

Adoption Technology at MSME: A Conceptual Model with TOE

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Adoption Technology at MSME: A Conceptual Model with TOE

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Abstract—Strengthening MSMEs (Micro, Small and Medium Enterprises) in an era of overall change (globalization) and a high level of competitiveness, already requires MSMEs to be able to withstand global challenges, such as creating goods and service innovations, making changes in human resources and technology to better direction, as well as widen the reach of marketing. MSMEs as the pillars of the Indonesian economy show a low contribution to exports because they only reach 14% of the total export value of the non-oil and gas sector, which is inversely proportional to the data on amount of MSMEs stack up to the amount large businesses. Build upon the literature review, this research proposes identify the part of the variables of each TOE dimension in adopting Digital Technology to increase the competitiveness of MSMEs export oriented. The research output will be able to contribute to the regulation of MSMEs in managing their business to increase export competitiveness by taking into account the factors resulting from the TOE framework.

Keywords— *Conceptual Model, Technology Adoption, TOE, MSMEs, Framework.*

I. INTRODUCTION

Strengthening MSMEs (Micro, Small and Medium Enterprises) in an era of overall change (globalization) and a high level of competitiveness, already requires MSMEs to be able to withstand global challenges, such as creating goods and service innovations, making changes in human resources and technology to better direction, as well as widen the reach of marketing[1]. These efforts need to be carried out to raise the brand and selling value of MSMEs themselves, mainly reliable in dealing with the onslaught of foreign products that are widely available in the market and industry in Indonesia, where MSMEs are the foundation of the economic sector that is able to accommodate large numbers of workers in Indonesia[2].

MSMEs as the pillars of the Indonesian economy show a low contribution to exports because they only reach 14% of the total export value of the non-oil and gas sector. In fact, build upon data compiled by the Ministry of Cooperatives and SMEs in 2019, the amount MSMEs in Indonesia is very large because it reaches 99.99% compared to the number of Large Enterprises reaching 0.01%. The lack of a strong economic base in Indonesia has provided a driving force for the government to strengthen the structure of the economy by continuously building the presence of MSMEs. The existence or existence of MSMEs cannot be denied because

it provides evidence to be able to survive and become the driving force of the economy, especially after the economic crisis. From another point of view, MSMEs also experience many obstacles or problems, such as lack of working capital, inadequate levels of human resources, and inappropriate absorption of science and technology.

Electronic commerce is a step or stage of the process of buying and selling, distributing or changing the owner of goods, services or information via the internet or computer networks. A suite of uses for e-commerce: establishing global regional marketing; lower costs; increased speed of marketing time; improving service to consumers, and increasing income. For various levels of organization, especially for the category of small and medium businesses, the existence of e-commerce has a good effect [3].

Studies on the role of digital technology to increase the competitiveness of MSMEs have also been carried out by several researchers. Foroudi et. al. [4] carry out the process of identifying the two dominant parts of digital technology, namely as service convenience and information quality. In addition, the influence of digital technology, marketing capabilities, assets or assets has an important role as a provider of facilities in the company's growth and development. Malesev & Cherry [5] in their research confirms massive recognition of the benefits of digital marketing tactics in the MSME ecosystem, but in the process of absorption and effective use of digital marketing is hindered by the lack of observation from the outside environment, lack of investment and training of effective and up-to-date marketing mix, strategies and objectives.

Currently, information technology (IT) is universally considered as an important tool in increasing the competitiveness of a country's economy. There is a consensus that IT has a significant influence on company productivity. This effect will only materialize if IT is widely spread to use. It is very important to understand the determinants of IT adoption. The following are some excerpts about the comparison of IT adoption models at the small or individual level and the enterprise-scale level. Oliveira & Martins [6] stated that The TOE model introduces or identifies three parts of the company's dimensions that have an influence on the acceptance or adoption and implementation of technological innovations, namely the technological, organizational and environmental dimension. Setiyani & Yeny Rostika [7] stated that The technological aspect does not have a significant effect on the

intention to accept and implement e-commerce, but the organizational and environmental aspects have a significant influence on the intention to accept and implement e-commerce. All technology variables or indicators have evidence to significantly support the technological aspects of the intention to accept and implement e-commerce. Other studies also reveal different results in terms of indicators that make up the dimensions, such as Low et. al. [8] revealing that top management support, pressure characteristics of trading partners, relative advantage, competitive pressure, and company size have a significant effect on the adoption of cloud computing. Gui et. al. [9] also stated relative advantage, and top management encouragement have a positive effect on cloud computing adoption from Indonesian MSMEs. While other indicators such as complexity, and compatibility do not have a significant relationship to the adoption of technology [8], [9], [10]. Borgman et.al. [10] also stated that firm size has no significant relationship to technology adoption.

Based on the background, research gap, and the development of previous research, this research purposes to propose a conceptual model of the Technology, Organization, and Environment (TOE) Framework in identifying the role of the variables of each TOE dimension in adopting Digital Technology to increase the competitiveness of MSMEs export oriented.

II. LITERATURE REVIEW

A. MSMEs and Digital Technology

The definition of MSME various definitions based on country, generally based on measurable characteristics, namely number of workers, level of capital, sales and ownership of property. In Indonesia, a small company is defined as having less than 100 employees. In the US, small company means a company with under 500 employees.

Although there is no broad understanding of MSMEs, they are divided into several dominant characteristics such as limited resources from technology, capital, and members), the simplicity of the core business, dynamic tactics, sensitivity to change, and a relatively narrow market scope. The success of SMEs also mainly depends on the owner. Owners make policies based on the owner's individual characteristics, close relationships with consumers, employees and upstream businesses [11]

Recently, together with extreme changes or digital disruptions, this has provided opportunities and challenges for MSMEs. With digital tools, MSME marketing has a global reach with a high level of effectiveness and efficiency. However, this also provides a very high level of competition against traditional MSMEs. So MSMEs are encouraged to carry out digitalization by adhering to three pillars: customer knowledge and insight, business forms, and forms of operation. Conventional MSMEs are prone to failure coupled with a lack of digital knowledge and skills and high quality employees, making it an obstacle in the acceptance or adoption of digital technology in this sector. [11].

B. Information Technology Adoption Model

There are various theories applied in the study, especially technology adoption. The most commonly applied theories are the technology acceptance model (TAM), the theory of planned behavior (TPB), the integrated theory of technology

acceptance and use (UTAUT), the Diffusion of Innovation (DOI), and technology, organization, and environment (TOE). On a company scale, the theory of DOI and TOE is widely used. On an individual scale, TAM, TPB, and UTAUT are used[7].

C. Technology, Organization, and Environment Framework

TOE was created in 1990 with originators by Tornatzky and Fleischer. This theory explains three aspects of the company's dimensions that have an influence on the process or stages of the adoption and implementation of technological innovations, namely the technological dimension, the organizational dimension and the environmental dimension. Can be seen in figure 1.

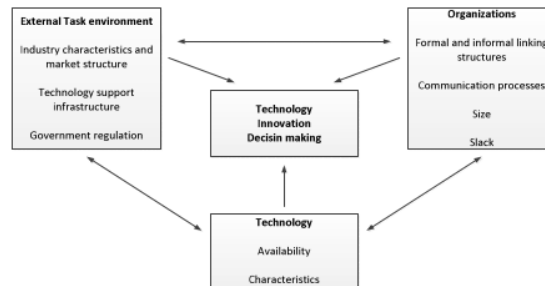


Fig. 1. TOE Framework

The technology dimension describes the internal and external technology that has a relationship with the company. The organizational dimension refers to the size of the description of the organization such as organizational boundaries, company scale, and managerial core. The environmental context is the company's relationship with industry groups, competitors and governments[11]

III. THE PROPOSED CONCEPTUAL MODEL

Build upon the previous research gaps, the model is modified into the framework of the research below:

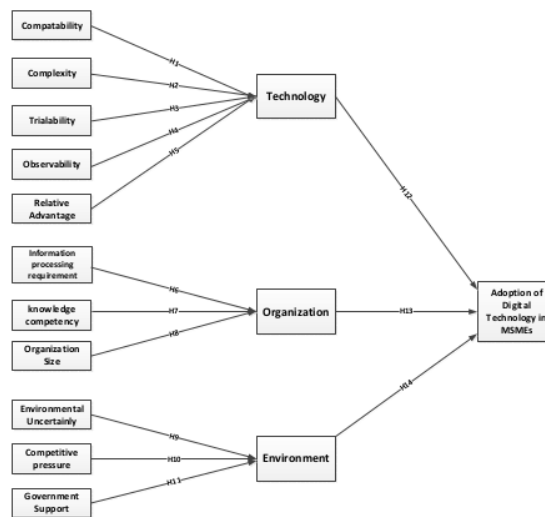


Fig. 2. Research TOE Model

Build upon the literature study, the research variables used in this study are in accordance with the proposed model concept, namely:

- a. Complexity is a barrier to innovation in understanding and applying digital technology to achieve business goals, which requires more effort to find ways to use innovation [7].
- b. Digital technology compatibility can be defined as the extent to which digital technology is consistent with technology that has the infrastructure, culture, values, and work practices preferred by MSMEs [12].
- c. Trialability is the extent to which an innovation can be tested on a limited basis or the more innovations that are tried, the faster the adoption [13].
- d. Observability is defined as the extent to which the results of an innovation are visible to others [14], [15].
- e. Relative advantage is defined as the degree to which an innovation is perceived as better than the idea it replaces.
- f. Information processing needs are defined as the gap between the information required by an organization and the information available in the application of digital technology [12].
- g. Knowledge Competencies are HR competencies that have skills in the field of digital technology so that MSMEs must also have digital technology knowledge competencies [12].
- h. Organization size implies that the larger the organization/company tends to adopt more information technology innovations in terms of flexibility and risk, and vice versa. [7].
- i. Environmental uncertainty is an environment that can undermine the use of new technologies, environmental vulnerabilities occur when complex and rapid changes occur. Organizations in high uncertainty may not adopt new technologies without supporting infrastructure and clear operating standards [12].
- j. Competitive pressure refers to the degree to which an organization reacts to competitive pressures, thereby encouraging the firm to use new technologies. It is concluded that competitive pressure is the strength of the organization's reaction to competitive pressure and compliance with industry requirements [12], [7].
- k. Government support can be defined as initiatives and opportunities from the government to encourage the adoption of digital technology [7].

The indicators of the variables used in this study can be seen in the table below

TABLE I. THE INDICATORS OF THE VARIABLES

Variables	Indicators	Ref
Relatif Advantage	Digital technology already or if implemented can reduce costs to the company	[9], [16],[17]

	Digital technology has been or if implemented can increase the efficiency of business operations at the company	[9], [16],[17]
	Digital technology has or if implemented can accelerate business processes in the company	[9], [16],[17]
	Digital technology already or if implemented can improve the relationship with the company's customers and business partners (vendors and customers) in the company	[9], [16],[17]
	Using digital technology makes it easier to perform business tasks.	[9], [16],[17]
	The use of Digital technology allows greater control over the business	[9], [16],[17]
Complexity	Digital technology is easy to implement in companies	[9], [16],[17]
	Digital technology is easy for employees to understand in the company	[9], [16],[17]
	Digital technology is trusted by employees at the company	[9], [16],[17]
	Digital technology requires a high level of expertise for companies to implement	[9], [16],[17]
Compatibility	Digital technology fits into the organisation culture in the company	[9], [16],[17]
	Digital technology matches the organisation value in the company	[9], [16],[17]
	Digital technology fits into the work habits of the company	[9], [16],[17]
	Digital technolog should be compatible with existing enterprise technology infrastructure.	[16],[17]
	Digital technolog should be fully integrated with enterprise information systems, software tools, and software solutions	[16],[17]
Trialability	I intend to try out Digital technology in before deciding whether to adopt it in practice	[18]
	A trial period before adopting Digital technology will reduce the perceived risks	[18]
	Trying out Digital technology is not important in my decision to adopt	[18]
	In the trial period, I will try to transform the saved records to Digital technology	[18]
Observability	The application of digital technology to MSMEs provides convenience in observing or observing it	[15]
	The application of digital technology to MSMEs makes it easy to communicate to others	[15]
	The benefits of applying digital technology to MSMEs can be felt for others	[15]
Knowledge Competencies	The adoption of digital technology requires an understanding of the application of the technology	[16]

	Adoption of digital technology requires the ability of organizations to adapt to technology	[16],[17]
	The adoption of digital technology requires the availability of organizational resources	[16],[17]
	Digital technology adoption requires top management support	[16],[17]
Organization Size	The adoption of digital technology can be applied to the size of MSMEs for small business scale	Author
	The adoption of digital technology can be applied to the size of MSMEs for medium-scale businesses	Author
	The adoption of digital technology can be applied to the size of MSMEs for large scale businesses	Author
Information processing needs	The data we currently use in our business is reliable.	[16]
	There is an agreement on clearly defined business rules and a set of data definitions.	[16]
	The search for and use of data/information to support decision-making is encouraged.	[16]
	Decision-making processes involving quantitative/numerical analysis are encouraged	[16]
Competitive pressure	Competitor companies influence the company's decision to adopt digital technology	[9]
	Pressure from the industrial sector influenced the company's decision to adopt digital technology	[9]
	Your business partners (vendors and customers) influence the company to adopt digital technology	[9]
Environmental uncertainty	The adoption of digital technology for MSMEs is an encouragement and demand from consumers	[19]
	The adoption of digital technology for MSMEs is an encouragement and demand from suppliers	[19]
	The adoption of digital technology for MSMEs is an encouragement and a demand for the development of the business world	[19]
	The adoption of digital technology for MSMEs is a push and a demand from competitors	[19]
Government Support	The government supports digital technology adoption	[9]
	The government sponsors digital technology workshops and conferences	[9]
	Law in Indonesia provides legal protection in the use of digital technology	[9]
	Indonesian laws and regulations facilitate the use of digital technology	[9]

This research is part of a larger research work, which is still ongoing. To get a complete picture of the conceptual model of the results of this study, data collection will be carried out from Indonesian information technology adoption experts. The questionnaire was distributed offline with the assistance of the research team to MSME management respondents in Blitar Regency, East Java Province, and Badung, Gianyar, Buleleng and Denpasar Municipalities, Bali Province.

The data collected from MSMEs will be analyzed first using the Structural Equation Modeling (SEM) technique through the use of Partial Least Squares (PLS-SEM) with the help of SmartPLS3 software. The purpose of this method is to find a causal relationship in a theoretical model based on empirical data. The benefits of this research are useful for identifying the role of Digital Technology to increase the competitiveness of export-oriented SMEs.

IV. CONCLUSION

A conceptual model of TOE digital technology adoption has been proposed which is equipped with variables and indicators that affect the adoption of digital technology for export-oriented MSMEs. Together with the proposed technology adoption variables and indicators, the model can be used to assess the level of digital technology adoption by MSMEs. To get many benefits from the adoption of this technology, especially for application developers, this model can be used as a framework for the digital technology development process of the development company. Therefore, our future research will focus on developing a TOE digital technology adoption framework for poultry farmers based on this research. A survey instrument consisting of a set of questionnaires related to the variables and indicators of the TOE technology adoption model will be developed. In future research, empirical tests will also be used to determine the effect of causality on variables with the adoption of developed digital technology.

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