

# Factors Influencing E-Commerce Adoption by SMES Indonesia: A Conceptual Model

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## Abstract

*E-commerce present different prospect to Small and Medium Sized Enterprises (SMEs) and provides benefits to SMEs. At this stage, there are a number of studies focused on SMEs in developed countries. For developing countries, the situation is quite different. Furthermore, there is still limited number of researches on e-commerce adoption by SMEs in Indonesia. SMEs play a vital role in reducing the rate of poverty and unemployment in Indonesian economy. In 2009, micro, small and medium enterprises in Indonesia consist of 52.7 million units or 99.99% of the total business enterprises, and employ 96.21 million people or 97% of the total labor forces. SMEs in Indonesia faced internal and external problems. This study explores various factors influencing e-commerce adoption by SMEs in several countries and projecting it to Indonesia. Results shows that there are a number of perceived opportunities presented by e-commerce adoption in Indonesia, i.e. extending market-reach and even global, increasing customer personalize services, and improving its competitiveness. Furthermore, this study also proposes six potential factors influenced the adoption of e-commerce by SMEs in Indonesia, i.e. perceived usefulness, perceived ease of use, relative advantage, perceived risk, perceived trust, and compatibility.*

**Keywords:** e-commerce, adoption factors, small and medium-sized enterprises (SMEs),

## 1. Introduction

Electronic commerce (e-commerce) is the process of buying, selling, transferring or exchanging products, services and/or information via computer networks, including the internet [1]. It has to do with how IT is used by an organization in order to improve interaction quality with and between all its stakeholders [2]. E-commerce provides benefits to organizations, individual customers and society. Several benefits of e-commerce are global out-reach, cost reduction, 24/7 business, rapid time-to-market, increased speed, improved customer services, improved information availability, just-in-time business decisions, and less importance of geography. E-commerce can be a benefit to organizations of all sizes, particularly to the small-business sector [1][2][3]. It is an effective instrument for administering business processes, specifically marketing and selling products and services around the world. It can bring about company's advantages through aforementioned benefits which at the end expand market penetration, optimized operations, and ultimately boosting revenue through its careful and selective continuous implementation in firms [4].

Small and Medium-Sized Enterprises (SMEs) are those business organizations which is considerably small in scale, which often are family-run companies and lack of networking [5]. Financial institutions tend to overlook their financial potential due to considerably their inadequate assets. In fact, experience shows that SMEs are the type of firms which has the strongest immune system against global financial turbulence and the most rapid growth. Economist believes that they are one of the strong holes and pillar for industrial development and drives national and regional economic growth. Thus, SMEs are more adaptable and elastic compare to their relatively larger firms when dealing with market changes or global economic turbulence. They are relatively faster in adopting opportunities for innovations and changes in market strategies. They have an ability to immediately recognize a change in the environment though they have insufficient resources. Those are the key factors which ensure their strategic position in promoting economic development.

SMEs in Indonesia are defined as independent productive enterprises, which are run by individuals or companies that are not subsidiaries that are owned, run or become both directly or indirectly part of a large enterprise [6]. According to Law #20 of 2008 [7], the Small business entity has the following criteria: (1) its asset is between 50.000.000 and 500.000.000 (IDR) including land and building, and (2) its annual sales is between 300.000.000 and 2.500.000.000 (IDR). The Medium-Sized business entity has the following criteria: (1) its asset is between 500.000.000 and 10.000.000.000 (IDR) including land and building, and (2) its annual sales is between 2.500.000.000 and 50.000.000.000 (IDR). Furthermore, Indonesian's Central Bureau of Statistics (BPS) provides a definition SMEs based on the number of employees, i.e. 5-19 persons for small-sized business and 20-99 persons for medium-sized businesses.

## 2. Problem Formulation

The United States is known as the place where e-commerce was initially adopted. It is recorded that US is still number one adopters in term of participants. US Cencus Bureau shows that 1.9% of total retail sales in the 1<sup>st</sup> quarter of 2004 come from of Business-to-consumer (B2C) e-commerce. This is almost double the amount of the same quarter in 2001. The yearly-based growth rate of B2C e-commerce retail of the 1<sup>st</sup> quarter of 2004 reached 28.1%, which is four times higher than the total retail, i.e. 8.8 % [8].

If we view a smaller scale of world economy power, such as ASEAN, we can see that SMEs are becoming determinant factor of ASEAN economy. They comprise more than 96% of all regional enterprises and between 50-95% of employment in many ASEAN countries. In general, SMEs contribute 30-53% of GDP and 19-21% of regional export. SMEs absorb the largest part of local human resources. They are spread transversely along various economic sectors, but mostly products which are manufactured mainly by hand. Geographically, they are evenly disbursed throughout rural and urban areas [6].

SMEs play a vital role in reducing the rate of poverty and unemployment in the Indonesian economy. In 2009, micro, small and medium enterprises in Indonesia comprise 52.7 million units or 99.99% of the total business enterprises, and employs 96.21 million people or 97% of the total labor forces. The SMEs share to GDP and export is 56.53% and 17.02%, respectively [6].

The crisis that occurred in Indonesia since the middle of 1997 has yet to show signs of ending. One by one of large enterprises went bankrupt because of the price of imported raw material skyrocketing, rising debt service costs due to depreciating rupiah against US dollar. Banking sector fails to play its role in providing financial support for industrial sector. Many companies are no longer able to continue their business because of high interest rates. Surprisingly, the majority of SMEs remains and even tends to grow. There are five reasons for SMEs to survive and tend to grow in number during the crisis. First, most of the SMEs produce consumer goods and services. Second, the majority of SMEs do not get loans from the bank. Third, SMEs have a strict specialization of production. Fourth, SMEs have more options in procuring raw materials locally; as a result, production cost is low and efficiency is high. Lastly, many formal sectors decided to reduce the number of their employees significantly as their company strategy during the major crisis. Those unemployed workers immediately turn to informal sectors, which mostly forming small-sized businesses. This consequently increased the number of SMEs [9].

There are several problems facing SMEs in Indonesia. Problems that can be considered as internal problems are lack of capital and limited access to financial resources, the quality of human resources, lack of business networks and market penetration ability, mentality of SME entrepreneur and lack of transparency. Problems which can be considered as external problems are limited facilities and infrastructure business, illegal fees, implication of regional autonomy, the implications of free traded, the nature of the product with a short resistance, limited market access, and limited access to information [10].

E-commerce could introduce different opportunities to SMEs and could assist this sector in deal with different technological and organizational inadequate [10]. SMEs may use e-commerce technologies to interact with customers and suppliers, gather market research data, advertise

goods and services, provide extensive and user-oriented information about goods and services, provide online transaction, as well as after sales support and assistance [11]. Furthermore, previous research also indicates that SMEs can take advantage of e-commerce technologies in increasing their business [12]. Thus, the use of e-commerce technologies enables SMEs to improve their efficiency and competitive position in the marketplace. The position of SMEs in developing countries in terms of e-commerce adoption is even lagging behind SMEs in developed world [13].

Given the facts that SMEs in Indonesian have several internal and external problems, their ability to survive Indonesian economic crisis, and the opportunity to use e-commerce for improving the Indonesian economy, a study to investigate potential factors that support successful e-commerce adoption by SMEs in Indonesian is a need. The result could be used as a basis to develop a model for measuring e-commerce adoption by SMEs in Indonesia and guidance on developing a framework for SME's commerce development, specifically in Indonesia.

A number of studies have been conducted in recent years concerning the adoption and use of e-commerce in SMEs. However, most of these studies focused on SMEs in developed countries. For developing countries, the situation is quite different [3]. Furthermore, there is still limited number of researches on e-commerce adoption by SMEs in Indonesian. Our study investigates the opportunities provided by e-commerce adoption for SMEs in Indonesia and potential factors that could influence e-commerce adoption by SMEs in Indonesia.

### **3. Problem Solution**

#### **3.1. Technology Acceptance**

Current studies try to model the interaction between factors which influence the adoption of information system at the organizational-level. They developed their model mainly based on theory of human behavior, like technology acceptance model (TAM), theory of planned behavior (TPB), and innovation diffusion theory (IDT). TAM is motivated by Ajzen and Fishbein theory [14]. It relies mainly on the reasons for an action is taken and measures its relevant contributed reasons. TPB suggests how a person responds and react toward something or some event is determined mainly by his/her existing concept of mind about his/her environment. TAM proposes two behavioral perceptions, i.e. perceived usefulness and perceived ease of use. These two factors can be modeled to explain the intention of users when adopting a technology. Perceived usefulness indicates how strong a person belief that a system can accomplish what it is intended to do. Perceived ease of use indicates how strong a person belief that a system can be operated with ease [15].

Researches in the field of information technology and system had been working extensively with IDT. Diffusion is defined as a process to converse an novel idea, a practice, or an object throughout community over time. Furthermore, innovation diffusion is defined as a time-phased process of communicating and implementing an innovation by individual or organization [14].

Innovation diffusion theory has five significant characteristics: relative advantage, compatibility, complexity, trial ability, and observables [16]. These characteristics are used to explain the users' adoption and decision-making process. Previous studies found that only relative advantage, compatibility, and complexity are consistently related to innovation adoption [17].

Previous works on adoption model tried to extend TAM and IDT to in order to enhance the performance of both models to estimate the use and adoption of new technology [18][19][20]. According El-Gohary [21], although the both models consider several important factors to measure the degree of technology acceptance and diffusion, there are other important factors that should be considered in order to grab the full scale and aspects of e-commerce adoption. This paper is intended to propose other relevant factors that could significantly determine the degree of e-commerce adoption by SMEs.

### 3.2. E-commerce Adoption Level

Rao et al, proposed five stages in e-commerce adoption by SMEs based on how the organization uses website to satisfy its business requirements [22]. First, *Non-adopter*: companies do not have website. Second, Level-1: *presence*: In this stage, most companies use websites to display information about products and services, communication on the website is a one way (from seller only). Third, Level-2: *portals*: the portals stage use websites for two-way communication with customers and suppliers provide services such as ordering, product feedback, surveys and customization. Fourth, Level-3: *transaction integrator*: this stage use websites for two-way communication with customers and suppliers, provide services such as ordering, product feedback, surveys and customization, and online payment and / or an online order fulfillment. Fifth, Level-4: *enterprise integration*: provide facilities similar with level-3 and adding Supplier Relationship Management (SRM), Customer Relationship Management (CRM), and integration of internal processes with online booking and.

Knol and Stroeken proposed six stages of information technology adoption by SMEs based on how organization uses IT to satisfy its business requirements [23]. First, Level-0: do not use IT. Second, Level-1: provide functional integration based on internal operation. Third, Level-2: provide multifunctional integration based on external. Fourth, Level-3: provide process integration based on external. Fifth, level-4: provide business process redesign. Sixth, level-5: provide redefinition business scope helped by IT.

### 3.3. E-commerce Adoption in Various Countries

It has been observed and demonstrated in many studies that SMEs have been actively looking for appropriate solutions and methods of adopting and integrating e-commerce into their business process. Small business e-commerce is defined as the use of internet technology and application to support business activities of a small firm [10].

In order to acquire the various advantages of e-commerce, it is important to know about issue of evaluating e-commerce adoption. Shaaban [24] identified three metric dimensions for evaluating e-commerce adoption, i.e. technical, organizational, and inter-organizational dimensions. The most important technical indicators for e-commerce adoption in the companies are compatibility and internet bandwidth and security. The most important organizational indicators for e-commerce adoption are leadership and management, organization culture, human resources, and products appearance. The most important inter-organizational indicators for e-commerce adoption are customer pressure, competitor, and supplier pressure [10].

A study on e-commerce adoption at New Zealand shows that there are several determinants of e-commerce technologies adoption. First, external-email adoption was determined by how innovative a Chief Executive Officer's (CEO's) is. Second, intranet adoption was determined by the degree of CEO involvement in deciding how intranet should be adopted in the organization. Third, extranet adoption was determined by the degree of relative advantage and competition that an organization would like to have or to be positioned. Fourth, internet-EDI adoption was determined by the degree of pressure from IT supplier. Fifth, web site adoption was determined by the intensity of information of products and how innovative the CEO is [11].

The literature study by Fathian et al. [26] reveals that the scale of SMEs determines how the firm adopts an innovation. We can categorize the factors which influence acceptance and diffusion of e-commerce by SMEs into two big categories, i.e. external and internal categories [27]. Factors which are categorized as external are communication and government support. Factors which are categorized as internal are firm size, CEO support, readiness, organization culture, organization structure, and innovation. Furthermore, insufficient knowledge and lack of experience are also considered barriers of e-commerce adoption.

Bhattacharjee and Prekumar [28] found the two behavioral perceptions proposed in TAM have a significant effect on the e-commerce, internet, and IT adoption. Furthermore, the factor of system

usefulness could lead to innovation adoption, while the factor of system convenience could only lead to practical use of the system, but not to continuous use of the system.

Suzanne et al [30] shows that the planned behaviour theory could be used to model intentions to adopt e-commerce of SMEs in Chile. The result indicates that there are two factors, i.e. subjective norm and attitude, which positively and significantly predict user intentions. Furthermore, it also indicates the same construct is not applied on perceived behaviour control.

Tan et al [31] note that the environmental factors have influenced positively e-commerce adoption in China. The Central government proved a great attention and has been offering support in term of policy and extensive investment in supporting industries to facilitate e-commerce. However, the organization factors are inhibiting e-commerce adoption and diffusion. This study found that firms in China are lack of business and human resources. It also indicates a cultural issue as one of the problem that significantly worsen the fact that there is lack of internal trust and enterprise-wide information sharing in China.

Bao and Sun [4] proposed a conceptual model of factors affecting e-commerce adoption by SMEs in China based on literature review. The factors are organizational factors, managerial factors, environmental factors, and e-commerce technical factors. They proposed these factors after viewing e-commerce adoption as a technological innovation and the environment might affect the success of e-commerce adoption. The organisational factor is measured by innovation orientation, IT resources, financial resources, and globalization level. The managerial factor is measured by decision maker support. The environmental factor is measured by competitive pressure and institutional pressure. The e-commerce technical factor is measured by perceived benefit, perceived complexity, and perceived risk.

Kurnia [32] found that perceived benefits, perceived organization resources and governance, perceived supporting services and perceived environmental pressure have different influences on the adoption of different e-commerce technologies. There are certain factors that determine SMEs' adoption of a specific e-commerce technology, which highlights the importance of these determinants to this specific technology. Thus, to encourage a particular e-commerce technology adoption, it is important to understand what factors are relevant in order to devise a more appropriate strategy for the specific context.

Tung [14] conducted a study about an extension of TAM model with IDT by adopting user's trust as one of the factors in the adoption of the electronic logistic information system in Hospital Information Systems (HIS) in the medical industry. This research combined innovation diffusion theory, technology acceptance model to propose a new hybrid technology acceptance model. The result indicated that compatibility, perceived usefulness, perceived ease of use and trust, all have a great positive influence on behavioral intention to use.

#### **3.4. E-commerce Adoption in Indonesia**

Several researches related with e-commerce adoption in Indonesia was conducted. Vidi [33] found that compatibility, top management support, organizational readiness, external pressure, and perceived benefits have significant positive effect to E-commerce adoption, and the adoption have significant positive effect to company's performance. She used Technology Acceptance Model (TAM) to create an e-commerce adoption model which was applied to SMEs in Indonesia. Data was collected from nine big cities in Indonesia, i.e. Padang, Jakarta, Cirebon, Yogyakarta, Jepara, Sidoarjo, Denpasar, Makassar, and Balikpapan.

Hafied [34] note that SMEs have already starting to apply e-commerce adoption to maintain their business process. Although the degree of adoption is different from one SME to another, it is still generally accepted that e-commerce adoption will bring positive impacts towards SMEs development. He also found that financing and customer service are the major driving factors in adopting e-commerce.

Fathul [35] notes that in general, the adoption among SMEs in Indonesia is still very low. It also occurs in many countries, especially developing countries [17]. IT is not considered as strategic issues by most of SMEs. This is consistent with the results of the study Sadowski, Maitland and Dongen [17] who found that the use of IT is more opportunistic and not strategic. Most of the SMEs in Indonesia is still in level one, which is using IT for the internal functional integration-oriented. A human resource capacity has been found as an inhibiting e-commerce adoption. Furthermore, benefits that can not be perceived directly related to SMEs revenue is also a determinant of IT adoption. Thus, these facts should be considered when designing an e-commerce adoption framework for SMEs in Indonesia [17].

Research conducted by Rahmana [36] found that the use of IT by SME to the area of administration, product design, marketing, production processes and others. The Internet Technology is widely used for browsing, email and promotion through firm's website.

Eva [37] conducted a study on the application of internet facilities (e-commerce services) for marketing SMEs products. Five e-commerce services are communication interaction, access to information and data, transaction, remote control and decision-making, and application and other services. In general, adoption of business processes by SMEs is still relatively low. The total mean score is 1.88, which indicates that the adoptions of those e-commerce services have been acknowledge (awareness), but the acquired information about those services is still insufficient. This certainly could hinder the acceptance of e-commerce services as an innovation to the organization's business process and could threaten the successful of e-commerce adoption by the organization.

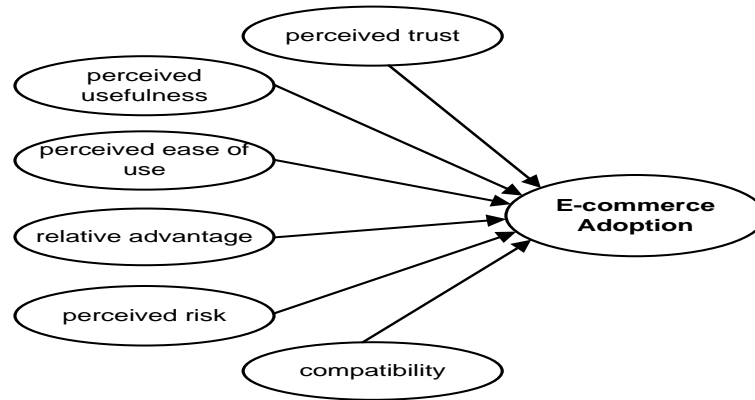
SME practitioners perceive that the implementation of e-commerce to support the company's operation is quite useful, especially in processes, such as marketing products, handling product inventory, manufacturing processes, and up to procurement of materials. Although the implementation of e-commerce can support the development of marketing of SME products, in practises, its implementations do not always run smoothly. Users find a number of constraints, such as internet access take a long time, difficult to switch to transaction-based technology, and companies have traditionally preferred to transact. Generally, SMEs are difficult to change from traditional purchasing, which is transactions done physically, into technology-based purchasing. They considered it as the highest constraint to e-commerce adoption [37].

Govindaraju and Chandra found that in general SMEs in Indonesia which were participating in this study have strategic plans to adopt higher level of e-commerce, though majority of the firms currently still adopt e-commerce at the lower level. There were three significant factors as barriers of e-commerce adoption in Indonesia SMEs. They were push force from internal and external environment, man from internal environment, and source of information from external environment [38].

Eight essential variables have no significant influences as the barriers of e-commerce adoption by Indonesian SMEs. Therefore, these variables can be predicted as the factors that can support e-commerce adoption. These essential variables need to further analysis. Eight variables which not significant i.e. financial, supply chain management, internet services, market, source of information, enterprises association, e-commerce popularity, security and political [38].

### **3.5. Factors Influenced E-commerce Adoption**

Based on literature review above, in this paper, we proposed the factors influence e-commerce adoption by SMEs in Indonesian, show in Figure 1. Six factors are perceived usefulness, perceived ease of use, relative advantage, perceived risk, perceived trust, compatibility. The factors are discussed separately.



**Figure 1. Proposed Factors affecting e-commerce adoption**

### 3.3.1. Perceived Usefulness

Perceived usefulness is defined as the degree to which a person believes that by utilizing a feature or a system, one can improve one's working quality, in term of process and product [39, 40]. Experimental work done by Davis et al [41] provide some empirical facts that the usefulness of a particular technology when it is adopted indeed increase organization's productivity in performing the business process.

### 3.3.2. Perceived Ease of Use

Perceived ease of use is defined as the degree of which a person believes that using a particular system would be effortless. This factor commonly represented as user friendliness, learning curve, and intuitive user interface. These quality attributes are common in software engineering and technology-usage settings and can be extensively used to ensure high user acceptance rate [15]. Both perceived usefulness and ease of use are considered in this study because many researchers suggest that the technology acceptance model can provide baseline prediction on user acceptance of enterprise information technology systems.

### 3.3.3. Relative Advantage

This factor is one the characteristics of the innovation diffusion theory which has meaning that innovation brings greater benefits to users than do other products [16]. In our study, we describe this factor in different meaning. We use relative advantage as a relative superiority of position or condition.

### 3.3.4. Perceived Risk

Risk is usually described in terms of the confidently allow somebody or something to belief about the possibility of gains and losses [42][43]. Perceived risk is classified as the scale of gains and losses that one may expect with respect to achieving specific outcome [44]. Just like in other domain, perceived risk tends to degrade one's intentions in adopting technology for exchanging information and performing transactions [42].

### 3.3.5. Compatibility

Compatibility represents the compliance degree of an innovation with existing solution perceived by potential users [16]. We use the compatibility, which is predicted as one of the factors which influence e-commerce adoption. Previous works indicate that compatibility has an influence on technology adoption perceived usefulness [17,45].

### 3.3.6. Perceived Trust

Trust is described as one's complete confidence that a feature or system would deliver its functionality in expected quality and reliability [45]. Trust is also described as one's preference to rely on other party which one perceives to be reliable based on some past experience. Trust is developed through time and manufactured using one's capability, reliability and integrity [46]. Distrust increases perceive risk and complexity of an e-commerce transaction. It lessens one's expectation of expected outcome and increases doubt on the correctness of business processes. [47].

Perceived trust refers to the degree of one's perception on technology solutions as an application of safe and reliable. [32]As already mentioned, trust plays a crucial role in e-commerce adoption. When adopter believes that customer distrust an e-commerce solution, than it influence the perceived usefulness of adopter to e-commerce. When customer is forced to use distrusted e-commerce solution, it decrease customer's perspective on ease of use, compatibility, and advantage of the solution [47].

The measurement of the six factors will be conducted using multiple attributes, which made possible an attribute can be used to measure more than one factor. The measurement elements to be used as follow:

- Top management support refers to the key for companies that want to develop e-commerce, or in other words the development of trade electronic has to start from top-level manager or owner (Surjadi, 2001 in [33]). Commitment from top management is essential to support cultural change needed in management style, management result, changes in work practices and support the need for communication and information technology (Blake, 1994 in Ruppel and Howard, 1998, in [33]).
- Cost leadership refers to the cost saving gained from the use of e-commerce. E-commerce could reduce the costs associated with processes related to e-commerce solution, such promotion, customer service, inbound logistic, and sales [48].
- Competitor/Rivalry refers to the position of e-commerce capability of the firm compare to its competitor. As more competitors adopt ecommerce, the harder for the firm to gain competitive position in the industry. The wider the use of ecommerce in firm's business processes, the higher the probability of the firm to gain competitive position in the industry.
- Reputation refers to perceive trust of customers to firm's ecommerce solution [48].
- Government influence refers to the degree of involvement, support (in terms of incentives and regulations), pressure from the government [21].
- National infrastructure refers to the existence of necessary and sufficient national infrastructure for e-commerce [21]. National infrastructure consists of telecommunication, regulation, human resource, and financial institution [49]. The cheaper the accessing cost, the higher the growth of e-commerce adoption.
- Organization size refers to the amount of qualified human resources owned by the firm. Organization size is regularly considered as one of the factors of innovation adoption [50]
- Market refers to the geographical attributes of potential firm's product or service buyers or users gained from the use of e-commerce. World Wide Web has played a major role in enabling market expansion of many modern enterprises.



- Product pricing refers to the ability to deliver a cheaper product or service through the use of e-commerce [48]. This is done by cutting the supply chain shorter which reducing the number of parties involved in delivering a product or service from provider to user.
- Organization cultural refers to the top managers' perception of e-commerce technologies and their perceptions of the availability of resources, rules and procedures within the organization. Availability of IT human resource (expertise) as well as web developers, content provider, IT technician, customer service professionals also need to be considered in this factor. Furthermore, availability of infrastructure (hardware), availability of information which is easy to be accessed valid and up-to-date, and availability of application to support implementation of e-commerce (software) will be considered too [21].
- Socio-cultural refers to the degree of positive or negative influence of existing cultural and social environment to the acceptance of e-commerce by individual users within the society. This element can be measured from the availability of IT workers, penetration level of web-enabled devices and communication devices [32]
- Time spent refers to the time required by user to accomplish certain functionality through an e-commerce. A number of metrics that are commonly used to measure time spent are order time, processing time, queuing time and payment time could reduced considerably [48].
- Delivery time refers to the time required to deliver a product or service from provider to user [48]. E-commerce is designed to reduce the delivery time.

#### 4. Conclusion and Further Research

The SMEs can take advantage of e-commerce technologies in expanding their business [24]. Thus, the use of e-commerce technologies enables SMEs to improve their efficiency and competitive position in the marketplace. Based on our literature study on e-commerce adoption, we found that there are a number of perceived opportunities presented by e-commerce adoption in Indonesia i.e. extending market-reach and even global, increasing customer personalize services, and improving its competitiveness.

Furthermore, we indicate six potential factors that influenced the adoption of e-commerce by SMEs in Indonesia, i.e. perceived usefulness, perceived ease of use, relative advantage, perceived risk, perceived trust, and compatibility. These factors have been abstracted from more than 10 previous researches. This study is research in progress. Our future work will focus on developing a model of e-commerce adoption by SMEs Indonesian based on aforementioned factors. We also proposed the use of Rao's e-commerce adoption stage model to provide a visual map of existing SMEs in Indonesia. Furthermore, this model describes the business process of e-commerce in each level.

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