The Southern African Journal of Entrepreneurship and Small Business Management
ISSN: (Online) 2071-3185, (Print) 2522-7343

Solving the small business paradox: E-commerce strategies for entrepreneurs

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Dates:
Received: 13 Dec. 2024
Accepted: 10 Mar. 2025
Published: 28 Apr. 2025

How to cite this article:
Widjaja, A.W., Sugiarto, S., Kurniawan, D. & Sheng, H.F., 2025, 'Solving the small business paradox: E-commerce strategies for entrepreneurs', *Southern African Journal of Entrepreneurship and Small Business Management* 17(1), a1040. https://doi.org/10.4102/sajesbm.v17i1.1040

Background: Entrepreneurial orientation is an important construct in determining value-creation activities and firm growth. Developing digital capabilities should be a crucial part of an entrepreneurial process. Resource limitations have forced small- and medium-sized enterprises (SMEs) to do things reactively and responsively, without incorporating them as an integral part of their entrepreneurial process toward creating competitive advantages.

Aim: This study examines the indirect effects of entrepreneurial orientation on firm performance mediated by implementing e-commerce among Indonesian SMEs.

Setting: This study is a quantitative study using a cross-sectional survey of SMEs in Indonesia who operate online businesses.

Methods: This quantitative study uses a cross-sectional survey of 560 SMEs who operate online businesses. Seven research variables were measured using indicators adapted from previous studies. The data were analysed using SmartPLS 3 and SPSS 26.

Results: Entrepreneurial orientation drives e-commerce integration for SMEs without considering perceived benefits. Resource limitations have compelled small businesses to develop more innovativeness and risk-taking approaches, instead of proactiveness in applying digital technology.

Conclusion: This study shows that e-commerce implementation is determined by entrepreneurial orientation and is not significantly affected by the intention to adopt e-commerce. SMEs should incorporate digital technology adoption as a part of the entrepreneurial process in their business strategies.

Contribution: The theoretical implications of the results of this study show that SMEs, in realising their desire to adopt digital technology, are not only determined by perceived usefulness and perceived ease of use but also by their entrepreneurial orientation.

Keywords: entrepreneurial orientation; entrepreneurial process; intention to adopt e-commerce; e-commerce implementation; small business performance.

Introduction

Digital transformations are crucial for the competitiveness and survivability of firms (Eller et al. 2020; Kraft, Lindeque & Peter 2022; Rupeika-Apoga et al. 2022; Scuotto et al. 2021; Ziółkowska 2021). Digitalisation to support a firm's growth is a crucial part of the entrepreneurial process because it creates opportunities that can be exploited to add value for customers that leads to the achievement of competitive advantages (Altinay et al. 2016). Developing businesses through digitalisation can be achieved by dynamically developing entrepreneurial orientation via its three dimensions (innovativeness, proactiveness and risk-taking) that vary independently according to the availability of resources (Lu & Dimov 2023). Entrepreneurial orientation is the company's orientation towards creating new entries and value-creation by utilising its resources through entrepreneurial decisions and actions to create competitive advantage (Ngo 2023; Wales et al. 2021). Resource limitations will determine how small- and medium-sized enterprises (SMEs) develop their entrepreneurial orientations and evaluate the benefits of e-commerce for their businesses (Cichosz, Wallenburg & Knemeyer 2020; Li et al. 2017; Sandulli, Baker & López-Sánchez 2013).

The advancement of digital technology and its impact on SMEs' digital transformation can create opportunities to develop new values for customers (Soluk, Kammerlander & Darwin 2021). For an SME, the entrepreneurial orientation concept is more appropriately used to describe how a

firm can become more 'being entrepreneurial', which can be explained as an entrepreneurial process through its three dimensions namely innovativeness, proactiveness and risk-taking (Covin & Slevin 1989; Covin & Wales 2019; Wales et al. 2021). In SMEs, entrepreneurial orientation is at the individual owner level to be able to 'be entrepreneurial' (Clark, Covin & Pidduck 2024). An entrepreneurial orientation is built upon a behavioural construct that reflects innovativeness and proactiveness as well as an attitudinal construct that reflects risk-taking behaviour. An entrepreneurial orientation can be seen from its entrepreneurial behaviour as well as its attitude towards risks (Anderson et al. 2015). Innovativeness is the ability to generate new products or processes using fresh insights, novel thinking and new knowledge. Proactiveness refers to the ability to anticipate and exploit future value-creating opportunities before others do. Risk-taking refers to the willingness to take action and commit resources under uncertain conditions for future outcomes (Clark et al. 2024).

The relationship between entrepreneurial orientation and firm performance still needs further investigation (Kraus et al. 2012; Rezaei & Ortt 2018; Soares & Perin 2020). The direct effects of entrepreneurial orientation on firm performance are very complex and highly dynamic. Its indirect effects need to be further examined through their mediating factors (Ngo 2023; Vega-Vázquez, Cossío-Silva & Revilla-Camacho 2016). The relationship between entrepreneurial orientation and firm performance might put SMEs in a paradoxical dilemma situation that compels SMEs to choose either being more entrepreneurial or being more managerial (Kim & Kim 2016). The same dilemma also occurs when SMEs decide to adopt and implement e-commerce in their business operations.

Adopting and simultaneously implementing e-commerce for SMEs with their limited resources and experience will be more difficult, as they cannot determine the perceived benefit value of e-commerce coupled with their proactive discouragement to apply e-commerce (Li et al. 2017). Determining and implementing a digital strategy should become the main strategic component for SMEs in dealing with the inescapable digital transformations. Digitalisation is becoming a key influencing factor for entrepreneurial action, and establishing a digitalisation strategy is very important for a company's success (Kraus et al. 2023). This is important for SMEs who develop disruptive innovation in applying e-commerce in their business. However, understanding the role of entrepreneurial orientation and digitalisation strategy, especially for SMEs, still needs further exploration. There are still limited studies on the adoption of digital technology to entrepreneurial activities in driving SME growth (Vrontis, Chaudhuri & Chatterjee 2022; Zamami 2022). Studies on technology adoption theories and models for SMEs in emerging countries are still relatively limited (Loo, Ramachandran & Yusof 2023).

The adoption of digital technology by SMEs can be explained by the technology acceptance model (TAM). The initial model that can be used to explain how firms adopt digital technology in their business operations is the TAM that was proposed by Davis (1989). For SMEs, predicting adoption rates can inform business strategies and resource allocation. Even though this model has its limitations, it is still relevant to explain how SMEs adopt new technology under their limitations (Alrousan & Jones 2016; Ritz, Wolf & McQuitty 2019). Technology acceptance model can be applied to explain how SMEs implement e-commerce in developing their businesses. For SMEs, entrepreneurial orientation will be carried out by them as the owner who also acts as the operating officer (Verhees et al. 2010). From a psychological perspective, entrepreneurial orientation plays an important role in determining the decision to adopt new technology (Gupta et al. 2016). Small- and medium-sized enterprises' intentions to apply digital technology will coincide with entrepreneurial orientation to determine their decisions in implementing e-commerce. The stronger the entrepreneurial orientation, through its risk-taking dimension, the better it will be able at overcoming obstacles in the ease of using technology and being quicker and more proactive in assessing perceived usefulness in digital transformation.

This study examines how SMEs adopt and implement e-commerce as their digital strategy with the constraints of limited resources. The urge to transform their business digitally will determine their entrepreneurial orientation as a strategic imperative to grow and utilise their resources. This study is important and interesting because the implementation of e-commerce should not only be the adoption of digital technology but also part of the entrepreneurial process towards creating a competitive advantage. This study is expected to be able to answer and clarify how SMEs exploit business opportunities from a digital transformation as an entrepreneurial process that should become a crucial part of their strategic processes.

Theoretical background and hypotheses development

The theoretical background in the formulation of research hypotheses that will be used to design the research model to explain the research questions is discussed next.

The effect of the need for digital transformation on entrepreneurial orientation

The development of digital technology has disrupted markets and industries so much so it compels firms to make technological innovations (Ho & Lee 2015) and to create new product propositions for customers who demand the need for a change in the business model (González-Varona et al. 2021). Digital technology has created new opportunities for SMEs to develop their innovative capabilities (Fanelli 2021). The need for digital transformation driven by the development of digital technology, business competition and shifts in digital consumer behaviour directs SMEs to be able to integrate digital technology into their businesses (Verhof et al. 2021). This need drives their entrepreneurial orientation to innovate and utilise digital technology proactively. This entrepreneurial orientation is part of the strategic imperatives

of digital transformation that need to be developed by SMEs to grow within the constraints of limited resources. Digitalisation creates opportunities that can be utilised by SMEs in their entrepreneurial activities to maintain their businesses (Kraus et al. 2019). Entrepreneurial orientation allows business opportunities arising from digitisation activities to be discovered and exploited by SMEs in a profitable manner (Eckhardt & Shane 2003; Sarason, Dean & Dillard 2006; Shane & Venkataraman 2000). Digitisation has created challenges for SMEs to be able to renew their customer value proposition and business model, which are crucial for their survivability (Clauss et al. 2020; Eller et al. 2020; Müller, Buliga & Voigt 2018). Based on this elaboration, a hypothesis can be formulated as follows:

H1: The need for digital transformation positively affects entrepreneurial orientation.

The effect of perceived usefulness and perceived ease of use on the intention to adopt e-commerce

Technology acceptance model can be used to describe the owner's or manager's perception of their intentions and realities in implementing e-commerce (Hadi Putra & Santoso 2020). This model can explain how SMEs accept and use digital technology, which is determined by its perceived usefulness and perceived ease of use. Davis (1989) defined perceived usefulness in the sense of how technological adoption can improve a firm's performance and perceived ease of use as the amount of effort and the level of difficulty in adopting new technology. These two factors will largely determine the level of benefits that can be gained by adopting a new technology. In their efforts to adopt digital technology, SMEs will evaluate the benefits that can be gained to empower their business activities (Kraft et al. 2022; Sastararuji et al. 2022). For small business entrepreneurs, the new technology will be more accepted mentally with high perceived usefulness and confidence in the ease of use to be able to implement the technology effortlessly and without excess competence (Gupta et al. 2016). Perceived usefulness and perceived ease of use will form beliefs that will determine the attitude of SMEs to be ready to adopt new technology because of its benefits (Manis & Choi 2019). The perceived usefulness of a new technology will be directly related to the expected benefits of adopting the technology, and perceived ease of use is the main determinant of the intention to use new technology (Ferri et al. 2020). Based on this elaboration, two hypotheses can be formulated as follows:

H2: Perceived usefulness positively affects the intention to adopt e-commerce.

H3: Perceived ease of use positively affects the intention to adopt e-commerce.

The effect of entrepreneurial orientation on e-commerce implementation

A strong entrepreneurial orientation will enable companies to be proactive and willing to take risks in exploiting opportunities and innovating in e-commerce (Aljarboa 2024). In contrast to big enterprises, digital transformation implementations in SMEs will exhibit entrepreneurial activities that are more related to higher business risk-taking (Rupeika-Apoga, Bule & Petrovska 2022; Ziółkowska 2021). Small- and medium-sized enterprises have to make bold actions in taking risks concerning e-commerce implementation because they have to face many obstacles in implementing new technology for their businesses (Eller et al. 2020; Fanelli 2021; Kraft et al. 2022). Business dynamics brought about by digital transformation have compelled SMEs to continuously identify new ways to redefine their business operations in a new digital era (Franco, Godinho & Rodrigues 2021). For SMEs, innovations and motivation to grow through learning can bring down their obstacles in implementing e-commerce (Scuotto et al. 2021). A new technology implementation is an integral part of an innovation strategy by SMEs (Somohano-Rodríguez, Madrid-Guijarro & López-Fernández 2020). Based on this premise, a hypothesis can be formulated as follows:

H4: Entrepreneurial orientation positively affects e-commerce implementation.

The effect of intention to adopt e-commerce on e-commerce implementation

Financial constraints faced by SMEs in e-commerce implementation have compelled them to make the most of social media for their benefit (Ritz et al. 2019). The constraints and uncertainty that they face make it difficult for SMEs to adopt e-commerce, and even more difficult for them to understand how to implement and monitor e-commerce (Qalati et al. 2021). Intention to adopt e-commerce is very necessary for SMEs to increase commitment and learning in dealing with these limitations, as well as to enhance understanding and skills in implementing information technology (Aljarboa 2024). E-commerce commitment demonstrated by the willingness to invest in resources and efforts to develop e-commerce-based excellence is essential for SMEs to improve their e-commerce performance (Ballerini, Herhausen & Ferraris 2023). In implementing e-commerce, the relative advantage that can be gained is considered by comparing the benefits and costs of e-commerce (Rahayu & Day 2015; Shahadat et al. 2023). Even though SMEs can reap many benefits by implementing e-commerce, the switching cost of its implementation is often bigger than its relative advantage (Christiansen, Haddara & Langseth 2022). Thus, the following hypothesis can be formulated:

H5: Intention to adopt e-commerce positively affects e-commerce implementation.

The effect of e-commerce implementation on firm performance

By implementing e-commerce in their business activities, SMEs can improve their performance in terms of higher effectiveness and efficiency (Kraus et al. 2019; Sastararuji et al. 2022; Vrontis et al. 2022). Firm performance for SMEs usually refers to marketing performance, development of new products and functions, and operational performance in the development of a firm operational method (Ngo 2023).

Social media applications as a part of e-commerce can increase both financial and non-financial performances by improving organisational capabilities to create values for customers and by lowering costs (Alrousan & Jones 2016; Eller et al. 2020; Verhoef et al. 2021). Digital technology implementation in a business process can renew and upgrade a business model developed by SMEs, allowing them to gain a bigger value (Müller et al. 2018). E-commerce can facilitate the development of a business model innovation that will make it possible for SMEs to achieve both financial sustainability and stakeholder credibility (Li 2020). Based on this premise, a hypothesis can be formulated as follows:

H6: E-commerce implementation positively affects firm performance.

Based on these research hypotheses, a research model can be formulated as shown in Figure 1. This research model is developed to answer the complexity of entrepreneurial orientation effects on firm performance by inserting e-commerce implementation as the mediating variable. The TAM approach is also used in this research model to examine whether there are effects of perceived benefit gains from e-commerce integration on firm performance.

Research methods and design

Sample and data collection

The study of the entrepreneurial orientation role in the e-commerce implementations for SMEs is urgently needed because there is a gap on the demand and supply side in the digital platforms, where only 12% – 15% of SMEs in Indonesia have applied digital platforms in their business operations, while more than 50% customers have turned to digital platforms in their search for product information of interest (Syafrian 2022). This quantitative research uses a cross-sectional survey design with 560 respondents. The analysis was performed at the organisational level on Indonesian SMEs who have conducted online business shops as the unit of analysis. The research was carried out using quantitative research by employing a cross-sectional survey-based study design with a triangulation approach. Triangulation techniques are implemented through triangulation of data sources to confirm the validity and reliability of information

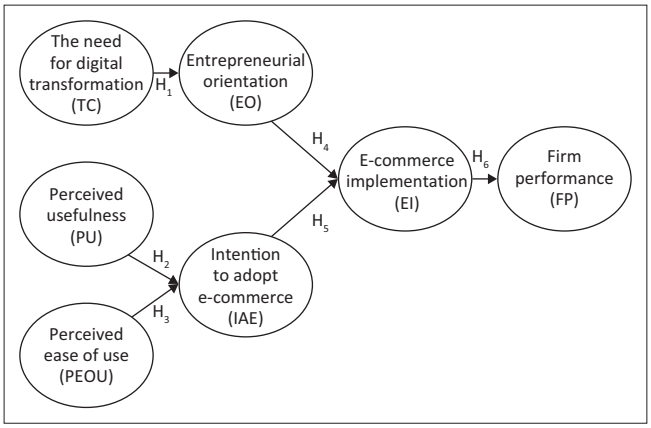

FIGURE 1: Research model.

obtained from research respondents who have run online businesses, confirmed by information from the owner, director, or manager of the company who runs the online business, and also those who have e-commerce knowledge who run online businesses, as well as those who act as the main decision-makers in companies that have online businesses. The sampling for this research was carried out using a purposive sampling method.

The sampling frame in this study is unidentified, and as such for the sample collection, a non-probability sampling technique was used. In determining the appropriate sample size, a rule of thumb about 5–10 times the largest indicator was used to measure a variable on its structural path that leads to a latent construct in the structural model (Hair et al. 2019).

The research respondents were required to have e-commerce knowledge, operate an online business, and act as the main decision-makers in the company that owned an online business. Nowadays, almost all SMEs in Indonesia that have adopted and implemented digital technology in their businesses use it in a simple, standard and replicable manner. Based on our observations, the level of adoption, on average, is similar throughout, and as such the authors did not make a specific stratification about the sector of interest. Respondents who were qualified to be further analysed were the ones who responded to all items in the questionnaire.

Measures

This study employed steps that have been validated across works of literature. All items were measured using a 5-point Likert scale with a scale of strongly disagree to a scale of strongly agree in questions sent to respondents. Research variables consist of (1) the need for digital transformation, (2) entrepreneurial orientation, (3) perceived usefulness, (4) perceived ease of use, (5) intention to adopt e-commerce, (6) e-commerce implementation and (7) firm performance. The variables used in this research were latent variables that were estimated according to their indicators (Sugiarto 2022).

The need for digital transformation was compelled by three factors of the external environment, namely technology, competition and customers (Verhoef et al. 2021). The measurement of the need for digital transformation variable was based on a perception of urgency to conduct digital transformation in a business process. E-commerce can affect firm performance in many aspects. Covin and Slovin (1989) described three dimensions of entrepreneurial orientation as a strategic posture for small firms, namely innovativeness, proactiveness and risk-taking. Wales et al. (2021) further explained that entrepreneurial orientation measurement can be based on these three dimensions. In essence, perceived usefulness refers to the relative advantage as indicated by the value increase as a result of digital technology implementation, while perceived ease of use describes the complexity of the digital technology to be applied (Alrousan & Jones 2016).

Based on the initial thoughts as developed by Davis (1989), perceived usefulness variable can be measured using the following two dimensions, financial usefulness and operational usefulness. Meanwhile, perceived ease to use can be measured using dimensions of technical easy to use and interaction easy to use. The measurement of the variable intention to adopt e-commerce was developed from a study conducted by Venkatesh et al. (2003). E-commerce implementation for SMEs is defined as the amount of digital and information technology adoption in business operations and development. Based on the studies by Alrousan and Jones (2016) and Alzahrani (2019), the e-commerce implementation variable can be measured using the following three dimensions: digital implementation in business, digital interaction in marketing and the use of digital transactions. By developing measurement as proposed by Ramanathan, Ramanathan and Hsiao (2012), firm performance can be measured from financial performance, non-financial performance, as well as the impact on two main organisational functions, namely marketing and operation (marketing and operation performance).

Measurement model

As the variables used in this study were latent variables measured based on their indicators, validity and reliability tests were performed according to the Partial Least Squares Structural Equation Modelling (PLS-SEM) rules regarding the measurement model. The measurement model was assessed for construct validity and internal consistency reliability. Construct validity was tested using convergent validity and discriminant validity (Creswell 2014; Hair et al. 2019). Internal consistency reliability was tested using commonly used indicators of internal consistency reliability (Dijkstra & Henseler 2015; Hair et al. 2014; Nunnally 1978). Data were analysed using SmartPLS 3 software (SmartPLS GmbH, Bönningstedt, Schleswig-Holstein, Germany) and the Statistical Package for the Social Sciences (SPSS) 26 software (IBM, Chicago, Illinois, United States).

Quality criteria

On the structural models and hybrid models that are formed and pass the robustness test for the measurement model, evaluation is then carried out regarding quality criteria. The statistics used are the coefficient of determination (R^2), which was estimated using the blindfolding method. R^2 measures the robustness of both the exploratory model and the sample prediction (Rigdon, Sarstedt & Ringle 2017). The range of R^2 values is between 0 and 1, where values of 0.75, 0.50 and 0.25 are each considered substantial, medium and weak, respectively (Hair, Ringle & Sarstedt 2011).

Besides the determinant coefficient value (R^2), the Q^2 statistic (cross-validation) is also used, which explains how accurately the exogenous construct can predict the endogenous construct. The value of Q^2 is useful for assessing the accuracy of model path predictions by comparing aspects of out-of-sample predictions (model) and in-sample predictions (observations). A high Q^2 value indicates that there is a small difference between the predicted value and the actual observed value, meaning it indicates high accuracy. The Q^2 value must be greater than 0 where the values 0, 0.25 and 0.5 are each considered weak, medium and substantial, respectively (Hair et al. 2011; Henseler et al. 2014).

To strengthen the robustness testing, the f^2 statistic is also used, which describes the exploratory strength of the model. Regarding the f^2 value, the effect category consists of small effect (0.02), medium effect (0.15) and large effect (0.35) (Hair et al. 2017). Quality criteria are also considered for model fit using the normed fit index (NFI). The NFI value ranges from 0 to 1. A higher NFI value indicates a better fit, with the NFI criteria ≥ 0.90 being a good fit, and $0.80 \leq \text{NFI} < 0.90$ being a marginal fit.

Hypothesis testing

Hypothesis testing was carried out using a level of significance at 5% and one-way testing concerning the research hypotheses in the research model as shown in Figure 1. In addition to research model hypotheses testing, hypothesis testing was also performed to determine the impact of time differences in e-commerce implementation. The author was interested in finding out whether there were differences in e-commerce implementation between SMEs that have been in the business for less than 3 years and SMEs that have been in the business longer than 3 years. A differential span of 3 years is used based on the results from a general observation about the probable survivability of a new opening business. During the first 3-year period, new opening businesses stumbled by the problems of survivability that were bigger than they could overcome.

The author used the median of e-commerce implementation indicators as the data to be tested. U-Mann–Whitney test was employed because it is the most suitable method to test whether two independent populations have the same central tendency values regarding the measurement scale used.

Data analysis technique

In conducting the relationship analysis, structural equation modelling (SEM) will be used (Sugiarto 2022). In SEM, three models are found, namely, the measurement model, the structural model and the hybrid model. The structural equation model that was formed was declared robust after passing the robustness testing related to measurement models, structural models and hybrid models. The first robustness test was carried out regarding the measurement model. After the measurement model formed using PLS-SEM is proven to meet the requirements for internal consistency reliability and construct validity, the next step is to evaluate the robustness of the structural model and hybrid model. At this stage, several assessments are carried out: collinearity problems detection, hypothesis testing, fulfilment of quality criteria using the coefficient of determination (R^2), f^2 effect size, Q^2 effect size and NFI.

Ethical considerations

Ethical approval to conduct this study was obtained from the President University Research Ethics Committee (No. ETHDEC2024-B0025).

Results

Respondent characteristics

The summary of 560 respondents' profiles that have met the requirements as defined by the researchers is shown in Table 1.

Measurement model

Table 2 shows that the largest indicator for latent constructs in this study is 5 for latent construct E-commerce implementation (EI), and the total indicator from all latent constructs is 25. Therefore, the number of respondents employed in this study has fulfilled the requirement based on the rule of thumb as stated above (Hair et al. 2019).

Table 2 also shows that all reflexive indicators for the research constructs have outer loading values greater than 0.7. Thus, all indicators for the research constructs were valid indicators to measure constructs in this study (Hair et al. 2019). The average variance extracted (AVE) value, which is a quadratic of outer loading value, as shown in Table 2, indicates that the AVE values for all constructs were greater than 0.5, suggesting that the

TABLE 1: Respondents' characteristics.

Description	Frequency	Relative frequency
Firm age (years)		
< 3	379	67.7
≥ 3	181	32.3
Number of employees		
< 10	86	15.4
10–50	352	62.8
> 50	122	21.8
Product category		
Fashion and accessories	77	13.8
Home and living	106	18.9
Food and beverages	134	23.9
Beauty and personal care	124	22.1
Mom and baby care	96	17.1
Others	23	4.2
Annual sales (bn Rp)		
< 2.5	309	55.2
2.5 – < 50	251	44.8

bn Rp, billion Rupiah.

TABLE 2: Measurement model assessment.

Construct	Indicator	Loading	AVE	Internal consistency reliability		
				Cronbach's alpha	rho_A	Composite reliability
The need for digital transformation (TC)	-	-	0.79	0.91	0.91	0.94
	TC1 (technological development)	0.88	-	-	-	-
	TC2 (latest technology)	0.88	-	-	-	-
	TC3 (survival effect)	0.89	-	-	-	-
	TC4 (company flexibility)	0.89	-	-	-	-
Perceived usefulness (PU)	-	-	0.70	0.80	0.92	0.88
	PU1 (sales)	0.80	-	-	-	-
	PU2 (efficiency)	0.82	-	-	-	-
	PU3 (productivity)	0.89	-	-	-	-
Perceived ease of use (PEOU)	-	-	0.84	0.90	0.90	0.94
	PEOU1 (easy to understand)	0.91	-	-	-	-
	PEOU2 (easy to become skilful)	0.92	-	-	-	-
	PEOU3 (easy learning)	0.91	-	-	-	-
Intention to adopt e-commerce (IAE)			0.73	0.82	0.88	0.89
	IAE1 (customer needs)	0.84	-	-	-	-
	IAE2 (working performance)	0.88	-	-	-	-
	IAE3 (company value)	0.83	-	-	-	-
Entrepreneurial orientation (EO)	-	-	0.65	0.72	0.75	0.85
	EO1 (creativity)	0.92	-	-	-	-
	EO2 (new ways to operate)	0.70	-	-	-	-
	EO3 (calculated risks)	0.78	-	-	-	-
E-commerce implementation (EI)	-	-	0.84	0.95	0.96	0.96
	EI1 (digitally presented)	0.93	-	-	-	-
	EI2 (closer relationship with the customer)	0.94	-	-	-	-
	EI3 (customer communication)	0.92	-	-	-	-
	EI4 (marketing activities)	0.82	-	-	-	-
	EI5 (business transaction)	0.96	-	-	-	-
Firm performance (FP)	-	-	0.77	0.90	0.91	0.93
	FP1 (efficiency)	0.88	-	-	-	-
	FP2 (sales)	0.92	-	-	-	-
	FP3 (online customers)	0.86	-	-	-	-
	FP4 (online visitors)	0.86	-	-	-	-

AVE, average variance extracted.

research constructs were valid (Hair et al. 2019). Thus, the measurement model formed meets the provisions of convergent validity.

Cross-loading values, which detect whether the correlation between a construct and its indicator measurement is larger than the values of other constructs, show that the latent constructs can better predict indicators in their respective blocks than indicators in other blocks.

The evaluation of the Fornell–Larcker criterion in this research shows that the root square value of the AVE is greater than the correlation value between constructs, thus indicating its validity (Fornell & Larcker (1981). Regarding heterotrait–monotrait values, the results of the analysis show that the lowest HTMT value is 0.044 and the highest HTMT value is 0.532. These values are lower than 0.85, indicating that the constructs in the path model are conceptually different from each other, which suggests that the discriminant validity test has met the requirements (Henseler, Ringle & Sarstedt 2015). Thus, the measurement model formed meets the provisions of discriminant validity. By fulfilling the provisions of convergent validity and the provisions of discriminant validity, the measurement model formed meets the provisions of construct validity.

The test results for internal consistency reliability are shown in Table 2. A construct is considered reliable when the Cronbach's alpha coefficient is > 0.70 (Nunnally 1978). Dijkstra and Henseler (2015) suggested that the rho_A value is usually set between the composite reliability value and Cronbach's alpha value. The higher the composite reliability value, the more reliable the data (Hair et al. 2019). The test results for internal consistency reliability have met these provisions, thus showing that research constructs have met the provisions of internal consistency reliability. After the measurement model formed using PLS-SEM has passed the robustness testing related to the measurement model and is proven to meet the internal consistency reliability and construct validity provisions, the next step is to evaluate the robustness of the structural and hybrid models.

Structural model and hybrid model

In conjunction with the formulation of a structural model and a hybrid model, a collinearity test was conducted by estimating the variance inflation factor (VIF), where the VIF value must be smaller than 10. A VIF value greater than 10 indicates that the constructs used in the study are highly correlated (Hair et al. 2017). The analysis results showed that the lowest VIF was 1.537 and the highest VIF was 7.875. The test results presented in Table 3 show that none of the research constructs were highly correlated, as indicated by VIF values smaller than 10. Therefore, the structural model formed has passed the robustness test related to collinearity problems between research variables.

Table 4 shows that the R^2 for the FP construct is 0.140, indicating a weak exploratory model. However, the f^2 value for FP shown in Table 5 is 0.163, suggesting that the model's exploration power is in the medium to large category. The Q^2 value for FP is 0.105, indicating accuracy that is classified as medium. The NFI in Table 6 for the Saturated Model is 0.857 and for the Estimated Model is 0.832, indicating a marginal fit (0.80 < NFI < 0.90 is a marginal fit).

From the test results, it was found that both the structural and hybrid models passed the robustness tests related to the

TABLE 3: Outer variance inflation factor values.

Indicators	VIF
EI1	5.49
EI2	5.71
EI3	4.69
EI4	2.22
EI5	7.87
EO1	2.40
EO2	1.56
EO3	1.69
FP1	2.94
FP2	3.40
FP3	2.38
FP4	2.20
IAE1	2.07
IAE2	1.65
IAE3	1.91
PEOU1	2.84
PEOU2	2.86
PEOU3	2.82
PU1	1.98
PU2	1.91
PU3	1.54
TC1	2.55
TC2	2.62
TC3	2.90
TC4	2.85

EI, e-commerce implementation; EO, entrepreneurial orientation; FP, firm performance; IAE, intention to adopt e-commerce; PEOU, perceived ease of use; PU, perceived usefulness; TC, the need for digital transformation; VIF, variance inflation factor.

TABLE 4: *R*-square values.

Variables	*R*-Square	*R*-Square adjusted
EI	0.06	0.06
EO	0.09	0.09
FP	0.14	0.14
IAE	0.09	0.08

EI, e-commerce implementation; EO, entrepreneurial orientation; FP, firm performance; IAE, intention to adopt e-commerce.

TABLE 5: F^2 values.

Variable	EI	EO	FP	PBTA	PEOU	PU	TC
EI	-	-	0.16	-	-	-	-
EO	0.06	-	-	-	-	-	-
FP	-	-	-	-	-	-	-
IAE	0.00	-	-	-	-	-	-
PEOU	-	-	-	0.09	-	-	-
PU	-	-	-	0.00	-	-	-
TC	-	0.10	-	-	-	-	-

EI, e-commerce implementation; EO, entrepreneurial orientation; FP, firm performance; IAE, intention to adopt e-commerce; PEOU, perceived ease of use; PU, perceived usefulness; TC, the need for digital transformation.

problem of collinearity between research variables and the explanatory ability of the model. Therefore, the analysis stage could be continued regarding hypothesis testing. As stated in the hypothesis testing section, when conducting hypothesis testing, a significance level of 5 percent is used. The inner model reveals the correlation between constructs and its significance value. Table 7 shows the analysis results and whether the research hypotheses can be either empirically confirmed or denied. The results of hypotheses testing confirmed that the PU construct did not significantly affect PBTA, and the PBTA construct did not significantly affect EI. The remaining research constructs had significant effects on other constructs, with p-values smaller than 0.05. Given that most of the research hypotheses have been proven to be significant, it can be stated that the paper's argument is built on an appropriate base of theory.

The R-square value for FP constructs is 0.140, hence indicating a weak exploratory model. The normed fit index (NFI) for saturated model is 0.857 and for estimated model is 0.832, which indicated a marginal fit ($0.80 \leq \text{NFI} < 0.90$ is a marginal fit). From the results of testing the hypotheses in Table 7, H2 and H5 are not supported by research data, while the other hypotheses are supported. This shows that implementing e-commerce by SMEs to improve their performance is only determined by entrepreneurial orientation and not by their attitude, which is based on the perceived benefits of adopting digital technology.

The effects of time differences in e-commerce implementation

This section answers the author's interest in finding out whether there were differences in e-commerce implementation between SMEs that have been in the business for ≤ 3 years and small businesses that have been in the business for more than 3 years. In this study, there were 379 SMEs (67.7%) that have operated for ≤ 3 years and 181 SMEs (32.3%) that have operated for more than 3 years. The null hypothesis in this analysis is that the central tendency of e-commerce implementation is the same across categories of SME operating periods. The alternative hypothesis in this analysis is that the central tendency of e-commerce implementation is not the same across categories of SME operating periods. The test results are shown in Table 8.

The analysis resulted in a Mann–Whitney U value at 36504.000, with an Asymptotic Significance (2-tailed) value of 0.191. The analysis results showed no evidence that e-commerce implementation by SMEs that have been in the business for ≤ 3 years is different from e-commerce implementation by SMEs that have been in the business for more than 3 years. The analysis results obtained based on empirical data support have passed the robustness testing and can answer the research objectives. Thus, it can be stated that the methods employed are appropriate.

Discussion

Results from this study show that e-commerce implementation is determined by the entrepreneurial orientation and is not significantly affected by the intention to adopt e-commerce. This shows that SMEs implemented e-commerce integration into their businesses as an entrepreneurial process based on innovativeness and risk-taking, although at lower levels (the indicators for the proactiveness dimension turn out to be not valid). The adoption of digital technology was done because it was relatively easy to do and it was also done as a response towards digital necessities. As such, this kind of entrepreneurial approach can only result in temporary competitive advantages with short-term orientations (Altinay et al. 2016). The digitalisation process should have become a crucial part of entrepreneurial initiatives for SMEs to be able to adapt and grow (Lu & Dimov 2023).

E-commerce implementations by SMEs tend to be more reactive, and the digital technology adoption has not been a part of their strategic planning. SMEs tend to be more informal in their strategic plannings and have short time horizons (Street, Gallupe & Baker 2017). Resource limitations make it difficult for SMEs to take on entrepreneurial initiatives. These constraints have made SMEs not be

TABLE 6: Fit summary.

Parameters of fit summary	Saturated model	Estimated model
SRMR	0.05	0.13
d_ULS	0.99	5.85
d_G	0.41	0.52
Chi-square	1423.51	1666.04
NFI	0.86	0.83

NFI, normed fit index; SRMR, standardised root mean square residual.

TABLE 8: Independent samples Mann–Whitney U-test summary (N = 560).

Statistic	Results
Mann–Whitney U	36504.00
Wilcoxon W	52975.00
Test statistic	36504.00
Standard error	1684.18
Standardised test statistic	1.31
Asymptotic significance (two-sided test)	0.19

TABLE 7: Structural estimates.

Hypothesis	Estimates	SE	*t*-statistics	*p*	Description	Conclusion
H1: The need for digital transformation → Entrepreneurial orientation	0.30	0.05	6.32	0.000	Significant	Supported
H2: Perceived usefulness → Intention to adopt e-commerce	0.03	0.05	0.72	0.470	Not Significant	Not supported
H3: Perceived ease of use → Intention to adopt e-commerce	0.29	0.05	6.10	0.000	Significant	Supported
H4: Entrepreneurial orientation → E-commerce implementation	0.23	0.04	5.18	0.000	Significant	Supported
H5: Intention to adopt e-commerce → E-commerce implementation	0.06	0.05	1.03	0.305	Not Significant	Not supported
H6: E-commerce implementation → Firm Performance	0.37	0.03	11.04	0.000	Significant	Supported

SE, standard error.

able to optimally execute their entrepreneurial processes. Innovativeness as the most crucial pillar cannot be optimally performed, neither can proactiveness. The audacity to take risks needs a strong resource commitment on the part of SMEs (Lu & Dimov 2023). Small- and medium-sized enterprises' lack of proactivity and courage to take risks results in their lack of ability to overcome barriers to adopting new technology, as explained by TAM, because of a lack of perceived ease of use and especially perceived usefulness of adopting the technology.

To deal with rapid and dynamic technological changes, SMEs need to be able to mobilise and upgrade their resources through business relationships with competent parties in e-commerce (Chou & Zolkiewski 2012). A strong commitment is needed to allocate resources in adopting digital technology because it incurs a high switching cost for SMEs to implement e-commerce (Sandulli et al. 2013).

Small- and medium-sized enterprises tend to focus on short-term sales performances instead of trying to create long-term competitive advantages (Widjaja & Sugiarto 2022). In dealing with digital technological changes about their short-term performances, SMEs tend to pursue trial-and-error-based learning, experimentation, and improvisation by adopting the already available e-commerce technology, with less emphasis on trying to develop a distinctive digital technology to create long-term competitive advantages (Ott, Eisenhardt & Bingham 2017). This is consistent with what Bingham, Furr and Eisenhardt (2014) described as the opportunity paradox that demonstrates a paradoxical tension between strategic focus and flexibility. To be able to exploit business opportunities brought about by digital transformations, SMEs must choose either to act opportunistically and flexibly in their response or to carefully scrutinise their focus in advance to determine their digital strategies. The paradoxical situation occurs when SMEs hastily and spontaneously adopt digital technology in their e-commerce activities, without, although should have been, being accompanied by flexibility and experimentation efforts that will lead to the creation of competitive advantage resources (Zuzul & Triapsas 2019).

Small- and medium-sized enterprises' successes in implementing e-commerce will be determined by their capabilities to create formal strategic planning by incorporating digital transformation as an important part of their business strategies (Heavin & Power 2018). Small- and medium-sized enterprises need to develop their entrepreneurial orientations to create unique resources that will be difficult to replicate by their competitors. This can be done by adopting a digital transformation in their business operations in accordance with their resources to develop a distinctive entrepreneurial orientation (Wiklund & Shepherd 2003). Nevertheless, the majority of small businesses are less able to develop their digital strategies and their associated entrepreneurial orientations (Becker & Schmid 2020).

The study by Hadi Putra and Santoso (2020) for SMEs in Indonesia showed that e-business implementation affected operational performance but did not affect strategic performance. This result can be attributed to the strategy formation that reflects the dichotomy between strategising by doing based on actions and strategising by thinking based on cognition (Ott & Eisenhardt 2020; Ott et al. 2017). In their efforts to implement digital technology, SMEs with their limited resources tend to act responsively (strategising by doing) in implementing a digital technology. By implementing digital technology as an emergency response by copying other businesses, entrepreneurs are hoping to be able to exploit business opportunities (Ott & Eisenhardt 2020). In dealing with a rapid digital transformation full of uncertainty, in conjunction with their resources and capabilities, SMEs tend to emphasise strategy by doing as a reactive response to exploit business opportunities that arise (Eisenhardt & Bingham 2017). However, any action that is not oriented to the creation of competitive advantages is bound to fail. This kind of paradoxical situation is frequently observed in SMEs, especially in developing countries (emerging economies).

A digital transformation that creates uncertainty and ambiguity needs to be flexibly addressed as a tool for an organisational learning (Raffaelli, Glynn & Tushman 2019; Zuzul & Triapsas 2019). Entrepreneurial processes and practices can improve organisational knowledge through a learning process for organisations to be more proactive (Altinay et al. 2016). The digital transformation learning process will help SMEs to develop a knowledge base that will make them more entrepreneurial (Rezaei & Ortt 2018). Practical actions in digitalisation should heuristically build experiences to create cognitive capabilities that are crucial for the development of competitive advantages (Bingham & Eisenhardt 2011; Bingham, Howell & Ott 2019). Entrepreneurial heuristics are important for the development of entrepreneurial ability to resolve problems and respond to rapid changes in implementing digital technology in a condition of incomplete information that is full of uncertainty (Lanza & Passarelli 2014).

Limited resources and low market forces have made SMEs take on a risk-averse action and be more reactive towards digital technology advancements (Kraus et al. 2012; Rahayu & Day 2105). Limited resources have discouraged SMEs from implementing technology with uncertain gains and being very careful in adopting digital technology (Müller et al. 2018). In developing new business products and processes, SMEs are frequently faced with the paradoxical dilemma to choose either being entrepreneurial or being managerial (Kim & Kim 2016).

The study done by Soluk et al. (2021) showed that SMEs, in developing their digital entrepreneurship, became more entrepreneurial by emphasising social interactions instead of trying to independently implement digital technology. To address the constraints of their limited resources, SMEs can

develop partnerships with related parties to improve their digital capabilities (Kabanda & Brown 2017). Social influence also plays a role for SMEs in adopting and implementing e-commerce, as described in the Unified Theory of Acceptance and Use of Technology (UTAUT) model (Venkatesh et al. 2003).

To become entrepreneurial, SMEs in developing e-commerce integration into their business need to develop entrepreneurial behaviour based on innovativeness and proactiveness, as well as adjust their attitude towards risks. There are inter-dimension correlations from the entrepreneurial orientation that can affect the success rate of an e-commerce integration in improving firm performance (Putninš, & Sauka 2019). To develop proactiveness, SMEs need to be more audacious to take risks following their available resources, which will also be determined by the innovativeness they have developed.

Limitations and future research

The limitations of this research point to the importance of a more in-depth study of how SMEs can develop their resources, which play a role in developing the dimensions of entrepreneurial orientation. More in-depth qualitative research is needed to enrich the results of this study. It should be interesting for further studies to examine how the dynamics of the three dimensions of entrepreneurship (innovativeness, proactiveness and risk-taking) relate to the development of resources for SMEs that support firm growth. Studies about digital transformation should not only focus on the process of implementing digital transformation but also need to examine how SMEs might be able to develop their entrepreneurial orientation pertaining to the three dimensions in dealing with a digital transformation. Research on the effects of e-commerce implementation on both organisational learning and entrepreneurial orientation for SMEs should be interesting to be further explored.

Further studies may also explore the role of time series on performance based on hypotheses or using panel data to demonstrate the effects of both cross-sectional and time series simultaneously, to gain a more comprehensive understanding about firm performance improvements according to the research model. A more focused study on a specific SME sector is also an interesting venue to be further explored. Further, adding more control variables such as firm years, the duration of e-commerce implementation, the rapidity in integrating e-commerce and other characteristics of SMEs should enrich our understanding. To improve the research model in explaining the dynamics of entrepreneurial process effects on the digitalisation process that leads to the improvement of SME performance, adding more variables is necessitated such as entrepreneurial culture, organisational learning, dynamic capabilities and so on.

Conclusion

Resource limitations in SMEs will affect the development of entrepreneurial orientation to improve skills and capabilities to be able to adapt in dealing with technological changes and to face the challenges in their business environments (Sandulli et al. 2013; Sastararuji et al. 2022). Resource availability will determine SMEs' capabilities to exploit business opportunities from e-commerce development to improve their performance. The dynamics in developing entrepreneurial orientations through its three dimensions will be determined by the firm capability to develop its resources (Lu & Dimov 2023).

In dealing with rapid and dynamic technological changes, SMEs must be able to mobilise and upgrade their resources through business relationships with competent parties in implementing e-commerce (Chou & Zolkiewski 2012). Small- and medium-sized enterprises should incorporate digital technology adoption as a part of the entrepreneurial process in their business strategies through measured and well-planned actions. SMEs in taking strategic action is usually carried out immediately without considering intentions and in-depth analysis.

Facing this kind of paradoxical situation, SMEs must think smart and understand that digital transformation through the integration of e-commerce into their businesses is not only about digital technology per se but also a tool to continuously develop their competitive positions. Small- and medium-sized enterprises must try to adopt a new technology to gain benefits from digital technology, starting from learning by doing to create innovations in their business operations (Eller et al. 2020). Small- and medium-sized enterprises need to carefully consider it in developing their digital capabilities by coordinating and cooperating with their digital ecosystems.

Resource limitations have made the three components of entrepreneurship, namely, innovativeness, risk-taking and proactiveness, to be simultaneously executed in the process of developing a digital-based business. To develop an entrepreneurial orientation for the growth of businesses, SMEs must strengthen their resource commitments (Lu & Dimov 2023). It is to be desired that the government can create a digital innovation ecosystem to support the growth of small business sectors. To be able to develop a digital technology-based innovation under the constraints of limited resources, small businesses need support from their ecosystems and the government (Müller et al. 2018; Shahadat et al. 2023). Small- and medium-sized enterprises can accomplish business digitalisation by developing and exploiting their resources by creating and building networks with their business partners (Chou & Zolkiewski 2012; Ho & Lee 2015). In developing countries such as Indonesia, ecosystem building is needed, which will help SMEs to elevate their digital competencies by developing entrepreneurial orientation in their business processes.

The theoretical implications of the results of this study show that SMEs, in realising their desire to adopt digital technology, are not only determined by perceived usefulness and perceived ease of use but also by their

entrepreneurial orientation. The development of entrepreneurial orientation through its three-dimensional dynamics is a more influential determinant in the adoption of digital technology. Limited resources result in SMEs reducing their intention and courage to adopt digital technology. They only pay attention to the ease of use of e-commerce and pay less attention to the perceived benefits. This is contrary to research results in TAM, which reveal perceived usefulness as the starting point in adopting new technology (Gupta et al. 2016). To overcome this problem, SMEs need to continue to develop and exploit their resources to strengthen their entrepreneurial orientation and increase their willingness and courage to adopt digital technology to maintain their survival.

Acknowledgements

The author, A.W.W., would like to extend gratitude to the research team, including the co-authors for their collaborative efforts in collection and analysis of data. Their expertise has greatly benefited the study. A.W.W., would also like to thank all individuals who have supported him intellectually and emotionally as the research project evolved.

Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

A.W.W. conceptualised the research and wrote the draft, S.S. handled the methodology and data analysis, D.K. wrote the draft, and H.F.S. assisted in conceptualising the research and collecting the research data.

Funding information

The author reported that they received funding from the Education Fund Management Institute and the Directorate General of Higher Education, Research, and Technology of the Ministry of Education, Culture, Research, and Technology, the Republic of Indonesia, through the Scientific Research Programme, which may be affected by the research reported in the enclosed publication. The author has disclosed those interests fully and has implemented an approved plan for managing any potential conflicts arising from their involvement. The terms of these funding arrangements have been reviewed and approved by the affiliated University in accordance with its policy on objectivity in research.

Data availability

The data that support the findings of this study are available from the corresponding author, A.W.W., upon reasonable request.

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