A Maturity Model for E-Commerce Adoption By Small And Medium Enterprises In Indonesia

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ABSTRACT

E-commerce provides several advantages for Small and Medium Enterprises (SMEs). E-commerce adoption by Indonesian SMEs is still very low. This study conducts a research to establish a maturity model of e-commerce adoption by Indonesia SMEs. It was carried out in two phases from 2014 until 2015. The result of the first phase recommends four levels of maturity model and 13 e-commerce benefits, 51 functionalities, and 9 non-functionalities that an e-commerce solution must have. The result of the second phase presents a maturity model of e-commerce adoption for SMEs in Indonesia.

KEYWORDS

E-Commerce Adoption, E-Commerce Benefit, Functionality, Maturity Model, Non-Functionality, Small and Medium Enterprises (SMEs)

INTRODUCTION

Small and medium enterprises (SMEs) are those business organizations that are considerably small in scale, often family-run companies, and lack of networking (Chang, Chang, Ho, Yen, & Chiang, 2011). SMEs are more adaptable and resilient compared to relatively larger firms when dealing with market changes or global economic turbulence. They are relatively faster in adopting opportunities for innovations and changes in market strategies.

E-commerce could not only introduce different opportunities to SMEs but also assist them in dealing with different technological and organizational inadequacy (Al-Qirim, 2007). E-commerce technologies are used by SMEs to interact with customers and suppliers, gather market investigation facts, advertise products, give extensive and user-oriented information about goods and services, and provide online transaction in addition to after-sales help and support (Al-Qirim, 2004). The use of e-commerce technologies allows SMEs to increase their competence in the marketplace. Santarelli and D'Altri (2003), McCole (2005), and Johnston et al., (2007) have found that e-commerce provides benefits for SMEs, such as increasing number of customers, allowing the penetration of new market, providing easier communication with customers, increasing competitive advantage, increasing cost saving, increasing profits, increasing sales, providing effective advertising, and increasing brand building.

A framework describing a possible stage of progression when adopting e-commerce will be a useful tool for SMEs to evaluate their current state of e-commerce. A maturity model is a framework for describing the characteristic enhancement patterns of organizational information system in general (Prananto, A., McKay, J., & Mashall, P., 2003). Implementation of technology in organization has

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a sequential phase that usually starts from the simplest to the most advanced applications based on the complexity level (Mendo, F.A. & Fitzgerald, G., 2005).

The previous research by Rao and Metts (2003) provides a maturity model of e-commerce adoption based on the characteristic of the evolutionary nature of e-commerce. The model consists of four levels: presence, portal, transaction and enterprise integration. The research by Govindaraju and Chandra (2011) also proposes a maturity model of e-commerce adoption based on the Rao maturity model. This study includes a non-adopter level and introduces five e-commerce maturity levels: non-adopter, presence, portals, transaction integration, and enterprise integration.

The adoption of e-commerce by Indonesian SMEs is still very low (Wahid & Iswari, 2007). The previous researcher (Govindaraju & Chandra, 2011) found that the majority of SMEs currently still adopt e-commerce at the lower level. Some SMEs have failed in adopting e-commerce. They are less aware of the potential advantages or the benefits and opportunities that could be achieved using e-commerce. A framework for implementing e-commerce by SMEs in Indonesia is not available. An existing maturity model of e-commerce adoption has been developed from a technology-based perspective. However, this model is not appropriate for SMEs in Indonesia, since SMEs in Indonesia must give more focus on the benefits achieved for each stage when using e-commerce. Therefore, the objective of this study is to develop a maturity model that is capable of providing a guideline for Indonesian SMEs in adopting e-commerce. The study aims to answer four specific research questions. First, how to determine the number of levels of the stage model for determining the level of e-commerce adoption? Second, how to determine the unique benefits that SMEs acquire if it was at a certain level of e-commerce adoption? Third, how to define the functionalities and non-functionalities of e-commerce needed to be utilized in e-commerce application in order to obtain benefits? Finally, how to map benefits of e-commerce into each level maturity model?

LITERATURE REVIEW

Overview of SMEs in Indonesia

SMEs in Indonesia are characterized as independent and productive enterprises. SMEs are operated by individuals or companies that are not subsidiaries. SMEs are owned by, run by, or they become (both directly or indirectly) a part of a large enterprise (The Ministry of Law and Human Right, 2009). Based on Law #20 of 2008 (The Ministry of Law and Human Right, 2009), a small-sized business entity must fulfill the following criteria: (1) it's asset is between 50 and 500 million (IDR), including land and building, and (2) it's annual sales is between 300 and 2,500 million (IDR). A medium-sized business entity must fulfill the following criteria: (1) it's asset is between 500 and 10,000 million (IDR), including land and building, and (2) it's annual sales is between 2.5 and 50 billion (IDR). Furthermore, Indonesian statistics bureau characterizes SMEs based on the number of employees for which small enterprises employ 5–19 people, while medium enterprises employ 20–99 people.

The development of Internet penetration in Indonesia is very fast. The average Internet penetration growth from 2005 to 2014 is 3.25% annually. In 2014, the Internet penetration reached 34.9%. It shows that the market share of online commerce or e-commerce in Indonesia is becoming potential (APJII, 2014). This fact was supported by the statement of The Ministry of Trade estimates that buying and selling goods via the Internet (e-commerce) of Indonesia reach US $10.08 billion. The average value of online shopping transaction grew 40% annually. Thus, the previous research showed that the majority of Internet users in Indonesia are very active in both trade and services sectors. In 2014, the percentage of trading is equal to 31.5% (APJII, 2014).

Past Study on SMEs and E-commerce Adoption

A number of studies have been conducted in recent years concerning the adoption and use of e-commerce in SMEs. Santarelli and D'Altri (2003) conducted a study on 128 SMEs in Italy. The result showed that 97% SMEs in Italy already used e-commerce. The main benefits brought about by the adoption of e-commerce were increased number of customers, penetration into new markets, faster communication with customers, increased flexibility in the supply chain, competitive advantage over competitors, the possibility to customize products/services, easy access to the customers' networks, and cost advantages (Santarelli & D'Altri, 2003).

A study on e-commerce adoption in New Zealand by McCole (2005) identified that 61.4% SMEs already used e-commerce to support their business activities. Other benefits of adopting e-commerce were effective advertising and brand building, increased customer base and sales, cost savings, and increased profits. This study also found significant differences between adopters and non-adopters in SMEs. Adopters tend to be more proactive, creative, and aware of opportunities offered by a new technology. Non-adopters are slow in detecting changes in technologies and have negative mindsets regarding e-commerce, such as distrusting the technology, unwilling to change, and unaware of benefits (McCole, 2005).

Kumar and Petersen (2006) reported that e-commerce adoption results in the availability of information, reduced response times, lowered costs of services, and improved customer satisfaction. Another study found that SMEs that adopted e-commerce in the US, European Union, and Canada obtained such benefits as improvement of revenue and cost minimization (Johnston et al., 2007). E-commerce adoption by SMEs in Australia and Singapore showed such potential benefits as increase in sales, productivities, and quality of services; reduction in inventory, procurement and distribution cost; and provide competitive advantages (Chong, 2008). Ying & Fengli (2012) identified that e-commerce adoption in Chinese SMEs showed a significant effect. The benefits of adopting e-commerce by Chinese SMEs are increasing trade opportunities, reducing transaction cost, increasing the number of customers, and enhancing the corporate image.

Delphi Method

The Delphi method was used as a research instrument in this study. It offers an appropriate research design that leads to the establishment of understanding and theory building of complex issues giving anonymous judgments collected and distilled through an iterative process from experts (Okoli & Pawlowski, 2004; Shaw, Chung, Cheng, & Fu, 2012). The process used a series of data collection and analysis techniques interspersed with expert feedback. The Delphi method is well suited for this study because there was incomplete knowledge about how to measure the maturity level of e-commerce adoption by an Indonesia SME based on a set of benefits that the SME gained through the utilization of certain functional and non-functional requirements of e-commerce (Skulmoski & Hartman, 2007). Functionalities are defined as behaviors that a system will provide under specific conditions, while non-functionalities are defined as characteristics that a system must provide. According to Siahaan & Irhamni (2012), a good requirements specification is determined by a high-quality requirements identification process. Control Objectives for Information and related Technologies (COBIT) Maturity Model is one of the best results of research design based on Delphi Method. It is used to measure how well developed management processes are with respect to internal control. The maturity model allows an organization to grade itself from nonexistent (0) to optimized (5).

Research Model

This study adopts the research model obtained from the previous research (Triandini, Djunaidy, & Siahaan, 2013). As shown in Figure 1, the research model consisted of three components: adoption levels, functional and non-functional requirements, and indicators. The indicators in this model represent the e-commerce benefits that can be achieved at every level.

Figure 1. Maturity model research
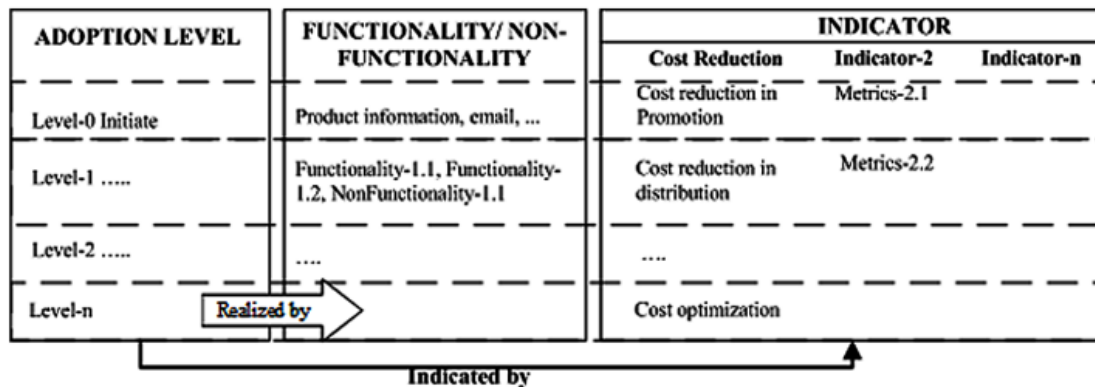
RESEARCH METHODOLOGY

This study is part of a main research that aims to establish a framework of e-commerce adoption in Indonesian SMEs as a guideline to gain benefits for adopting e-commerce. This study involved two phases of data collection and analysis. The first phase obtained the number of levels of e-commerce adoption by SMEs in Indonesia, benefits of e-commerce adoption, and functional and non-functional requirements of e-commerce. The second phase obtained the mapping of benefits of e-commerce adoption to each adoption level. The Delphi method was used for this purpose.

Data Sampling

In the first phase, the respondents were required to complete an email survey consisting of the initial list of e-commerce adoption framework, i.e., benefits, functional and non-functional requirements of e-commerce, and levels of e-commerce adoption. The respondents were asked to validate the suitability of this component with respect to each adoption level. They consisted of academicians in IT, SMEs that have used e-commerce to support their business, and practitioners in the field of IT and government. In the second phase, respondents in this phase were those who filled out the questionnaires in the first phase and additional respondents from practitioners. The respondents were asked to give a score between 0 to 9 that represents the degree of which a benefit is materialized for each adoption level.

Data Collection Process

Data collection in the first phase was conducted from April to June 2014. There were110 questionnaires distributed to respondents by email. Sixty-six questionnaires were filled in. Five questionnaires were not filled in completely. Therefore, only 61 questionnaires (60%) were processed and analyzed. Data collection in the second phase was conducted from October 2014 to January 2015. There were 75 questionnaires distributed to respondents by email. Thirty-two questionnaires were filled in. One questionnaire was not filled in completely. Therefore, only 31 questionnaires (43%) were processed and analyzed.

Measurement Construction Process

Questionnaires in the first phase was given in three different parts. The first part consisted of general questions about respondents. The factual questions were designed to gather basic information about the respondents in order to analyze the data by geography, sector, employee size, and years standing SMEs. The second part consisted of questions with regard to the proposed level of e-commerce adoption. The third part consisted of three questions. The first question determined the criteria for the benefits of e-commerce adoption and proposed 20 benefits. The list of benefits were derived from

a previous research (E. Triandini et al., 2013), which includes cost reduction, global market, market penetration, revenue increment, customer service improvement, information availability improvement, and time to market. However, these benefits were elaborated in more detail into 20 benefits. The second question determined the functionality of e-commerce and proposed 54 functionalities. The list of functionalities were derived from a previous research (Triandini et al., 2013). There are 12 functionalities, i.e. information product, checkout, payment, shipping, promotion, searching, search engine optimization, provide security, customer account, management order, reporting and analytic, and multi-language and currency. These functionalities were described in more detail to 54 functionalities. The third question determined the non-functionalities of e-commerce. This research proposed 11 non-functionalities, i.e. keeping content up-to-date, communication with website owner, accepting online user feedback, providing a business policy statement, providing privacy policy statement, user control of personal information, information fit-to-task, trust, responses times, on-line completeness, and relative advantage. The list of non-functionalities was derived from a previous research (Triandini et al., 2013).

The second phase of this study was mapping e-commerce benefits to maturity level of e-commerce adoption. The whole questionnaires were divided into two parts.

The first part of the questionnaire consisted of general questions about respondents. The factual questions were designed to gather basic information about the respondents in order to analyze the data geography, sector, employee size, and years standing SMEs. The second part was designed to map the benefits of e-commerce to the level of e-commerce adoption. A Likert scale ranging from 1 to 9 points to indicate the expert's level of agreement toward a specific item (1: extremely irrelevant, 2: strongly irrelevant, 3: irrelevant, 4: somewhat irrelevant, 5: neutral, 6: somewhat relevant, 7: relevant, 8: strongly relevant, 9: extremely relevant) was used. The questionnaires have 13 questions about benefits of e-commerce adoption. These benefits were the result of research phase two. In the second phase, respondents were asked to rate on a 9-point scale for each benefit of e-commerce adoption toward every level.

Reliability Measurement

As recommended by Kothari (2004), reliability and validity should be considered when evaluating a measurement tool. When the output generated by the measurement instrument is consistent, then the instrument is considered reliable. The acceptable level of reliability consistency should be higher than 0.60. According to Khotari (2004), validity denotes how suitable an instrument for the measurement. It is a critical criterion with respect to qualitative researches. A Pearson correlation matrix was used to assess the validity of research instrument. Data values of each variable were summed to obtain the total value of the research variables. The correlation of each variable to the total value of the variable was calculated to obtain the significance value.

One of usability factor analysis is to recognize or identify a set of new series variables that are not correlated to replace a set of original variables that are correlated in multivariate analysis(Supranto, 2004). Cronbach's alpha is used to measure and determine consensus among respondents or the member of an expert panel (Graham, Regehr, & Wright, 2003). They define the concept of consensus within a group of experts as a condition of homogeneity or consistency of opinion among the panelist. Cronbach's alpha is usually used to measure internal consistency and its value varies between 0 and 1. Its value higher than 0.70 are considered satisfactory, indicating acceptable level of consensus among the experts (Nunnally, J.C., & Bernstein, I.H, 1994).

ANALYSIS AND FINDINGS

Level of E-Commerce Adoption

The first phase questionnaires show that all experts agreed to use four-levels of e-commerce adoption. There are two reasons for the four level preferences. First, it is considered more efficient. Second, it represents all levels of utilization e-commerce. This segregation of e-commerce adoption into four-

Table 1. E-commerce adoption level

Level	Description
1 (Newcomer)	E-commerce has not been recognized as a means to achieve the benefits. There are basic characteristics of e-commerce, such as e-mail, social media, and static website
2 (Growing)	There is an awareness that e-commerce can be used to achieved the benefits. There are general e-commerce functionalities although it may not be used properly
3 (Established)	Best practice of e-commerce usage has emerged to achieve the benefits. There are e-commerce functionalities that enable integration with third-party business processes.
4 (Strategic)	E-commerce has played strategic roles in achieving benefits. All business processes with regard to achieving benefits mainly relies on e-commerce functionalities. New functionality to support the creation of new business processes may immerge.

levels also supported by Evi Triandini, Djunaidy, & Siahaan, (2014). The four levels of e-commerce adoption as well as their descriptions are shown in Table 1. This answers the first research question, i.e. there are four levels of maturity in the e-commerce adoption.

E-Commerce Benefits

Validity testing was conducted by looking at the correlation among scores of each item in the questionnaire and the total score to be measured using Pearson Correlation Coefficient. According to the classification of the absolute value of r (Cohen, 1988), any item which has the value less than 0.3 must be removed. There were tree benefit items removed, i.e. marketing costs for promotion, consumer interaction, and increased market penetration. Thus, it leaves 17 valid benefit items. Furthermore, all valid 17 benefit items were evaluated to measure their reliability. Four items, i.e. marketing costs for introduction new product, marketing cost for bandwidth, company information, and rapid time to market were unreliable and later removed. This was because these items have corrected item-total correlation lower than 0.30 and do not meet the criteria specified by Nunnally & Bernstein (1994). The Cronbach's alpha value of 13 valid benefit items was 0.820. Whereas, the value corrected item-total correlation of each item was vary from 0.362 to 0.668. Thus, the 13 items are considered reliable and can be used as a component for developing the maturity model of e-commerce adoption. This result is consistent with the previous researches (Johnston et al., 2007; Kumar & Petersen, 2006; Santarelli & D'Altri, 2003; Ying & Fengli, 2012). With regard to the second research question, the following benefits can be acquired by SMEs: marketing cost for exhibition, 24 hours transaction, the speed of delivery information, product information, information on how to conduct transaction, information status transaction, information history transaction, information review product, information rating product, time product order, delivery process, increased market penetration and increase revenue.

E-Commerce Functionalities and Non-Functionalities

Result of the validity testing removed three functionalities of e-commerce, i.e. display per product, simple search function, and Google map sites, and left 51 valid items. Results of the reliability testing for these valid items showed that all items have corrected item-total correlation values higher than 0.3 and met the criteria specified by Nunnally & Bernstein (1994). Moreover, the resulting Cronbach's alpha value of 0.951 showed that 51 functionalities are reliable and can be used for developing the maturity model of e-commerce adoption. Results of this stage were consistent with the previous study by Triandini et al. (2013). With regard to the third research question, the following functionalities of e-commerce can be utilized in e-commerce application in order to obtain benefits: product reviews, product rating, product comparison, related product, stock availability, product by category, sort product by price/name/rating/reviews, product price discounts, newsletter subscription management, fixed amount discount promotion, promotion new product, send page of friend, promotional banners, like on facebook, live chat, pools and survey, advanced search, search engine

friendly, user identification and authentication, payment security, create account, online order status, online order history, recently ordered items, address book, newsletter subscription, product review submitted, real-time shipping rate, register users, tax estimations, shipping charge estimation, save shopping estimation, order management, create multiple invoices, process refund, print invoices, print packing slips, Cash on Delivery (COD), bank transferred, credit card, real time rate calculation, table rate shipping for weight and destination, table rate shipping for number of items and destination, report for customer, report for low level management, report for middle management, dashboard, multilanguage, and multicurrency.

Results of the validity testing showed that all 11 non-functionalities of e-commerce are valid. However, results of the reliability testing showed that two items, i.e. keeping content up-to-date and communication with website owner are unreliable and must be dropped. Thus, the remaining nine non-functionalities are considered reliable and can be used for developing the maturity model of e-commerce adoption. This result was also supported by the (International Standard Organization, 2008) and (Loiacono, 2007). Hence, with regard to the third research question, the following non-functionalities of e-commerce can be utilized: accepting online user feedback, providing a business policy statement, user control of personal information, information fit-to-task, trust, response times, on-line completeness, and relative advantage. These non-functionalities would be used as components for developing maturity model of the e-commerce adoption.

Mapping E-Commerce Benefits into Maturity Levels

All 13 benefit items were evaluated to measure their reliability for each level. The result showed that all items have Cronbach's Alpha value higher than 0.7 and met the criteria specified by Nunnally & Bernstein (1994). A descriptive analysis was used. It calculates the mean and standard deviation of each benefit of e-commerce adoption. The major statistics used in Delphi studies calculate means and standard deviation in order to present information concerning the perception of respondents (Hasson, F., Keeney, S., McKenna, 2000). The mean and standard deviation values of each adoption level-benefit pairs are provided in Table 2. Those values were used to determine the point value of each benefit level.

A formula as shown in equation (1) is used to calculate the point value of the i-th level (LP_i) of an e-commerce benefit. In this equation, $\overline{x}_i$ and $\overline{s}_i$ denote the mean and standard deviation of the i-th of a particular e-commerce benefits, respectively.

$$LP_i = \frac{\left(\left(\overline{x}_i + s_i \right) + \left(\overline{x}_{i+2} - s_{i+2} \right) \right)}{2} \tag{1}$$

For example, using the equation (1) together with the mean and standard deviation values of each adoption level-benefit pairs as shown in Table 2, the point value of the 1st level (LP_1)of the benefit of marketing costs for exhibition (B1) can be calculated as $LP_1 = ((2.6154 + 1.7578) + (4.5385 - 1.3301))/2 = 3.7907$. Similarly, the point values of the 2nd level (LP_2) = 6.6551and the 3rd level (LP_3) = 7.2728 can be obtained.

Determination of the range of values for each level was done by rounding the point value of the level resulting from the calculation of using the equation (1). For resulting point values calculated in the previous example, the point values of the 1st, 2nd and 3rd levels are rounded to 4, 6, and 7, respectively. Since, this study uses the range level of e-commerce adoption between 1and 9, therefore the range level 1 is set to 1–4, level 2 is set to > 4–6, level 3 is set to > 6–7, and level 4 is set to > 7. Based on result of data analysis, the range values for all benefits of e- commerce adoption level were obtained, as shown in the Table 3.

As described earlier, the maturity model of e-commerce adoption was developed based on results of the two phases. The practice of each benefit in a level was provided according to the descriptions of each level and solutions suggested by the respondents with regard to the range values as shown in

Table 2. Descriptive Statistics Benefits of E-commerce

Benefits of E-commerce	Level	$\overline{x}$	S	Benefits of E-commerce	Level	$\overline{x}$	S
Marketing costs for exhibition (B1)	Level 1	2.6154	1.7578	Information review product (B8)	Level 1	3.8750	2.3910
	Level 2	4.5385	1.3301		Level 2	5.8750	1.6683
	Level 3	6.6923	1.2506		Level 3	7.5000	1.0328
	Level 4	7.9231	1.3205		Level 4	8.4375	0.7274
24 hours transaction (B2)	Level 1	3.8889	2.2723	Information rating product (B9)	Level 1	3.8889	2.5179
	Level 2	5.6111	1.8515		Level 2	5.7222	1.8409
	Level 3	7.7222	0.8948		Level 3	7.6111	0.9164
	Level 4	8.5000	0.7071		Level 4	8.6111	0.6077
The speed of delivery information (B3)	Level 1	4.0588	2.0147	Time product order (B10)	Level 1	2.9412	2.2212
	Level 2	5.7647	1.6405		Level 2	5.1176	1.9001
	Level 3	7.7059	0.7717		Level 3	7.2941	1.0467
	Level 4	8.5294	0.6243		Level 4	8.3529	0.9315
Product information (B4)	Level 1	3.7857	1.8051	Delivery process (B11)	Level 1	2.5333	1.8465
	Level 2	5.7857	1.3114		Level 2	4.4667	1.5055
	Level 3	7.7857	0.8926		Level 3	7.0667	0.8837
	Level 4	8.5000	0.6504		Level 4	8.3333	0.8165
Information on how to conduct transactions (B5)	Level 1	3.8235	1.8787	Increased Market Penetration (B12)	Level 1	3.8889	2.2723
	Level 2	5.6471	1.6934		Level 2	5.6111	1.8515
	Level 3	7.5882	0.7952		Level 3	7.7222	0.8948
	Level 4	8.7647	0.5623		Level 4	8.5000	0.7071
Information status transactions (B6)	Level 1	2.8750	2.3058	Increased revenue (B13)	Level 1	3.8125	1.7970
	Level 2	5.0000	1.7889		Level 2	5.7500	1.5275
	Level 3	7.4375	0.8139		Level 3	7.6250	0.8062
	Level 4	8.7500	0.4472		Level 4	8.6875	0.6021
Information history transactions (B7)	Level 1	3.6190	2.5588				
	Level 2	5.5714	1.9383				
	Level 3	7.6190	1.0235				
	Level 4	8.7619	0.5390				

Source: Data Primary. 2014

Table 4, Table 5, and Table 6. For example, the practice of marketing costs for exhibition at level 1 is defined as e-commerce has not been recognized as a means for reduction of marketing costs allocated for exhibitions. For the range values of 1-4, respondents suggested that the use of marketing tools is limited to email, social media, and static website.

Table 3. Range level benefits of e-commerce

No.	Benefits of E-commerce Adoption	Level 1	Level 2	Level 3	Level 4
1	Marketing costs for exhibition	1 - 4	> 4 - 6	> 6 - 7	> 7
2	24 hours transaction	1 - 5	> 5 - 7	> 7 - 8	> 8
3	The speed of delivery information	1 - 5	> 5 - 7	> 7 - 8	> 8
4	Product information	1 - 5	> 5 - 7	> 7 - 8	> 8
5	Information on how to conduct transactions	1 - 5	> 5 - 7	> 7 - 8	> 8
6	Information status transactions	1 - 4	> 4 - 7	> 7 - 8	> 8
7	Information history transactions	1 - 5	> 5 - 7	> 7 - 8	> 8
8	Information review product	1 - 5	> 5 - 7	> 7 - 8	> 8
9	Information rating product	1 - 5	> 5 - 7	> 7 - 8	> 8
10	Time product order	1 - 4	> 4 - 7	> 7 - 8	> 8
11	Delivery process	1 - 4	> 4 - 6	> 6 - 8	> 8
12	Increased Market Penetration	1 - 5	> 5 - 7	> 7 - 8	> 8
13	Increased revenue	1 - 5	> 5 - 7	> 7 - 8	> 8

Source: Primary Data, 2014

CONCLUSION

This paper addresses four research questions as identified in the introductory part of this paper. Regarding the first question, the research produced four level as a number of levels at maturity model. The levels of maturity model such as newcomer, growing, established, and strategic were identified. These four levels of maturity have represented the e-commerce adoption by SMEs in Indonesia. Thirteen benefits that can be achieved by a SMEs if it was at a certain level of e-commerce adoption were produced and answered the second question of the research. Finally, 51 functionalities and 9 non-functionalities produced in this research answered the third research question. The last research question on how to map these functionalities and non-functionalities of e-commerce into each level maturity models left as the next research work.

SMEs in Indonesia are interested to use e-commerce if they know the benefits that can be obtained. However, they have difficulty in implementing e-commerce. The maturity model created in this study differs from the models defined by Rao and Metts (2003) and Govindaraju and Chandra (2011). Regarding the fourth question, the framework developed in this research provides benefits at each level of e-commerce adoption, whereas in the previous models, the determination of the level is based on the characteristics of the evolutionary nature of e-commerce. Therefore, the maturity model developed in this research is expected to facilitate and foster interest and willingness for Indonesia SMEs to use e-commerce to support their business process. Moreover, the maturity model of e-commerce adoption will be a useful tool for SMEs to evaluate their current state of e-commerce adoption as well as to help them to formulate appropriate actions and strategies in designing their upcoming e-commerce initiatives for the next level. In this regard, the next stage, will give more benefits for using e-commerce.

The future study will implement this maturity model into a content management system (CMS). Several SMEs in Indonesia will be chosen as pilot projects in order to examine this maturity model. SMEs will be assigned an initial state before using CMS that has been filled by the maturity model. It aims to find out if an increase in the level of e-commerce adoption can be obtained.

Table 4. Maturity model of e-commerce adoption

Level	Benefits of E-commerce Adoption			
	Marketing Costs for Exhibition	**24 Hours Transaction**	**The Speed of Delivery Information**	**Product Information**
1	E-commerce has not been recognized as a means for reducing marketing costs allocated for exhibitions. Facilities: e-mail, social media and static website.	E-commerce has not been recognized as a means to increase transactions 24 hours. Facility: a static website.	E-commerce has not been recognized as a means to increase the speed of information delivery. Facility: a static website.	E-commerce has not been recognized as a means to increase the speed of delivery information products. Facility: a static website.
2	There is awareness that e-commerce can be used for reducing marketing expenses allocated for exhibitions. Facilities: catalogues, ordering, product search, and contacts.	There is awareness that e-commerce can be used to increase transaction 24 hours. Facilities: an address book with billing and shipping addresses, user registration, multiple languages, and multiple currencies.	There is awareness that e-commerce can be used to increase the speed of information delivery. Facilities: a category of products, promotion of new products, product search, and business information provision.	There is awareness that e-commerce can be used to increase the speed of delivery information products. Facilities:a category of products, promotion of new products, product search, and product comparisons..
3	Practice the use of good e-commerce has emerged for reducing marketing expenses allocated for exhibitions. Facilities enable business process integrated with third-party, i.e. send page to a friend, live chat, and the like on social media.	Practice the use of good e-commerce has emerged for enhancing transaction 24 hours. Facilities enable business process integrated with third-party, i.e. the payment through banks and shipping through a service bureau delivery.	Practice the use of good e-commerce has emerged for enhancing the speed of information delivery. Facilities enable business process integrated with third-party, i.e. the payment through banks and shipping through a service bureau delivery.	Practice the use of good e-commerce has emerged for enhancing the speed of product information delivery. Facilities enable integrated with third-party business process is on social media.
4	There has been conducted long-term planning the use of e-commerce for reducing of marketing expenses allocated for exhibitions. Facilities support the creations of new business processes for marketing purposes.	There has been conducted long-term planning on the use of e-commerce for 24 hours transactions. Facilities support the creations of new business processes for 24 hours transactions.	There has been conducted long-term planning on the use of e-commerce for improving the speed of information delivery. Facilities support the creation of new business processes that dashboard, user feedback and better quality of interaction.	There has been conducted long-term planning on the use of e-commerce for improving the speed of product information delivery. Facilities support the creation of new business processes, i.e. the promotion of the banner.

Table 5. Maturity model of e-commerce adoption (continued)

Level	Benefits of E-commerce Adoption			
	Information on How to Conduct Transaction	**Information on Transaction Status**	**Information on Transaction History**	**Information on Review Product**
1	E-commerce has not been recognized as a means to increase the speed of information on how to conduct the transaction. Facility: a static website.	E-commerce has not been recognized as a means to increase the speed of transaction status information delivery. Facility: a static website.	E-commerce has not been recognized as a means to increase the speed of transaction history delivery. Facility: a static website.	E-commerce has not been recognized as a means to increase the speed of review product information delivery. Facility: a static website.
2	There is awareness that e-commerce can be used to increase the speed of information on how to conduct the transaction. Facilities: a better response time and a confidence of secure information.	There is awareness that e-commerce can be used to increase the speed of transaction status information delivery. Facilities: historical customer orders and better response time.	There is awareness that e-commerce can be used to increase the speed of transaction history delivery. Facilities: user registration and shopping chart storage.	There is awareness that e-commerce can be used to increase the speed of review product information delivery. Facilities: user registration and website content up-to-date.
3	Practice the use of good e-commerce has emerged for enhancing the speed of information on how to conduct the transaction. Facility enables integrated with third-party business process is a cost information of shipping through the shipping service bureau.	Practice the use of good e-commerce has emerged for enhancing the speed of transaction status information delivery. Facility enable integrated with third-party business process is the delivery process integrated with a service bureau delivery.	Practice the use of good e-commerce has emerged for enhancing the speed of transaction history delivery. Facility related with the transaction history is integrated with third-party business processes.	Practice the use of good e-commerce has emerged for enhancing the speed of review product information delivery. Facility related with the product review is integrated with third-party business processes.
4	There has been conducted long-term planning on the use of e-commerce for improving the speed of information on how to conduct the transaction. Facility supports the creation of new business processes for the purpose of delivering information on how to conduct the transaction.	There has been conducted long-term planning on the use of e-commerce for improving the speed of information delivery status of transaction. Facility supports the creation of new business processes for the purpose of delivery of transaction status information.	There has been conducted long-term planning on the use of e-commerce for improving the speed of transaction history delivery. Facility supports the creation of new business processes for the purpose of delivering information of transaction history.	There has been conducted long-term planning on the use of e-commerce for improving the speed of review product information deliver. Facility supports the creation of new business processes, i.e. user feedback.

Table 6. Maturity Model of E-commerce Adoption (continued)

Level	Benefits of E-commerce Adoption				
	Information rating product	Time product order	Delivery process	Increased Market Penetration	Increased revenue
1	E-commerce has not been recognized as a means to increase the speed of delivery information product rating. Facility: a static website.	E-commerce has not been recognized as a means to increase the speed of product ordering time. Facility: a static website.	E-commerce has not been recognized as a means to increase the speed of delivery process. Facility: a static website.	E-commerce has not been recognized as a means to increase market penetration. Facilities: promotional discounts and the percentage cuts.	E-commerce has not been recognized as a means to increase revenue. Facility: a static website.
2	There is awareness that e-commerce can be used to increase the speed of delivery information product rating. Facilities: user registration, customer order history, and website content up-to-date.	There is awareness that e-commerce can be used to increase the delivery speed of product ordering time. Facilities: user registration, order new products, and payment in cooperation with banks.	There is awareness that e-commerce can be used to increase the speed of delivery process. Facilities: latest product orders, customer history, and transaction completed online.	There is awareness that e-commerce can be used to increase market penetration. Facilities: the promotion of the new product price, product search, and a better response time.	There is awareness that e-commerce can be used to increase revenue. Facilities: the promotion of the new product, product search, and website content up-to-date.
3	Practice the use of good e-commerce has emerged for enhancement the speed of delivery information product rating. Facilities related with the product rating are integrated with third-party business processes.	Practice the use of good e-commerce has emerged for enhancement the speed of product ordering time. Facilities enable integrated with third-party business process are payment through credit card and information shipping costs.	Practice the use of good e-commerce has emerged for enhancement the speed of delivery process. Facilities enable integrated with third-party business process, e.g. shipping integrated with a service bureau delivery, estimation of shipping cost.	Practice the use of good e-commerce has emerged for enhancement market penetration. Facilities enables integrated with third-party business process are send pages to friends and live chat	Practice the use of good e-commerce has emerged for enhancement revenue. Facilities enable integrated with third-party business process is send pages to friends.
4	There has been conducted long-term planning the use of e-commerce for improving the speed of delivery information product rating. Facilities support the creation of new business processes, namely polling and survey, and user feedback.	There has been conducted long-term planning the use of e-commerce for improving the speed of product ordering time. Facilities support the creation of new business processes for the purpose of increasing the speed of product ordering time.	There has been conducted long-term planning the use of e-commerce for improving the speed of the delivery process. Facilities support the creation of new business processes for the purpose of improvement of delivery processes.	There has been conducted long-term planning the use of e-commerce for improving market penetration. Facility owned e-commerce supports the creation of new business processes, namely the promotion with a banner and a better quality of interaction.	There has been conducted long-term planning the use of e-commerce for improving revenue. Facilities support the creation of new business processes that is a better quality of interaction.

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