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## INFORMATION SYSTEMS ADOPTION AMONG SMES IN SURABAYA GREATER AREA

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### Abstract

*The rapid growth of Internet Technology (IT) in Indonesia proposes many new improvement opportunities for small and medium enterprises (SMEs) particularly in business process automation. Observing the cost of acquisition IT has become more affordable now compared to ten years ago, more and more SMEs are implementing it. Various studies in the field of SMEs have been done, but not much focusing on how SMEs adopting Integrated Information Systems. Specifically, in Surabaya greater area, most of SMEs are trying to automate their business processes, however not many realize that in terms of IT adoption context, SMEs are not just merely a simple scaled-down model of large firms, hence many project implementations in SMEs were failing. This study focuses on examining four important antecedents of technology adoption using Technology Acceptance Model framework. The perceived efficiency benefit and perceived service benefit were proposed as the antecedents of Perceived Usefulness. Familiarity and Owner's ICT Knowledge were proposed as antecedents of Perceived Ease of Use. The collected data of 264 SME owners or managers were tabulated and analyzed using path analysis to measure the causal effects. Result findings from final model confirmed the significance of Perceived Ease of Use as the largest predictor of Intention to Use IT for business process automation. Despite solid theoretical contribution of the findings, this study offers practical means of increasing the success rate of IT adoption by SMEs.*

**Keywords:** Small Medium Enterprise, Surabaya, Integrated Information Systems, TAM

### Introduction

Small and Medium Enterprises (SMEs) now have the challenge of an increasingly complex and competitive industry, including the challenges of exploiting information technology in which, the needs are more and more akin to the needs of information technology in large business enterprises. SMEs also often do not have access to human resources in the field of information technology to ease the adoption of information technology, even though most SMEs agree that information technology is needed to compete in a growing and increasingly global market.

Information systems continue to play as an important role in the success of any business despite the size of the SMEs. Computer network installation even in the smallest of small businesses will boost overall office efficiency by allowing employees to quickly access and share information and network resources such as high-speed internet connection, integrated information systems, collaboration systems, office productivity and cloud based data backup system. Information systems and organizations influence one another. Information systems are built by managers to serve the interests of the business firm. At the same time, the organization must be aware of and open to the influences of information systems to benefit from new technologies (Laudon & Laudon, 2015). Previous studies note that most big enterprises are using Integrated Information Systems software packages and nowadays more SMEs are on the route of adopting them gradually from one module to another, however the bulk benefits of Integrated Information Systems software packages remain hidden (Dillard and Yuthas as cited in Maditinos, Chatzoudes, & Tsairidis, 2012). Prior to this study, an Information System implementation was done at an SME in Surabaya which engages in the field of leather goods, the result confirms the limitation of SMEs in terms of their readiness to adopt Information System (Wiradinata & Antonio, 2015).

Specifically, in Indonesia, SMEs are the key to success in the reduction of unemployment and boosting economic growth in Indonesia. SMEs have contributed a great deal in the resilience of the Indonesian economy, especially in a period of economic stagnation and financial crisis during 2008-2009. Support to SMEs should be encouraged to support Indonesia becoming 10 most influential economic powers in the world by 2025 according a study from the OECD (2012). Therefore, research on how SMEs adopt Information Technology as their sustainability strategy is considered very important for academics and business practitioners in Indonesia. This study will try to open more horizon on how SMEs particularly in Surabaya greater area which are dominated by family managed business perceive their intention to adopt Integrated Information Systems.

## Related Literature

### *Small and Medium Enterprises (SMEs)*

The term Small and Medium sized Enterprise (SME) varies in one country to another. Due of the diversity of SMEs, every simple definition is subject to criticism. The Indonesian Ministry of micro, small and medium enterprise under the Statute number 20 year 2008 defined SMEs according to 3 categories based on the company assets and revenue (1) Micro, (2) Small, and (3) Medium business as listed in table 1 below:

Table 1. Criteria for Micro, Small and Medium Business

	Micro Business	Small Business	Medium Business
Assets (land and building not included)	Rp. 50,000,000 or less	above Rp. 50,000,000 until Rp. 500,000,000	above Rp. 500,000,000 until Rp. 10,000,000,000
Annual Revenue	Rp. 300,000,000 or less	above Rp. 300,000,000 until Rp. 2,500,000,000	above Rp. 2,500,000,000 until Rp. 50,000,000,000

Contributions of SMEs are also significant to reduce unemployment, both in the developed and developing countries, including Indonesia. In today's era of global economy, SMEs are required to make changes in order to increase their competitiveness. One important factor that will determine the competitiveness of SMEs in Indonesia is the use of information technology (IT) (Rahmana, 2009). The use of IT can improve business transformation through speed, accuracy and efficiency of information exchange in large numbers. Case studies around the world show more than 50% productivity is achieved through investments in IT. SMEs may increase their global competitiveness if they able to run to take advantage of IT to make their business operations reliable, balanced, and standardized.

### *Integrated Information Systems*

There are many types of business firms, and there are many ways in which the IT function is organized within the firm. A very small company will not have a formal information systems group. It might have one employee who is responsible for keeping its networks and applications running, or it might use consultants for these services. Larger companies will have a separate information systems department, which may be organized along several different lines, depending on the nature and interests of the firm. The question of how the information systems department should be organized is part of the larger issue of IT governance which not the main interest of this study.

SMEs have long been found to be different from larger firms in terms of ICT adoption context. They are not just merely a simple scaled-down model of large firms (Thong et al. as cited in Kuan & Chau, 2001). In many cases, SMEs face substantially bigger risks in ICT adoption compared to larger firms do because of inadequate resources and limited knowledge about ICT (Cragg & King; Ein-Dor & Segev as cited in Kuan & Chau, 2001).

### *Technology Adoption*

The broadly used Technology Acceptance Model (TAM) is suitable for task-oriented information systems such as management information systems and the model focuses on finding determinants of the acceptance of such systems (Dishaw & Strong, 1999; Wang, Lo, & Fang, 2008; Wu, 2012). Therefore, the TAM is not tailored to the explanation of human-relationship development which occurs with SME ICT adoption therefore, the TAM model needs to be modified or extended to be an adequate theoretical model for ICT adoption. In recognition of this most of the recent studies based on a theoretical causal model will try to add social and psychological constructs into existing as proposed in recent studies by Alalwan et al. (2016). The TAM has been considered as one of the most prevalent and satisfactory models within the Information Systems field. According to a Google scholar, the original study of Davis (1989) has been cited by 30,925 other articles by the end of September 2016.

The development and testing of a causal model has not been the purpose of many previous studies (Gefen, 2003; Ghobakhloo, Arias-Aranda, & Benitez-Amado, 2011; Ghobakhloo & Tang, 2015; Moon & Kim, 2001). Instead, these studies have examined hypotheses derived from existing theories as to the importance of factors such as efficiency, service quality, familiarity (Kim, Ferrin, & Rao, 2008) and owner ICT knowledge (Ghobakhloo et al., 2011) in the context of SME ICT adoption and usage.

## Research Design and Methodology

A review of existing theory and previous studies the main variables that are related to the intention to use a ICT are identified as well as the causal relationships among them. This leads to a proposed theoretical model which is presented in figure 1 below where the operationalization and measurement of the variables is discussed as well as the research hypotheses represented by the theoretical model and the structure of the questionnaire used in the study.

### *Proposed Theoretical Model*

The proposed theoretical model is based on existing theories and previous studies presented in the literature review. The proposed theoretical model is illustrated in Figure 1 which has been notated to identify the research hypotheses



associated with the causal relationships among the variables.

The proposed theoretical model is strongly influenced by the models developed and tested in previous studies. It is not claimed that all possible variables or causes and effects are included in the proposed theoretical model but as shown in the literature review there is strong theoretical support for the variables and cause and effect relationships that are included in the model.

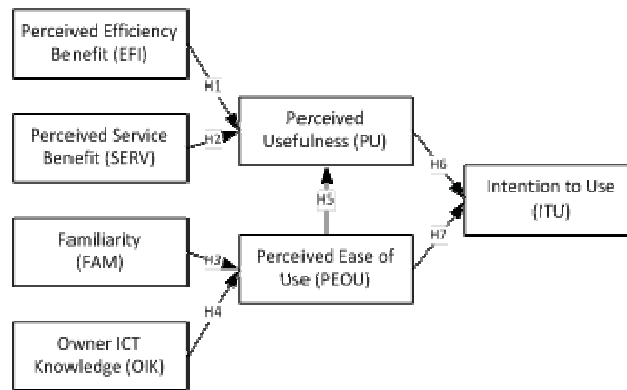


Figure 1 Proposed Theoretical Model

In Figure 1 there are 7 variables including 4 exogenous variables, for which no causes are proposed, and 3 endogenous variables, which have at least one variable as a proposed cause. The endogenous variable Intention to Use (ITU) is the dependent variable. The model has 7 Hypotheses as listed in Table 2. Each of the 7 variables is a latent variable (itemized in Table 3) measured with more than one indicator as described in Table 4. These 7 variables may be categorized into one of 2 groups which reflect the nature of the constructs based on TAM framework represented by the variables. The first group was the antecedents of Perceived Usefulness (PU) which consists of Perceived Efficiency Benefit (EFI) and Perceived Service Benefit (SERV). The next group was the antecedents of Perceived Ease of Use (PEOU) which involves Familiarity (FAM) and Owner ICT Knowledge (OIK). Both TAM constructs then predicted to influence Intention to Use Information Systems by SME owners or managers.

Table 2. Hypotheses

Hypothesis	Variable Relationship
H1	Perceived Efficiency Benefit (EFI) significantly affect Perceived Usefulness (PU)
H2	Perceived Service Benefit (SERV) significantly affect Perceived Usefulness (PU)
H3	Familiarity (FAM) significantly affect Perceived Ease of Use (PEOU)
H4	Owner ICT Knowledge (OIK) significantly affect Perceived Ease of Use (PEOU)
H5	Perceived Ease of Use (PEOU) significantly affect Perceived Usefulness (PU)
H6	Perceived Usefulness (PU) significantly affect Intention to Use (ITU)
H7	Perceived Ease of Use (PEOU) significantly affect Intention to Use (ITU)

Table 3. Definitions and symbols for model variables

Variable (Symbol)	Operational Definition	Reference
Perceived Efficiency Benefit (EFI)	The degree to which technology will provide efficiency to company operational activities	(Kuan & Chau, 2001)
Perceived Service Benefit (SERV)	The degree to which technology will provide satisfaction to company's service	(Lin, Wu, & Tsai, 2005)
Familiarity (FAM)	The degree of CEO's acquaintance with vendor providing information systems implementation service	(Kim et al., 2008)
OwnerICT Knowledge (OIK)	The degree to where a CEO have knowledge of IT and Innovativeness traits	(Premkumar, 2003)
Perceived Ease of Use (PEOU)	The degree to which a CEO believes that using information systems would be free of effort	(Davis as cited in Pearson & Grandon, 2005)
Perceived Usefulness (PU)	The degree to which a CEO believes that using information systems would enhance his or her company performance	(Davis as cited in Pearson & Grandon, 2005)
Intention to Use (ITU)	The degree to which a CEO intent to use information systems in his or her company	(Davis as cited in Pearson & Grandon, 2005)

In Table 3 each of the 7 variables is operationalized as a latent variable measured with a set of at least two indicators. Table 4 shows the symbol used for each indicator and a reference to a previous study discussed in previous section which is used as the source of an existing measuring instrument for the indicators.

Table 4. Proposed indicators and measuring instruments for latent variables

Variable (Symbol)	Indicators	Measuring Instrument
Perceived Efficiency Benefit (EFI)	4 indicators: efi1, efi2, efi3, efi4	(Kuan & Chau, 2001)
Perceived Service Benefit (SERV)	6 indicators: serv1, serv2, serv3, serv4, serv5, serv6	(Lin et al., 2005)
Familiarity (FAM)	4 indicators: fam1, fam2, fam3, fam4	(Kim et al., 2008)
OwnerICT Knowledge (OIK)	4 indicators: oik1, oik2, oik3, oik4	(Premkumar, 2003)
Perceived Ease of Use (PEOU)	5 indicators: peou1, peou2, peou3, peou4, peou5	(Davis as cited in Pearson & Grandon, 2005)
Perceived Usefulness (PU)	5 indicators: pu1, pu2, pu3, pu4, pu5	(Davis as cited in Pearson & Grandon, 2005)
Intention to Use (ITU)	3 indicators: itu1, itu2, itu3	(Davis as cited in Pearson & Grandon, 2005)
	Total Number of Indicators:	31 indicators

In Table 4 each of the indicators is measured on a 5-point Likert scale and the measures are treated as interval scale measures in the analyses. Existing measuring instruments are used in order to improve the reliability and validity of the measures.

A self-administered structured questionnaire designed to measure the variables in the proposed theoretical model was prepared in both English and Indonesian. The questionnaire uses measuring instruments used in previous studies in order to improve the validity and reliability of measures. Section 1 of the questionnaire is used to collect information about respondents in the sample and is used to prepare a profile of those respondents.

Both language versions of the questionnaire were reviewed by a focus group of 5 experienced ICT users and suggested modifications were included in the next versions of the questionnaire. The Indonesian version was then administered in a pilot study with a sample of 10 respondents. Their responses and comments were noted and any additional necessary modifications were incorporated into the final English and Indonesian versions of the questionnaire. The Indonesian version was then used in the full study.

#### Data Preparation and Preliminary Analyses

The collected data of 264 SME owners or managers were done using purposive (judgmental) sampling method due to difficulties in setting up sampling frame and this method was appropriate in situations where individuals with certain experience are compulsory. The data was then tabulated into SPSS worksheet for further analysis. Among them there were 21 questionnaires removed due to various errors, hence the final sample size was recalculated as 243 samples. This number of samples was considered satisfactory for Path Analysis (Kline, 2011). The principal component analysis method was used to test the construct validity and each latent variable was measured with factor loading of 0.4 or above. The factor loading result suggests the elimination of an indicators from Perceived Efficiency Benefit (EFI), namely EFI4 because it has significant cross-loadings on other factors and was not measuring only Perceived Efficiency Benefit.

The reliability of each variable was measured using Cronbach alpha technique and the result showed all coefficient are all good (above 0.7) except Perceived Usefulness (PU) the coefficient was slightly below 0.7 but still can be used for further analysis.

Among all respondents there were 130 males (53%) and 113 females (47%), majority respondents were residing in Surabaya (39%), Sidoarjo (23%), and Gresik (19%). Around 82% of respondents have experience using information technology for at least a year. Almost 63% of respondents are actively selling in online environments.

Descriptive statistics results for all indicators associated with each latent variables shows acceptable skewness and kurtosis values. Correlation among model and profile variables can be seen in appendix 2 which shows all hypotheses proposed in the theoretical model were significantly correlated at 0.05 or less.

**Results and Discussions**

Figure 2 below shows the results of the Path Analysis of the theoretical model using IBM AMOS 21 software package.

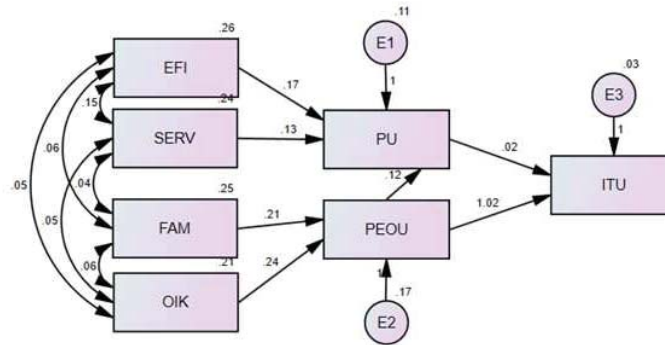


Figure 2. Path Analysis of proposed theoretical model

Table 5. Fit statistics for proposed theoretical model

Model	N	NC ( $\chi^2/df$ )	RMR	GFI	AGFI	NFI	IFI	CFI	RMSEA
Theoretical Model	243	5.884	0.029	0.951	0.829	0.941	0.951	0.95	0.142
		R <sup>2</sup> : Perceived Usefulness (0.173), Perceived Ease of Use (0.146), Intention to Use (0.879)							

In table 5 some of the fit statistics already have acceptable values and some are close to meet the acceptable values, an approach to enhance fit statistics value can be done by considering to add plausible causal effects as listed in correlation table in appendix 2 and removing insignificant relationship. This were done by adding direct effect from both EFI and SERV to PEOU. Removal of relationship from both EFI and SERV to PU as well as PU to ITU which showed no significant causal effect has also proven to enhance the fit statistics. The hierarchy was then analyzed using the specification search facility provided by IBM AMOS 21 software package and comprehending the advice from Kline (2011) to select model with smallest Normed Chi-square (NC) value as illustrated in Figure 3 below.

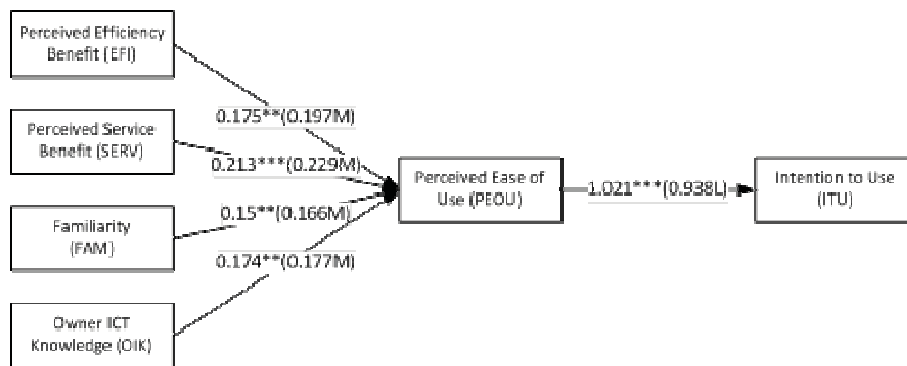


Figure 3. Direct effects in the final model

Table 6. Fit statistics for the final model

Model	N	NC ( $\chi^2/df$ )	RMR	GFI	AGFI	NFI	IFI	CFI	RMSEA
Final Model	243	1.347	0.003	0.993	0.962	0.993	0.998	0.998	0.038
		R <sup>2</sup> : Perceived Ease of Use (0.28), Intention to Use (0.879)							

This research finding proposed a model of IS adoption in SMEs through examining Perceived benefit, familiarity and CEO ICT knowledge. The findings from hypotheses testing indicate that the determinants of information systems

adoption in the context of SMEs are not limited only to the technological factors, but also determined by organizational readiness. Findings suggest that Perceived Ease of Use is a very important determinant of information systems adoption in SMEs, which supports many other past studies. Surprisingly, Perceived Usefulness was identified as insignificant predictor to Intention to Use which need a further elaboration, this could be triggered by characteristics differences of SMEs in Surabaya greater area where most of SMEs were not fully aware of the benefits of adopting Information Systems, however many of them were started to use due to environmental pressure which refers to the influence from the internal and external environment that compels SMEs to adopt Information Technology. Environmental pressure can occur from a customer, supplier, government policy, market pressure, or changes in external environments (Kurnia, Choudrie, Mahbubur, & Alzagooul, 2013; Zhu & Kraemer, 2005).

In summary, all interested parties to boost the adoption of Information Systems in SMEs such as IT vendors and service providers as well as government bureau need to understand that the result findings of this study shows that formulating policy regarding Perceived Ease of Use and its antecedent Perceived Service Benefit are very influential for Information Systems adoption in SMEs. Some of the policy related to the dominant variable are (1) demonstrate the benefits of partner or customer satisfaction due to business process automation in SMEs. Other than that (2) the various parties involved need to instill the perception of convenience for the majority of the owners / managers of SMEs who are not from among the IT literate.

### Conclusion

SMEs need to utilize Integrated Information Systems to improve the competitiveness of the company in order to be able to compete in the globalization and strive for the competition in ASEAN economic community, however it is very important to understand that Information Systems adoption in SMEs have several different characteristics compared to large enterprise with plenty talent and resources. The implementation of better strategy for Integrated Information Systems is necessary to improve the competitiveness of enterprises.

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Appendix 1 Descriptive Analyses

	N	Mean	Std. Deviation	Skewness	Kurtosis	Cronbach Alpha
PERCEIVED EFFICIENCY BENEFIT (EFI)						
EFI1	243	4.03	.667	-.037	-.737	0.83
EFI2	243	4.19	.605	-.109	-.426	
EFI3	243	4.10	.657	-.110	-.685	
EFI4	243	4.24	.584	-.098	-.443	
PERCEIVED SERVICE BENEFIT (SERV)						
SERV1	243	4.26	.593	-.154	-.522	0.88
SERV2	243	4.20	.638	-.197	-.629	
SERV3	243	4.14	.649	-.149	-.655	
SERV4	243	4.16	.658	-.182	-.717	
SERV5	243	4.24	.568	-.029	-.369	
SERV6	243	4.21	.626	-.192	-.582	
FAMILIARITY (FAM)						
FAM1	243	3.96	.598	.012	-.185	0.817
FAM2	243	3.84	.623	.121	-.501	
FAM3	243	3.83	.617	.120	-.473	
FAM4	243	3.89	.653	.111	-.661	
OWNER ICT KNOWLEDGE (OIK)						
OIK1	243	3.73	.596	.177	-.548	0.71
OIK2	243	3.98	.589	.003	-.084	
OIK3	243	3.72	.697	-.141	-.128	
OIK4	243	3.72	.641	.146	-.431	
PERCEIVED USEFULNESS						
PU1	243	3.99	.643	.007	-.557	0.67
PU2	243	3.95	.570	-.007	.101	
PU3	243	4.03	.501	.058	1.022	
PU4	243	4.02	.534	.020	.556	
PU5	243	3.86	.579	.016	-.151	
PERCEIVED EASE OF USE						
PEOU1	243	4.16	.630	-.133	-.544	0.81
PEOU2	243	4.07	.599	-.024	-.213	
PEOU3	243	3.94	.586	.009	-.083	
PEOU4	243	3.98	.620	.013	-.369	
PEOU5	243	4.03	.588	-.006	-.084	
INTENTION TO USE						
ITU1	243	4.18	.608	-.108	-.0427	0.75
ITU2	243	4.06	.596	-.020	-.0182	
ITU3	243	3.98	.616	.014	-.340	

Appendix 2 Correlations among model and profile variables

	AGE	ITE	EDU	EFI	SERV	FAM	OIK	PU	PEOU
AGE	1								
ITE	-.111	1							
EDU	-.054	.273**	1						
EFI	-.091	.077	.147*	1					
SERV	-.054	.151*	.149*	.612**	1				
FAM	.056	-.025	-.025	.230**	.184**	1			
OIK	-.007	.003	-.088	.194**	.218**	.250**	1		
PU	-.093	.201**	.157*	.401**	.374**	.110	.163*	1	
PEOU	-.014	.111	.081	.410**	.419**	.298**	.307**	.314**	1
ITU	-.017	.069	.068	.414**	.402**	.316**	.310**	.308**	.938**

\*\* . Correlation is significant at the 0.01 level (2-tailed). \* . Correlation is significant at the 0.05 level (2-tailed).

Shaded cells indicate significant correlation associated with hypothesized causal effect in the theoretical model.