Implementation of System Dynamics to Increase Successful Utilization of E-Commerce with Marketing and Innovation Capability in MSMEs

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Abstract: MSMEs (Micro, Small, and Medium Enterprises) are critical to the economic development of many cities across the world. The role of MSMEs can encourage equitable economic development which is one of the main pillars of the ASEAN Economic Community (AEC). However, many people still do not understand how to promote a new product that has a significant market potential using internet technology. The ongoing COVID-19 pandemic is causing changes in individual habits which also has the opportunity to permanently influence market developments in the coming years. Many people choose to shop online using e-commerce. The role of e-commerce is very influential in improving the performance of MSMEs. There are several variables in the successful use of e-commerce, including internal and external inhibiting and supporting variables. The system dynamics method is used in this study to link variables associated to e-commerce success with variables linked to MSMEs’ performance. The results of this study are the success of the use of e-commerce is interrelated with marketing and innovation capability which has a positive effect on the performance of MSMEs. This study is intended to boost the use of e-commerce in MSMEs, particularly in Indonesia.

Keywords: system dynamics; e-commerce; MSMEs performance

1. Introduction

MSMEs (Micro, Small, and Medium Enterprises) are critical to the economic development of many cities across the world. Nowadays, MSMEs using e-commerce to accelerate their business. The Indonesian E-commerce Association (idEA) stated that until March 2021, the number of MSMEs that have joined various marketplaces has reached 4.8 million. This condition increases at the end of 2020 as 3.8 million business actors[1].

The community has diverse creativity, it has the potential to build MSMEs that have high competitiveness. In this case, the role of MSMEs can encourage equitable economic development which is one of the main pillars of the ASEAN Economic Community (AEC). The Indonesian government has the power to optimally control its tasks and activities through policies. However, this opportunity is still not enough to face the AEC[2]. The important thing that needs to be considered is the readiness of business actors to face competition in the EAC, especially in terms of studying technology because it can provide solutions to advance the MSMEs. However, many
people still do not understand how to promote a new product that has a significant market potential using internet technology.

This can be overcome, with the use of e-commerce to manage MSMEs effectively. According to Baum, electronic commerce (e-commerce) is a dynamic mix of technologies, applications, and business processes that connect businesses, customers, and specialized communities through electronic transactions and the selling of products, services, and information[3]. With a large number of internet users in Indonesia, MSMEs have a great opportunity to develop e-commerce. The growth of the online market with e-commerce in Indonesia has the potential to develop.

From the research before known some several factors that support the achievement of e-commerce success, including the driving and inhibiting factors both from internal and external[4]. The result of this research is recommendations for increasing the success of e-commerce in MSMEs. In addition, from this research, it can be proven that e-commerce can help MSMEs if they pay attention to the factors that influence their success.

Research conducted by Sok, et al. discusses how to achieving superior SME performance[5]. From the research, the authors found that marketing and innovation capability are positively associated to MSMEs success. In addition, the role of e-commerce is very influential on improving the performance of MSMEs, if it can be used and utilized properly by business actors.

Therefore, the authors want to identify the factors that influence the success of e-commerce utilization and how it relates to marketing capability and innovation capability so that the performance of MSMEs can increase. The goal of this study is to develop a system dynamics model using the Causal Loop Diagram to maximize e-commerce usage. This paper consists of several parts as follows: the first part which contains a literature review, the second part shows the development of the model, and the last part shows the conclusion.

2. Literature Review

2.1 Micro, Small, Medium Enterprises

MSMEs are defined as productive businesses that stand alone and are carried out by individuals or small group of people or business entities that are not subsidiaries or branches that are owned, controlled, or become a part either directly or indirectly of a medium or large business with a certain amount of wealth and income, according to the Indonesian book of Law number 20 of 2008 concerning Micro, Small, Medium, Enterprises[6].

2.2 E-Commerce

E-commerce, according to the OECD, is defined as the buying and selling of goods between firms, homes, individuals, governments, and other organizations over a small computer network connected to the internet[7]. In a narrow definition, e-commerce is the use of internet-connected technology to support any business process required for a company to function effectively[8].
2.3 System Dynamics

System Dynamics is a method that not only describes the complexity in the system but also describes the processes and behavior in the system[9]. The steps in the system dynamics modeling are:

- **Causal Loop Diagram (CLD)**
  In the causal loop diagram, the variables derived from the collected data are places according to the interaction pattern. The causal loop diagram is a feedback (cause and effect) diagram presented by a system dynamics model. This diagram depicts how a variable's polarity affects its direction of change. There are two types of polarity flow: positive and negative[10].

- **Stock and Flow Diagram (Basic Model)**
  The cause and effect diagram is a detailed version of the stock and flow diagram (SFD). The SFD depicts the relationship between variables more clearly than the causal loop diagram. SLD employs a variety of symbols to represent the numerous variables involved[10].

3. Model Construction

3.1 Problem Articulation

At present, the use of e-commerce that is not optimal will be difficult to develop MSMEs. Customers tend to choose to buy in stores that have e-commerce services. By studying the success factors for using e-commerce, MSMEs have a greater and faster opportunity to develop. The ongoing COVID-19 pandemic is causing changes in individual habits which also has the opportunity to permanently influence market developments in the coming years[11].

To find out what factors influence the successful use of e-commerce, the authors conducted a literature study. From several journals, the author makes a model for e-commerce’s successful utilization. This model can help business owners to maximize the use of e-commerce in their business.

3.2 Formulating a Dynamics Hypothesis

The authors describe the relationship between marketing and innovation capability with successful e-commerce use using a system dynamics method, as previously mentioned. At this stage, researchers identify variables that have a significant effect on the output of the model built from the data and literature collected. Then the researcher determines the endogenous and exogenous variables from the variables that have been found.

According to Quaddus & Achjari, the factors that influence the success of e-commerce utilization are internal driving factors, internal inhibiting factors, external driving factors, and external inhibiting factors[4]. Successful e-commerce can be seen from the increasing value of internal and external drivers. On the other hand, internal and external inhibiting factors should decrease.

Then according to Sok, the performance of an MSME can be seen if it is able to provide value for marketing capability, innovation capability, and learning capability[5]. In this study, the
authors only take aspects of marketing capability and innovation capability that are associated with the successful e-commerce utilization. The higher value of both variables are able to support the performance and competitiveness of SMEs. The innovation capability variable means a set of interrelated processes within a company to make it easier to implement the successful evolution, development, and implementation of product innovations. High innovation capabilities will enable SMEs to achieve superior performance[5].

Marketing capability is a collection of processes within the company that is interrelated to facilitate the development, evolution, and implementation of successful marketing strategies against competitors. MSMEs, especially in Indonesia, sell their products via social media platforms such as Instagram, Facebook and WhatsApp. Constraints that are often faced are resources that are able to manage not only social software but also cash flow, market expertise, as well as tactical and strategic customer problems[5].

Innovation capability and marketing capability are influenced by the level of success in using e-commerce and the Market Share Index of e-commerce. By knowing the value of these variables, the production value can be calculated. The production value itself is influenced by the average manufacturing growth. In this study, the authors discuss about e-commerce, so the production value is also influenced by the value of online transactions and offline transactions. The Successful Use of E-commerce is depicted in Figure 1 as a causal loop diagram.

Figure 1 A Causal Loop Diagram of the Successful Utilization of E-Commerce.
3.3 Validation Structure

Validation aims to test the validity of the variables and the relationship between variables. Validation is done by using the literature. Table 1 shows the endogenous and exogenous variables in the model.

Table 1 Model Boundary Successful Utilization of E-Commerce.

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### Production Value | [12]
---|---
Online Transaction | [12]
Offline Transaction | [12]
Average Manufacturing Growth | [13]

### 4. Conclusions
In this paper, the authors propose a systems dynamics approach with the consideration that researchers can incorporate expert knowledge and describe nonlinear behavior into the model. Based on the model that has been made using a causal loop diagram, it can be concluded that marketing capability and innovation capability are interrelated with e-commerce successful utilization. Internal and external forces, as well as other variables, influence these variables. The validation process is then carried out by locating each variable’s references. The results revealed that the model was viable and that MSMEs could utilize it to make decisions. Marketing capability, innovation capability, and learning capability are three elements that have an impact on MSMEs’ performance [5]. In this study, the authors have not included the variable learning capability. So for further research, it is expected that the learning capability variable and other variables related to e-commerce successful utilization will be explored. In addition, further researchers can validate the model using the scenario from the stock-flow diagram.

### References


