

Behavioral Analysis of Information Technology Acceptance in Indonesia Small Enterprises

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Abstract

Small manufacturing enterprise (SMF), based on its unit numbers and the number of involved labors, has the potentials to play an important role in the Indonesia's economy. However, its contribution to the national economy (i.e., GDP) has been minimal as to compare with its medium and large enterprise counterparts. This indicates that improvement of SMF's productivity is required. Information technology, especially internet technology, application within SMFs is regarded to have significant impact on their business performance. The objective of this research are to examine some factors that influence intention of utilization and usage of Information technology to performance company, based on the model UTAUT (Unified Theory of Acceptance and Use of Technology) proposed by Venkatesh et al., (2003). 150 SMF operators—from which primary data were collected, and path analysis were used in this study. It was found that internet adoption was significantly affected by perceived usefulness, perceived ease of use, internet self efficacy, and internet anxiety. Firms' business performance, however, was not significantly affected by internet adoption.

Keywords: Information and Communication Technology, behavioral model, Firm performance

JEL Codes : M15, D23, L25

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1. Introduction

As reported by the *Ministry of Cooperatives and Small and Medium Enterprises* (CSME) in 2004 the number of small business was 43,158,468 units (99.85% of total businesses) involving 70,919,385 workers (89.24% of total workers in industry sector). However, its contributions to the nation's Gross Domestic Product (GDP) and export values has been minimal as to compare with its number of business units and workers involved. Contributions of small, medium, and large enterprises to GDP were, respectively, IDR820,491,528 millions (40.36%), IDR315,372,815 millions (15.51%), and IDR896,960,557 millions (44.12%). Small enterprises' contribution to export values was IDR23,775,942 millions (4.05%) which is smaller than those of medium enterprises (IDR67,904,169 millions or 11.57%) and large enterprises (IDR495,173,009 millions or 84.38 %).

The role of information technology in improving small businesses' contribution to the nation's economy is of importance. However, the use of information technology in Indonesia has generally been lower than those of most countries. Availability of information technology infrastructure, number of unit of computers owned by enterprises, and internet access indicate this. As reported by the World Bank (2002), Indonesia's profile in information and communication technology (ICT) application was as follows: computer ratio to population was 9.9 per 1,000 residents; telephone connection was 91 per 1,000 residents; internet hosts was 0.8 per 10,000 residents; and internet users was 2 millions. Investment in ICT, meanwhile, was USD3.54 billion (2.2% of GDP) which is equivalent to USD16.6 per capita.

A number of weaknesses of small businesses operators in Indonesia has been identified. The most significant weaknesses, according to Department of Trade and Industry

(2002) include lack in (i) aggressiveness and capability in accessing market, and (ii) use of information technology in developing small businesses. In relation to these weaknesses, is relatively difficult. There are three main problems in encouraging small business operators to use information technology. These include perception that information technology is expensive and, therefore, it could not be afforded by small business operators; limited technological resources and lack in information technology infrastructure; and both quantity and quality of human resources.

The profound research on the information technology in the small-medium-scale is important to analyze the aspects of information technology application in Indonesia, particularly to identify how far the above problems become the determining factors in the application of information technology and what are their implications towards the performance of small-medium businesses in Indonesia. The success of information technology application brings a wide range of dimensions which cover the parameters used to measure the effectiveness of the information technology functions and also parties or groups utilizing the applications of information technology. To the small-medium scale businesses, the major party that dominantly concerns with the decision making is the owner and the executives. They embrace important roles in the decision making which utilizing information technology in their companies. Besides, their involvement in the process of technology adoption holds important factors in improving the intensity of the use of information technology.

2. Theoretical Framework and Research Model

A number of behavioral theories has been applied to examine the process of information technology adoption by end-users. Some of which are *Theory of Reason Action (TRA)*, *Theory of Planned Behaviour (TOB)*, *Task-Technology Fit Theory (TTF)*, and *Technology Acceptance Model (TAM)*. Amongst these theories, *Technology Acceptance Model (TAM)* was found as a model that has been widely used in various studies on adoption process of information technology. Following these models, in 2003, Venkantesh and his colleagues developed a new model called *Unified Theory of Acceptance and Use of Technology (UTAUT)*.

This model (i.e., UTAUT) was developed based on previous models on adoption of information technology, which include TRA, TPB, TTF, and primarily *Technology Acceptance Model (TAM)*. TAM model, which was introduced by Fred D. Davis in 1986, is an adapted model from TRA and is specifically developed for modeling information technology adoption by users. According to Davis (1989), the primary objective of TAM is to provide foundation for determining impacts of external factors on trust, attitude, and objectives of information technology end-users. Relationships among variables within this model are depicted in figure, which follows.

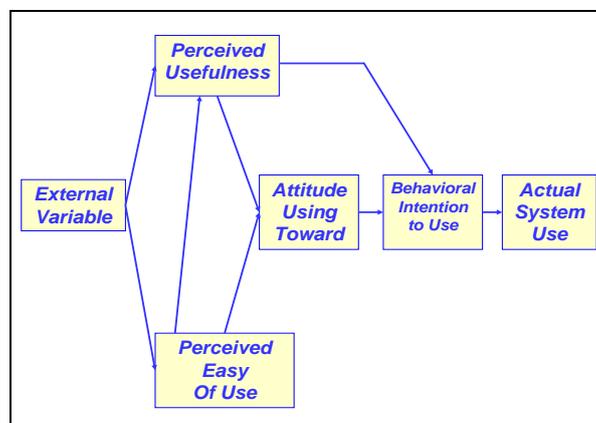


Figure 1. *Technology Acceptance Model*

In UTAUT theoretical model, according to Venkatesh *et al.* (2003), gender, age, experience, and characteristics of IT application related to their position in the firm (i.e., optional or compulsory) serve as moderating effect on the use of certain information system. Its predictor variables, meanwhile, include performance expectancy, effort expectancy, social influence, and facilitating condition. The details of UTAUT model are presented in figure below.

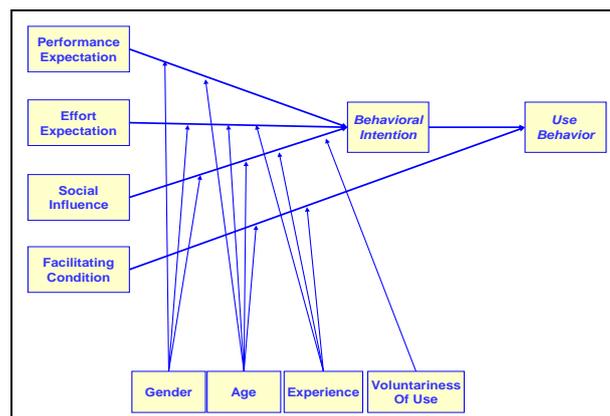


Figure 2. UTAUT Model (Venkatesh *et al.*, 2003)

Studies on the application of information technology within small and medium enterprises have been limited as to compare with the application of this technology within corporations or large enterprises. Small business operators or owners are individuals who play important roles in directing the business' policies and directions. Research results show that there is a strong relation between small business owners' perception toward information technology and computer system and its actual application within their business operations

(Heilman, Finnel, and Glorfeld, 1999). The impact of characteristics of information technology users on adoption processes, meanwhile, was investigated by Igarria *et al.* (1997), Gefen and Straub (1997), Foong (1999), Hubona and Jones (2003), Venkatesh *et al.* (2003), and Kleijnen, Wetzels and Ruyter (2004). On theoretical model UTAUT (*Unified Theory of Acceptance and Use of Technology*) which was reported by Venkatesh *et al.* (2003), gender, age, experience, and characteristics use relating to user position within the firms (compulsory or optional), serve as moderating effect on use of information technology. Its predictor variables are performance expectancy, effort expectancy, social influence, and facilitating condition. Lee and Runge (2001) concluded that the company's innovation possessed actual influence toward the adoption of information system by SMEs; nonetheless in the case of internet adoption, those variables had no influences. Lee stated (2004) that the adoption of e-mail by SMEs owners or managers is influenced by their innovative ability.

According to Riemenschneider and Mykytyn (2000), characteristics of information technology application within small business are as follows: (1) financial and accounting activities are the major part of information technology application; (2) technological training programs are directed primarily to its managers; (3) top management's support and involvement play an important role in achievement of the implementation of information technology within the firms; and (4) in line with findings of most studies on information technology, the involvement of end-users is the key aspect when they are satisfied. On the other hand, OECD (2004), state that inhibiting factors for ICT application within small and medium businesses include: (a) business process incompatibility; (b) limited managerial and technical ICT application skills; (c) development and maintenance costs; (d) problems relating to computer networks and telecommunication infrastructure; (e) problems with trust

and security in ICT application; (f) law uncertainty; and (g) various challenges relating to electronic business process.

Riemenschneider and Mykytyn (2000) stated that key persons of small business as end user of information technology tend to take into account computer self-efficacy, i.e., training and computer system application skills. Beside self-efficacy, Brown (2002), in his research on web based technology adoption in developing countries includes computer anxiety as an additional variable. His research results show that there is a strong effect of computer anxiety on adoption of this type of technology. According to Wetzels and Ruyter (2004), computer skills serve as moderating variable to PEOU. Mirchandani and Motwani (2001) found that computer skills serve as predictor variable in e-commerce adoption by small-scale businesses, with positive correlation coefficient. Bresnahan, Brynjolfsson, and Hitt (2000), found that level of education and computer skills of end-user are weakly related to computerized work and intensity of use of technology by end-user.

Level of ICT adoption variable,s which are used in those studies, are mostly categorical, i.e. adopter and non adopter. In some publications, partial adopter and full adopter are used for these terms. Van Akkeren and Cavaye (1999) classify small businesses into 3 categories: *non-adopter*; *adopter*; and *full-adopter*. Referring to previous studies, variables that will be analyzed in this study are as follows.

Table 1
Research Variables

No	Predictor	Number of item	References
1.	Performance Expectancy	4	Gefen and Straub (2000); Venkantesh <i>et al.</i> (2003), Gardner and Amoroso (2004)

2.	Effort Expectancy	4	Gefen and Straub (2000); Venkantesh <i>et al.</i> (2003); Gardner and Amoroso (2004)
3.	Facilitating Condition	4	Chau and Hu (2001); Venkantesh <i>et al.</i> (2003); Anderson and Schwager (2004); Klopping and McKinney (2004)
4.	Social Influence	4	Maholtra and Galletta (1999); Venkantesh <i>et al.</i> (2003)
5.	<i>Self Efficacy</i>	5	<u>Eastin and LaRose</u> (2000); Mirchandani and Motwani (2001), Kleijnen, Wetzels and Ruyter (2004); Riemenschneider and Mykytyn (2000)

Response variable, on the other hand, is internet adoption level, which consists of 3 levels i.e., internet adopter, potential-adopter, and non-adopter. Based on the theoretical review and previous research's results, a set of hypotheses and research model for this preliminary study are developed and depicted in the following figure.

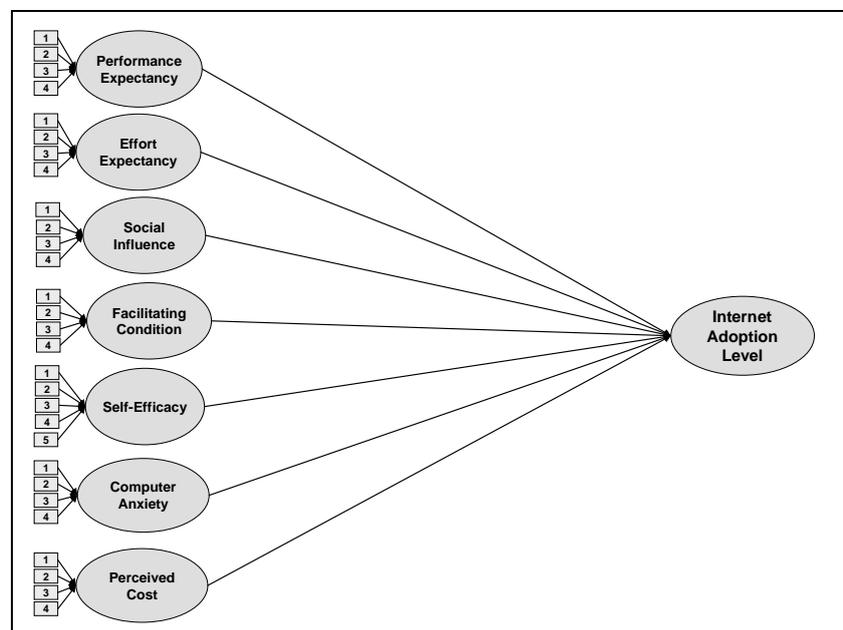


Figure 1 Research Model

3. Research methods

Subjects of the research are 150 SMF operators who are associated with the Indonesia's Association of Small Business Operators (HIPKI) in three sectors (manufacturing, trading and services), which were randomly selected. Independent variables include (i) performance expectancy, (ii) effort expectancy, (iii) social influence, (iv) facilitating condition. Two dependent variables are behavioral intention and firm business performance.

Hypotheses to be tested are: (i) behavioral intention is affected by—either simultaneously or partially—performance expectancy effort expectancy, social influence, facilitating condition, and (ii) firm business performance is affected by behavioral intention.

4. Results and discussion

From this research is seen that value Alpha yielded is 0,9294, from the value can be said that a measuring instrument wearied for the research of this is reliable and from corelation value from the data can be said that an instrumen wearied for the good quality.

Result of the test correlation is to know the relation between two variables to be tested and as used by free variable pervormance expectancy, effort expectancy, social influence and facilitating condition. The independent variable will be tested by its relation to variable behavioral intention and company performance.

The correlation between those variables can be seen in table as shown below

Table 2. Correlation between variables in services sector

Variable	Significance	Correlation (r)
X1 – Y	0.000	0.540
X2 – Y	0.018	0.333
X3 – Y	0.000	0.560
X4 – Y	0.003	0.412
Y – Z	0.000	0.492

Table 3. Correlation between variables in manufacturing sector

Variable	Significance	Correlation (r)
X1 – Y	0.000	0.525
X2 – Y	0.000	0.476
X3 – Y	0.000	0.487
X4 – Y	0.000	0.568
Y – Z	0.000	0.682

Table 4. Correlation between variables in Trading sector

Variable	Significance	Correlation (r)
X1 – Y	0.000	0.628
X2 – Y	0.000	0.707
X3 – Y	0.000	0.584
X4 – Y	0.000	0.660
Y – Z	0.000	0.679

The test result indicates that there are relations who are positive significant because from free variable tested to be seen by a social influence represent the variable having biggest influence value to behavioral intention, later followed by performance expectancy, facilitating condition and effort expectancy. This matter told that the social environment the main factor which influence the adoption of ICT.

Analysis of variance (ANOVA) for each submodel is shown in Tables 5. , internet technology adoption is significantly ($p < 0.05$) affected by the four mentioned independent variables.

Table 5. Analysis of variance model

Source of	Sum of Squares	df	Mean Square	F	Sig.
Regression	3.654447243	4	0.913611811	2.889493	0.027142
Residual	26.24328003	83	0.316184097		
Total	29.89772727	87			

5. Conclusion

Variable predictor that are performance expectancy, effort expectancy, social influence and facilitating condition influence to the level of use information technology in SME , while variable effort expectancy and variable facilitating condition have the influence which enough reality. Social influence variable has the biggest influence followed by variable of performance expectancy, facilitating condition and effort expectancy.

From research wick have been done, can be suggested as follows, with there are real influence from variable predictor to storey level use information technology and with the support of moderating variable is hence needed by a development and socialization from computer use specially in ICT.

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