ways. First, there is indication that the likelihood of e-commerce adoption is higher as the increase of MSMEs wealth measured by basic financial product such as saving and mortgage. Second, the negative association is due to the MSMEs aim to get profit from financial product such as mutual fund and bank-based equity. Our finding suggests that MSMEs with more sophisticated financial products may indicated stable firms with good accounting and strong customer based to make them have access to financial institution. This raises the possibility these firms do not need to embrace e-commerce to expand their marketing. Meanwhile firms with basic financial products such as savings and mortgage may indicated firms with poor accounting and small marketing based and lack access to financial institution. This also raises the possibility that these firm needs e-commerce to expand their business with small investment.

This study has enhanced e-commerce research by using logistic regression to evaluate association between firm performance and financial inclusion as our variable of interest. Our results suggest that firm's performance is associated with financial inclusion. However, the relation is varying for each financial inclusion proxy. Our findings report that when the MSMEs business growing well they tend to put their excess cash on saving or investment, more over they gravitate to use credit that provided by third party on e-commerce to boost their business. Firms with cost leadership strategy tends to use almost all the financial application to minimize their product cost.

By and large, our findings have implication on the MSME's as well as the regulator. For the MSMEs, our survey suggest that the adoption of e-commerce contribute positively to the MSME's business growth. Meanwhile, for the regulator some insight can be drawn from this study such as, the adoption of e-commerce in MSMEs can be fostered by increasing financial inclusion index. To increase the financial inclusion index, government can provide development program to support MSMEs so they can grow better and faster. If MSMEs sustain and grow, they will use more financial application to support their business.

For future research direction, some extensions could be considered. First, we can add security system and index technology literacy related with adopting e-commerce. In addition, variable related customer experience can be added so it can explore more information from customers. Second, investigating the reverse causality between the adoption of e-commerce and financial inclusion can be made to avoid endogeneity problem in the model.

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