Does E-commerce adoption create SME performance: A Literature Review

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ABSTRACT

This study aims to examine previous research in order to determine the effect of technology and organization on SME performance mediated by E-commerce adoption. This study applies various theories, namely the theory of diffusion of innovation (DOI), and technology, organization, environment (TOE) to explain the relationship between variables. As a literature study article, this article contributes to developing a conceptual framework about SME performance in the perspective of the two theories. This article is important for management and further research considering that not many previous studies have used the theoretical framework of diffusion of innovation (DOI), and technology, organization, environment (TOE) to test a similar research model. This study has limitations in obtaining research that examines the company's environment from the perspective of technology, organization, environment (TOE) theory. Nevertheless, this study carries a new framework that illustrates the contribution of technology, organization, and E-commerce adoption to SME performance.

Keywords:
SME Performance
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I. Introduction

Information technology is progressing and developing according to the needs of society. Advances and developments in information technology occur in all sectors, especially trade and business [1]. This makes business actors continuously innovate services related to the use of information technology, so that they can be known by the wider community, especially in transactions and buying and selling. One form of the very rapid progress and development of information technology is the emergence of electronic commerce or e-commerce [2]. That is, in the business world the role of information technology is utilized for electronic commerce. E-commerce is universally regarded as a valuable tool in increasing the productivity and competitiveness of a business or economy of a company and a country [3], [4]. On this occasion the researcher is interested in analyzing e-commerce in an organization or Small and Medium Enterprises (SMEs). Therefore, it is important to understand the factors that influence e-commerce adoption and the emerging theoretical models in dealing with e-commerce adoption itself.

The history of e-commerce began when the United States Department of Defense formed an agency called the Defense Advanced Research Project Agency (DARPA) with the task of conducting a communications network project under the name ARPA. ARPA was redeveloped in 1969 into the ARPANET communication network, namely the Advanced Research Project Agency Network through the use of PDP-10 and PDP-11 computers at the time [5]. At the end of the 1970s, Electronic Data Interchange (EDI) and Electronic Fund Transfer (EFT) technologies emerged which further enhanced the new chapter of e-
commerce development. In addition, at the end of the 1980s, technology emerged that supported the use of Electronic Credit Cards, ATM machines (Automated Teller Machines) and Telephone Banking which were forms of e-commerce at that time. E-commerce has skyrocketed since the discovery of internet technology in the 1990s and its use is increasingly considered to provide significant benefits for the smooth running of a business or business process [6].

There are several theories that can be used in e-commerce adoption research. Researchers use the theory of diffusion of innovation (DOI), [7], [8], and technology, organization, environment Framework (TOE) [9], because these two models are at the organizational or company level as the unit of analysis. Previous researchers and scientists have done a lot of research related to the factors that can affect the adoption of e-commerce through DOI, and the TOE framework to explain the relationship between the factors that influence the implementation of technological innovation in an organization or company. The TOE theoretical framework explains that there are three aspects that can influence innovation in the use of e-commerce technology in an organization, namely Technological, Organizational and Environmental.

Meanwhile, DOI theory, which stands for Diffusion of Innovation theory, explains the fundamental approach to analyzing new technology diffusion [10]. DOI theory was introduced by [7] which states that the adoption and use of innovation by companies or organizations is influenced by two aspects, namely innovation characteristics and organizational characteristics. According to [8], innovation characteristics can explain the variation in the innovation adoption rate of a company or organization by 49-87%. Furthermore, according to [11] in their research, TOE's theoretical framework overlaps and is related to DOI theory. There are similarities between these two theories which lie in the characteristics of innovation and technology as well as between the characteristics of organizations and organizations. However, there are differences between these two theories where the DOI theory does not consider the impact of environmental aspects as is done in the TOE theoretical framework. Therefore, in the current study, researchers will use technology, organization and environment as factors that influence the adoption of e-commerce by SMEs. In addition, the current study will also interpolate the SME Performance variable to see the influence of the factors that influence the adoption of e-commerce in SMEs and their impact on the performance of SMEs in order to contribute to interested parties both theoretically and practically. On the other hand, there are studies that have measured these factors on e-commerce adoption and SME performance by obtaining different research results.

[12] conducted a study entitled Factor Affecting E-Commerce Adoption in SMEs in the GCG: An Empirical study of Kuwait. The results of his research obtained the fact that the technology context through indicators of perceived benefits has a positive and significant effect on the adoption of e-commerce by SMEs in Kuwait. This is in line with the findings [13]–[17] which show E-Commerce Adoption on SME performance. [18] explains that the availability of technology through indicators of the availability of financial resources has a positive effect on e-commerce adoption. However, this finding is inconsistent with the results of research by [19] which found that cost was found to have no significant correlation with e-commerce adoption. A possible explanation for this finding is because the price of hardware and software associated with e-commerce technology is not too expensive for SMEs. The results of the research by [20] obtained the fact that technology has a positive impact on organizational performance. Technology is understood as the systematic application of science or other organized knowledge to practical tasks. Meanwhile, [21] found that technological competence on e-commerce adoption has a positive but insignificant effect on the performance of SMEs in the Greater Jakarta area. Technological competence, in this case the competence related to e-commerce literacy, is not a determining factor in the performance of SMEs in e-commerce adoption.
Research results [22] obtained the fact that the organization through the size indicator is a determining factor in influencing the adoption of e-commerce. [23], [24] explains that organizational factors through age of firm and firm size indicators have a positive effect on e-commerce adoption. Organizations can also have an impact on SME business performance. [25], [26] explain that organizational business characteristics affect business performance. This shows that if the size of the business (organization) is large, the performance of SMEs will also be good or increase. Small and Medium Enterprises (SMEs) in Indonesia are economic activities in accordance with Law Number 20 of 2008 concerning Micro, Small and Medium Enterprises.

1) Small Business; is a productive economic business that stands alone, which is carried out by an individual or a business entity that is not a subsidiary or branch of a company that is owned, controlled, or becomes a part, either directly or indirectly, of a medium or large business that meets the Business criteria. Small as referred to in the Act.

2) Medium Enterprises; is a productive economic business that stands alone, which is carried out by an individual or a business entity that is not a subsidiary or branch of a company that is owned, controlled, or becomes a part, either directly or indirectly, with a Small or Large Business.

The indicators in the performance dimensions of SMEs in this study were adopted from several research sources, namely [27]–[30]:

1) Increase in sales and profit; Sales is an integrated effort to develop strategic plans that are directed at satisfying the needs and wants of buyers, in order to get sales that generate profits.

2) Efficiency; The performance of a company or organization can be measured through efficiency, which is expected to be obtained from the adoption of new information technology by a company. In particular, e-commerce is predicted to reduce coordination and transaction costs due to the automation of online transactions, as well as productivity and increased efficiency.

3) Increased consumer or customer satisfaction; Is a key factor in the company's performance. Customer satisfaction is generally defined as a feeling or assessment by customers of the products or services they have used.

Based on the theory of diffusion of innovation (DOI), and technology, organization, environment (TOE) as well as previous research, it is known that technology, organization, and e-commerce adoption have an influence on SME performance. This article fills the gap and establishes the conceptual framework for technology, organization, and E-commerce adoption and SME performance in the context of developing countries. The author intends to study theoretically, first, how does technology affect SME performance, either directly or indirectly through e-commerce adoption? Second, how does organization affect SME performance, either directly or indirectly through e-commerce adoption? Third, how does e-commerce adoption affect SME performance? The authors leave further study to answer the question by applying the appropriate data. The introduction is the first part of the article structure. In the second part, the author discusses the methods used in this literature review. The third section describes the results, including technology, organization, and e-commerce adoption that have an influence on SME performance, and discusses the propositions derived from the relationship between these variables. The last section states the conclusion.

II. Method

This research was developed in three stages (Figure 1). First, collect then review the literature and previous studies. Then analyzed and adopted to be formulated into a research model. Third,
instrument development. At this stage, each variable is explained, including compiling measurement items.

![Research Method Diagram](image)

**Figure 1. Research Method**

During the process of collecting literature and previous research, the authors used certain keywords, such as "technology and e-commerce adoption", "technology and SME performance", "organization and e-commerce adoption", "organization and intention to leave", "e-commerce adoption and SME performance", "diffusion of innovation (DOI) theory, and technology, organization, environment (TOE) and SME performance". This research combines keywords and the forward snow-ball method as a search strategy. Throughout the selected papers, the authors examine the papers and summarize the main hypotheses and findings to ensure that all articles qualify. After that, a conceptual research model (figure 2) was drawn up.

![Conceptual Model Diagram](image)

**Figure 2. Conceptual model**

**III. Result and Discussion**

A. Technology and E-commerce adoption: diffusion of innovation (DOI) Perfective

*Diffusion of Innovation (DOI)* theory which stands for Diffusion of Innovation theory where this theory explains the fundamental approach to analyze new technology diffusion and a process of how an innovation can occur through a communication channel. Roger defines the diffusion of innovation "as the process by which an innovation is communicated through certain channels over time among the members of the social system" [31], [32]. [8] suggests that there are five characteristics of innovation, namely:

1) Relative Advantage is the level of excess of an innovation. This can be seen from the results of previous innovations or from things that are usually done, measured in terms of economy, social achievement, comfort and satisfaction. The greater the perceived relative advantage, the faster the innovation is adopted.

2) Compatibility is the level of compatibility or suitability of an innovation, which can be considered whether it is consistent or in accordance with existing values, experiences and needs.
If the innovation is contrary to or not in accordance with the values and norms adopted, the new innovation cannot be adopted easily.

3) Complexity is the level of complexity of the innovation to be adopted, how difficult the innovation is to understand and use. The easier an innovation is to understand, the faster the innovation is adopted.

4) Triability is the level of whether an innovation can be tested first or must be bound in its use. An innovation that can be tested in real situations is generally adopted more quickly. In order to accelerate the adoption process, an innovation must be able to show its advantages.

5) Observability or observability is the level of how the results of using an innovation can be seen or can be observed by others.

The theory of diffusion of innovation (DOI), which presents a fundamental approach for investigating the diffusion of new technologies [10], [31]. DOI theory postulates that the adoption and use of a firm’s innovations is influenced by the characteristics of the innovation and the characteristics of the organization. Rogers shows that the characteristics of an innovation consist of five attributes that can explain 49-87% of the variance in the rate of adoption. At the organizational level, Rogers [8] suggests several organizational characteristics that influence the adoption and use of innovations. DOI theory is also found to be a framework that is often used in considering the adoption of e-commerce and e-business in developing countries [33]–[42]. Empirical studies investigating the adoption of e-commerce and e-business in developing countries aim to demonstrate the various implications of the development of e-commerce and e-business in developing countries.

In the context of developing countries, companies are considered to need to issue a budget for periodic information technology updates [43]. The budget allows employees to update or upgrade their knowledge and skills in information technology. The budget can also be used to maintain information technology systems and hire trainers or experts. This is because employees need to be introduced to e-commerce through applicable training [44], [13] explains that technology is a determining factor in influencing e-commerce adoption. Technological factors are the most dominant influence to adopt e-commerce successfully [45]. Operating in e-commerce properly can get the expected results.

The results of the study [45], [46] obtained the fact that information technology plays an important role in e-commerce. These findings correlate with research by [47] who found that the most dominant factor in adopting e-commerce was technology readiness. Technology readiness is the most important factor in adopting e-commerce because SMEs cannot adopt e-commerce if the company is not ready in technology [16]. [18] explained that the availability of technology has a positive effect on e-commerce adoption. The results of the study [48] obtained the fact that technological factors significantly and positively influenced the adoption of information and communication technology. [49] explains that technological factors, namely technology infrastructure, level of IT HR expertise, and the development of third parties have a positive effect on e-business adoption. It was found that the technology variable with the perceived benefit indicator has a positive and significant relationship with e-commerce adoption, which means that perceived benefit is one of the determinants of e-commerce adoption by SMEs in Indonesia [19], [50]–[52].

Based on the theory and empirical experts described earlier, this study uses indicators from technology according to [11], [19], [30] including: (1) Perceived Benefits. (2) Compatibility. (3) Costs. Based on this description, it describes how technology directly or through the contribution of e-commerce adoption determines the achievement of SME performance. However, there are still limited researchers who examine the role of e-commerce adoption as a mediator in this context.

Proposition 1. E-commerce adoption Creates SME performance.

Proposition 2. Technology Creates SME performance through E-commerce adoption.

B. Organization and E-commerce adoption: Technology, Organization, Environment (TOE) Perfective
The theoretical framework of technology-organization-environment (TOE) is an abbreviation of technology-organization-environment which was introduced by [9] which in this theory explains that there are three aspects that can affect innovation in the use of technology in an organization, namely:

1) Technological Context, describes the technology used, suitability, and relevant and available technical skills in an organization.
2) Organizational Context, the organizational context refers to the internal measures of the organization such as the size of the organization itself.
3) Environmental Context, is an internal and external arena where the company runs its business. Environmental Context includes the industry itself, competitors, trading partners and government support.

The theoretical perspective of technology-organization-environment (TOE) is derived directly from the DOI concept. The TOE framework identifies two aspects that can influence an organization's use of a technological innovation: (1) the technology context describes the existing technology that is being used and the relevant technical skills available in the organization; (2) organizational context refers to the internal size of the organization such as its size by [9]. In the literature, the TOE framework and DOI theory are often used in various domains of adoption of electronic commerce and business as well as the concept of adoption of information systems. The first includes the adoption of various "e-" constructs such as e-procurement [47], [53], [54], e-commerce [55]–[57], e-markets [58]–[62], and e-supply chains [63]–[70].

While organizational characteristics refer to different features of the organization such as scope, size or managerial structure, which can accelerate the adoption of information systems [71], [72]. According to [8] company size represents several important aspects of an organization, such as slack resources, organizational structure and decision-making flexibility, which can affect the adoption of information systems. Likewise, the adoption of e-business requires organizational adaptation, such as business process reengineering and organizational restructuring. [73] to carry out the above processes, company managers must have certain knowledge and skills. Therefore, this study combines firm size and top management support in organizational characteristics

[23], [24] explains that organizational factors through firm size indicators have a positive effect on e-commerce adoption. Larger companies are known to have a lot of resources while smaller companies will find it very difficult to acquire such a system due to limited resources. These results are correlated with the research of [74] which obtained the fact that the organization through the size indicator is a determining factor in influencing e-commerce adoption. This finding is inconsistent with the results of research by [19] which obtained the fact that organizational context through firm size indicators has no effect on e-commerce adoption of Indonesian SMEs. It is indicated that Indonesian SMEs do not know the size of the company as a factor that influences it in the implementation of e-commerce.

Based on the theory and empirical experts described earlier, this study uses indicators from organization according to [11], [19], [24] as follows (1) Age means the length of time the company operates which affects the mindset in seeing changes in business models and decisions to use e-commerce; (2) Size means the size of the company that affects the adoption of e-commerce in terms of assets; (3) Source of funding. Based on this description, it describes how the organization mechanism directly or through the contribution of e-commerce adoption determines the achievement of SME performance.


C. Creating E-commerce Adoption to SME Performance

Adoption can be interpreted as the appointment or acceptance of something, e-commerce adoption means the adoption or acceptance of e-commerce that was previously never owned or used [75]. The adoption of e-commerce in an organization is carried out if the organization feels the need and must have the electronic commerce [76], [77] explained that there are several forms of e-commerce adoption as part of information technology commonly used by MSMEs, namely email, internet, extranet/vpn, websites, electronic data interchange (EDI), and electronic fund transfer (EFT). Adoption by an organization is influenced by various factors [78]. Electronic commerce (e-
commerce) is defined as the behavior of trading in goods and services, with the help of telecommunications and telecommunications-based tools such as the Internet. E-commerce is often used in a much broader sense, basically meaning the same as "electronic business" (e-business) and e-commerce is a sub-component of e-business. Where e-business refers to company operations carried out with the help of the Internet and online technologies, for example buying and selling products with digital money through Electronic Data Interchange.

The concept of e-commerce contains tools that are strategically important to business from the products offered to the processes carried out by electronic-oriented businesses with any business capacity/category [79]. The concept of e-commerce has strategic importance for businesses ranging from tangible products offered to process-oriented ones in any capacity/category. The concept of e-commerce covers many areas, such as electronic catalogs which are a place for sellers to communicate their offers to potential buyers [80]. E-commerce just like online stores can be used to manage orders and inventory and process transactions, people have the opportunity to buy selected products anywhere in the world. Goods and services available through e-commerce can range from raw materials, finished goods to even services provided for certain reasons [81]. E-commerce is defined as the process of buying, selling, transferring or exchanging products, services or information through a computer network on the internet [82].

There are many reasons that encourage SMEs to adopt e-commerce to support their business activities. E-commerce can increase business opportunities, competitiveness, and better and more profitable market access [83]. E-commerce is emerging as a new way to help companies win the market competition [84]. When companies view e-commerce as a tool to expand their market, reduce costs and so on, they tend to adopt e-commerce [85]. This is because e-commerce allows organizations to access potential customers and suppliers via the web. In addition, e-commerce offerings are; market expansion, productivity improvement, product and service customization, 24-hour trade and knowledge exchange [13], [83], [86], [87].

The adoption of e-commerce can improve business performance through increased online sales. [86] explains that the adoption of e-commerce has an impact on the strategy of SMEs. The introduction of e-commerce has changed business plans and strategies. [18] stated that the adoption of e-commerce had a positive and significant effect on improving the performance of SMEs. In line with the technology-organization-environment (TOE) framework which identifies two aspects that can influence an organization's use of a technological innovation: (1) the technology context describes the existing technology being used and the relevant technical skills available in the organization; (2) organizational context refers to the internal size of the organization such as its size [9]. The main reason that affects the adoption of e-commerce is that companies are able to improve the quality and speed of service so that it has a good impact on increasing sales and profits. The results of the study [55] explain that e-commerce adoption has a positive influence on performance and competitive advantage. This finding is correlated with the results of the study [19], [26], [36], [74] which found the fact that e-commerce adoption has a positive effect on the performance of SMEs. The adoption of e-commerce has a positive and significant impact on the performance of SMEs [30]. According to him, performance improvement can be in the form of reducing transaction costs and closer coordination of economic activities between business partners. In particular, e-commerce is predicted to reduce coordination and transaction costs due to online transaction automation, as well as productivity and increased efficiency. This finding is inconsistent with the results of the study [35], [88] which found that the use of e-commerce had no significant effect on increasing sales or profits of SMEs.

Based on the theory and empirical that has been explained earlier, the E-commerce adoption in this paper uses the parameters proposed by [27], [35], [88] including: (1) Use of the internet in the process of selling products; (2) Availability of e-commerce supporting facilities; (3) HR readiness in e-commerce; (4) The speed of SMEs in responding to consumers online.

IV. Conclusion

This study prioritizes the influence of technology and organization on SME performance mediated by e-commerce adoption. Based on the literature review, e-commerce adoption has great potential in determining the improvement of SME performance driven by technology and organizations. Explanation of research variables through the perspective of the theory of diffusion of
innovation (DOI), and technology, organization, environment (TOE). The use of theory in this research is intended to provide a comprehensive explanation, although some theories have not been widely used by many studies. However, these theories are able to explain the effects that arise between variables significantly. The research model and supporting arguments used in this study can contribute to advancing current discussion efforts in the field of business management and administration. Therefore, this research is very relevant to be applied to further studies using quantitative, qualitative, and mixed methods.

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