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SMEs Decision Making on E-Business Application: The Influence of Social Factor

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Abstract:

The adoption of e-business in small medium-sized enterprises (SMEs) is somewhat limited. The e-business application by SMEs is influenced by social factors. This study aims to focus on experimentally investigate the effect of external advisor and peers to SMEs decision making on e-business application. This experimental research is done due to the fact that individuals do not make decision in isolation. The social settings surround individuals may influence their behaviour in taking choices. To do the experiment, SMEs decision making on adopting particular level of e-business technology is defined as dependent variable. Two particular social factors: external advisor and peers are defined as independent variables. The experiment confirmed that both social factors significantly affect SMEs in deciding the level of e-business technology to be adopted. However, which social aspect (external advisor or peers) which has a greater effect remains questionable. The interaction of both variables is not significantly proven either.

Keywords: *e-business, small medium-sized enterprises, social factors, experimental research*

1. Introduction

Small and medium-sized enterprises (SMEs) have a prominent contribution to the economic growth of any country (Beaver, 2002 in Simpson and Docherty, 2004). The increase in competitive markets leads SMEs to consider e-business as an enabler in surviving or expanding their businesses (Chong and Pervan, 2007; Magal, Kosalge, Levenburg, and 2009). E-business is the process of doing business electronically by using the internet and its related technologies as enablers (Darch and Lucas, 2002). Some authors use the terms e-business and e-commerce interchangeably, while the others define the scope of e-business is wider than e-commerce. This paper doesn't aim to discuss this discrepancy. It tends to follow the first paradigm and focus on studying the behaviour of SMEs while making decision on e-business/e-commerce investment.

Magal *et.al* (2009) summarised some advantages of SMEs by implementing e-business, such as: cost effectively extend market scope, build name recognition, transform their supply chain, and track customer preferences. Furthermore, e-business may bring tangible financial benefits for SMEs in customer development and e-marketing (Grant, Edgar, Sukumar, Meyer, 2014). However in practice, the adoption of e-business in SMEs is somewhat limited due to some reasons. E-business technology is perceived by SMEs as a costly and risky investment (Wymar and Regan, 2005). Meanwhile, Pratt (2002) and Vlosky and Smith (2003), in Magal *et.al* (2009) mentioned the major reason for limited use of e-business by SMEs is the failure to see the strategic value in implementing e-business.

This study follows the arguments that SMEs decision making on e-business investment are a blend of both objective and subjective thought (Grant *et.al*, 2014). In other words, the influencing factors can be categorised as either technical or social factors (Lawson, Alcock, Cooper, and Burgess, 2003). The study further agrees to the Lawson *et.al* (2003) and attempts to investigate how the interaction of technical and social factors affects SMEs decisions. In this case, technical factor is defined as information technology (IT) sophistication. Furthermore, this study assumes that the higher level of IT sophistication, the closer SMEs to e-business adoption. Meanwhile, social factors that are examined in the study are concentrating to external advisor and peer effects. For this reason, the following research question is articulated:

RQ: Does social factor (external advisor and peers) affect SMEs decision making on e-business adoption?

In the following section, this paper discusses some fundamental theories and concepts of the research, and successively comes up with hypotheses development. Then, research design is presented in the third section.

2. Theoretical Frameworks

This section contains the discussion of theories and concepts that constructs the framework of research. The definition of e-business and its scope of application in practice are given in the beginning. It is followed by the discussion of a research framework regarding the definition of ICT sophistication level in SMEs. The section ends up with the formulation of research gaps as well as research purposes concerning the social factors that may affect SMEs decision making in implementing e-business.

2.1. The Broad Concepts and Scopes of E-Business

The adoption of e-business as an enabler to accelerate business has a long history in research. Discussion regarding the adoption of SMEs e-commerce has been abundance in literatures. For example: Tan and Teo (1998) and Wymer and Regan (2005) investigated on identifying factors that influence the adoption of e-business. Meanwhile, Abebe (2014) summarized some investigations in potential strategic benefits and pitfalls of e-business adoption in SMEs (e.g. Johnston et al., 2007; Wymer and Regan, 2005; Grandon and Pearson, 2004; Bianchi and Bivona, 2002). Additionally, many researchers attempted to model the diffusion of e-business using differ well-known approach, such as innovation diffusion theory (IDT), theory of planned behaviour (TPB), technology acceptance model (TAM), or by doing exploratory research in producing their own model for particular context.

The scope of e-business system can be varied in concepts and practices. Raymond, Bergeron, and Blili (2005) proposed the assimilation of e-business activities that might be categorized as “communicational/informational” functions, “business intelligence” functions, and “transactional/collaborative” functions. Communicative functions may include promotion of products/services and interaction with customers. Business intelligence functions involve attracting potential clients and market intelligence. Transactional functions focus on selling products/services and interacting with business partners in order to collaborate on research and development as well as marketing.

Meanwhile, Simpson and Docherty (2004) summarized scopes of e-business that were defined by some researchers as follows: any business activities through paper free swapping of business information over the Internet, in the form of business-to-business or business-to-customer (Lim, 2001), consumer-to-consumer or consumer-to-business (Rayport and Jaworski, 2001). Al Qirim (2007) classified e-business based on the use of technology: external/internal email, intranet, extranet/VPN, internet/EDI, and website. However, Timmers (1999), Rayport and Jaworski (2001), and Lambert (2002) in Simpson and Docherty (2004) agreed to maintain a generic wider scope of e-business as all aspects of a business where technology is important.

2.2. E-Business Adoption in SMEs: A Research Framework

Many literatures seem to mix up the adoption of information and communication technology (ICT) with e-commerce and e-business Simpson and Docherty (2004). Indeed, both ICT and e-commerce has a strong interrelation. The failure of the decision in adopting e-business is often linked to the existing ICT applications (Rantapuska and Ihanainen, 2008). Many studies have been classified a wide-ranging of e-business technologies adopted by SMEs. However, none of them provided the level of ICT sophistication, which ordered from the least to the most sophisticated or advance level.

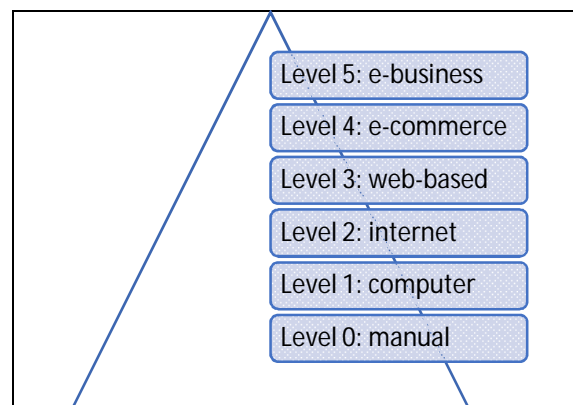


Figure 1: ICT Sophistication Level: the proposed framework for SMEs

This study attempts to close this gap by introducing the framework of ICT sophistication level for SMEs. The level is ranging from the least to the most advance, as follows:

- Level 0 (manual application): the state in which SMEs do not adopt any technology for doing businesses.
- Level 1 (computer application): the state in which SMEs use merely computer as an enabler.
- Level 2 (internet application): the state in which SMEs have been in touched by internet technology for email and/or search engine.
- Level 3 (web-based application): the state in which SMEs have had company websites, actively update it, and utilize it to promote their companies and products.

- Level 4 (e-commerce application): the state in which SMEs have been implementing e-commerce system. The company website aims not only to promote their companies and products, but also includes the more advance online database for managing their orders and transactions.
- Level 5 (e-business application): this is the most advance state in which SMEs thoroughly utilize IT, may be formed as decision support system or merely advance online database) for promoting their companies and products, manage their transactions, manage their inbound resources, maintain relationship with their customers and partners.

2.3. The Social Influence to SMEs Decisions on E-Business Investment: A Research Purpose

Pratt (2002) and Fomin (2005) in Abebe (2014) denoted that the capability of implementing e-business differs substantially between large enterprises and SMEs. The lack of understanding on the strategic role of technology, and deficiency in technical skills amongst owners or managers of SMEs places a heavy reliance on the role of external advice (Darch and Lucas, 2002; Simpson and Docherty, 2004). Besides, SMEs are often put something into practices once the successful example is available within their peers. There are many facts that individuals do not make decision in isolation. The social factors surround individuals may influence their behavior in taking choices.

Compare to large industries, SMEs tend to easily be influenced by their social settings. Unfortunately, the effect of non-technical factor to e-business implementation is barely researched. Hence, this study extends the existing research on e-business application by investigating the influence of social factors to SMEs decision making on e-business adoption. It focuses on investigating two particular social factors, external advisor and peer effects, and their influence to SMEs in making decision related e-business application.

3. Research Design

This study focuses on investigating SMEs behaviours on making decision about the adoption of e-business. To answer an experimental research method is conducted. The experimental research aims to test whether social factors do have a significant influence to SMEs decision making on e-business application. Social factors are further defined as the effect of external advisor and peers, whilst the level of e-business application is indicated by the level of ICT sophistication. The level of ICT sophistication is divided into 5 (five) stages as mentioned in previous section.

In designing an experiment, two types of variables (independent and dependent variables) are necessarily determined in advance. Independent variables (IV) are variables that are manipulated in an experiment (Martin, 2007) or corresponding to some experimental conditions or experimental factors or 'factors' (Abdi, Edelman, Valentin, and Dowling, 2009). In contrast, dependent variables (DV) represent participant's behaviour in response to manipulations of that variable (Martin, 2007, and Abdi *et.al*, 2009). Alternately, IV represents presumed causes whilst DV reveals the supposed effect (Abdi *et.al*, 2009). The design of experiment in this study includes experimental variables as follows:

Independent variable: The effect of external advisor, peers, and combined external advisor and peers.

Dependent variable: SMEs decision on adopting particular level of ICT sophistication.

The relationship of IV and DV is predicted via hypothesis. The nature of prediction that is brought in this experiment is just that IV will cause a change in DV. This circumstance is called non-directional hypothesis. In other case, if the prediction is about the direction of change then it is a directional hypothesis (Martin, 2007). This experiment aims to examine the directional null hypothesis as follows:

H_0 : The existence of external advisor, peers, or combined advisor-peers is failed to influence SMEs decision on adopting higher level of ICT sophistication.

If the null hypothesis appears unlikely in terms of the results of the experiment then we decide to reject the null hypothesis, and accept the alternative hypothesis (Abdi *et.al*, 2009). The alternative hypothesis is defined as follows:

H_1 : The existence of external advisor, peers, and combined advisor-peers is significantly influence SMEs decision on adopting higher level of ICT sophistication.

To start the experiment, we randomly invite a number of SMEs to be participated in a group discussion. SMEs' owners and managers are divided into 2 groups. Figure 2 illustrates the way this experiment is sequentially designed. First, we present the aims of the study and provide the participants with a form of pre-test. The pre-test is prepared to grasp information about statistic descriptive of respondents as well as their current stage of ICT sophistication.

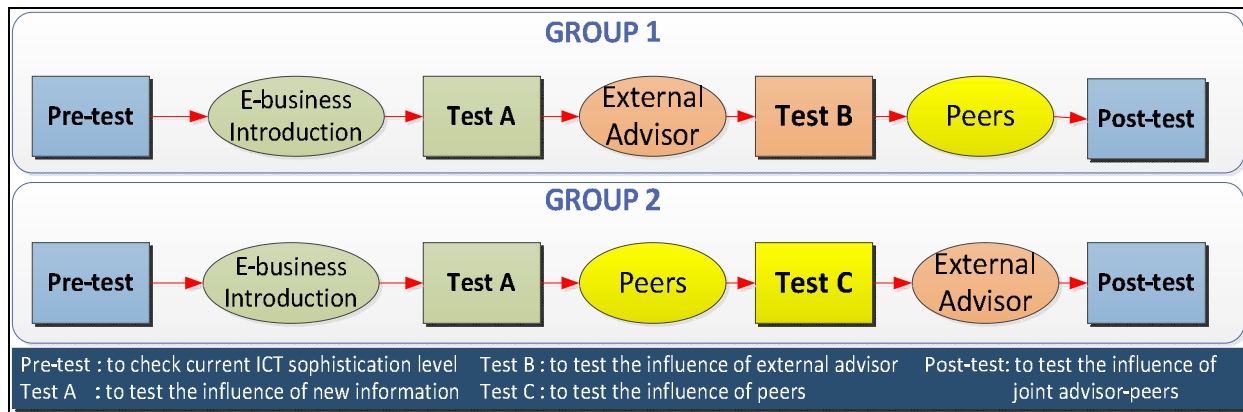


Figure 2: The experimental design

In the second stage, an introductory session about e-business is presented. The session purposes to promote the benefits and strategic value of e-business. The investment and operational costs that may occur are also carefully explained. No discussion is allowed during this session. After listening to e-business presentation, the participants are asked to do Test A. Test A is purposed to check whether a new knowledge regarding e-business has influenced them shift up their current ICT sophistication to higher level.

Further stages present two treatments which correspond to the two social factors: external advisor and peers. Group 1 and group 2 are treated similarly but in different order as illustrated in Figure 2. The different order is designed to avoid an order effect. Such treatments aims to prove a hypothesis those social factors bring influence to SMEs decision making on e-business adoption. Each treatment is closed by conducting a set of tests, to measure changing behaviour after particular treatments.

First, to test the influence of external advisor, SMEs are given a chance to seek advice from an external advisor to make themselves ascertained about their decision. However, they are not allowed to discuss their decisions with other members in the group. At the end, test B is conducted to assess the influence of and external advisor to SMEs’ decision making. Second, SMEs managers are given an example of peers who successfully implemented e-business. Besides, they are given a chance to freely communicate with the group or peer before taking their decisions. To close this session, test C delivered to measure peers effects on SMEs decision making.

At the end, each group came up with the same circumstance in which they received the join advisor-peers influence. Although group 1 received external advisor before peer effects, whilst group 2 on the other way around, this is good for counterbalancing. To close the session in both groups, post-test is delivered. Post-test is aimed to measure in the joint influence of external advisor and peers may significantly affect SMEs’ owners and managers to take a risky decision on adopting the more advance of ICT technology, or even jump to the highest level (e-business application).

4. Results and Discussions

Casual observations revealed that majority of SMEs are concentrated in industrial cluster (Mano, Iddrisu, Yoshino, 2012). Hence, this study took place in an industrial cluster to achieve particular numbers of participants. Our study was particularly located in Sidoarjo, a small town in Indonesia which is well-known as one of the growing industrial cluster. The industrial cluster comprises diverse type of SMEs, such: automotive components, electrical components, household appliance, farm equipment, and. metal-based handicraft.

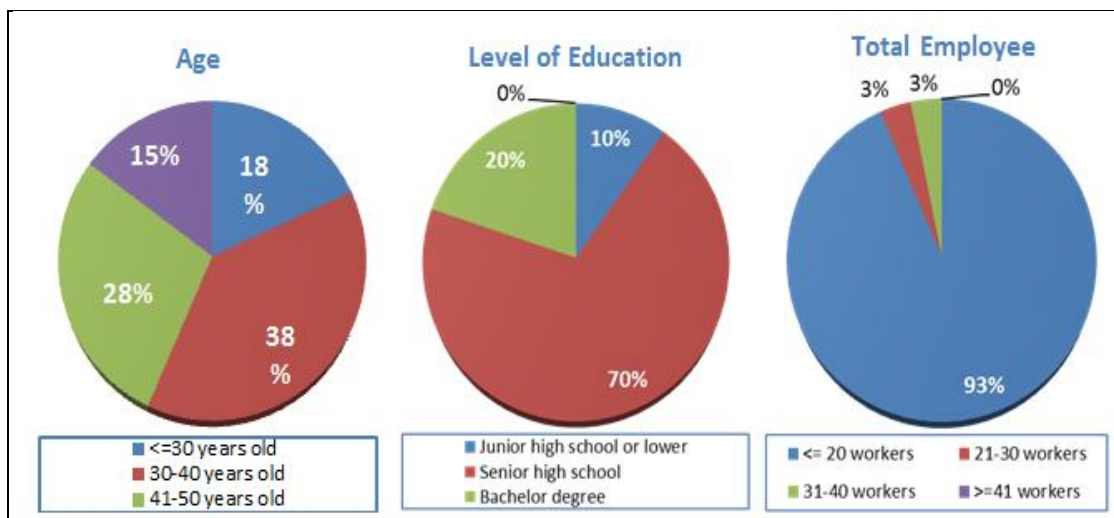


Figure 3: Descriptive statistic of participant

The study was collaborated with a business development services (BDS) which has a senior advisor who has long experiences in providing consultations for SMEs in this cluster. In addition, this BDS frequently facilitates or mediates SMEs with: government, industries, universities, and any other third parties. We sent 85 invitations but only 60 SMEs owners and managers came in the experiment. Figure 3 displays the descriptive statistic of participants which majority are young managers (around 30-40 years old), coming from medium education level (senior high school). Most of the SMEs under study are quite small in scale of business, with maximum 20 employees or workers.

4.1. Average ICT Levels

Table 1 illustrates the statistical results of the four experimental groups under the 1% level of significance. The average ICT levels are steadily increasing from column 1 to column 5. Comparing column 1 and 2, the means of the scores shows that initial information about e-business has influence a bit to SMEs' decisions on taking higher ICT level. Additionally, the social effects bring a better influence to SMEs' decisions. The joint effect of peer and external advisor even contributes to the greatest influence.

Statistical score	Pre-test	Test A Baseline	Test B Advisor	Test C Peers	Post-Test Advisor-Peers
	1	2	3	4	5
Number of sample	60	60	30	30	60
Means of the scores	0.15	1.55	2.4	2.6	3.55
Variance	0.23	0.52	1.01	0.32	0.93
(a) <i>P-value</i> 1&2	1.21E-22*			(d) <i>P-value</i> 3&4	0.173*
(b) <i>P-value</i> 2&3	7.67E-05*			(e) <i>P-value</i> 3&5	1.50E-06*
(c) <i>P-value</i> 2&4	5.06E-11*			(f) <i>P-value</i> 4&5	3.75E-08*
(d) <i>P-value</i> 2&5	7.10E-24*				

*Alpha 0.001, one-tailed

Table 1: The statistical results

Pair-wise comparisons between all columns 1 to column 5 reveal the rejection of null hypothesis, except the comparison advisor and peer effects. It means that the presence of social factors do have significance impacts to SMEs managers in taking decision regarding the adoption of ICT or e-business technology. Comparing the relative influence of each social factor, peers effect looks greater than the effect of external advisor. However, the *t*-test of the two groups proves the different average ICT level scores are not significant. It means neither external advisor nor peers play a better effect to SMEs.

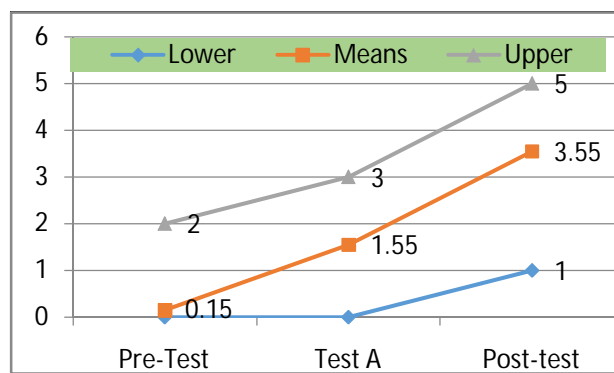


Figure 4: Comparison of before and after treatment

Figure 4 displays the comparison of ICT sophistication level on three different time periods. Pre-test checks current ICT level of SMEs, test A measures the changing score after they get knowledge about e-business, whilst post-test assesses the final scores after they get through all the experimental treatments.

A slight score increase from pre-test to test A implies once SMEs more understandable about the strategic value of ICT and e-business, they will have more willingness to adopt it. Interestingly, the score increase from pre-test to post-test are quite considerable. This significant increase implies once SMEs more understandable and positively influence by social setting, there will a great change in the way they take decisions.

Observing the lower scores, there are SMEs in the sample that are not willing or slightly willing to change their decision. However, the increase means of the scores are quite significant. Additionally, figure 4 shows that there are some SMEs intend to adopt e-business (the highest level of ICT technology) by the end of the study.

4.2. Effects and Interactions of Social Factors: The Experimental Variability

Multiple-variable experiment, or factorial experiment, enables researcher to investigate not only effects but also interactions among variables. Figure 5 shows means of the independent variables (external advisor and peers) towards the dependent variable. As there are two independent variables in this experiment, two possible main effects are emerged. The main effect of external advisor is graphically illustrated in Figure 5a, whilst the main effect of peers is in Figure 5b.

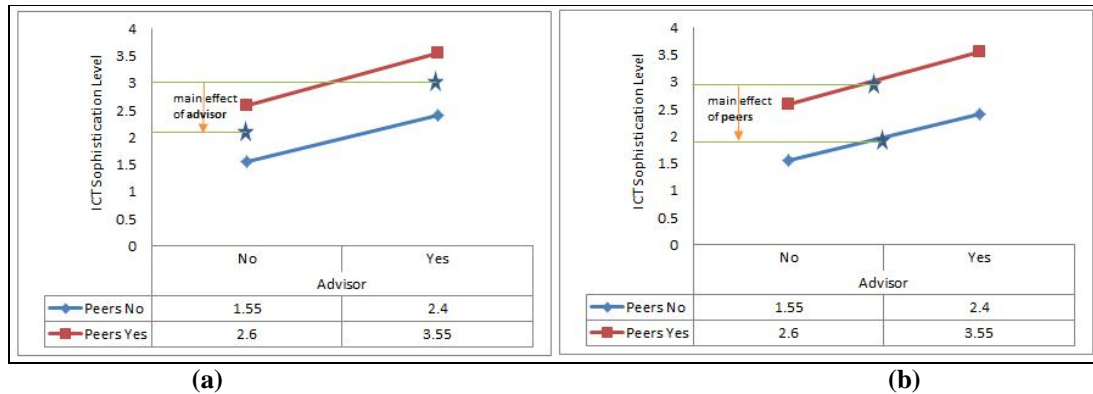


Figure 5: The experimental means of ‘external advisor’ and ‘peers’

To examine whether these main effects are significant, an analysis of variance (ANOVA) was conducted. First, table 2 provides a test the equality of variances in the sample. The significance value for homogeneity of variances is <.05, so the variances of the groups are significantly different.

F	df1	df2	Sig.
4.353	3	176	.006
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.			

Table 2: The homogeneity test

The ANOVA calculation is shown in table 3, in which successively presenting source of variations, sum of squares, degree of freedom (df), mean square, and P-value of f (Sig). All scores are tested under 5% level of significance (Alpha = 0.05). The null hypotheses (H₀) and alternative hypotheses (H₁) for each source of variations are as follows:

- H_{0,A} : the main effect of external advisor is zero.
- H_{1,A} : the main effect of external advisor is not zero.
- H_{0,B} : the main effect of peers is zero.
- H_{1,B} : the main effect of peers is not zero.
- H_{0,C} : the main effect of interaction between external advisor and peers is zero.
- H_{1,C} : the main effect of interaction between external advisor and peers is not zero.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power ^b
Corrected Model	146.411 ^a	3	48.804	73.814	.000	.557	221.441	1.000
Intercept	852.544	1	852.544	1.289E3	.000	.880	1289.440	1.000
Peers	94.044	1	94.044	142.239	.000	.447	142.239	1.000
Advisor	8.711	1	8.711	13.175	.000	.070	13.175	.951
Peers * Advisor	9.344	1	9.344	14.133	.000	.074	14.133	.962
Error	116.367	17	.661					
Total	1290.000	18						
Corrected Total	262.778	17						
R Squared = .557 (Adjusted R Squared = .550)								

Table 3: Result of ANOVA (Alpha 0.05)

Referring to table 3, sources of variations measure the main effects of the two independent variables, as well as the interaction of both variables. An interaction occurs when the relationship between one independent variable and the participant’s behaviour depends on

the level of a second independent variable (Martin, 2007). The results of ANOVA test reject the null hypotheses for all sources of variation. It means, the effects of each independent variable as well as the interaction of both variables are significant.

5. Conclusion

This study intended to investigate two particular social factors: external advisor and peer effects regarding their influence to SMEs in making decision on e-business application. The success in adopting e-business was linked to the existing ICT applications. Thus, the study measured the sophistication of e-business technology that ranging in the 5-level of ICT level. Two experimental groups were formed, to test the effect of external advisor, peers, and the combined of both factors to SMEs decision making on adopting particular ICT technology. Sets of tests were conducted, to measure current ICT adoption as well as the impact of each treatment stage.

The *t*-test resulted in the rejection of null hypothesis for pairwise comparisons among all treatment, except groups of advisor effect and peer effect. It means that social factors have significant influences to increase the confidence level of SMEs managers on investing to the more advance ICT technology. The acceptance of null hypothesis for the pairwise of advisor effect and peer effect implied that an investigation to reveal which social factor which plays greater role in affecting SMEs decision was not proven. The combined advisor-peers effects brought the greatest leverage to SMEs decision on ICT investment.

In addition to the *t*-test, ANOVA attempted to reveal the main effect of social factors as well as their interaction in influencing ICT level. The results confirmed that external advisor and peers definitely affect the ICT sophistication level. Thus, it strengthened the evidence that social settings play an important role to enhance SMEs decision making on e-business investment. This study also proved the previous work that SMEs adoption level on e-business technology are pretty low because of the failure on understanding the strategic values of e-business and ICT technology. The more knowledgeable SMEs, the greater willingness they have to adopt e-business.

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