HOW ICT ADOPTION COULD AFFECT INDONESIAN SMEs ORGANIZATIONAL PERFORMANCE

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ABSTRACT

Currently, the use of Information Communication Technology (ICT) in the industry is growing fast. Nevertheless, Small Medium Enterprises (SMEs) in Indonesia do not follow these conditions in sense of using the ICT. The influencing factor of ICT adoption is identified as internal and external factors. Accordingly, the objective of the study is to exploit the ICT adoption among Indonesian SMEs to improve the better organizational performance. The previous studies involve conceptual model of the combination between Diffusion of Innovation (DOI) theory, The Technology-Organization-Environment (TEO) theory, and Ioconovou's framework.

The survey method for 100 SMEs selected conveniently in Indonesia, thus the data obtained is analysed using SEM/SmartPLS program. The study has exogenous variable including technology, organization, management characteristic, and environment. The endogenous variable is ICT adoption and organizational performance both operational and final overall performance. The research result found that ICT use was predicted by characteristic of management and technology, additionally operational and final performance in Indonesian SMEs were predicted by ICT uses. Suggestions and further study is also presented at the end of this paper.

Key words: internal factor, external factor, ICT adoption, organizational performance, operational performance, final performance.

1. INTRODUCTION

Currently, use of Information Communication Technology (ICT) by enterprises cannot be ignored. Compared with SMEs, most ICT adoption is used by large companies. Over the past two decades, the using ICT by SMEs has generated a great deal of interest among researchers, governments, and international organizations (D. Kabongo & O. Okpara, 2014). The any business organization cannot avoid the development of ICT adoption. Since the application of ICT in business activity have an impact on business processes. The previous studies have found the adoption of ICT in SMEs is still slow, it is because many factors affect its especially in developing countries.

Although many barriers to widespread adoption of ICT in SMEs in developing countries but SMEs started receiving ICT adoption (Ndiege et al, 2012; Chairoel, Widyarto, & Pujani, 2015). ICT adoption in Indonesian SMEs is still low caused by an internal and external factor. The Indonesian SMEs is the first phase using information technology. A few studies examined the impact of the ICT adoption on organizational performance. Given the foregoing considerations, the research questions are proposed: what are the factors influence the use of ICT and impact of ICT on organizational performance?

This paper is organized as follows. In the beginning, the review of ICT adoption and organizational performance are presented. The research hypotheses are proposed and continued with the methodology and results to answer research questions. The last section, conclusion and implication sum up the discussion.
2. RESEARCH MODEL AND HYPOTHESES

2.1. ICT Adoption

This study constructs the adoption of ICT in organizations focusing on the actual use of ICT such as the use of computers, internet access, communications as well as marketing. Actual use of ICT is shown in seeking information, taking orders, accept payment, customer service, purchase orders, payments to vendors (Bayo et al., 2013; Delone & McLean, 2004; Tan et al., 2010).

Previous studies have shown internal and external factors affecting the use of ICT (Chong, 2008, Kapurubandara et al., 2009, Ghobakhloo et al., 2011). Internal factors consist of technological, organizational and managerial characteristics, while external factors consist of environment.

Technology is seen as a necessary measure for adoption when to adopt and use ICT. The decision to adopt the technology does not only depend on what is available in the market but how the technology according to the technology of the company. Technologies are defined and presented in a variety of dimensions consisting of perceived relative advantage, compatibility, complexity, trial-ability, observability, cost investment and security.

H1: There is the significant relationship between technology factors and ICT adoption among Indonesian SMEs.

Organizations factor is one important factor in the adoption of information technology addition technical factor (Azadegan & Teich, 2010). Organizations can have different perspectives on how useful a technology may be. In using ICT adoption, it needs resources. In an enterprise, the most important resources to adopt the new technology consist of finance, human, technology resources. Especially for SMEs, if the manager consider that the importance of ICT adoption must be followed by the resources of the enterprise. The adopt ICT must be supported by the strategy of the enterprise, this is supported by statements of Huy (2012) that the orientation of strategy on corporate organization became a factor to influence the adoption of technology.

H2: There is the significant relationship between organization factors and ICT adoption among Indonesian SMEs.

Managerial characteristic in this study explain about people to make decision in SMEs just like an owner, Chief Executive Officer (CEO) or top manager. The number of study stated that the individual characteristic crucial role in implementation of new technology (Bayo Mariones and Lera Lopez, 2007). Some study found the positive impact knowledge CEO and experience that influence of ICT in SMEs (Ghobakhloo, 2011). Additionally the attitude of CEO (top manager) or owners influenced the use of ICT (Golding et al., 2008). As a result, we proposed the following hypotheses for context of ICT adoption.

H3: There is the significant relationship between managerial characteristic factors and ICT adoption among Indonesia SMEs.

Environment is something that outside an organization and cannot be controlled such as government, customer, and supplier pressure. The environment has a strong impact of the decision to adopt ICT (Bayo-Moriones & Lera-Lopez, 2007). The role of government is important to the development of the use ICT in SMEs. Beside the government, supplier and customers the factors of environment whereas effect the adoption of ICT. Customer and supplier of pressure will force SMEs to use ICT in order to improve the marketing of its product. The number of study showing government support for e-commerce (Chong, 2008; Huy et al., 2012; Jeon, 2006; Looi, 2005; Tigre, 2003) and ICT adoption (Alam & Noor, 2009; Irefin et al., 2012) in various develop and developing countries. This is supported by Gemino et al. (2006), they state that supplier and customer had a strong influence on IT adoption.

According to previous study pressure from buyer and supplier seemed to be logical reason for adopting Electronic Data Interchange (EDI) (Al Qirim, 2007), e-commerce (Chong, 2008; Ghobakhloo et al., 2011; Huy et al., 2012), and ICT adoption (Alam & Noor, 2009). Another reason for
small businesses to adopt Information Technology (IT) comes from government policy. The fourth hypothesis presents the relationship between environment and ICT adoption as below:

\[ H4: \text{There is the significant relationship between environment factors and ICT adoption among Indonesian SMEs.} \]

2.2. Organizational Performance

Few previous studies have revealed variation in the effects of ICT based on the type and degree of technology adoption. The effect of ICT will be observed based on performance or benefit, in this study the performance consists of the operational performance with the business process of the company and the final performance related effects on the whole organization (Liang, 2010; Bayo et al., 2013).

2.3. Operational Performance

Operational performance is one of the organization performance in the short time in using of ICT adoption. The use of ICT is positively associated with operational performance (Bayo et al., 2013). According to Gibbs et al., (2003) e-commerce is an additional channel for marketing of business as a means to cut of costs and improve operational performance. Many SMEs have not yet reached a level of maturity that most SMEs expect a short term increase of operating performance (Costello et al., 2007). The relationship between ICT adoption and operational performance are presented in the fifth hypothesis

\[ H5: \text{There is the significant relationship between ICT adoption in Indonesian SMEs and operational performance.} \]

2.4. Final Performance

Based on some types of ICT are investigated by Bayo et al (2013) showed a significant relationship between operational performance with the final performance. Type of ICT distinguished on the term of general use, communication and market oriented. Paul & Anantharaman (2003) revealed that the effective operational performance will affect financial performance of an organization. The relationship between operational performance and final performance are presented in the sixth hypothesis:

\[ H6: \text{There is the significant relationship between operational performance and final performance in Indonesia SMEs.} \]

According to Apulu (2011), ICT adoption on SME's Nigeria has been identified may increase profit caused ICT utilization in marketing can increase profit (final performance) in many organization. The various evidence at the firm level as to impact of IT capital on financial performance measures such as profit and market value (final performance) (Dedrick et al., 2003). ICT impact on final performance (market share and profit) mainly occur by indirect means of the improvement of internal and external communication as through operational performance (Bayo, et al., 2013). It shows the influence of ICT adoption on the final performance of the company. The seventh hypothesis looks at the relationship between ICT adoption and final performance

\[ H7: \text{There is the significant relationship between ICT adoption and final performance in Indonesia SMEs.} \]

Figure 1 shows proposed conceptual framework that integrates the influences and impacts of ICT adoption. The results of a literature review suggest 9 hypotheses. There are 7 determining factors of ICT adoption consisting of technology, organizational, managerial characteristic, environment, ICT adoption, operational performance and final performance.
3. RESEARCH METHOD

This study made use of the deductive approach and an explanatory study indicated by the quantitative method. The source data in this study was primary data, derived from an owner, manager, or IT manager. They worked in SMEs. The research sample as a respondent is all SMEs in the city of Padang Indonesia using ICT adoption. The techniques of sampling used convenience sampling. Finally, There are 100 respondents at the initial study. The collecting data by interview (face to face) were distributed the questionnaires. The data analysis is conducted by employing Structural Equation Modeling (SEM) using SmartPLS program (Partial Least Square). In SEM process, Model and Structural Measurement was conducted as validity and reliability test, outer weight and VIF (Variance Inflation Factor) also significant relationships for a hypothesis.

4. RESULT AND DISCUSSION

4.1. Respondent Characteristic

Table 6 shows the characteristic of the respondent. Respondents by gender were indicating the number of female (55%) more rather than male (45%). Respondents by age, the majority of respondents aged less than 40 years old (83%). Around 52%, the respondents by the position in organization are as an owner, manager, an owner and manager. The level of education of respondents majority educated between high school to bachelor (90%). About 89%, the number of employment of respondents was as much as between 5 until 15 employments. Out of the 100 SMEs responding in this study, the majority (72 %) were in service and travel business. Moreover 64% of respondents had an income of less 100 million annual.

ICT Adoption

Based on the using basic ICT adoption, around more 20%, respondents utilize hand phone, computer/laptop, and internet access. The most preferred adoption of ICT...
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by the respondents for communication is email (62%) followed by intranets (53%). Whereas for the marketing of respondents would choose web page (68%) rather than e-commerce (16%).

Table 7. ICT Adoption

<table>
<thead>
<tr>
<th>Type</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td>55</td>
<td>22.7%</td>
</tr>
<tr>
<td>Intranet</td>
<td>44</td>
<td>15.1%</td>
</tr>
<tr>
<td>E-commerce</td>
<td>32</td>
<td>10.6%</td>
</tr>
<tr>
<td>Web page</td>
<td>26</td>
<td>8.8%</td>
</tr>
<tr>
<td>Total</td>
<td>216</td>
<td>100%</td>
</tr>
</tbody>
</table>

4.2. Model Measurement

PLS standard procedure used for the analysis, have two stage. The first stage, the model measurement is tested for validity and reliability for the reflective model, whereas formative model tested with VIF and outer weight. The second stage, the structural model is run to test the hypotheses.

Reflective Measurement Model

Reliability test

Table 8, shown each construct contains a good reliability because the value of Cronbach alpha and composite reliability is more than 0.70, indicating that the constructs are internally consistent and hence reliable.

Table 8. Reflective Measurement Model

<table>
<thead>
<tr>
<th>Construct</th>
<th>Operational Performance</th>
<th>Final Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR</td>
<td>0.709</td>
<td>0.912</td>
</tr>
</tbody>
</table>

Formative Measurement Model

The concept of reliability and construct validity are not meaningful when employing the formative measurement model. The formative measurement model of subsequent analysis should be considered collinearity the indicator. Each indicator tolerance, VIF value have to range between <3 and <10. Table 10 indicated the all of the indicators have the VIF value less than 3 and 10, means not occur collinearity. The prior assessment should be testing each indicator's outer weight and outer loading. When indicator's outer weight is significant that the indicator keeps being retained.. However, if an indicator weight is insignificant but the appropriate outer loading is significant, the indicators have to be retained. Furthermore, if outer weight and outer loading were insignificant, there is no empirical support to retain the indicators it should be dropped from the model. If the theory-driven conceptualization of the construct strongly supported retaining the indicators, it should be kept in the formative.
constructs. Based on table 10, all indicators in the formative constructs has to be retained. Because there is indicator significant as outer weight, outer loading and supporting the theory-driven conceptualization (Afthanorhan, 2014)

Table 10. Formative Measurement Model

<table>
<thead>
<tr>
<th>TECHNOLGY</th>
<th>outer weight</th>
<th>outer loadings</th>
<th>outer output</th>
<th>outer output</th>
</tr>
</thead>
<tbody>
<tr>
<td>TECHNOLOGY</td>
<td>m1</td>
<td>m2</td>
<td>m3</td>
<td>m4</td>
</tr>
<tr>
<td>TECHNOLOGY</td>
<td>p1</td>
<td>p2</td>
<td>p3</td>
<td>p4</td>
</tr>
<tr>
<td>TECHNOLOGY</td>
<td>c1</td>
<td>c2</td>
<td>c3</td>
<td>c4</td>
</tr>
<tr>
<td>TECHNOLOGY</td>
<td>d1</td>
<td>d2</td>
<td>d3</td>
<td>d4</td>
</tr>
<tr>
<td>TECHNOLOGY</td>
<td>e1</td>
<td>e2</td>
<td>e3</td>
<td>e4</td>
</tr>
</tbody>
</table>

4.3. Structural Model

R-square value for each endogenous variable as the predictive of power of the structural model. It is 0.25 (weak), 0.50 (moderate), 0.75 (strong). This study has three endogenous variable that is final performance ($R^2 = 0.511$), ICT adoption ($R^2=0.414$), and operational performance ($R^2=0.271$). The prediction of FP construct was accounted for 51.7 percent due to its relationship with ICT adoption and operational performance. The prediction of the ICT adoption construct was explained at 41.4 percent variance by its relationship with technology, organization, management characteristic, and environment. The OP construct was predicted at 27.1 percent by the ICT adoption. According Chin (1998), the $R^2$ value of ICT adoption and operational performance are weak model. The final performance is moderate model.

Table 11. R Square endogen variable

<table>
<thead>
<tr>
<th>R Square</th>
<th>Final Performance</th>
<th>ICT Adoption</th>
<th>OP</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.511</td>
<td>0.414</td>
<td>0.271</td>
<td></td>
</tr>
</tbody>
</table>

Effect Size

Effect size is a measure used to assess the relative impact of a predictor construct on an endogenous construct. Effect size ICT adoption is very small to final performance and OP is large to final performance.

Table 12. Effect size
Q-square
Q square is a measure of predictive relevance based on the blind folding technique. Table 13 indicated the endogenous construct of FP, ICT adoption, and OP have a value greater than zero (0). It means the construct indicated good predictive relevance.

<table>
<thead>
<tr>
<th>Total</th>
<th>SSO</th>
<th>SSE</th>
<th>I-SSE/SSO</th>
</tr>
</thead>
<tbody>
<tr>
<td>700</td>
<td>457,378,117</td>
<td>0.346,313</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>117,118,513</td>
<td>0.414,487</td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>466,306,325</td>
<td>0.189,489</td>
<td></td>
</tr>
<tr>
<td>700</td>
<td>419,566,813</td>
<td>0.400,765</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>411,801,378</td>
<td>0.178,234</td>
<td></td>
</tr>
<tr>
<td>900</td>
<td>557,979,733</td>
<td>0.380,003</td>
<td></td>
</tr>
<tr>
<td>2500</td>
<td>2177,344,823</td>
<td>0.125,042</td>
<td></td>
</tr>
</tbody>
</table>

Table 13. Q square

Structural Path Coefficient
The structural measurement shown in table 14. It is observed that among hypotheses H2, H4, and H7 are not supported (insignificant t-values) while the hypotheses H1, H3, H5 and H6 are supported (significant t-values).

Table 14. Structural Model for this research

The test relationship between construct indicates the construct affect the technology and management characteristic provided effect to ICT adoption. The ICT adoption influence on operational performance, again the operational performance affects final performance.

5. RESULT AND DISCUSSION
This study examined the factor influence the use of ICT adoption and impact to use ICT adoption. The 100 SME in Padang has been the respondents with questionnaire surveys and the analysis has used SEM/SmartPLS. Four of seven were significant influence and the rest were insignificant. The research result found that ICT use was predicted by technology and management characteristic, additionally operational and final performance in Indonesian SMEs were predicted by ICT uses. This means respondents has accepted the ICT adoption particularly technology and management characteristic. Most respondents use ICT at the basic level such as mobile phones, personal computer (PCs), and internet access. Therefore, the average level of education of the respondents are senior high school, then the respondent receives only innovation but not necessarily to use. The operational performance impact from using ICT adoption and final performance impact from operational performance. Respondents who an owner, director in SME and they are made decision to using ICT adoption. It can be concluded organization and environment.
were not affect ICT adoption in Padang's SMEs.

6. Implication

The findings carry theoretical implications for the ICT adoption literature as they extend the scope of the research on organizational performance. Moreover, this research allows managers to recognize better how to manage organization the efficiency and effectively and to expand uses ICT adoption on company with the aim of identifying organization performance.

7. REFERENCES


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