Comprehensive Framework of E-commerce Adoption in Indonesian SMEs

I Hayati¹ and L Andrawina¹
¹School of Industrial Engineering, Telkom University, Republic of Indonesia
hayatiindah2306@gmail.com

Abstract. The use of Internet has been growing rapidly in the last decade. One of the popular uses of Internet is e-commerce which gives changes in the market and forces companies to adapt to survive, including small-medium enterprises (SMEs). As one of developing country, e-commerce adoption among Indonesian SMEs is still low with only 8% of SMEs has adopted e-commerce. Despite many researches regarding e-commerce adoption, the topic still needs a comprehensive study on internal and external factors affecting e-commerce adoption. This study aims to fill these gaps by developing a comprehensive framework on e-commerce adoption among Indonesian SMEs. The originality of this study resides in managerial demography and company’s knowledge management as additional factors to the model proposed by previous studies. This study concludes four external dimensions and five internal dimensions affecting e-commerce adoption. The external dimensions are institutional environment, economic environment, socio-cultural environment and technology environment. While the internal dimensions consist of managerial demography, company’s size, company’s capabilities, corporate strategy and company’s knowledge management.

1. Introduction
The Internet users at the end of 2018 have reached 4.4 billion of users or approximately 55% of the world population (www.internetworldstats.com). One of the popular practices of Internet is for online selling/buying products and services known as e-commerce that has rapidly increasing users over the years. The escalation of e-commerce users is driven by the benefits that cannot be obtained from conventional buying/selling transaction. On the consumer side, e-commerce offers easiness and convenience of shopping from anywhere and at any time, emotional satisfactions, the simplicity of comparing prices and features, etc.[1]. While on the seller side, e-commerce makes it possible for reaching wider market without limitation of location and selling points [2]. But, e-commerce also increases level of competition among seller/companies because of more transparent and high-exposure market.

To be able to survive in this new marketing era, companies are forced to adopt this technology [2]. This applies for small medium enterprises (SMEs) too. This study focuses on e-commerce adoption in SMEs in Indonesia. In 2017, 99% of business units in Indonesia consisted of SMEs with 59,2 million business doers [3]. Based on Indonesia’s economic structure, SMEs absorbed about 97,3% of workers and gave 58,2% contributions on the National Gross Domestic Product [4]. It makes SMEs as the most important economy sector in Indonesia’s business and industry area. However, at the end of 2018, only 8% of SMEs that have been adopting e-commerce [3]. Furthermore, study and efforts are needed to help SMEs to adopt e-commerce so that SMEs can also be able to compete in this digital era.
While many researches on e-commerce adoption have been carried out over the last 10 years, those researches still disperse over various areas and journals and only focus on specific aspects of a company. Study of [5][6][7] have provided frameworks of e-commerce adoption that took into account various aspects of a company. But, those study have not yet considered knowledge management and managerial demography as factors that affecting e-commerce adoption. While [8] and [9] have proved that knowledge management also affects a company’s decision to adopt e-commerce. This study is carried out to fill those gaps. This paper thoroughly examines external and internal factors effecting e-commerce adoption and propose a comprehensive model of e-commerce adoption on SMEs from country level to internal company level including knowledge management aspect and managerial demography aspect. This study is still a theoretical study, but an empirical study will be carried out in the future to validate the proposed model.

The remainder of this paper is organized as follow. Section 2 reviews related literatures. Section 3 presents and discusses the proposed conceptual model while Section 4 provides conclusion and implication of this study for practitioners and researchers. Finally, Section 5 suggests future work and extension for this study.

2. Literature Review

2.1. Basic Concept
E-commerce is defined as buying and selling process of a product/service using the internet as mediator and electronic data transmitter [10]. E-commerce has been started to be a popular method of marketing transaction because it offers many advantages compared to conventional method. On the seller side, some of the advantages such as reduce sales and marketing expenses, wider reach of market, increase customer service level, improve competitive position, etc. [2]. With its many benefits, e-commerce can be one of the solutions for SMEs to increase their profit and broaden their market shares. However, the adoption of e-commerce on SMEs is still lacking compares to other big enterprises. This happens in Indonesia too as one of the developing countries [11]. At the end of 2018, only 8% of SMEs in Indonesia that have been adopting e-commerce [3].

E-commerce adoption can be defined as the usage of e-commerce by a company to support its business transaction. In [11] the connection between e-commerce adoption level and the realized benefit among SMEs in Indonesia was studied. The study showed that e-commerce adoption level among Indonesian SMEs are still lacking compares to other countries and the SMEs that have been adopting e-commerce still not realized its full benefits.

2.2. Related Model
There are many studies that have been done in e-commerce adoption area, but only a few that carried out on SMEs in the developing country especially ones that use comprehensive framework and consider various aspects in a company. The [12] studied e-commerce adoption in Iran but only considered two factors on company level, organizational readiness and company’s awareness of e-commerce. Furthermore, [13] also studied factors affecting e-commerce adoption on company level, but from a different point of view, which is the demographic factors of the company’s top management team (TMT). Another point of view for studying e-commerce adoption was shown by [9] by studying influence of knowledge management process namely knowledge acquisition, knowledge dissemination and knowledge application to e-commerce adoption on Malaysian SMEs.

The more complex study was carried out by [5] that considered factors affecting e-commerce adoption from environment perspective, firm’s perspective as well as technology perspective. In [5] was also provided a framework determining e-commerce adoption. However, this framework is still a theoretical study that needs to be tested empirically. From [2], also studied internal and external factors affecting e-commerce adoption in Indonesian SMEs. The study suggested perceived benefits, perceived compatibility, adoption cost, technology readiness, firm size, customer/supplier pressure, external support, owner’s innovativeness, owner’s IT ability, and owner’s IT experience as factors
affecting company’s decision on e-commerce adoption. In addition, [6] also provide a theoretical framework on e-business competitiveness factors by considering factors on country level, industrial level and company level. The newer empirical study on e-commerce adoption that offered various factors was conducted by [7]. The study showed an integrated model of internal factors, environmental factors and technological factors. Nonetheless, the above studies have not considered knowledge level and knowledge management process in the company.

Knowledge is an important factor in a company for creating a competitive advantage, thus it has to be maintained on a continuous basis [8]. It is stated in [9] that knowledge management must also be considered in studying e-commerce adoption because one of the barriers in e-commerce and e-business adoption is to change the traditional business operation to technological prospect which relies on the availability of suitable information. In [9] specifically studied the influence of knowledge management on e-business adoption in Malaysian SMEs. The study showed that knowledge acquisition and knowledge application to have significant effect on e-business adoption among Malaysian SMEs. Moreover, [8] also acknowledged company’s knowledge management capabilities as another factor that affecting e-commerce adoption as well as organizational readiness.

This study is carried out to complete the former e-commerce adoption frameworks by adding firm’s knowledge management system and managerial demography characteristic in order to build a comprehensive framework on e-commerce adoption. The state of the art of this study is shown on Table 1 by mapping and comparing dimensions from previous studies and the dimensions proposed in this study.

3. Proposed Conceptual Model

3.1. Proposed Model

Based on literature review that has been done, a conceptual model consists of comprehensive factors affecting e-commerce adoption was developed. The proposed model, as can be seen in Figure 1, has the closest correlation with the framework proposed by [5]. The advancement on this proposed model is offered by adding knowledge management dimension and managerial demography. Knowledge management holds important role in creating company's competitive advantage that can support the success of e-commerce adoption. Managerial demography is considered because as has been shown in previous study that the demographic factors of top management team (TMT) affect the company’s decision making and risks taking processes. This proposed model is developed also by taking into account the practical use for future empirical study that will be conducted among Indonesian SMEs. The future empirical study will be conducted as a confirmatory research by collecting data and questionnaires among Indonesian SMEs that have been adopting e-commerce. The SMEs will be clustered by their product and regional to ensure the results are globally valid for Indonesian SMEs, not only dependent on specific product or regional.

3.2. Discussion

The proposed factors affecting e-commerce adoption are categorized into two dimensions, external dimension and internal dimension (Figure 1).
Table 1. Literature Review Dimension Mapping

| Author             | Year | External Environment | Internal Environment |
|--------------------|------|-----------------------|-----------------------|
|                    |      | A | B | C | D | E | F | G | H | I |
| Hajli et al.       | 2014 |   |   |   |   |   | X |   |   |   |
| Awa et al.         | 2014 |   |   |   |   |   | X |   |   |   |
| Chong et al.       | 2013 |   |   |   |   |   |   | X |   |   |
| Li and Xie         | 2012 | X | X | X | X | X | X | X |   |   |
| Rahayu and Day     | 2015 | X |   | X | X | X | X |   |   |   |
| Kurnia et al.      | 2015 | X | X |   |   | X |   |   |   |   |
| Maditinos et al.   | 2014 | X | X |   |   |   |   |   |   |   |
| Chatzoglou and Chatzoudes | 2016 | X | X | X |   |   |   |   |   |   |
| Ciarniene and Stankeviciute | 2015 | X | X | X | X |   |   |   |   |   |
| Ghobakhloo et al.  | 2011 | X | X | X | X | X |   |   |   |   |
| Awa et al.         | 2015 | X | X | X | X |   |   |   |   |   |
| Martin et al.      | 2012 | X | X |   |   |   |   |   |   |   |
| Sanchez-Torres and Juarez-Acosta | 2018 | X | X | X |   |   |   |   |   |   |
| This study         | 2019 | X | X | X | X | X | X | X | X | X |

Where:
A: Institutional Environment, B: Economic Environment, C: Socio-Cultural Environment, D: Technology Environment, E: Managerial Demography, F: Company’s Size, G: Company’s Capabilities, H: Corporate Business Strategy, I: Company’s Knowledge Management

Figure 1. Proposed Conceptual Model
3.2.1 **External Dimensions**, Institutional Environment, related to government support toward e-commerce to create a conducive environment which can influence a company’s decision to adopt e-commerce. It consists of legal system [5], e-commerce policy and tax policy ([5, 19]), national e-commerce strategy [5][6], e-commerce training and promotion [5], and perceived government support [5][6][16]. A supportive institutional environment can give opportunities for companies to adopt and thrive in e-commerce. The results of previous studies showed that institutional environment is in alignment with the country's e-commerce adoption. It was concluded in [5] that a supportive institutional environment gives positive effect to industrial e-commerce adoption. The study from [16] also concluded that government support leads to e-commerce adoption. In addition, [6] concluded that positive government policy and e-commerce policy give positive effect to e-commerce adoption.

**H1.** Positive institutional environment gives positive effect to e-commerce adoption.

**Economic Environment**, represents the macro-economy condition which influences the growth of industries. Based on literature review, it consists of economic stability (GDP, inflation rate, etc.), the majority of traditional/non-traditional industrial sectors, industrial competitive level and customer/supplier pressures. The study of [5][6] concluded that positive national economic development such as increase in GDP, economic stability and inflation rates give positive impact on e-commerce adoption. A study from [5] suggested that non-traditional economic sectors are more likely to adopt e-commerce. Meanwhile, [6][7][16][20] all agreed that highly competitive level in the market drives e-commerce adoption. In [2][15][16] it is also concluded that positive customer and supplier pressure stimulates e-commerce adoption. Hence, this study concluded that positive economic environment leads to e-commerce adoption.

**H2.** Positive economic environment gives positive effect to e-commerce adoption.

**Socio-Cultural Environment**, affects how community values, accepts and reacts to changes or new things. Referring to literature study, the indicators in this dimension are value/belief among society, the demography of targeted customers, perceived customer's acceptance to innovation and perceived customer's readiness. In [5], it was stated that the national culture of a country affects acceptance of technology innovation. While [1] concluded that the demography of the customers affects customer’s behaviour including customer’s acceptance of innovation. Study of [16] showed that customer's acceptance of new technology, attitude toward changes and perceived consumer readiness can affect company's decision to adopt e-commerce. An open culture drives e-commerce adoption due to community acceptance of technology innovation. Positive customer's acceptance and customer's readiness encourage company to adopt e-commerce.

**H3.** Open socio-cultural environment motivate company to adopt e-commerce.

**Technology Environment**, based on literature review, adequate technology environment such as the availability IT infrastructures, low cost of technology adoption, and support from IT vendors increases e-commerce adoption among companies. In the study from [2][6][13][16] all agreed that the readiness of IT infrastructures will encourage company to adopt e-commerce. Those studies also showed that technology adoption cost negatively influences e-commerce adoption while support from technology vendors give positive effect on e-commerce adoption.

**H4.** Adequate technology environment motivates companies to adopt e-commerce.

3.2.2 **Internal Dimension**, Managerial Demography, the demography attributes such as age, experience, education level, gender, etc. can affect a person's behaviour including their decision-making process. An empirical study from [14] showed that the demographic factor of top management team (TMT) can affect the company's decision for adopting e-commerce. In [2][6][16] it was also shown that knowledge and attitude of TMT and their attitude toward technology and innovativeness can also impact company’s decision to adopt e-commerce.

**H5.** Managerial demographic criteria affect e-commerce adoption.
Company Size. In [5] was concluded that small firms with flexible structure are more likely to adopt e-commerce while [2] and [6] proved that larger firms are more likely to adopt e-commerce. Company size is related to its ability to provide resources which means larger company have greater ability to provide resources. Hence, this paper suggests that company size positively influences e-commerce adoption. Company size can be measured by assets owned, revenue, company’s structure and numbers of worker.

H6. Firms size positively influences e-commerce adoption.

Company’s Capabilities, company’s capabilities cover its technological capabilities, financial capabilities, operational capabilities and its employee capabilities. Technological capabilities refer to company’s ICT infrastructures and its perceived risk and advantages. Financial capabilities are in correspondence with company’s ability to invest its assets and capital in e-commerce, while operational capabilities and employee capabilities refer to the fitness of company’s business with the adapted technology and the ability of its employee in using technology to do their work [6]. Furthermore, [6] and [7] stated that company’s capabilities are aligned with its e-commerce adoption. Based on those previous works, this paper also suggests that sufficient company's capabilities enhance e-commerce adoption.

H7. The greater the company’s capabilities, the more likely the company to adopt e-commerce.

Corporate’s Strategy, the corporate’s strategy refers to the management characteristic in taking risk, innovativeness and proactiveness in order to achieve company’s goal [21]. Corporate's strategy affects how a company approaches its market and reacts to challenges. In [5] showed that company with globalization and innovative strategy tends to be more likely to adopt e-commerce. Perceived value of customers also related to company’s strategy. Perceived value of customers can be defined as how the company value its customers and maintain customer’s satisfaction [21]. The company with customer oriented will try to establish customer relation and analysis potential revenue that might satisfy its customer’s needs thus leads to greater chance of adopting e-commerce [21].

H8. Corporate’s strategy affects company’s adoption of e-commerce.

Company’s Knowledge Management, knowledge is an important resource of a company for creating competitive advantage, thus maintaining knowledge has become key focus point in a business [8]. Knowledge management can be defined as process to identify, transfer, store and disseminate knowledge [9]. In [9] has proven that knowledge management process which are knowledge acquisition, knowledge dissemination, and knowledge application give significant effect to e-business adoption. While [8] revealed that knowledge level and knowledge sharing are significant factors for successful e-business implementation. One of the barriers in e-commerce adoption is to change the traditional business operation into a technological operation and to keep up with the fast-changing online market. Those capabilities rely on the level of company's knowledge and the availability of suitable information. As a deduction, it makes knowledge management gives effect to company's e-commerce adoption.

H9. Positive company’s knowledge management give positive impact to e-commerce adoption

3.2.3 E-commerce Adoption, acts as dependent variable in this study. A study from [11] reviewed e-commerce adoption among Indonesian SMEs and stated that the success of e-commerce adoption can be measured from the benefit realized which the top six are extended market reach, increased sales, improved external communication and company image, improved processing time and increased employee productivity.

4. Conclusion and Implementation
E-commerce adoption not only affected by internal factors, but also by external factors which play significant role at how a company would run its business. This study comprehensively summarized nine dimensions both external and internal dimension which determine a company’s adoption of e-commerce. The external factors consist of institutional environment, economic environment, socio-cultural environment, and technology environment. While the internal dimensions consist of managerial demography, company size, company’s capabilities, corporate strategy and company’s knowledge management. The framework proposed on this paper provides comprehensive conceptual basis for further empirical analysis and can be an implication for practitioner especially for SMEs as a guidance for adopting e-commerce adoption and also for the authorized parties to enhance e-commerce adoption among Indonesian SMEs.

5. Future Work
This study is a theoretical study with nine proposed hypothesis which need to be validated empirically. The empirical study is still on-going as the future work carried out among Indonesian SMEs where the rate of e-commerce adoption is still low. There is also possibilities on extending this study with more dimension and factors which have not been considered.

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