



# Analysis on E-Commerce Usage Adoption Based on Technology, Organization, and Environment at MSMEs in Balikpapan

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**Abstract.** Covid-19 pandemic has had an impact on MSMEs in Indonesia to be able to maintain their business through the role of digitalization. Not only due to Covid-19 pandemic factor, Digital transformation in MSMEs today can be influenced by several factors, with a factor is the role of the government. Indonesian Coordinating Minister for Maritime and Investment Affairs said that the government was being encouraging 10 million MSMEs to be able to connect to digital platforms through several government programs. East Kalimantan is the largest contributor to MSMEs on Kalimantan Island, especially Balikpapan which is an area that has a rapid economic industry. Until the recovery during the current pandemic, the latest data for active MSMEs in Balikpapan in 2021 was 2,804 MSMEs. Efforts to implement e-commerce adoption were one of lacks of adoption of e-commerce might be seen from several very influential aspects such as humans, technology, organizations, and environmental factors. These factors might be analyzed as the level of e-commerce adoption in this research. Thus, an approach based on TOE (technology, organization, and environment) was an effective approach to answer these problems. Although that, the e-commerce adoption is positively influenced by 59.8%, by each factor of bandwagon effect, compatibility, cost effectiveness, competitive pressure, entrepreneurial orientation, competitive intensity, relative advantage, interactivity, and top management. On other hand, from the results obtained, respondents stated that the ease of MSMEs' owners in making transactions and sales promotions was greatly influenced by the existence of e-commerce applications and might be seen from each TOE factors, so that this allowed users to continue to use and utilize e-commerce as a help tool's users with their transactions and sales promotions.

**Keywords:** E-Commerce, MSME, TOE.

## 1 Introduction

Micro, Small, and Medium Enterprises (MSMEs) are businesses that fall within certain size criteria in terms of their investment in machinery or equipment, turnover, or number of employees [1–3]. Micro enterprises typically have fewer than 10 employees and are often started by entrepreneurs or small business owners. Small enterprises have a

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A. Putro Suryotomo and H. Cahya Rustamaji (eds.), *Proceedings of the 2023 1st International Conference on Advanced Informatics and Intelligent Information Systems (ICAI3S 2023)*,

Advances in Intelligent Systems Research 181,

[https://doi.org/10.2991/978-94-6463-366-5\\_16](https://doi.org/10.2991/978-94-6463-366-5_16)

higher employee count than micro-ones but are still relatively small-scale compared to larger corporations. Medium enterprises are larger in scale compared to micro and small ones but are not as massive as large corporations.

MSMEs play a crucial role in economic development, contributing significantly to job creation, innovation, and overall economic growth. In Indonesia, MSMEs are the backbone of the country's economies. According to the Ministry of Cooperatives and SMEs, there are currently 64.2 million MSMEs, contributing 61.07% of GDP or 8,573.89 trillion rupiah, absorbing up to 97 percent of the workforce and up to 60.4% of total investment in Indonesia. MSMEs often face unique challenges related to access to finance, technology adoption, market access, and regulatory compliance, which can vary based on the specific industry and country in which they operate, including in Indonesia too [1–3]. Thus, the use of digital technology is important in order to spur productivity for MSMEs so they are able to penetrate the global market [1, 2].

COVID-19 had had a major impact on various sectors, one of which is the economic sector. COVID-19 pandemic caused restrictions on Indonesian society's activities which had an impact on aspects of direct communication. One of the impacts of the COVID-19 pandemic was MSMEs, based on data from the Ministry of Cooperatives which shows that 1,785 cooperatives and 163,713 MSMEs were affected by the COVID-19 pandemic [4–6]. The most affected MSME sector was food and beverage. Meanwhile, apart from food and beverages, the MSME sector that was shaken during the COVID-19 pandemic was also the creative and agricultural industries. In overcoming the problems faced by MSMEs and cooperatives, the government had implemented several efforts. One of them is, including MSME owners as the recipients of the government's aid programs.

Even though the COVID-19 pandemic had created several problems for MSME owners, on the other hand, there were also opportunities that had emerged. MSME owners might take advantage of information and communication technology usage considering that electronic commerce (e-commerce) in 2020 will reach US\$ 130 billion [4, 5]. E-commerce transactions had increased drastically during the COVID-19 pandemic. One of them was through the usage of e-commerce considering that there were many e-commerces available in Indonesia such as Shopee, Lazada, Tokopedia, and Blibli.com. Apart from that, the existence of e-commerces also provide various types of facilities that can help and make them easier for MSMEs to promote their businesses [4, 7, 8].

Digital transformation in MSMEs today can be influenced by several factors, with a factor is the role of the government. Indonesian Coordinating Minister for Maritime and Investment Affairs said the government is encouraging 10 million MSMEs to be able to connect to digital platforms through several government programs. Because currently only 8 million MSMEs or only 13% have switched to the digital media. This target is likely to be achieved this year. Moreover, since it was launched last May, now 600,000 MSMEs have entered the digital era. Apart from that, the customer factors influence MSME owners to switch to digital media, proven by the skyrocketing trend of online shopping during the Covid-19 pandemic, which has now led to MSME owners being able to provide business efficiency to the customer by using digital media as a solution [4, 9].

East Kalimantan is the largest contributor to MSMEs on Kalimantan Island, especially Balikpapan which is an area that has a rapid economic industry. Based on Industry MSMEs and Cooperatives Service of Balikpapan (*Dinas Koperasi dan UMKM Kota Balikpapan*)'s data, in 2021 the total data on the distribution of MSMEs, especially in Balikpapan was 47 thousand, divided into 6 regional sectors and South Balikpapan Sub-District was the area with the greatest number of MSMEs in Balikpapan with a total of 9,980 MSMEs. Until the recovery during the current pandemic, the latest data for active MSMEs in Balikpapan in 2021 was 2,804 MSMEs [6, 10]. Efforts to implement e-commerce adoption were the opportunities for MSMEs in Balikpapan, however, from data on e-commerce usage in East Kalimantan, 18% of e-commerce users include 5.74% of e-commerce use among MSMEs in Balikpapan based on active MSMEs' data at Industry MSMEs and Cooperatives Service of Balikpapan. From this data, it can be said to be minimal considering that the role of technology is very influential on MSMEs.

On a research result by [11], the lack of adoption of e-commerce might be seen from several very influential aspects such as humans, technology, organizations, and environmental factors. The human factor was caused by a lack of insight and readiness in using new technology. Technological factors might be caused by difficulties in using technology and lack of knowledge regarding the use of e-commerce as a new technology. Apart from that, organizational factors were also caused by organizational leaders who can determine decisions in adapting the use of technology in the organization and a culture that is lacking in adapting to the use of technology in an organization causing unfamiliarity with adopting new things. As well as environmental factors or might be said to be factors outside the organization which might be caused by a significant level of competitors in implementing new things such as technology which caused other organizations to be able to adapt and compete to maintain their business as well as the following factors from innovations that come from outside the organization to be able to also apply within the organization. These factors might be analyzed as the level of e-commerce adoption in this research.

A research result by [12] showed that the low level of e-commerce use in Balikpapan was caused by factors related to limited human resources and budgets. Apart from that, based on interviews to several MSMEs in Balikpapan, there were several obstacles in utilizing e-commerce technology, such as the difficulty for MSMEs to obtain capital to be able to place advertisements and product branding, also various technical problems for MSMEs such as adapting to use of technology in marketing products as well as the high competition factor in Balikpapan that had the similar business products. These problems form the basis of this research to be able to analyze the application of technology through aspects such as technology, organization, and environment (TOE).

Thus, an approach based on TOE is an effective approach to answer these problems with each indicator adopted in this research including Cost Effectiveness, Interactivity, Compatibility, Relative Advantage, Top Management, Entrepreneurial Orientation, Competitive Intensity, Bandwagon Effect, and Competitive Pressure [13, 14]. The TOE Framework was first developed by Tornatzky and Fleischer in 1990 [14]. This research that was done at MSME case, it was more suitable to use an approach based on TOE rather than other approaches such as Technology Acceptance Model (TAM), Unified

Theory of Acceptance and Use of The Technology (UTAUT), and Diffusion of Innovation (DOI) [13].

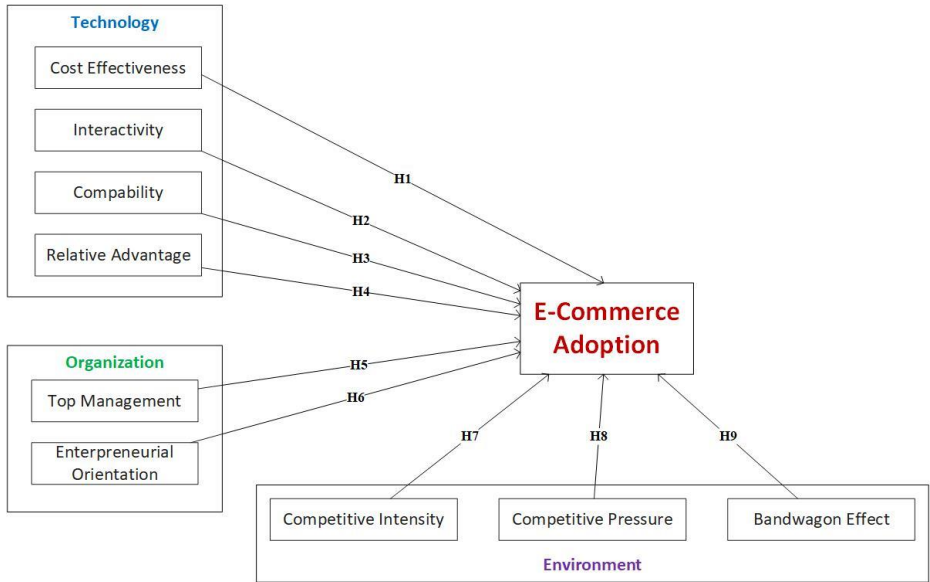
The TOE-based approach had been chosen by several researchers and has quite good results because it involves various aspects in studying e-commerce adoption [13, 15]. Theoretically, TOE explains the factors that determine the success of technology adoption [13–15]. Technological factors might be seen based on how much benefit the organization may obtain when the technology is used [13, 15]. Apart from that, technological factors also explained about the suitability between the technology to be adopted and the integrity of the organization [13, 15]. Organizational factors explained internal readiness in terms of infrastructure and technical capabilities related to technology adoption [15]. Furthermore, environmental factors in TOE theory discussed the influence of business partners, competitors, and external supporting factors in technology adoption [15].

Research of [15] considered an approach based on TOE assumes that the decision to use technological innovation is based on organizational factors, the external environment, and the characteristics of the technology. By using TOE, MSME may prepare all forms of business to meet needs in readiness for using e-commerce and making decisions. MSMEs has a simple organization, usually the owner acts as a manager and acts in making decisions. In MSMEs, the role of the business owner is very dominant in managing the business, both in supervising the production process, marketing, and making decisions.

## 2 Research Method

The population of this research were the active registered MSMEs' owners at Industry MSMEs and Cooperatives Service of Balikpapan, also MSME's owners in Balikpapan who had used e-commerce applications. Then, this research samples were determined by Slovin's Method [16], so the samples were 114 of 161 population. The numbers of 161 population of this research were gained from Industry MSMEs and Cooperatives Service of Balikpapan. Thus, the numbers of this research were 114 respondents.

The conceptual model and hypothesis of this research referred to each [9–15, 17]. Thus, this research conceptual model is shown by Fig. 1.



**Fig. 1.** This research conceptual model

Then based on this research conceptual model as shown by Fig. 1, this research hypotheses are explained by Table 1.

**Table 1.** This research hypotheses

Code	Hypotheses
H1	Cost Effectiveness (CE) affects positively to E-Commerce Adoption (EA).
H2	Interactivity (I) affects positively to E-Commerce Adoption (EA).
H3	Compatibility (C) affects positively to E-Commerce Adoption (EA).
H4	Relative Advantage (RA) affects positively to E-Commerce Adoption (EA).
H5	Top Management (TM) affects positively to E-Commerce Adoption (EA).
H6	Entrepreneurial Orientation (EO) affects positively to E-Commerce Adoption (EA).
H7	Competitive Intensity (CI) affects positively to E-Commerce Adoption (EA).
H8	Competitive Pressure (CP) affects positively to E-Commerce Adoption (EA).
H9	Bandwagon Effect (BE) affects positively to E-Commerce Adoption (EA).

This research questionnaires were designed, based on each [9, 11, 13, 15, 17]. More detail, this research questionnaires design is explained by Table 2.

**Table 2.** This research questionnaires design

<b>Variable</b>	<b>Indicators</b>	<b>Questions</b>
Cost Effectiveness (CE)	CE1	Our company (MSME) adopts e-commerce to reduce marketing communications costs
	CE2	Our company (MSME) adopts e-commerce in order to save the costs, it relates to time and effort in marketing, branding, and stronger customer service
	CE3	E-commerce will enable our company (MSME) to generate higher profits
	CE4	E-commerce will increase a company (MSME)'s ability to outperform the competition
Interactivity (I)	I1	E-commerce provides features for interactive communication with our customers.
	I2	E-commerce contains components to assist interactions between providers and consumers.
	I3	E-commerce makes it possible to engage customers through mentions and replies with controlled message content.
Compatibility (C)	C1	It is easy to integrate e-commerce with existing strategies.
	C2	E-commerce adoption is compatible with our business processes and operations.
Relative Advantage (RA)	RA1	E-commerce improves the company's image
	RA2	E-commerce allows us to increase our productivity.
	RA3	E-commerce allows us to achieve certain goals faster.
Top Management (TM)	TM1	Top management considers E-commerce adoption as important for the organization.
	TM2	Top management effectively communicates its support for the use of E-commerce.
Entrepreneurial orientation (EO)	EO1	My business often tries new ideas.
	EO2	My efforts are looking for new ways to do things.
	EO3	My business is creative in its operating methods.
Competitive Intensity (CI)	CI1	Our company (MSME)'s customers change easily to use our competitors' products or services without any difficulty.
	CI2	There is competition among companies in the industry, our company (MSME) operates intensely.

Variable	Indicators	Questions
Bandwagon Effect (BE)	BE1	E-commerce is the popular application and due to it, our company (MSME) would use e-commerce.
	BE2	Our company (MSME) follows other companies (MSMEs) to use e-commerce.
	BE3	Our company (MSME) chooses to adopt e-commerce due to many other companies (MSMEs) have used e-commerce.
Competitif Preasure (CP)	CP1	We choose to adopt e-commerce because many other companies or MSMEs have used.
	CP2	Our company (MSME) is more likely to get higher profits if using e-commerce.
	CP3	Our company (MSME) is more likely to get more competitive advantages if using e-commerce.
Adoption E-Commerce (AE)	AE1	Adopting e-commerce application.
	AE2	Developing e-commerce application.

After this research questionnaires had been designed as they are shown by Table 2, they were tested as the rules of thumb about data test by both validity and reliability test, but the test was done as the pilot test of this research questionnaires [16, 18]. If the pilot test was a success based on both validity and reliability test, the questionnaires were ready to be used for collecting data from each of this research respondents.

The data was collected by visiting “one by one” each MSME’s owner in Balikpapan, so this research respondents filled this research offline questionnaire. This research data was collected offline, done to ensure that each respondent's entries are accountable (preventing the biased data). After the data had been collected from each of this research respondents, the data would be tested by both validity and reliability tests, using SmartPLS.

Validity test on this research was done by both factor loading and average variance extracted (AVE) measurements. The validity test by factor loading measurement was done by measuring the factor loading of each variable’s indicators and ensuring the factor loading of each variable’s indicators is not less than 0.7 [18]. Then the validity test by AVE measurement was done by measuring the AVE values of each research variable and each AVE value must be more than 0.5 [18].

After this research data was valid after the validity test by both factor loading and AVE tests, the next step was the reliability test by both cronbach’s alpha (CA) and composite reliability (CR) tests [18]. Based on the rules of thumbs about both CA and CR tests [18], both CA and CR values must be above 0.7. If the data was reliable after tested by both CA and CR tests, then this research data might be analyzed.

Next steps, this research model and hypotheses were tested and then, the results were analyzed. This research model was tested by  $R^2$  test for measuring the change variation degree of the independent variable to the dependent variable [18]. This research

hypotheses were tested by t-test where  $t_{\text{value}}$  must be higher than  $t_{\text{table}}$  [18]. This research results were not only analyzed by both  $R^2$  and t tests, but also analyzing each respondent's opinions. Then, this research conclusions might be determined based on the results analysis of each  $R^2$  test, t-test, and the respondents' opinions.

### 3 Result and Discussion

#### 3.1 Results

Each of this research conceptual model and hypotheses were tested by  $R^2$  test for conceptual model test and t-test for hypotheses test. Each result of  $R^2$  test and t-test are shown by each Table 3 and Table 4.

**Table 3.**  $R^2$  test result

Variable	$R^2$
Adoption E-Commerce (AE)	0.598

**Table 4.** T-test (hypotheses test) results

Hypothesis	$T_{\text{value}}$	Hypothesis Status
H1 (CE $\rightarrow$ EA)	1.65	Accepted
H2 (I $\rightarrow$ EA)	2.736	Accepted
H3 (C $\rightarrow$ EA)	0.071	Rejected
H4 (RA $\rightarrow$ EA)	6.858	Accepted
H5 (TM $\rightarrow$ EA)	0.3	Rejected
H6 (EO $\rightarrow$ EA)	0.579	Rejected
H7 (CI $\rightarrow$ EA)	0.169	Rejected
H8 (CP $\rightarrow$ EA)	3.38	Accepted
H9 (BE $\rightarrow$ EA)	1.776	Accepted

Table 3 shows that  $R^2$  value of e-commerce adoption means the e-commerce adoption is positively influenced by 59.8%, by each factor of bandwagon effect, compatibility, cost effectiveness, competitive pressure, entrepreneurial orientation, competitive intensity, relative advantage, interactivity, and top management. The rests (40.2%), only other factors (outside each factor of bandwagon effect, compatibility, cost effectiveness, competitive pressure, entrepreneurial orientation, competitive intensity, relative advantage, interactivity, and top management) influences the e-commerce adoption (the other factors might be analyzed by each respondent's opinion).

Table 4 shows each hypothesis of H3, H5, H6, and H7 were rejected based on t-test results due to  $t_{\text{value}}$  of the hypotheses  $< t_{\text{table}}$ , where  $t_{\text{table}} = 1.646$  for this research due to



the numbers of this research respondents were 114. However, the rules of thumb of t-test, including the value of  $t_{table}$  were referred to [16, 19, 20]. Although each hypothesis of H3, H5, H6, and H7 were rejected based on t-test results, each of them might be analyzed further by each respondent's analysis.

### 3.2 Discussions

From the results obtained, respondents stated that the ease of organizations (MSMEs)' owners in making transactions and sales promotions was greatly influenced by the existence of e-commerce applications and might be seen from technological, organizational, and organizational factors, so that this allowed users to continue to use and utilize e-commerce as a help tool's users with their transactions and sales promotions. Several related recommendations that were determined based on the results of this research were:

- Carrying out a comprehensive evaluation of existing technological infrastructure in MSMEs.
- Ensuring each MSME's technology infrastructure is adequate to support the use of e-commerce.
- Provide adequate training to employees or business (MSME) owners on the use of e-commerce platforms.
- Conduct a detailed analysis of operational costs associated with e-commerce adoption.
- Consider e-commerce integration with existing systems, ensuring that the user interface of the MSME e-commerce platform is attractive and easy to use.
- Providing chat facilities and customer support services that are responsive and easy to access.
- Utilize the power of social media by integrating e-commerce platforms with MSME social media accounts.
- Using interactive features, conducting a thorough evaluation of existing technology infrastructure in MSMEs, choosing e-commerce solutions that can be integrated with existing systems and processes in MSMEs, collaborating with compatible suppliers or partners, carrying out regular monitoring of technology performance of e-commerce and its compatibility, education and awareness, demonstration and trials, solution-based approach, providing support and facilitating partnerships with parties that can help MSMEs, top management must show a strong commitment to e-commerce adoption, communication and cultural change, encouraging innovation within MSMEs by providing space for employees to propose new ideas related to e-commerce adoption, taking a proactive approach in exploring opportunities and challenges related to e-commerce adoption, building collaboration and networking with other MSMEs or stakeholders related to e-commerce, market and competitor analysis, product and service innovation, building networks and communities, focusing on competitive advantage, monitoring and continuously adapting strategies to respond to competitive pressures.

## 4 Conclusion

The factors influencing the adoption of e-commerce in MSMEs in Balikpapan include bandwagon effect, compatibility, cost effectiveness, competitive pressure, entrepreneurial orientation, competitive intensity, relative advantage, interactivity, and top management.

Based on the recommendations provided, MSMEs in Balikpapan can improve their e-commerce adoption by evaluating technological infrastructure, providing training, integrating e-commerce with existing systems, utilizing social media, and more.

The potential challenges for MSMEs in Balikpapan in adopting e-commerce may include limited technological infrastructure, lack of awareness and understanding of e-commerce, resistance to change, and regulatory barriers. However, there are also opportunities such as reaching a broader customer base, increasing sales and revenue, expanding market reach, and improving overall competitiveness.

This research still had the limitations so that the related subsequent research will be expected to "perfect" the limitations of this research, based on the following research suggestions: (a) conducting a comparative test between MSMEs in Balikpapan and other cities in terms of adoption of e-commerce on TOE factors that influence e-commerce adoption in the two cities. This will provide broader insight and allow identification of differences and similarities between MSMEs in various locations, (b) continuing research on digital marketing strategies used by MSMEs in Balikpapan to increase e-commerce adoption. Review how technology, organizations, and the environment influence the selection and implementation of these digital marketing strategies and examine the use of social media, online advertising, search engine optimization, and other strategies that MSMEs can use to increase their visibility and sales through e-commerce, (c) analysis of sustainability factors in the adoption of e-commerce by MSMEs in adopting the use of e-commerce. These factors can include social, economic, and environmental aspects that influence the success and sustainability of e-commerce adoption by MSMEs in Balikpapan as well as identifying challenges and opportunities related to these sustainability aspects.

**Acknowledgment.** The authors would like to thank grants for this research from Community Service and Research Institution (LPPM) of Institut Teknologi Kalimantan.

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