Antecedents of Internet Technology Adoption in Small Medium Business

Trianggoro Wiradinata[1]   Tony Antonio[2]   Rinabi Tanamal[2]
1.School of Management & Business, Ciputra University, Surabaya 60219, Indonesia
2.School of Creative Industry, Ciputra University, Surabaya 60219, Indonesia

Abstract
The development of Internet Technology which is increasing rapidly and affordable bring new opportunities for small and medium enterprises (SMEs) in business process innovation. Various studies in the field of entrepreneurship and information technology have been made, but not much found a study that examines in particular the level of adoption of Internet technologies for the creation and development of SMEs. Considering SMEs as the key to success in the reduction of unemployment and economic growth, systematic studies which combine qualitative and quantitative approaches need to be done, particularly to anticipate the ASEAN free trade area competition. The approach of this study will utilize Technology-Organization-Environment (TOE) framework, which examines the internal and external factors of a SMEs that determines their adoption of internet technology.This study exploited a method of literature study and focus group discussion to 32 SME owners as respondents. Data from the study were processed using descriptive statistics technique to examine determine the possible antecedents of Internet Technology adoption by SMEs. The results opened further opportunity to investigate causal relationship among the variables of internet technology adoption.
Keywords: Technology Adoption, Small Medium Business, TOE Framework, Facilitating Conditions

1. Introduction

The growth of internet users since 2000 as a medium for the exchange of information has opened up many new opportunities in innovation business operations. Internet enables the exchange of information without depending on the place and time with some applications such as e-mail, enterprise resource planning (erp), point of sales (pos), e-shop, e-procurement, crowd sourcing, e-marketplace, and so forth. Not only large organizations use the Internet in their business process innovation and the exchange of information, but many small and medium enterprises (SMEs) also began to use it, especially when their business partners also increase the use of Internet technology. Table 1 below shows the penetration of Internet users in Asia compared users around the world in second quarter of 2014.

Table 1. The Internet User in Asia

	Population (2014 Est.)	Pop. % World	Internet Users 30-Jun-14	Penetration (% Pop.)	Internet % Users
Asia Only	3,996,408,007	55.60%	1,386,188,112	34.70%	45.70%
Rest of World	3,185,998,558	44.40%	1,649,561,228	51.80%	54.30%
WORLD TOTAL	7,182,406,565	100.00%	3,035,749,340	42.30%	100.00%

As we can observe from Table 1, the number of Internet Users in Asia is estimated 1,386,188,112 which is a 34.70% penetration from total population. It was also a tremendous growth of internet user, compared to fifteen years ago the numbers has grown from 114,304,000 to 1,386,188,112 which indicates an enormous 1213% growth.

Internet Technology enables SMEs to be able to reach the global market (Al-Qirim, 2003), thus the SME market segment geographically extended. Furthermore Internet technology may be used to improve effectiveness and efficiency in communicating both internally between the owners and employees and among employees also externally with business partners, both SMEs and their customers earn benefit (Zhu et al., 2004). The challenges faced by SMEs in the adoption of Internet Technology are contrast to large enterprises, especially regarding the lack of capital, resources and knowledge of internet technologies (Cragg & King, 1993; Welsh & White, 1981).

Specifically in Indonesia, small and medium enterprises (SMEs) are the key to success in the reduction of unemployment and economic growth in Indonesia. SMEs have contributed a great deal in Indonesia's economic resilience, especially in a period of economic stagnation and financial crisis in year 2008-2009 ago. Support to SMEs should be encouraged to support the Indonesian SMEs which patterned to become 10 biggest world economic power by 2025 according a report from the OECD (2012). Besides, the free trade zone agreement in ASEAN Economic Community is just around the corner which challenges SMEs in Indonesia to further more excel in the business competition against SMEs from neighboring countries within the scope of ASEAN. Therefore, researches on SMEs are considered very important and crucial for academics and business practitioners in Indonesia. Adoption of information technology for SMEs is an area of researches that requires a solid theoretical basis and helps strengthen the conceptual and empirical foundation.

2. Related Literature

The basic terminology used in this study is discussed before an overview of the recent studies. A number of previous studies were found influential in predicting the antecedents of TOE framework which will be discussed and constructing the basis for the theoretical model. The TOE framework clusters context affecting companies' innovation by adopting the technology in three contexts: technological context, organizational context, and the context of the environment pressure.

2.1 T-O-E Framework

Zhu and Kraemer (2005) conducted a study to solidify TOE framework that consists of three main dimensions, namely: technology, organization and environment which is based on previous research by Tornatzky & Fleischer (1990). This framework is consistent with the diffusion of innovations theory developed by Rogers (1983), which focuses on the characteristics of the technology along with internal and external characteristics as drivers of technology diffusion.

2.1.1 Technology Context

The Technological context includes technologies available to the companies to adopt. These include both existing technologies inside the company and outside the company, as well as the collection of available technologies in the market (Zhu et al., 2004).

2.1.2 Organizational Context

Organizational context ranges its understanding of several descriptive measures, including firm size and scope; the CEO IT knowledge, financial commitment, the centralization, formalization, and complexity of its managerial structure; the quality of its human resources; and the amount of slack resources available internally (Zhu et al., 2004; Ghobakhloo et al., 2011).

2.1.3 Environmental Context

Environmental context that refers to the environment where the organization is located, including consideration of the industry, competitors and government support (Tornatzky & Fleischer, 1990).

One of the many reasons SMEs using technology are the desire to always stay competitive and innovative. Competitive when they have to compete with their competitors whether existing competitor or new entrants. Innovative when they need to collaborate with both internal employees and externally with business partners (Grandon & Pearson, 2004).

2.2 Overview of Previous Study

Several studies have been conducted by previous researchers associated with the framework of TOE can be seen in table 2 below:

Table 2. Previous research using the framework TOE

Research Focus	Methods	References
Perception based model for EDI adoption by SMEs	Quantitative analysis to 575 SMEs	Kuan & Chau, 2001
Information Technology investment payoff in e-business environment	Quantitative analysis to 612 financial company	Zhu et al., 2004
Post adoption variation of e-business value by organization	Quantitative analysis to 624 retail organization	Zhu & Kraemer, 2005
E-Commerce application adoption by SMEs	Quantitative analysis to 235 SME owners/managers	Ghobakhloo et al., 2011

It is shown in Table 2 above that studies of technology adoption continue to use TOE framework to formulate model of causal relationship to factors affecting technology adoption.

2.3 T-O-E Conceptual Model

The conceptual model proposed to be used in this study using a conceptual model proposed by Zhu and Kraemer (2005).
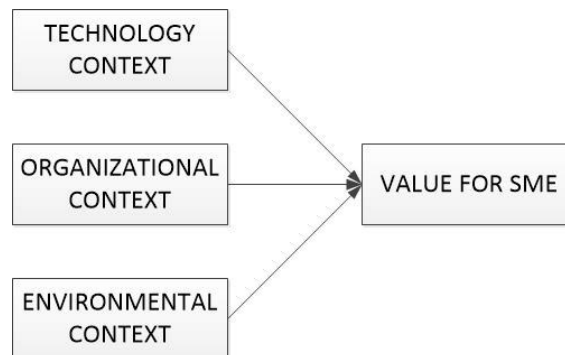
Figure 1. The TOE Conceptual Model

In the conceptual model in Figure 1 above, each dimension of Technology context, Organizational context and Environmental context each have some latent exogenous variables, as well as endogenous variables. Value for SMEs due to the adoption of Internet technology also has few latent variables, each of which consists of several indicators (Tornatzky & Fleischer, 1990; Ramdani et al., 2009).

No studies have been conducted in accordance within the context of SMEs in Surabaya greater area in Indonesia which explores the adoption of Internet technologies with the purpose of innovating business operation.

3. Research Design and Method

The longer roadmap of the study aims to develop a theory with practical contributions about the effects of technology, organization and environment on the use made by owners or managers of small medium enterprises in using internet technology. The designated population was Indonesian entrepreneurs who live in Surabaya greater area who owns or manage SMEs operation utilizing internet technology in daily business operation. The research will be partly basic and partly applied; partly descriptive and explanatory; cross-sectional in time, and employs descriptive statistical techniques for data analysis.

The unique antecedents of the internet technology adoption antecedent variables are comparable to starting up new ventures or innovation. They suggest that data-gathering methods that allow one to gather rich qualitative and quantitative data, such as direct observation, interviews, and focus groups, are likely more effective than collecting through questionnaires. However questionnaires allow rapid gathering of useful data once the phenomenon is sufficiently well understood to permit the development of appropriate questions (Hofer & Bygrave, 1992).

The current scope of this paper is in the early stage of exploratory phase where Focus Group Discussion (FGD) has been done to several group of SME owners or managers. The FGD result will be combined with results from previous study to confirm the most influential antecedents of internet technology adoption by SMEs. The antecedents found influential from the FGD will be used as a basis for empirical research to predict cause and effect relationship of intention to use internet technology by SMEs.

The selection of candidates for the respondent performed with the prerequisite that the respondent should be someone who is already familiar with the internet technology thus the aim of test further questions regarding some of the antecedents of the adoption of the technology becomes more relevant. SME locations is limited to the scope of the *Gerbang Kertosusila* (Surabaya greater area) assuming internet infrastructure in this area is already quite good and reliable. The list of FGD questions were drawn up and delivered in Indonesian version, as well as the answers given by the owner or manager of the SMEs.

4. Analysis and Discussion

Analyses were performed by interviewing of 32 SME owners or managers who have first validated by the research team. Validation was based on their experience of using internet for their daily life activities. The respondents profile were 14 males (44 percent) and 18 females (56 percent), most of the respondents were aged between 20 to 29 years, which consists of 59 percent from total participants, followed by second age group which is below 20 years old with 31 percent and the least age group were 30 or above. In terms of education group level, most of respondents finished high school with a total of 62 percent whether they are currently working or studying in a college, the rest which consists of 38 percent completed undergraduate level.

Based on the research method that has been described in section 3, the outcome of this interview can be analyzed and interpreted in section 4.1 below.

4.1 Result and Interpretation
During the focus group discussion several issues were identified dominant. Issues regarding the environment

pressure were predominantly discussed about the competition among SMEs whether local competition (66 percent) or neighboring ASEAN countries due to free trade agreement coming in late 2015 (53 percent). Other issues identified were opportunities to find cheaper raw materials (59 percent), request from suppliers (47 percent) and government regulation (38 percent).

The discussion about factors from internal organization which influence the intention to adopt internet technology were dominated by the perceived benefit for efficiency (69 percent), followed by the level of ICT literacy of the SME owners or managers (66 percent), subsequently the needs to increase service quality (59 percent) and organization size (53 percent). Some discussions also mentioned about the needs for internal collaboration among several branches (34 percent).

From the technology perspective, the focus group discussion concluded that ease of use has been the main issues for SME to adopt internet (72 percent). Another factor dominantly discussed was the number of users of particular internet technologies (69 percent) which show compatibility was a big issue for SMEs. Other factors discussed were infrastructure readiness (59 percent) in which some of them were mentioning cloud services, systems reliability was also mentioned by some of the participants (47 percent), last but certainly not least was the data security (53 percent). Specifically on data security some SME owners or managers worried about their data being stolen by un-authorized users.

4.2 Theoretical and Practical Implications

Practical contribution of the results of this study will be beneficial to the two parties, namely the first to policy makers and providers of internet technology infrastructure would understand the problems faced by the owners or managers of SMEs in adopting Internet technologies for the management of their businesses so that they can formulate appropriate solutions. Either the owners or managers of SMEs who are willing to cooperate in a limited trial software module will get a web-based application along with usage guidelines that improve business productivity.

While this research also contributed to the theoretical understanding of the factors that influence the adoption of Internet technology by employers or managers of SMEs to increase their business competitiveness. In general there are three contributions to the literature, the first results of this study will show how the relationship between the perception of the advantages of using technology to increase business performance. Second, the results of this study will also investigate the influence of the organization's ability to use technology to increase business performance, and the third in this research also studied how the environment or competition between SMEs trigger the adoption of technology for business performance excellence.

5. Conclusion

This study examined several antecedents of internet technology adoption by SMEs by utilizing TOE framework to cluster the variables. Both Focus Group Discussion (FGD) technique and study from previous literature suggest to emphasis on several antecedents discussed during the interview including competition (local and ASEAN), perceived benefit for efficiency, SME owner/manager internet technology literacy, ease of use and compatibility of a particular technology.

Subsequent studies may endeavor to target firms with the daily use of either enterprise resource planning (ERP) or point of sales (POS) applications to manage their business process transactions. Furthermore, the study has not put any limitation on the distinction between micro business with few employees and SME with more employees. Another emphasis needs to be explored is the influence of Asean free trade which can measured more accurately when the time comes.

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