

# Gap between Regions in the Use of E-Commerce by MSEs

## Macro-level Research Using Provincial Data from Indonesia

---

**Ida Busnetty**

Center for Industry, SME and Business Competition Studies, USAKTI

**Tulus T.H. Tambunan**

Center for Industry, SME and Business Competition Studies, USAKTI

---

**Abstract:** The availability of information and communication technology (ICT) has assisted companies to effectively produce and market their products and services in the global market. However, the majority of micro and small enterprises (MSEs) in Indonesia have not adopted such technology or e-commerce to support their business activities. Based on province data (cross-section data), this study aims to examine the adoption of e-commerce by MSEs in different provinces in Indonesia. It addresses two research questions. First, how many MSEs have adopted such technology? Second, what factors influence e-commerce adoption by MSEs? The study used multiple regression to estimate empirically the impact of selected factors as independent variables on the number of MSEs that use e-commerce. It shows at least three important facts: (i) the degree of e-commerce adoption by MSEs in Indonesia is still very low; (ii) there is a positive relationship between market size in a province and the number of MSEs in the province adopting e-commerce; and (iii) in a region where all residents or households have a computer or access to the Internet, it is not always that all business actors, especially MSEs, in that region adopt e-commerce.

**Keywords:** MSE, e-commerce, ICT, external factors, Indonesia

## Introduction

It is undeniable that information and communication technology (ICT) has changed many things in business. It not only has changed the way businesses communicate to each other or deal with their customers, distributors and suppliers, but also through digital marketing or e-

commerce it has changed the way they promote and sell their products or purchase their raw materials. Digital marketing has now become the trend in targeting both current and prospective customers. Most people now have daily access to the Internet via personal computers, laptops or smartphones. Social media is one of the best channels of online marketing, and Instagram is one of the fastest growing platforms available today ([Balakrishnan & Boorstin, 2017](#)). More businesses are now eager to establish a strong presence on this network and encourage their prospects' engagement. To be able to survive in this new business environment all companies, including micro and small enterprises (MSEs), are pushed to adopt this technology. Sooner or later, MSEs which do not adopt this technology and business practice will be displaced by their competitors and abandoned by their customers ([Ahmad et al., 2015](#); [Bakos & Brynjolfsson, 2000](#); [Barry & Milner, 2002](#)).

Governments in many countries have given considerable attention to the utilization of ICT, particularly the adoption of e-commerce, by MSEs by issuing special policies and regulations to assist them. In Indonesia, despite the rapidly growing Internet media, the number and percentage of MSEs that have utilised the Internet or adopted e-commerce are still low. According to the 2016 Economic Census, only 563,000 enterprises or about 2.14% of total MSEs in all sectors have utilised such technology; although it varies by province (Figure 1) ([BPS, 2017](#)). Therefore, in the past few years the Indonesian government has taken many measures to encourage or support them to adopt such technology in order to expand their marketing. The measures include providing training for MSE owners in utilizing the Internet, Facebook, Instagram and other application systems, and to create their own websites; creating a special web portal (SMESCO Trade) by the Ministry of Cooperatives and Small Medium Enterprise (SME) that all micro, small and medium enterprises (MSMEs) can use for marketing their products; and issuing various regulations to provide a sense of security for business actors in adopting e-commerce and internet banking.

A review of the literature reveals that there is a growing body of literature on the adoption of e-commerce or online marketing by MSMEs. While these studies improve researchers' understanding of MSMEs' efforts to adopt e-commerce, they are all micro-level research: i.e., the theories and frameworks were empirically tested with data collected from interviews with the owners or managers of MSMEs on variables that were expected to influence their ability to adopt e-commerce, such as external factors, organizational barriers, technical barriers, environment barriers, perceived usefulness, perceived ease to use, and attitude. To the authors' knowledge, no attention has been given to macro-level research, i.e., the influence of regional factors such as poverty, income per capita, and the average education of the population, on differences in e-commerce adoption by MSMEs between regions.

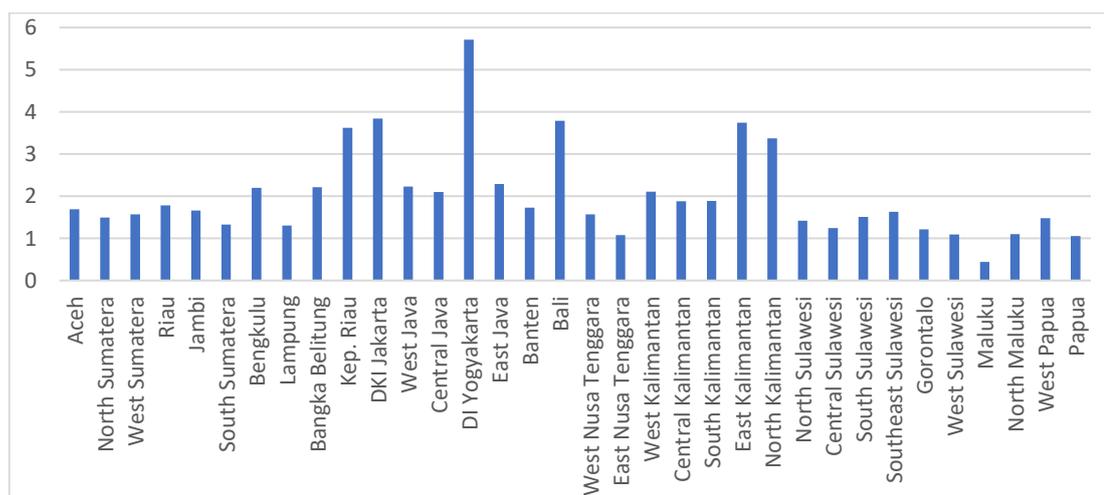


Figure 1. The Adoption of E-Commerce by MSEs in 34 Provinces in Indonesia, 2016 (%) (Source: [BPS, 2017](#))

Therefore, by using statistical data from 34 provinces in Indonesia, this macro-level study tries to close this research gap. More specifically, it addresses the following two research questions. First, how many MSEs in Indonesia have adopted e-commerce? Second, what factors influence e-commerce adoption by MSEs? This research only focuses on MSEs, not including medium enterprises (MEs), because there is no province data regarding the adoption of e-commerce by MEs.

## Literature Review

As the market competition becomes increasingly tight, it is vital for business actors to use modern technologies, including ICT, as among their key sources of competitive advantage. In many developing countries, although the need to have ICT is also apparent, there are still many companies, especially MSEs, that do not adopt this technology. For larger enterprises with ample human and financial resources, the adoption of ICT may not be a significant problem. But, for MSEs which face resources limitations, including lack of funds and skill, ICT adoption becomes a problem. Most MSEs do not consider IT as a strategic issue, but rather use it more opportunistically ([Triandini, Djunaidy & Siahaan, 2013](#)). Therefore, the adoption among MSEs in many developing countries, including Indonesia, is still very low.

Literature on e-commerce and MSMEs can be grouped into two categories, namely studies that focus on factors influencing e-commerce adoption, and studies that give more attention to the benefit of utilizing this technology. According to the title and purpose of this study, the focus of this literature review is on that first category.

## Literature on Technology Acceptance Model

Many of the existing studies in this category that attempted to explain the barriers to e-commerce acceptance in MSMEs were based on the Technology Acceptance Model (TAM). It

is one of the models that is used extensively for explaining the factors influencing the adoption of e-commerce or ICT. This model has many variables, including organizational barriers, technical barriers, environment barriers, perceived usefulness, perceived ease to use, attitude, intention and desire (intention to use), and behaviour (actual use). This model is known as a powerful model for predicting the acceptance of new technology by users.

In connection with the position of the current study, different studies have been conducted in many parts of the world and some of them can be mentioned briefly here. Nakhleh (2017) explored the practice of e-commerce among MSMEs in Al-Qassim region, Saudi Arabia and the obstacles to e-commerce faced by managers. In order to collect the required data, a questionnaire was developed on the basis of an extensive review of the literature, and this was distributed to a sample of 100 SMEs in the Al-Qassim region. The questionnaire comprised four main domains: the practice of e-commerce as a dependent variable, with organizational, technological and environmental factors as independent variables. The results supported the hypotheses that organizational factors (top management support, employee skills and experience, and business strategy alignment), technological factors (Internet service quality, information technology security, perceived benefits, e-payment services, and number of technical officers), and environmental factors (customer preferences, industry characteristics, socio-cultural factors, and competitor pressure) have significant and positive relationships with the practice of e-commerce in MSMEs. As stated by Nakhleh, the absence of these factors can therefore be regarded as a barrier to the practice of e-commerce.

Esmailpour, Hoseini & Jafarpour (2016) identified the main obstacles and challenges of e-commerce adoption by MSMEs. They collected primary data through interviews with 157 managers and company experts from 86 companies in the industrial city of Bushehr (Iran). The results showed that organizational barriers, technical barriers and environmental barriers as external factors on technology have affected two starter variables of the technology acceptance model, namely usefulness and perceived ease, and these predicted relationships are confirmed. In addition, expressed relationships in the TAM, including the impact of usefulness and perceived ease on attitude, impact of attitude on intention, and finally impact of intention on actual use, were confirmed.

Xiong, Qureshi & Najjar (2013) investigated what factors affect the acceptance of ICTs including e-commerce by small business owners in two provinces in China. They collected data through a survey of 118 different small businesses in two provinces. Factor analysis was conducted to examine how the responses on a number of measured variables influence each other by examining the patterns of correlations between the variables. Their analysis found that the factors that affect ICT adoption by small businesses in China are attitude toward using technology, perceived usefulness, facilitating condition, anxiety, perceived ease of use, and

job-fit, which are different from the existing model. Perceived ease of use and attitude toward using technology are identified as the most important factors affecting the adoption of ICT among China's small business.

Looi (2005) developed a model of factors motivating and inhibiting e-commerce adoption among MSMEs in Brunei Darussalam. A qualitative research method, in the form of semi-structured interviews, was used to identify factors that are important and relevant to encourage willingness to adopt. Findings showed that owner characteristics, like lack of perceived benefits, lack of knowledge and skill, and perceived lack of trust, are significant inhibitors, while environment characteristics, like competitive pressure, government support and infrastructure, are significant motivators of electronic commerce in Brunei Darussalam.

Empirical results of other studies on the subject are summarized in Table 1. Together with recent studies briefly discussed above, this table shows a structured literature review by consolidating the growing body of academic literature in the field of the main important factors in determining or encouraging the adoption of digital marketing or e-commerce by MSMEs. This literature review provides an understanding of past research points and methodologies related to the studies of digital marketing by MSMEs to explore, analyse and develop a clear understanding about the different studies and methodology implemented relating to the field of digital marketing and MSMEs. Obviously, in this category of literature all existing empirical studies on the subject are based on micro data collected through interviews with selected respondents from different companies, mostly in one area/region.

**Table 1. Selected Important Literature on the Adoption of E-commerce by MSMEs with the Technology Acceptance Model (TAM)**

Researcher	Year	Findings: adoption determinants	Data	
			Type	Method of collection
<a href="#">Al-Bakri &amp; Katsioloudes</a>	2015	Readiness, strategy, managers' perceptions, external pressure by trading partners	Micro	Survey/Interviews
<a href="#">Ahmad et al.</a>	2015	Perceived relative advantage, perceived compatibility, manager's/owner's knowledge and expertise, management characteristics. external change agents	Micro	Survey/Interviews
<a href="#">Lertwongsatien &amp; Wongpinunwatana</a>	2014	Organizational factors, technology factors, environmental factors	Micro	Survey/Interviews
<a href="#">Dlodlo &amp; Dhurup</a>	2013	Perceived ease of use, external pressure, mission, job performance, resource availability and compatibility	Micro	Survey/Interviews
<a href="#">Ghobakhloo</a>	2013	Cost of ecommerce, incompatibility, risk, awareness of e-commerce, knowledge of	Micro	Survey/Interviews

Researcher	Year	Findings: adoption determinants	Data	
			Type	Method of collection
		information systems, external/government support, preparedness partners		
<a href="#">Poorangi &amp; Khin Poorangi</a>	2013	Relative advantage, trialability, observability, company culture, complexity	Micro	Survey/Interviews
<a href="#">Cosgun &amp; Dogerliogl</a>	2012	Financial resources, organisational size, top management support, perceived benefits, industry characteristics, external pressure, and compatibility external IT support	Micro	Survey/Interviews
<a href="#">Das &amp; Das</a>	2012	Information exchange with customers, intense competition, government incentive schemes, enterprises sector, size, age	Micro	Survey/Interviews
<a href="#">Kenneth, Rebecca &amp; Eunice</a>	2012	Leadership style, resources, infrastructure, competition and positioning on the adoption of electronic commerce	Micro	Survey/Interviews
<a href="#">Zaied</a>	2012	Technical factors, legal and regulatory, Internet security, organisational factors, economic factors, political factors, social-cultural factors, use of Internet banking and web portals	Micro	Survey/Interviews
<a href="#">Ghobakhloo, Arias-Aranda &amp; Benitez-Amado</a>	2011	Perceived relative advantage, perceived compatibility, CEO's innovativeness, information intensity, buyer/supplier pressure, support from technology vendors, and competition	Micro	Survey/Interviews
<a href="#">Jones et al.</a>	2011	Perceived benefits, time consumed to develop an e-business operation, ICT skills, e-business deployment in a region (e.g. supplier usage), financial resources	Micro	Survey/Interviews
<a href="#">Arendt</a>	2008	Proper knowledge, education and skilled owner-managers and employees	Micro	Survey/Interviews
<a href="#">Chitura et al.</a>	2008	business opportunities, time, security, e-commerce acceptance among customers and suppliers, willingness of senior managers to use such technology, associated costs, communication, infrastructure, perceived benefits, complexity, type of products	Micro	Survey/Interviews

Researcher	Year	Findings: adoption determinants	Data	
			Type	Method of collection
<a href="#">Marasini, Ions &amp; Ahmad</a>	2008	Readiness for change, costs, basic skills, awareness of its benefits	Micro	Survey/Interviews
<a href="#">Saffu, Walker &amp; Hinson</a>	2008	Organizational support/pressure, managerial productivity, decision aids, perceived usefulness, compatibility, external pressure	Micro	Survey/Interviews
<a href="#">Chong &amp; Pervan.</a>	2007	Perceived relative advantage, trialability, observability, variety of information sources, communication amount, competitive pressure, and non-trading institutional influences.	Micro	Survey/Interviews
<a href="#">Alam &amp; Ahsan</a>	2007	Government support, understanding the importance of ICT adoption, manager's ICT knowledge and skills	Micro	Survey/Interviews
<a href="#">Aghaunor &amp; Fotoh</a>	2006.	Perceived complexity, perceived benefits, organizational competence, perceived compatibility, supporting industries e-readiness, management support, market e-readiness, IT capability, and government e-readiness.	Micro	Survey/Interviews
<a href="#">Migiro</a>	2006	Associated cost, availability of funds, technical know-how, perceived benefits	Micro	Survey/Interviews
<a href="#">Molla &amp; Licker</a>	2005	Organizational factors, environmental factors, infrastructure, government supports	Micro	Survey/Interviews
<a href="#">Poon &amp; Swatman</a>	2005	Management enthusiasm, perceived benefits, industry and product specificity	Micro	Survey/Interviews
<a href="#">Ching &amp; Paul</a>	2004	Business value and system of business, perceived benefits, associated cost, customer pressures	Micro	Survey/Interviews
<a href="#">Scupola</a>	2003	technology characteristics (e.g. benefits and barriers), organizational characteristics (e.g. slack resources), government intervention, public administration and external pressure from competitors, suppliers and buyers	Micro	Survey/Interviews

## Literature on Digital Divide

The above literature review shows obviously that there are many studies on the adoption of ICTs or e-commerce by organizations/companies. However, rare are those that explore the

topic using the concept of “digital divide”. Digital divide (DD) is a term that refers to the gap between individuals, companies, regions and countries in accessing and using ICT. This technology can include the telephone, television, personal computers and the Internet.

Important studies on DD include Zhu, Kraemer & Xu (2003), Viswanathan & Pick (2005), Wielicki & Cavalcanti (2006), Arendt (2008), Fong (2009), Stiakakis, Kariotellis & Vlachopoulou (2009), Oliveira & Martins (2010), Wielicki & Arendt (2010), Srinuan & Bohlin (2011), and Bach, Zoroja & Vukšić (2013). Zhu, Kraemer & Xu (2003) developed a conceptual model for studying the adoption of e-business (EB) at the firm level, incorporating six adoption facilitators and inhibitors, based on the technology–organization–environment theoretical framework. Survey data from 3100 businesses and 7500 consumers in eight European countries were used to test the proposed adoption model. To examine whether adoption patterns differ across different e-business environments, they divided the full sample into high EB-intensity and low EB-intensity countries. The findings showed that: (1) technology competence, firm scope and size, consumer readiness, and competitive pressure were significant adoption drivers, while lack of trading partner readiness was a significant adoption inhibitor; (2) as EB-intensity increases, two environmental factors, i.e. consumer readiness and lack of trading partner readiness, become less important, while competitive pressure remains significant; (3) in high EB-intensity countries, e-business was no longer a phenomenon dominated by large firms – as more and more firms engage in e-business, network effects work to the advantage of small firms; and (4) firms were more cautious in adopting e-business in high EB-intensity countries,

Viswanathan & Pick (2005) analysed the growth of the e-commerce industry and its relationship with associated industries, such as telecommunications and software, in the context of the Indian and Mexican economies. In addition, they also examined factors impacting the adoption of e-commerce in different sectors of the economy. The major variables considered in their research included growth in the number of Internet connections, telecommunications infrastructure, attitudes and awareness of corporations and individual customers towards e-commerce, growth of the software industry in terms of its relationship to e-commerce, and the role played by the government. The two nations were compared on four groups of e-commerce factors. Based on existing trends, they also examined the major bottlenecks to future growth and presented a framework that may help explain the process of e-commerce diffusion in developing countries.

Wielicki & Cavalcanti's (2006) paper reported on findings of a study conducted among over 750 MSMEs in Central California regarding uses and application barriers for ICT. This study focused on the scale, dimensions and reasons for existence of a so-called digital divide. It showed that the primary reason for discrepancies in utilization of ICT among MSMEs and

large corporations is not as much lack of funds or access to information technology as it is lack of proper management, education, training and skilled labour. Some comparative pilot data from Poland and Brazil indicate also that insufficient management, education and training may contribute to the existence of a digital divide, regardless of economic status of a country.

Arendt (2008) examined the use of ICT-based solutions by MSMEs in selected regions of Spain, Portugal, Poland, and California (USA), and digital divide phenomena which exist between MSMEs and large enterprises. He collected data from face-to-face interviews with MSMEs' owner-managers and employees from the regions and used it for making a comparative analysis based on descriptive statistical methods. He argued that the main barrier to better utilization of ICT and e-commerce, and thus the main reason why MSMEs faced a digital divide, was not the lack of access to information technology but the lack of proper knowledge, education and skilled owner-managers and employees within the enterprise.

Fong (2009) assessed the impact of ICTs on Gross National Income (GNI) per capita in developing countries using data from 2005. Her regression analysis showed a significant relationship between GNI per capita (in PPP international dollars) and adoption of each ICT (mobile phone, personal computer, and telephone), with the exception of Internet technology. Her study suggests that an increase in the adoption of mobile phone, personal computer, and fixed-line telephone by one percent will bring about an increase in average income per person in lower-middle-income and low-income developing countries of approximately 2.8 per cent, 4.1 per cent, and 6.3 per cent, respectively. The absence of a significant relationship for Internet technology may be the result of an absence of a critical mass in Internet adoption and usage. This warrants further investigation with a more robust analytical model.

The digital divide is nowadays evolving to digital inequality, i.e., the socio-economic disparities inside the 'online population'. Stiakakis, Kariotellis & Vlachopoulou (2009) examined two main dimensions of digital inequality, namely 'skills' and 'autonomy' of Internet users. The level of formal education was selected as a representative variable for the skill dimension, as well as the density of population in different geographical areas as a representative variable for the autonomy dimension. The research was focused on the member states of the European Union (EU). The data, provided by Eurostat, included the daily use of computers for the last three months and the average use of the Internet at least once per week. The findings indicate that the EU already faces the problem of digital inequality to an extended degree, since there are significant disparities among the European countries with regard to the aforementioned variables.

Oliveira & Martins (2010) analysed the pattern of e-business adoption by firms also across European Union (EU) member states. They used survey data from 6,964 businesses in EU27

members. The choice of variables used in the analysis was based on the technology-organization-environment (TOE) theory. In the TOE framework, three aspects may possibly influence e-business adoption, namely technological context (technology readiness and technology integration), organizational context (firm size, expected benefits and barriers of e-business, and improved products or services or internal processes) and environmental context (Internet penetration and competitive pressure). They performed a factor analysis (FA) of multi-item indicators to evaluate the validity and to reduce the number of variables. They used the principal component technique with varimax rotation to extract four eigen values, which were all greater than one. The first four factors explain 72.4% of variance contained in the data. The four factors found were expected benefits and obstacles of e-business, Internet penetration, technology readiness, and technology integration. The findings suggest that in the European context the most important factor to characterize e-business adoption is the specific characteristics of the industry and is not the country to which the firm belongs.

Wielicki & Arendt (2010) explored a shift in the perception and ranking of barriers to implementation of ICT-based solutions among MSMEs in selected regions of Spain, Portugal, Poland and California (USA), which can be attributed to the degree of ICT readiness exhibited by a given country. They have verified a hypothesis that the more knowledge-based a given economy is (as measured by ICT indexes), the more likely it is that perception of the key ICT implementation barriers among MSMEs will shift away from mere lack of funds and technology toward lack of knowledge, education and information system planning. The conclusion of their study may well serve a better distribution of resources allocated by governments to overcome the business digital divide that limits productivity of so many MSMEs.

Srinuan and Bohlin (2011) presented a literature review and classification scheme for digital divide research. The review covered journal articles published between 2001 and 2010. The results showed that the digital divide is a multifaceted phenomenon, due to the many dimensions of determinant factors. Recent studies covered by their review have included socio-economic, institutional and physiological factors in order to gain a greater understanding of the digital divide. Among other findings, they showed that technological determinism is not sufficient to explain the emergence of the digital divide. Moreover, several types of technologies were investigated, both from empirical and conceptual standpoints. The divide in access and usage are discussed at the global, social and democratic levels by employing a quantitative method, either a survey or data analysis, as the main method. It revealed, however, that there is less discussion in developing countries and at the level of the organization (i.e., MSMEs, the private sector and the public sector).

Bach, Zoroja & Vukšić (2013) also presented a review of published papers on DD among corporations. Papers from the journals indexed in SSCI that investigate corporate DD were examined in order to compare the research on corporate DD in terms of: (1) geographical area, time frame of the study, sampled corporations; (2) phenomena used as the indicators/measure of DD, inequality type, ICT adoption cycle, determinants of DD; and (3) data collection approach, data sources, sample size and methodology used for investigation of DD determinants. Their research revealed that most of the papers on corporate DD investigate the first-order corporate DD and ICT use in developed countries, using a large number of phenomena as a proxy for corporate DD, ranging from general ICT use and Internet use to the specific ICT use, such as e-business. Most of the research revealed that internal factors in corporations are crucial for adopting and using ICT in order to increase business performance and competitiveness. Based on the results of their DD literature review, they concluded that future research should focus on ICT access and use in developing countries and more research should be conducted by using secondary data such as transactional data or national data, since it allows larger samples and a broader scope of corporations to be investigated.

## Indonesian Case Studies

Literature on ICT or e-commerce adoption by MSMEs in Indonesia has been growing in the past decade. It includes Budiarto *et al.* (2018), Chairuel & Riski (2018) and Suhartanto & Leo (2018). The purpose of the former was to test the effect of both internal (owners' knowledge) and external (infrastructure) factors on the success of ICT implementation and MSMEs' performance. For that purpose, data was collected from 110 MSME owners with a mail questionnaire, and a regression model was used to test the hypothesis and to examine the effect of each variable. The result of this research showed that both internal and external factors have a significant impact on ICT implementation.

Chairuel & Riski (2018) aimed to identify internal and external factors of ICT adoption by MSMEs by conducting a survey of 146 selected MSMEs. The conceptual model in their research was the combination between Diffusion of Innovation (DOI) theory and the Technology-Organization-Environment (TEO) theory. The collected data was analysed using SEM/Smart-PLS program. The study has exogenous variables including technology, organization, managerial characteristic, and environment, and the endogenous variable is ICT adoption. The research found that ICT use was predicted by the characteristics of management, organization and technology.

Suhartanto & Leo (2018) examined small business entrepreneur resistances to adopting online store and website technology. Their qualitative study used the technology adoption model (TAM) as a theoretical basis. From their sample of 131 small entrepreneurs, they found that

perceived lack of usefulness, perceived lack of ease to use, resources, and social influences are resistance factors for entrepreneurs to adopt online stores and websites. Among these factors, the perceived lack of usefulness and resources is considered the most substantial resistance factor for the entrepreneur to adopt the technology.

According to Julianto (2016), there were various obstacles faced by the Indonesian government (i.e., the State Ministry of Cooperative and Small Medium Enterprise) in encouraging or supporting MSEs' owners to utilise ICT or to adopt e-commerce, namely their low understanding of this kind of technology and its usefulness, their mindset, which is not in favour of adopting e-commerce, and their lack of knowledge on how to operate this technology. Especially MSEs located in isolated/rural areas, many of them were unfamiliar with the online marketing system. Therefore, they prefer to do marketing with conventional methods, by utilising the distribution networks that they have been using for a long time or involving many traders or collectors who have long been their key customers.

Rahayua & Day (2015) did a survey of more than 200 MSME owners/managers in 2015. In their study, MSME refers to a business which has less than 100 employees, assets less than 10 billion rupiah and total sales per year below 50 billion rupiah. They concluded that the adoption of e-commerce by MSMEs in Indonesia was affected by several factors, which are perceived benefits, technology readiness, owners' innovativeness, and owners' ICT experience and ability.

Triandini *et al.* (2013) investigated the opportunities provided by e-commerce adoption for MSMEs in Indonesia and potential factors that could influence their e-commerce adoption. Their study, however, was not empirical but rather a discussion of a conceptual model. It proposed six potential factors influenced the adoption of e-commerce, i.e., perceived usefulness, perceived ease of use, relative advantage, perceived risk, perceived trust, and compatibility.

Govindaraju & Chandra (2011) found that many MSMEs in Indonesia did have strategic plans to adopt a higher level of e-commerce, though the majority of them currently still adopt e-commerce at a lower level. They found eight essential variables which have no significant influences as the barriers of e-commerce adoption by MSMEs. Accordingly, these variables can be predicted as the factors that can support e-commerce adoption that need further analysis, namely financial, supply chain management, Internet services, market, source of information, enterprises association, e-commerce popularity, security and political.

Eva (2007) conducted a study on the application of e-commerce services for marketing MSME products. Five e-commerce services were communication interaction, access to information and data, transaction, remote control and decision-making, and application and other

services. In general, she found that the adoption of these online-based business processes by MSMEs was still relatively low. Many MSME owners/managers faced a number of constraints, such as Internet access taking a long time, difficulties to switch to transaction-based technology, and many MSMEs, especially MSEs, still preferring the traditional ways of marketing (such as waiting for buyers to visit their shops, or selling their products to merchants to then sell to places that are farther away) even though they may have access to the Internet or Wi-Fi. Likewise, in payment, most MSEs do not want to be paid by credit card but cash. So, generally, MSE owners/managers were difficult to change from their traditional behaviour of doing business, including marketing.

Hafied (2007) found that many MSMEs in Indonesia have already started to apply e-commerce adoption to increase or at least to maintain their revenues or profits, although the degree of adoption is different from one company to another. It was also revealed from his research that financing and customer service were the major driving factors in adopting e-commerce.

Kartiwi (2006) aimed to understand the factors and combinations of factors that MSMEs need to be considered before embracing e-commerce into their business, by providing a closer look at actual experience of Indonesian SMEs. For this purpose, two case studies (firms) were carried out to analyse and explain the underlying factors that are likely to determine the varying extent of e-commerce adoption in MSMEs, especially in the service sector. The findings of their case studies have been further extended into the development of a proposed practical framework to illustrate how e-commerce adoption should be carried out from a strategic perspective.

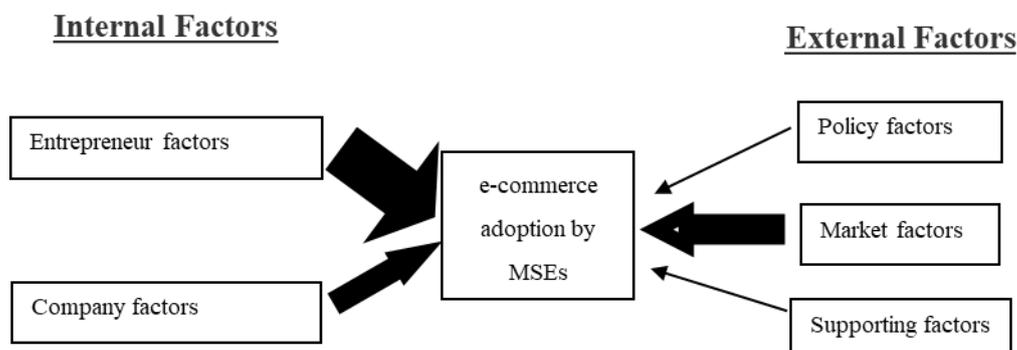
Finally, Vidi (2006) also used TAM to create an e-commerce adoption model in examining factors affecting the adoption of e-commerce by MSMEs in Indonesia for her thesis. She inferred that compatibility, top management support, organizational readiness, external pressure, and perceived benefits have significant positive effect on e-commerce adoption, and the adoption has significant positive effects on company performance. Data was collected from nine big cities in Indonesia, i.e., Padang, Jakarta, Cirebon, Yogyakarta, Jepara, Sidoarjo, Denpasar, Makassar and Balikpapan.

## Theoretical Framework

As explained before, this study is based on the concept of digital divide, aiming to examine the influence of regional factors on differences in e-commerce adoption by MSMEs between provinces in Indonesia. The literature review reveals that the decision of a business owner to adopt e-commerce is influenced by many factors, directly or indirectly. These factors can be grouped into two categories of factors: internal factors and external factors. Internal factors

are related to: (i) individual characteristics of the entrepreneur/business owner, which include education, age, strategic vision, business planning, ICT knowledge, expertise, and experience, confidence that the use of e-commerce can improve business (perceived usefulness), confidence that this new marketing system would deliver its functionality in expected quality and reliability (perceived trust), and willingness to adopt e-commerce as well as to adjust the way he/she does business with the related requirements; and (ii) characteristics of a company including size, organizational complexity, technology readiness, resources (i.e., availability of skilled labour in ICT and capital), company culture and level of innovativeness, and type of business. The first and second groups of factors can be said to be, respectively, the “entrepreneur” factors, and the “company” factors

External factors are related to the external environment uncontrolled by the company. They can be categorized into three sub-factors: (i) market factors (e.g., market size, location, degree of complexity and level of competition, and pressures from trading partners and customers to adopt e-commerce); (ii) policy factors (e.g., government regulation, laws, and incentive measures or facilities in the forms of, e.g., tax relief, specially designed ICT training programs for MSE owners and employees, and other facilities to ease the use of ICT for beginners); and (iii) supporting factors, such as the availability of ICT, infrastructure (e.g., electricity, software/hardware vendors, having a computer or smartphone, access to the Internet, universities and other training institutes providing ICT/e-commerce training, funding support by the bank, and active support by business associations and chamber of commerce).



**Figure 2. Theoretical Framework**

Thus, as illustrated in Figure 2, generally, e-commerce adoption by MSEs is influenced by five main factors. From the literature there is no conclusion which of these five factors most influences the adoption of e-commerce by MSEs. But, because business decisions are in the hands of entrepreneurs or company leaders, especially things that have a serious consequence to the company, it can be hypothesized that the characteristics of entrepreneurs/business owners have the most influence, shown by the broadest black arrow. The second and third factors which also have big influences are, respectively, market and characteristics of company.

So, based on the theoretical framework, the general hypothesis is that all these five groups of factors have positive and significant influences on e-commerce adoption by MSEs, and the entrepreneur factors have the largest effect, followed by the market factors and company factors.

## Methodology

### Economic Method

In accordance with the research objective, the following functional form, i.e., a multiple regression at 0.05 level of significance, was used to estimate empirically the impact of determinant factors as independent variables on the number of MSEs in all sectors that use e-commerce. The definitions of operational independent variables are given in Table 2. Unfortunately, there is no province data for many determinant factors included in these two categories of factors illustrated in Figure 1. So, in this model the number of independent variables is very limited. For instance, local governments in many provinces have organized ICT training for MSMEs, which can actually be adopted as an independent variable that represents a policy factor.

$$\text{MSEs-e} = \alpha_0 + \alpha_1 \text{HH}_1 + \alpha_2 \text{HH}_2 + \alpha_3 \text{GW} + \alpha_4 \text{GRDP} + \alpha_5 \text{EDU}$$

where MSEs-e = number of MSEs in all sectors that use e-commerce as a percentage of total MSEs per province.

**Table 2. Definitions of Operational Independent Variables**

Factor	Variable used	Definitions and Variable Units
Supporting Factor	HH <sub>1</sub>	The number of households that have computers as a percentage of total households per province.
	HH <sub>2</sub>	The number of households that have access to the Internet as a percentage of total households per province.
Company Factor	GW	Electricity flow from the electricity transmission system to the consumer (Gigawatts per hour) per province.
Market Factor	GRDP	Percentage distribution of Indonesia's gross domestic product by province.
Entrepreneur Factor	EDU	The number of MSEs whose owners have a college or university diploma as a percentage of the total MSEs per province.

E-commerce adoption was measured by Internet access, use of website, online marketing, use of the web for buying and selling, sending e-mail to communicate with business partners, using the World Wide Web to access information such as information about markets and competitors; and use of ICT tools for business information processing.

## Hypotheses

Based on the model and the number of independent variables, this study has five hypotheses:

H<sub>1</sub>: in province with higher percentage of households having computer (HH<sub>1</sub>), the percentage of MSEs adopting e-commerce is higher than in provinces with lower percentage;

H<sub>2</sub>: in province with higher percentage of households having access to the internet (HH<sub>2</sub>), the percentage of MSEs adopting e-commerce is higher than in provinces with lower percentage;

H<sub>3</sub>: in province with higher percentage of households having access to electricity (GW), the percentage of MSEs adopting e-commerce is higher than in provinces with lower percentage;

H<sub>4</sub>: in province with higher income per capita (GRDP), the percentage of MSEs adopting e-commerce is higher than in provinces with lower income per capita;

H<sub>5</sub>: in province with higher percentage of highly educated MSE owners/entrepreneurs (EDU), the percentage of MSEs adopting e-commerce is higher than in provinces with lower percentage.

## Data

This study used secondary data, i.e., 2016 cross-section data of 34 provinces published in *Indonesian Statistics* for all independent variables, and National Economic Census 2016 for MSEs (the only data available on MSEs using e-commerce by province). Both datasets are from the National Bureau of Statistics.

## Results

### Descriptive Statistics and Statistical Tests

Table 3 presents the outcomes of the descriptive statistics for the main variables involved in the regression model. Key figures, including mean, median, standard deviation, minimum and maximum value, are reported. This was generated to give an overall description of the data used in the model and served as a data screening tool to spot unreasonable figures.

**Table 3. Descriptive Statistics of the Data**

	MSEs-e	HH1	HH2	GW	GRDP	EDU
Mean	2.942	2.044	5.311	1.806	2.941	4.634
Median	1.195	1.920	5.372	0.370	1.215	4.200
Maximum	1.872	3.340	8.570	9.900	1.744	1.050
Minimum	0.120	1.224	1.976	0.010	0.230	2.500

	MSEs-e	HH1	HH2	GW	GRDP	EDU
Std. Dev.	4.848	5.864	1.282	2.997	4.241	1.778
Skewness	2.494	0.883	-0.103	1.837	2.259	1.228
Kurtosis	7.936	3.146	3.915	4.962	7.168	4.635
Probability	0.000	0.108	0.537	0.000	0.000	0.002
Observations	34	34	34	34	34	34

Source: computed from SPSS

Various statistical tests were performed first, to determine the stability of the model, normality, multicollinearity and heteroscedasticity. The stability test (CUSUM and CUSUM SQ) shows the CUSUM and CUSUM of Squares lines do not cross the 5% significance line. So, it can be concluded that the model used is stable. The normality test results show that the prob. Jarque-Bera is more than 0.05 (i.e. 0.3558), which means that the data used are normally distributed (Figure 3). Based on the multicollinearity test (if a variable has a Variance Inflation Factor (VIF) value less than 10 (Table 4), then the variable does not have multicollinearity), it can be concluded that all independent variables in this model do not have multicollinearity. Finally, based on the heteroscedasticity test results that prob. Chi-Square is more than 0.05 (0.0532) (Table 5), it can be concluded that there is no heteroscedasticity.

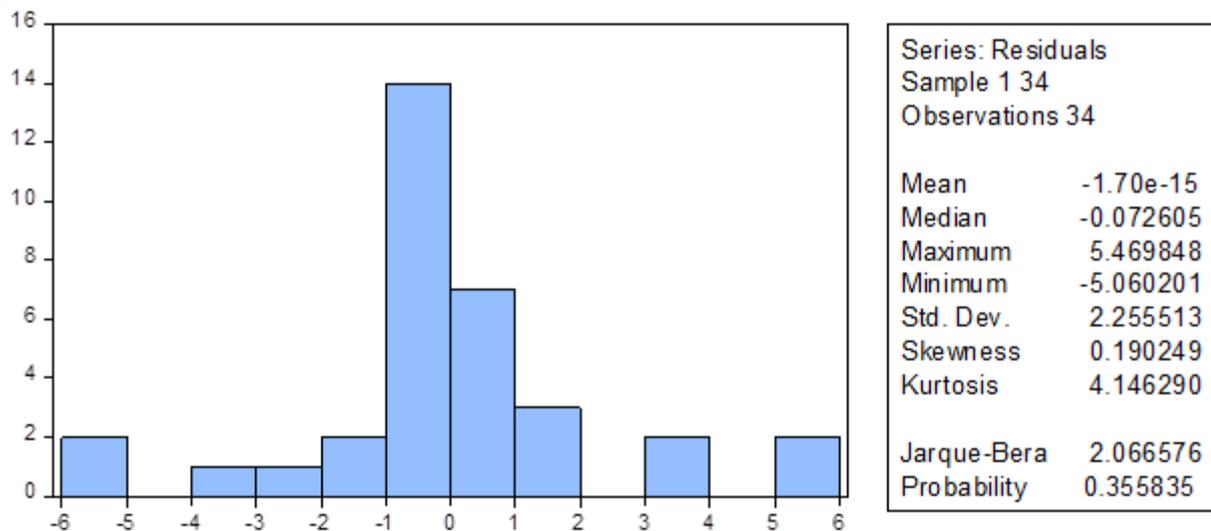


Figure 3. The Normality Test Results

Table 4. Variance Inflation Factors (N=34)

Variable	Coefficient Variance	Uncentred VIF	Centred VIF
$\alpha_0$	5.412694	30.69347	NA
HH <sub>1</sub>	0.018718	47.88099	3.542982
HH <sub>2</sub>	0.003982	67.29282	3.602590
GW	0.061185	4.156698	3.025185
GRDP	0.031128	4.608015	3.080821
EDU	0.092416	12.86317	1.608946

**Table 5. Heteroskedasticity Test: Glejser**

F-statistic	28.83459	Prob. F(21,11)	0.0000
Obs*R-squared	32.41122	Prob. Chi-Square(21)	0.0532
Scaled explained SS	42.34480	Prob. Chi-Square(21)	0.0038

## Regression Results

For the purpose of determining the extent to which the explanatory variables explain the variance in the explained variable, regression analysis was employed. The *t*-test was used to determine the significance of the effect of each explanatory variable on the explained variable. According to the hypotheses given above, it is expected that all the explanatory variables, partially, have a significant effect on the explained variable at a significance level of 0.05. The results of such analysis are narrated in Table 6.

**Table 6. Regression Results**

Dependent Variable: MSEs-e						
Variable	Coefficient	Prob.	Std Error	Hypothesis	t-Statistic	Conclusion
$\alpha_0$	2.667900	0.2612	2.326520		1.146734	
HH <sub>1</sub>	0.052804	0.7024	0.136813	H <sub>1</sub> rejected	0.385956	Not significant
HH <sub>2</sub>	0.044544	0.4861	0.063102	H <sub>2</sub> rejected	-0.705903	Not significant
GW	0.564949	0.0302	0.247357	H <sub>3</sub> accepted	2.283943	Positive significant
GRDP	0.697563	0.0005	0.176431	H <sub>4</sub> accepted	3.953748	Positive significant
EDU	-0.326206	0.2924	0.304001	H <sub>5</sub> rejected	-1.073046	Not significant
R-squared						0.783538
Adjusted R-squared						0.744884
S.E. of regression						2.448630
Sum squared residual						167.8821
Log likelihood						-75.39124
F-statistic						20.27058
Prob(F-statistic)						0.000000
Durbin-Watson statistic						2.081481

## Discussion

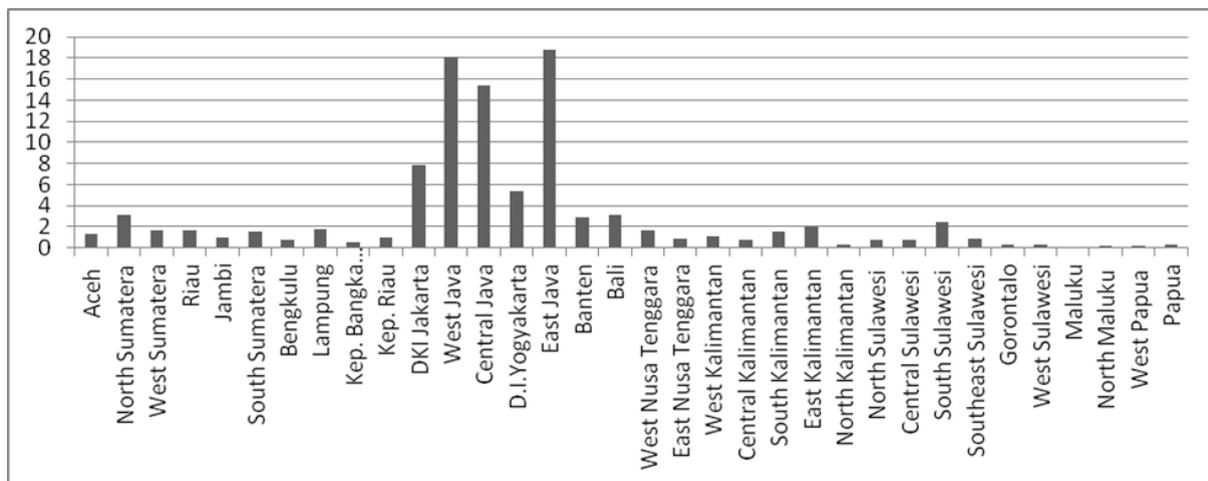
The regression results show that not all independent variables have an impact on the use of e-commerce by MSEs as theoretically expected. For households that have computers (HH<sub>1</sub>), the probability result is 0.7024 > 0.05, which means that it is insignificant: H<sub>1</sub> is rejected. This can be explained by the fact that e-commerce can also be done by a smartphone. In fact, a smartphone is more flexible and can be taken anywhere. It can be assumed that all MSE owners have a smartphone, as this has now become a necessity, no longer a luxury item. Meanwhile, in Indonesia, not all MSE owners, especially peddlers, roadside food stall owners, small grocery store owners, small motorbike repair shop owners, and craftsmen, do not have personal computers or laptops.

Likewise, with the percentage of households that have access to the Internet ( $HH_2$ ), the result is  $0.4861 > 0.05$ , not significant, and therefore  $H_2$  is rejected. It is very likely that this variable does not have a positive and significant effect on the use of e-commerce by MSEs because the number of households in a region that have access to the Internet or have Wi-Fi at home is not always directly proportional to the number of MSEs that use e-commerce. An MSE owner may have Wi-Fi at home but does not use e-commerce in marketing his/her products. On the other hand, a shop owner may not subscribe to Wi-Fi at home, but has Wi-Fi in his/her shop or utilizes Wi-Fi for free in public places, or he/she buys a daily, weekly or monthly Wi-Fi package. So, actually the required variable in this particular case should not be the number of households that have access to the Internet but the number of MSE owners who have Internet access or a Wi-Fi subscription, for which there is no data available at provincial level. An earlier study by Govindaraju & Chandra (2011) reveals a number of essential variables which have no significant influence as barriers to e-commerce adoption by MSMEs. Therefore, they argued that these variables can be predicted as the factors that can support e-commerce adoption that need further analysis. The variables include Internet services, e-commerce popularity among MSMEs, and security in using e-commerce. In other words, it is still an open question regarding the significant influence of the Internet on the use of e-commerce by MSMEs, especially MSEs.

The effect of electricity flow to the consumer (GW) on the use of e-commerce by MSEs is positive and significant ( $0.0302 < 0.05$ ), as generally expected; so  $H_3$  is accepted. During the Covid-19 pandemic (March-May/June 2020) the Indonesian government required all schools and universities and companies in non-strategic sectors to close and school children and students learn and employees work from home. However, this 'anti-Covid impact' policy is not easy to be carried out in remote and rather isolated regions where most households are poor, especially in the eastern part of the country, because, besides the difficulty of accessing the Internet, there is also no electricity.

The effect of GRDP on the use of e-commerce by MSEs is positive and significant ( $0.005 < 0.05$ ); so  $H_4$  is accepted. Not only is the direction in accordance with the theory and the relationship is significant, but it also has the largest coefficient value among the independent variables. This independent variable represents the market size, and the result may confirm that the market size is an important (if not the most important) factor in influencing an entrepreneur or business owner to use e-commerce. Market size is not only determined by the number of buyers but also by the number of traders or suppliers that automatically increase the level of market competition. And, one way to stay in the market, besides improving the quality of goods or services, is to improve marketing efficiency and effectiveness by using an e-commerce system.

The importance of the market size is also supported by the following figures. Based on the 2016 Economic Census, the distribution of MSEs in all sectors in Indonesia that adopt e-commerce by province, depicted in Figure 4, shows that MSEs using e-commerce are found mainly in Java island which consists of DKI Jakarta (the Capital City of Indonesia), the Province of Banten, the Province of West Java, the Province of Central Java, D.I. Yogyakarta, and the Province of East Java. Parts of Java with the highest proportion of MSEs that use e-commerce are the Province of East Java, with around 18.72 % of all MSEs adopting this technology in Indonesia, followed by the Province of West Java and the Province of Central Java with, 18.11 % and 15.41 %, respectively.



**Figure 4. Percentage Distribution of Total MSEs Adopting e-commerce by Province, Indonesia, 2016 (Source: BPS, 2017).**

Java is the centre of economic and financial activities in Indonesia, with DKI Jakarta, the Province of Banten and the Province of West Java together as the largest region in Indonesian GDP, followed by the province of East Java and the province of Central Java. Also, about 70 percent of the Indonesia population are found in this island; while, outside Java Island, especially in the eastern region where many poor provinces are found, the percentage of MSEs using e-commerce is much lower. Provinces that have the lowest percentage in this region are Maluku with only 0.12 %, North Maluku with 0.16 %, and West Papua 0.19 %.

The scatter diagram of MSEs-e and GRDP shown in Figure 6 may provide a clearer picture of the relationship between MSEs-e and market size, represented by provincial GDP.

Finally, the relationship between EDU and the use of e-commerce by MSEs is not significant ( $0.2924 > 0.05$ ) and the coefficient is negative; so  $H_5$  is rejected. These results give the impression that conducting e-commerce is not affected by the level of formal education of the MSE owners. In Indonesia, MSE owners are generally poorly educated; in fact, most of them who are above 40 years old have only elementary school, or those who are still in their 20s only have a high school diploma. With low education, it is difficult for them to find jobs in the formal sector, for example, as employees in a big company. Therefore, they are forced to open

their own businesses. So, there is a kind of negative relationship between the level of education of MSE owners and the existence of MSEs.

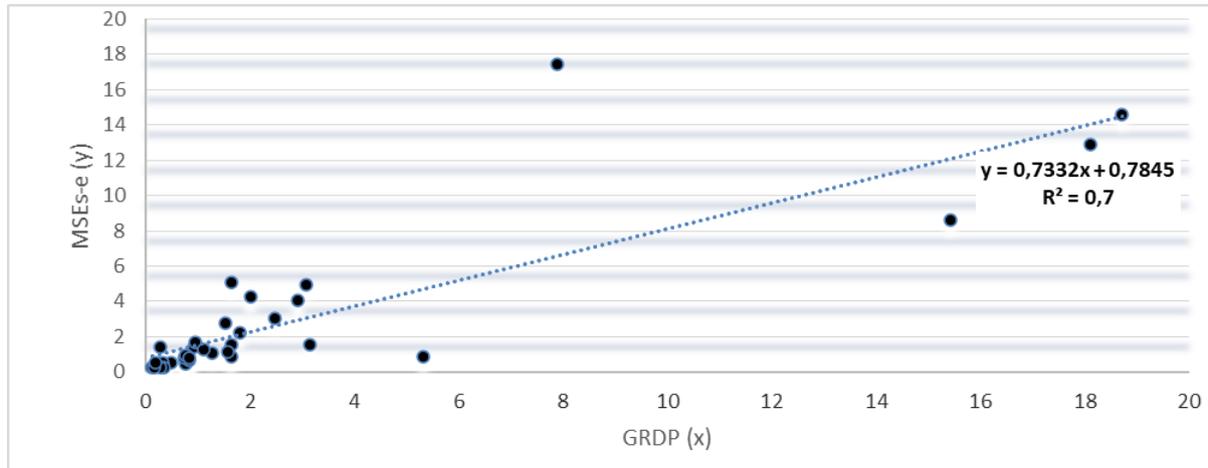


Figure 6. Scatter Diagram of MSEs-e and GRDP, Indonesia, 2016 (Source: BPS, 2017)

## Conclusions

This study outlines some significant findings on the e-commerce adoption by MSE owners/entrepreneurs in Indonesia. It shows at least three important facts. First, the degree of e-commerce adoption by MSEs in Indonesia is still very low. The review of literature reveals several explanations, which include owners' low understanding of the importance of ICT or e-commerce for their businesses, their mindset, which is not in favour of using ICT or adopting e-commerce (i.e., they prefer to do marketing with conventional methods), lack of human resource capacity, and lack of owners' innovativeness.

Second, there is a positive relationship between the size of economic activities or market in a province and the number of MSEs in the province using the Internet or e-commerce. One explanation is that, in regions where market size is large, represented by many buyers and producers, usually the market competition among MSEs themselves as well as between MSEs and larger companies and imported goods is tight. Such market conditions force MSEs to be more aggressive and smarter in promoting as well as marketing their products, and, for that, they must utilise the Internet/ICT or adopt e-commerce.

Third, in a region where all residents or households have a computer or access to the Internet, it is not always that all business actors, especially MSEs, in that region utilize e-commerce technology. This suggests that there are many other factors, as already discussed in the literature review or described in the theoretical framework, which are far more important in influencing the decision of an MSE owner or entrepreneur to change his/her marketing system from conventional to e-commerce usage.

## Limitation and Future Research

However, this study, which has tried to assess the impact of internal and external factors, as explained in the conceptual framework of this study, on the use of e-commerce by MSEs in Indonesia, based on secondary data, is not entirely successful. There are lots of factors, especially from the category of entrepreneur, company, policy and supporting factors, for which there are no province data.

Therefore, this research should be combined with primary data-based studies, that is, data collected from interviews with MSEs owners/entrepreneurs. And to get an idea of the differences (if any) between provinces and between sectors, the field survey must cover MSEs in various sectors and provinces. In the sample selection procedure, the priority sectors should be trade, agriculture and manufacturing industries, because usually the majority of MSEs are in these three sectors. The priority provinces are one or two provinces with the highest percentage of MSEs using e-commerce (e.g., East Java and West Java provinces) and one or two provinces with the least number of MSEs using e-commerce (e.g. Papua and West Papua provinces).

## References

- Aghaunor, L., & Fotoh, X. (2006). Factors Affecting Ecommerce Adoption in Nigerian Banks. *IT and Business Renewal*, June. <https://www.diva-portal.org/smash/get/diva2:4190/fulltext01>
- Ahmad, S. Z., Bakar, A. R. A., Faziharudean, T. M., & Zakic, K. A. M. (2015). An Empirical Study of Factors Affecting e-Commerce Adoption among Small- and Medium-Sized Enterprises in a Developing Country: Evidence from Malaysia. *Information Technology for Development*, 21(4), 555-572. <https://www.tandfonline.com/doi/abs/10.1080/02681102.2014.899961>
- Alam, S. S., & Ahsan, N. (2007). ICT Adoption in Malaysian SMEs from Services Sectors: Preliminary Findings. *Journal of Internet Banking and Commerce*, 12(3), 1-11 <https://www.icommercecentral.com/open-access/ict-adoption-in-malaysian-smes-from-services-sectors-preliminary-findings.php?aid=38510>
- Al-Bakri, A. A., & Katsioloudes, M. I. (2015). The factors affecting e-commerce adoption by Jordanian SMEs. *Management Research Review*, 38(7), 726-749. <https://doi.org/10.1108/MRR-12-2013-0291>
- Arendt, L. (2008). Barriers to ICT adoption in SMEs: how to bridge the digital divide? *Journal of Systems and Information Technology*, 10(2), 93-108. [https://www.researchgate.net/publication/220419434\\_Barriers\\_to\\_ICT\\_adoption\\_in\\_SMEs\\_How\\_to\\_bridge\\_the\\_digital\\_divide](https://www.researchgate.net/publication/220419434_Barriers_to_ICT_adoption_in_SMEs_How_to_bridge_the_digital_divide)
- Bach, M. P., Zoroja, J., & Vukšić, V. B. (2013). Review of corporate digital divide research: A decadal analysis (2003-2012). *International Journal of Information Systems and Project Management*, 1(4), 41-55. <https://www.bib.irb.hr/673992?rad=673992>

- Bakos, Y., & Brynjolfsson, E. (2000). Bundling and Competition on the internet. *Marketing Science*, 19 (1), 63–82. [https://www.academia.edu/2773540/Bundling\\_and\\_Competition\\_on\\_the\\_Internet](https://www.academia.edu/2773540/Bundling_and_Competition_on_the_Internet)
- Balakrishnan, A., & Boorstin, J. (2017). Instagram says it now has 800 million users, up 100 million since April. 25 September, CNBC.Com. <https://www.cnbc.com/2017/09/25/how-many-users-does-instagram-havenow-800-million.html>
- Barry, H., & Milner, B. (2002). SME's and Electronic Commerce: A Departure from the Traditional Prioritisation of Training? *Journal of European Industrial Training*, 25(7), 316–326. <https://www.emerald.com/insight/content/doi/10.1108/03090590210432660/full/html>
- BPS (2017) Analisa Ketenagakerjaan Usaha Mikro Kecil, Sensus Ekonomi 2016. Analisa Hasil Listing, November, Jakarta: Badan Pusat Statistik Nasional. <https://www.bps.go.id/publication/2017/12/26/3d1e106a193f44a29983778e/analisis-hasil-listing-sensus-ekonomi-2016---analisis-ketenagakerjaan-usaha-mikro-kecil.html>
- Budiarto, D. S., Sari, M. W., Sudaryana, A., & Prabowo, M. A. (2018). IT Implementation on Indonesian SMEs: Challenges or Barriers? *International Journal of Business and Society*, 19(S4), 546-553. <http://www.ijbs.unimas.my/index.php/content-abstract/all-issues/64-vol-19-s4-2018/528-it-implementation-on-indonesian-smes-challenge-or-barriers>
- Chairoel, L., & Riski, T. R. (2018). Internal and External Factor Influence ICT Adoption: A Case of Indonesian SMEs. *Jurnal Manajemen dan Kewirausahaan*, 20(1), 38–44 [https://www.researchgate.net/publication/327400596\\_INTERNAL\\_AND\\_EXTERNAL\\_FACTOR\\_INFLUENCE ICT ADOPTION A CASE of INDONESIA SMEs](https://www.researchgate.net/publication/327400596_INTERNAL_AND_EXTERNAL_FACTOR_INFLUENCE ICT ADOPTION A CASE of INDONESIA SMEs)
- Ching, H. L., & Ellis, P. (2004). Marketing in cyber space: What factors drive Ecommerce adoption? *Journal of Marketing Management*, 20 (3-4), 409-429. [https://www.researchgate.net/publication/247495073\\_Marketing\\_in\\_Cyberspace\\_What\\_Factors\\_Drive\\_E-Commerce\\_Adoption](https://www.researchgate.net/publication/247495073_Marketing_in_Cyberspace_What_Factors_Drive_E-Commerce_Adoption)
- Chitura, T., Shepherd, M., Dube, T., & Bolongkikit, J. (2008). Barriers to Electronic Commerce Adoption in Small and Medium Enterprises: A Critical Literature Review. *Journal of Internet Banking and Commerce*, 13, 1-13. [https://www.researchgate.net/publication/291006359\\_Barriers\\_to\\_electronic\\_commerce\\_adoption\\_in\\_small\\_and\\_medium\\_enterprises\\_A\\_critical\\_literature\\_review](https://www.researchgate.net/publication/291006359_Barriers_to_electronic_commerce_adoption_in_small_and_medium_enterprises_A_critical_literature_review)
- Chong, S., & Pervan, G. (2007). Factors Influencing the Extent of Deployment Electronic Commerce for Small and Medium Sized Enterprises. *Journal of Electronic Commerce in Organizations*, 5(1), 1-29. <https://www.igi-global.com/article/factors-influencing-extent-deployment-electronic/3485>
- Cosgun, V., & Dogerliogl, O. (2012). Critical Success Factors Affecting E-commerce Activities of Small and Medium Enterprises, *Information Technology Journal*, 11(12). 1664-1676. [https://www.researchgate.net/publication/272963812\\_Critical\\_Success\\_Factors\\_Affecting\\_e-commerce\\_Activities\\_of\\_Small\\_and\\_Medium\\_Enterprises](https://www.researchgate.net/publication/272963812_Critical_Success_Factors_Affecting_e-commerce_Activities_of_Small_and_Medium_Enterprises)
- Das, S., & Das, K. K. (2012). Factors Influencing the Information Technology Adoption of Micro, Small and Medium Enterprises (MSME): An Empirical Study. *International*

- Journal of Engineering Research and Applications, 2(3), 2493-2498. [http://www.ijera.com/papers/Vol2\\_issue3/OY2324932498.pdf](http://www.ijera.com/papers/Vol2_issue3/OY2324932498.pdf)
- Dlodlo, N., & Dhurup, D. (2013). Drivers of E-Marketing Adoption among Small and Medium Enterprises (SMEs) and Variations with Age of Business Owners. *Mediterranean Journal of Social Sciences*, 4(14), 53-66. <https://www.mcser.org/journal/index.php/mjss/article/view/1576>
- Esmailpour, M., Hoseini, S. Y., & Jafarpour, Y. (2016). An Empirical Analysis of the Adoption Barriers of Ecommerce in Small and Medium sized Enterprises (SMEs) with implementation of Technology Acceptance Model. *Journal of Internet Banking and Commerce*, 21(2), 1-22. <https://pdfs.semanticscholar.org/39fa/a1d36cf19699fb5d4f431eae427b02b3e2fo.pdf>
- Eva, A. M. S. (2007). Persepsi Penggunaan Aplikasi Internet untuk pemasaran produk usaha kecil menengah, Paper presented at The National Seminar on Information Technology Application, 16 June, Yogyakarta. <https://journal.uui.ac.id/Snati/article/view/1719>
- Fong, M. W. L. (2009). Digital Divide: The Case of Developing Countries. *Issues in Informing Science and Information Technology*, 6(2), 471-478. <http://iisit.org/Vol6/IISITv6p471-478Fong597.pdf>
- Ghobakhloo, M. (2013). Barriers to Electronic Commerce Adoption Among Small Businesses in Iran. *Journal of Electronic Commerce in Organizations*, 9, 48-89. [https://www.researchgate.net/publication/314058374\\_Barriers\\_to\\_Electronic\\_Commerce\\_Adoption\\_Among\\_Small\\_Businesses\\_in\\_Iran](https://www.researchgate.net/publication/314058374_Barriers_to_Electronic_Commerce_Adoption_Among_Small_Businesses_in_Iran)
- Ghobakhloo, M., Arias-Aranda, D., & Benitez-Amado, J. (2011). Adoption of e-commerce applications in SMEs. *Industrial Management & Data Systems*, 111(8), 1238-1269. <https://pdfs.semanticscholar.org/8f5b/e07e808fd92d1f835ff9426bc4c2741cc1ee.pdf>
- Govindaraju, R., & Chandra, D. R. (2011). E-commerce adoption by Indonesian Small, Medium, and Micro Enterprises (SMMES): analysis of Goals and Barriers. Paper presented at the IEEE 3rd International Conference on Communication Software and Networks, 27-29 May, Xi'an. <https://www.semanticscholar.org/paper/E-commerce-adoption-by-Indonesian-small%2C-medium%2C-of-Govindaraju-Chandra/bff63933e9281fd4cb2feb6047aa7bb25ff63b80>
- Hafied, N. (2007). Adoption of E-commerce for small and medium enterprises: A case study of rural banks in the Depok city. Thesis Program Magister Teknologi Informasi, Universitas Indonesia, Depok. <http://lib.ui.ac.id/detail?id=126301&lokasi=lokal>
- Jones, P., Packham, G., Beynon-Davies, P., & Pickernell, D. (2011). False promises: E-business deployment in Wales' SME community. *Journal of Systems and Information Technology*, 13(2), 163-178. <http://dx.doi.org/10.1108/13287261111135990>
- Julianto, P. A. (2016). Pemerintah Targetkan 44 Juta UMKM Pasarkan Produk Lewat Internet. *Kompas Newspaper*, 18 June. <http://ekonomi.kompas.com/read/2016/06/18/111218426/pemerintah.targetkan>
- Kartiwi, M. (2006). Case Studies of E-commerce Adoption in Indonesian SMEs: The Evaluation of Strategic Use. *Australasian Journal of Information Systems*, 14(1), 69-75. [https://www.researchgate.net/publication/30387419\\_Case\\_Studies\\_of\\_E-commerce\\_Adoption\\_in\\_Indonesian\\_SMEs\\_The\\_Evaluation\\_of\\_Strategic\\_Use](https://www.researchgate.net/publication/30387419_Case_Studies_of_E-commerce_Adoption_in_Indonesian_SMEs_The_Evaluation_of_Strategic_Use)

- Kenneth, W., Rebecca, M. N., & Eunice, A. (2012). Factors Affecting Adoption of Electronic Commerce among Small Medium Enterprises in Kenya: Survey of Tour and Travel Firms in Nairobi. *International Journal of Business, Humanities and Technology*, 2(4), 76-91. [https://www.academia.edu/5283564/Factors\\_Affecting\\_Adoption\\_of\\_Electronic\\_Commerce\\_among\\_Small\\_Medium\\_Enterprises\\_in\\_Kenya\\_Survey\\_of\\_Tour\\_and\\_Travel\\_Firms\\_in\\_Nairobi](https://www.academia.edu/5283564/Factors_Affecting_Adoption_of_Electronic_Commerce_among_Small_Medium_Enterprises_in_Kenya_Survey_of_Tour_and_Travel_Firms_in_Nairobi)
- Lertwongsatien, C., & Wongpinunwatana, N. (2014). E-Commerce Adoption in Thailand: An Empirical Study of Small and Medium Enterprises (SMEs). *Journal of Global Information Technology Management*, 6(3), 67-83. <https://www.tandfonline.com/doi/abs/10.1080/1097198X.2003.10856356>
- Looi, H.-C. (2005). A Model of Factors Influencing Electronic Commerce Adoption among SMEs in Brunei Darussalam. *International Journal of Information Technology*, 10 (1), 72-87. [https://www.semanticscholar.org/paper/a-model-of-factors-influencing-electronic-commerce\\_looi/5ae3c9fe8defd847dec68ec9025e70345d7cc929](https://www.semanticscholar.org/paper/a-model-of-factors-influencing-electronic-commerce-looi/5ae3c9fe8defd847dec68ec9025e70345d7cc929)
- Marasini, R., Ions, K., & Ahmad, M. (2008). Assessment of e-business adoption in SMEs: A study of manufacturing industry in the UK North East region. *Journal of Manufacturing Technology Management*, 19, 627-644. [https://www.researchgate.net/publication/235261647\\_Assessment\\_of\\_e-business\\_adoption\\_in\\_SMEs\\_A\\_study\\_of\\_manufacturing\\_industry\\_in\\_the\\_UK\\_North\\_East\\_region](https://www.researchgate.net/publication/235261647_Assessment_of_e-business_adoption_in_SMEs_A_study_of_manufacturing_industry_in_the_UK_North_East_region)
- Migiro, S. O. (2006). Diffusion of ICTs and E-commerce adoption in manufacturing SMEs in Kenya. *South African Journal of Library and Information Science*, 72(1), 35-44. <https://pdfs.semanticscholar.org/1058/33840d410a5c96e4ad1a7e9232659a46f33d.pdf>
- Molla, A., & Licker, P. S. (2005). Perceived E-Readiness Factors in E-Commerce Adoption: An Empirical Investigation in a Developing Country. *International Journal of Electronic Commerce*, 10(1), 83-110. [https://www.researchgate.net/publication/262249082\\_Perceived\\_E-Readiness\\_Factors\\_in\\_E-Commerce\\_Adoption\\_An\\_Empirical\\_Investigation\\_in\\_a\\_Developing\\_Country](https://www.researchgate.net/publication/262249082_Perceived_E-Readiness_Factors_in_E-Commerce_Adoption_An_Empirical_Investigation_in_a_Developing_Country)
- Nakhleh, H. (2017). The practice of e-commerce and its obstacles: A field study on SMEs in the Al-Qassim region. *International Journal of Advanced and Applied Sciences*, 4(6), 159-168. <https://doi.org/10.21833/ijaas.2017.06.023>
- Oliveira, T., & Martins, M. F. (2010). Firms patterns of e-business adoption: evidence for the European Union. *The Electronic Journal Information Systems Evaluation*, 13(1), 47-56. <http://www.ejise.com/issue/download.html?idArticle=656>
- Poon, S. & Swatman, P. (2005). Small business use of the Internet: Findings from Australian case studies. *International Marketing Review*, 14(5), 1-15. [https://www.researchgate.net/publication/228554825\\_Small\\_business\\_use\\_of\\_the\\_Internet\\_Findings\\_from\\_Australian\\_case\\_studies](https://www.researchgate.net/publication/228554825_Small_business_use_of_the_Internet_Findings_from_Australian_case_studies)
- Poorangi, M. M., & Khin, E. W. S. (2013). Strategic Alliance on Malaysia SMEs to compete globally. Endogenous and exogenous prospective. *Actual Problem of Economics*, 3(141), 407-415. [http://www.irbis-nbu.gov.ua/cgi-bin/irbis\\_nbu/cgiirbis64.exe?I21DBN=LINK&P21DBN=UJRN&Z21ID=&S21REF=10&S21CNR=20&S21ST](http://www.irbis-nbu.gov.ua/cgi-bin/irbis_nbu/cgiirbis64.exe?I21DBN=LINK&P21DBN=UJRN&Z21ID=&S21REF=10&S21CNR=20&S21ST)

[N=1&S21FMT=ASP meta&C21COM=S&2 S21P03=FILA=&2 S21STR=ape 2013\\_3\\_45](#)

- Poorangi, M. M., Khin, E. W. S., Nikoonejad, S., & Kardevani, A. (2013). E-commerce adoption in Malaysian Small and Medium Enterprises Practitioner Firms: A revisit on Rogers' model. *Anais da Academia Brasileira de Ciências*, 85(4), 1593-1604. <https://doi.org/10.1590/0001-37652013103512>
- Rahayua, R., & Day, J. (2015). Determinant Factors of E-commerce Adoption by SMEs in Developing Country: Evidence from Indonesia. *Procedia - Social and Behavioral Sciences*, (195),142-150. [https://www.researchgate.net/publication/282556781\\_Determinant\\_Factors\\_of\\_E-commerce\\_Adoption\\_by\\_SMEs\\_in\\_Developing\\_Country\\_Evidence\\_from\\_Indonesia](https://www.researchgate.net/publication/282556781_Determinant_Factors_of_E-commerce_Adoption_by_SMEs_in_Developing_Country_Evidence_from_Indonesia)
- Saffu, K., Walker, J. H., & Hinson, R. (2008). Strategic value and electronic commerce adoption among small and medium-sized enterprises in a transitional economy. *Journal of Business & Industrial Marketing*, 23(6), 395-404. <http://197.255.68.203/handle/123456789/710>
- Scupola, A. (2003). The Adoption of Internet Commerce by SMEs in the South of Italy: An Environmental, Technological and Organizational Perspective. *Journal of Global Information Technology Management*, 6(1), 52-71. <https://www.tandfonline.com/doi/abs/10.1080/1097198X.2003.10856343>
- Srinuan, C., & Bohlin, E. (2011). Understanding the digital divide: a literature survey and ways forward. *Proceedings of the 22nd European Regional Conference of the International Telecommunications*. Conference Paper. Budapest. <http://econstor.eu/bitstream/10419/52191/1/672623358.pdf>
- Stiakakis, E., Kariotellis, P., & Vlachopoulou, M. (2009). From the digital divide to digital inequality: A secondary research in the European Union. In Sideridis, A. B., & Patrikakis, C. Z. (eds.), *Next Generation Society Technological and Legal Issues*, Heidelberg: Springer. [https://link.springer.com/chapter/10.1007/978-3-642-11631-5\\_4](https://link.springer.com/chapter/10.1007/978-3-642-11631-5_4)
- Suhartanto, D., & Gundur L. (2018). Small business entrepreneur resistance of ICT adoption: a lesson from Indonesia. *International Journal of Business and Globalisation*, 21(1), 5-18. [https://www.researchgate.net/publication/326822647\\_Small\\_business\\_entrepreneur\\_resistance\\_of\\_ICT\\_adoption\\_a\\_lesson\\_from\\_Indonesia](https://www.researchgate.net/publication/326822647_Small_business_entrepreneur_resistance_of_ICT_adoption_a_lesson_from_Indonesia)
- Triandini, E., Djunaidy, A., & Siahaan, D. (2013). Factors Influencing E-Commerce Adoption by SMES Indonesia: A Conceptual Model. *Lontar Komputer*, 4(3), 301-311. <https://ojs.unud.ac.id/index.php/lontar/article/view/16727>
- Xiong, J., Qureshi, S., & Najjar, L. (2013). Factors that affect Information and Communication Technology Adoption by Small Businesses in China. *Proceedings of the Nineteenth Americas Conference on Information Systems*, Chicago, Illinois, August 15-17. [https://www.researchgate.net/publication/281928715\\_Factors\\_that\\_affect\\_information\\_and\\_communication\\_technology\\_adoption\\_by\\_small\\_businesses\\_in\\_China](https://www.researchgate.net/publication/281928715_Factors_that_affect_information_and_communication_technology_adoption_by_small_businesses_in_China)
- Wielicki, T. R., & Cavalcanti, G. (2006). Study of digital divide: measuring ICT utilization and implementation barriers among SMEs of Central California. In Abramowicz, W., & Mayr, H. C. (eds.), *Business Information Systems*, 9th International Conference on Business Information Systems (BIS 2006). Bonn: Gesellschaft für Informatik e.V.

<https://dl.gi.de/handle/20.500.12116/24147;jsessionid=806F40A79A8F649CD610EE73C3FAF280>

- Wielicki, T. R., & Arendt, L. (2010). A knowledge-driven shift in perception of ICT implementation barriers: Comparative study of US and European SMEs. *Journal of Information Science*, 36(2), 162-174. [https://www.researchgate.net/publication/220195822\\_A\\_knowledge-driven\\_shift\\_in\\_perception\\_of ICT\\_implementation\\_barriers\\_Comparative\\_study\\_of\\_US\\_and\\_European\\_SMEs](https://www.researchgate.net/publication/220195822_A_knowledge-driven_shift_in_perception_of ICT_implementation_barriers_Comparative_study_of_US_and_European_SMEs)
- Vidi, V. (2006). Analisis Faktor-faktor yang Mempengaruhi Pengadopsian Electronic Commerce dan Pengaruhnya terhadap Kinerja Perusahaan (Analysis of factors affecting the adoption of electronic commerce and its effect on company performance). Thesis of Management Magister Program, Universitas Diponegoro, Semarang.
- Viswanathan, Nanda K. & James B. Pick (2005). Comparison of e-commerce in India and Mexico: an example of technology diffusion in developing nations. *International Journal of Technology Management*, 31(1/2), 2–19. <http://www.inderscience.com/offer.php?id=6619>
- Zaied, Abdel Nasser H. (2012). Barriers to E-Commerce Adoption in Egyptian SMEs. *Information Engineering and Electronic Business*, (3), 9-18. [https://www.researchgate.net/publication/272854426\\_Barriers\\_to\\_E-Commerce\\_Adoption\\_in\\_Egyptian\\_SMEs](https://www.researchgate.net/publication/272854426_Barriers_to_E-Commerce_Adoption_in_Egyptian_SMEs)
- Zhu, K., Kraemer, K., and Xu, S. (2003). Electronic business adoption by European firms: a cross-country assessment of the facilitators and inhibitors. *European Journal of Information Systems*, 12(4): 251-268. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.493.783&rep=rep1&type=pdf>