Information Systems Adoption among SMEs in Developing Country: The Case of Gerbang Kertasusila

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***Abstract*—The rapid growth of Internet Technology (IT) in Indonesia opens up many new business process innovations for small and medium enterprises (SMEs). Observing the cost of acquisitioning IT has become more affordable now compared to ten years ago, more and more SMEs convinced to implementing it. However, the success rate has been anecdotal. Various studies in the field of SMEs have been done, but not much focusing on how SMEs are adopting Integrated Information Systems. Specifically, in Gerbang Kertasusila (Industrial part of East Java, Indonesia), 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 combines T-O-E and TAM framework to analyses the important antecedents of technology adoption at the firm level. The collected data of 398 SME owners or managers were tabulated and analyzed using structural equation modelling to measure the causal effects. Result findings from final model confirmed the significance of Competitive Pressure (CP) and Owner's ICT Knowledge and Innovativeness (OIKI) as the largest predictor of Intention to Adopt IT for business process automation. Despite solid theoretical contribution of the findings, this study also offers practical means of increasing the success rate of IT adoption by SMEs.**

***Index Terms*—Information Systems Adoption; Small Medium Enterprise; TAM; TOE.**

I. INTRODUCTION

New challenges of more complex and competitive industries are upon Small and Medium Enterprises (SMEs), including the challenges of exploiting information technology to meet more needs of implementing information systems as in large business enterprises. Most often SMEs do not have access to IT human resources to accommodate information system adoption. Thus, hinders them to implement IT, even though they are aware of the need for implementing information systems to compete in this growing and increasingly global market.

SMEs contribute significantly to diminish unemployment in both developed and developing countries, including Indonesia. In the global economy era, changes need to be made in order for the SMEs to increase their competitiveness. One important factor that will determine the competitiveness of SMEs in Indonesia is the use of information technology [1]. Businesses can improve significantly through the use of IT by transforming speed, accuracy and efficiency of information exchange. It has been proven by case studies around the world that more than 50% productivity is achieved through investments in IT. SMEs may increase their global competitiveness if they are able to take advantage of IT in order to become more reliable, balanced, and standardized.

The definition of Small and Medium-sized Enterprise (SME) varies in different countries. The diversity of SMEs resulted in different definition toward different country. 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 business, (2) Small business, and (3) Medium business as listed in Table 1.

Table 1
Criteria for Small and Medium Business

Criteria	Small Business (IDR)	Medium Business (IDR)
Assets (without land and building)	50,000,001 until 500,000,000	500,000,001 until 10,000,000,000
Annual Revenue	300,000,001 until 2,500,000,000	2,500,000,001 until 50,000,000,000

Note: criteria below small business is categorized as micro business

Gerbang kertosusila as a strategic urban economic planning area is actually an official acronym of six cities in East Java province in Indonesia which consists of Gresik, Bangkalan, Mojokerto, Surabaya Sidoarjo, and Lamongan as main metropolitans. This acronym also corresponds with the definition of Surabaya Extended Metropolitan Area. It has an area of 5,925.843 km2, and at the 2010 survey had a population of 9,115,485.

Kurnia, Choudrie, Mahbubur, & Alzagoul [2] clarifies the role of e-commerce has the potential to accelerate the growth of small and medium enterprises (SMEs) in developing countries. However, the adoption of e-commerce by SMEs in developing countries have not yet dealt with the complexity systematically. Factors included in the study were the influence of organizational, industry, and national readiness and environmental pressure on the adoption of diverse e-commerce technologies. Results of the study showed a significant effect of environmental stress on the adoption of various technologies e-commerce, the readiness of national organizations and show the influences that vary for different technologies.

A study by Lee & Lee [3] indicates that community service quality has a positive direct effect on open-source ERP use. Open-source ERP quality has a direct positive effect on user satisfaction, which in turn has a positive effect on individual net benefits. In addition, it also positively affects organizational net benefit. Hence, implementers using open-source ERP need to take the community service quality

identified in the study into account when implementing open-source ERP.

The Association of Southeast Asian Nations (ASEAN), established on 8 August 1967, aimed to accelerate the member countries' economic growth, social progress and cultural development by collaborating more effectively through new and simpler policies that benefit their citizens while maintaining peace and order. The ASEAN Economy Community (AEC) is the member countries; including Indonesia. Indonesia is open to both regional and global economies opportunities, in which since 2015 Indonesia has entered the AEC to focus on politics and security, social culture and economy.

Entering the AEC has benefits as well as challenges for Indonesian SMEs. Facing the AEC means that Indonesia is open to a higher level of competition. Whereas Indonesian SMEs currently lack financing in terms of capital, government support, information and technological support in order to meet international standard and to compete in the AEC [4]. In addition, previous studies also mentioned that SMEs in the AEC are facing challenges such as low productivity, lack of managerial capabilities, and heavy regulatory burden explained by Wan as cited in [5].

This paper is organized as follows: Section 2 discusses the existing theory in Technology Adoption. In Section 3, we will discuss the methodology for conducting the research. In Section 4, we propose a theoretical model, formulate hypothesis, analyze and compare the existing and proposed theoretical model for Information Systems adoption by SMEs. Section 5 we test and modify the model to achieve fitness, subsequently in Section 6 we discuss the result findings. Section 7 will conclude this study.

Basic terminologies, model, and frameworks used in this study will be discussed first, followed by several previous studies related to the adoption of Information Systems by SMEs. Previous studies were articles chosen which closely related to variables and relationships as the basis of theoretical model formulation found in section 4. Ghobakhloo & Tang [6] study shows that the determinants of IS success among SMEs are not limited to the technological factors identified in the classic DeLone and McLean IS success model. Specifically, the study found that IS success among SMEs is highly determined by organizational and environmental determinants. The study has observed that the involvement of both top management and employees in different stages of IS implementation is crucial and IS success among SMEs requires internal and external support. Hence, the proposed model for this study will take advantage both Technology-Organization-Environment (TOE) framework and Technology Acceptance Model (TAM) as explained in detail along with several previous studies associated with TOE and TAM below.

A. Technology-Organization-Environment (TOE)

The Technology-Organization-Environment (TOE) Framework was developed by Tornatzky & Fleischer [7] as a framework used to examine the level of various IS or IT adoption within firms' products and services [8]. The model includes three main contexts namely technological, organizational and environmental. This makes the model advantageous over others that study technology adoption, the use of technology, and technology innovation value creation [9].

Technological context describes both the existing technologies in use and new technologies relevant to the firm. Organizational context refers to descriptive measures about the organization such as scope, size, and the amount of slack resources available internally. Environmental context is the arena in which a firm conducts its business, its industry, competitors, and dealings with government. The TOE framework was found to provide consistent empirical support in a number of IS domains including EC adoption among SMEs [10].

B. Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) has been broadly accepted model for understanding the adoption and usage process of IT. The model explains the variance of behavioral intention (BI) of users related to the adoption and usage of Information Technology (IT) across a broad context [11]. TAM is used to predict user's IT acceptance and usage on the job and to explain the determinants of the acceptance. TAM explains the relationship among the user's IT acceptance, adoption, and afterwards the user's Behavioral Intention of IT usage [12].

The primary determinants of the TAM are Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). This model suggests that PEOU influences PU which has been proven by repeated testing of TAM. The result showed these two variables have 40 percent of the variance within individuals' intention to use and the following implication of IT [13]. TAM is also an intension-based model that establishes intention to implement technology is a good indicator of its actual usage [14]. The user's BI is affected by both PU and PEOU, while PU is affected by PEOU. The user's attitudes and intentions in implementing a technology system are shaped by PU and PEOU [15]. Only when users believe that using a particular technology can improve their business, they are willing to adopt the technology. Thus usefulness is the key indicator of technology adoption [16]. TAM has certain limitations as one of the earliest technology adoption model, which in some studies on the model shows to have resulted in conflicting findings and thus have led to confusions. TAM was also suspected as an illusion of accumulated tradition, technological determinism and techno-centric predictions implying that technology, rather than individuals, determines organization's structure and behavior. The integration of the constructs of TAM and TOE frameworks ensures social and behavioral constructivism are brought up to convey both human and non-human factors into the consideration of the model [17].

C. Previous Studies

Gangwar, Date, & Raoot [11] made a review on IT adoption based on insights from recent available technologies. The review of literature was selected regarding IT adoption within organizations in order to comprehend integrated models for technology adoption needs. The research also identified main parameters of firm-level technology adoption to TAM model and TOE framework. From the integration, predictive power of the models was intended to be improved. The research accessed popular databases from the year 2000 to 2012 of recent technology adoption, namely, e-commerce, ERP, RFID, EDI, and knowledge management. TAM model and TOE framework were used to review those studies collected from the databases in order to identify relevant set of organization

technology adoption variables. The reviewing process started from selection of keywords, searching published articles in the databases, making choice for relevant papers, identifying IT adoption models at organizational level, selecting TAM model and TOE framework as most accepted models, developing an understanding on needs of integrating models, developing ways to integrate the two (TAM and TOE), finally, writing discussion and conclusion. The findings indicate that TAM model and its extended versions are proved to have significant capability to explain technological adoption, while TOE framework also proved to have similar significance in the matter.

Ghobakhloo, Arias-Aranda, & Benitez-Amado [10] examined the adoption of e-commerce application in SMEs using TOE framework which affects the decision to adopt e-commerce and extend its adoption, as well as adoption and non-adoption of different EC applications within small medium enterprises. Questionnaire-based survey was conducted to collect data from 235 managers and/or owners of manufacturing SMEs in Iran. Data gathered was analyzed using factorial analysis, while multiple and logistic regression analysis were used to analyze relevant hypotheses. The result shows that EC adoption within SMEs is affected by perceived relative advantage, perceived compatibility, CEO's innovativeness, information intensity, buyer/supplier pressure, support from technology vendors, and competition. Overall, the main finding of this study suggests more effective training to introduce and promote e-commerce adoption.

An Empirical Study of factors that influence e-commerce adoption or non-adoption in small medium business done by Pearson & Grandon [18] identified variables that differentiate between adopters and non-adopters of e-commerce. Managers/owners of SMEs were surveyed, with the boundary of business with less than 500 employees. The data collection process was gathering organizations that are considered as SME and contacted the managers through email for the survey. From 1069 organizations found, quite a few were willing to participate, thus in the 4-week period, a total of 100 surveys were collected. 94 out of 100 responses were used for statistical analysis; the other 6 responses were incomplete. The findings show the factors that differentiate between SME adopters and non-adopters of e-commerce ordered based on their level of significance are organizational readiness, perceived usefulness, compatibility, and external pressure. The findings also indicate that SMEs most receptive to adopting e-commerce have the financial and technological resources, see e-commerce as beneficial for their firms, and sense the external pressures to integrate e-commerce into their organization.

D. Important Variables

There were 10 important variables originated from previous studies are proposed as the antecedents of the adoption of information system by SMEs in Gerbang Kertasusila, which are organized into four categories: technology context (four variables); organization context (three variables), environment context (two variables), and technology adoption (a variable)

In technology context, this study uses 2 main factors from TAM, the Perceived Usefulness (PU) is the degree someone perceives a technology is useful in completing tasks and the Perceived Ease of Use (PEOU) is operationalized as the degree someone perceives a technology is not complicated to master [19]. Familiarity (FAM) is proposed as an antecedent to PEOU which translated to the concept of automaticity, understood as the absence of conscious thought in performing an act and to individuals' acts that become habits which are carried out spontaneously [20]. Perceived Technology Risk (PTR) is associated with the possibility of an individual experiencing an economic loss or a loss of security or privacy as a result of adopting technology beyond their control [20].

Organization context introduces Owner's ICT Knowledge & Innovativeness (OIKI), Organizational Support (OS), and Managerial Productivity (MP) as the dominant factors. Owner's ICT knowledge is known to help facilitate and speed up the adoption of Information Systems. Greater knowledge of SME owners will reduce the degree of uncertainty entangled with IS adoption which will result in lower risk of Information Systems adoption. Owner's ICT Knowledge & Innovativeness (OIKI) is defined as how knowledgeable and have eagerness to innovate his or her SME [10]. Organizational Support (OS) is Owner's perception of an operational support value of Information Systems. It includes support for decision making and cooperative partnerships in the industry. Managerial Productivity (MP) is best described as the degree an Information System provides better access to information, helps in the management of time, improves communication among managers, etc. Both Organization Support and Managerial Productivity were directly taken from Subramanian and Nosek's study as cited in [18].

The dominant factors of environmental context on Information Systems (IS) adoption are Competitive Pressure by trading partners, customers, and government. Published by Iacovou *et al*. as cited in [10]. Lin as cited in [21] confirmed competitive pressure as the pressure resulting from a threat of losing competitive advantage which turned out to be a strong determinant of IS strategies in organizations. Government policy is another critical environmental factor that tends to affect innovation diffusion. Dasgupta *et al*. as cited in [21] found that companies operating in an environment where government policies are restrictive have low IT adoption, on the other hand, if governments could encourage IS usage by establishing supportive business laws to protect e-business transactions and regulating the use of IT to make it a trustworthy business platform, then high IS adoption can be expected.

II. Research Design and Methodology

This article aims to develop theoretical knowledge with the practical effects of the use of information systems integrated by small business owners for the purpose of performance of the business. The population of this study is firm residing in the Gerbang Kertasusila area (East Java, Indonesia) and have experience in using information systems on a small scale. Only data from the small and medium-sized business were collected due to the nature that most micro businesses were not using information systems. This study is partly basic and partly applied research, cross-sectional in time, and use descriptive statistics for the preparation and analysis. Structural equation modeling (SEM) techniques were further used for developing theoretical models of the adoption of technology by small and medium-sized enterprises [22].

Questionnaire designed to measure variations in the theoretical models and other variables used to describe the personal characteristics of the respondents. An exact number of small and medium-sized enterprise in Gerbang Kertasusila

is currently unknown. However, the number is estimated around 100,000, hence minimum sample size for the study was determined using slovin formula as 398 to ensures accuracy and increase generalizability using a precision of 0.05 and 95 percent confidence interval.

It was impossible to get a sampling frame that can be used to randomly select samples due to the nature of SMEs in developing countries, hence a non-probability purposive judgmental sampling method was used. This method is appropriate indeed when the specific experience is needed from the samples [23]. Data collection from respondents was carried out in stages, especially through the personal contacts of researchers and access provided by the SME empowerment organizations.

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 presented throughout previous section. 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.

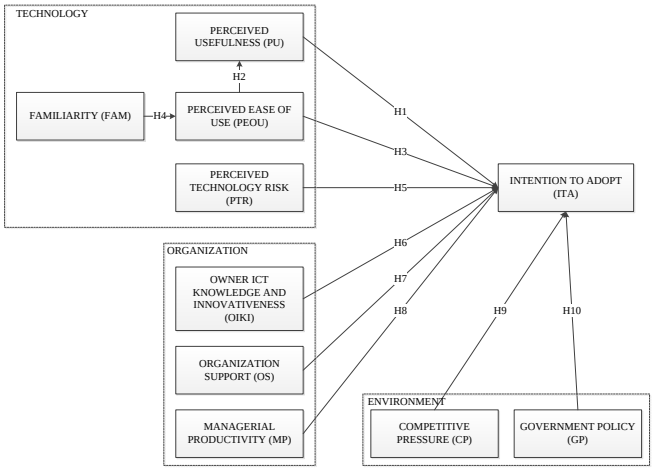

Figure 1: Proposed Theoretical Model.

In Figure 1, there are 10 variables including 7 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 Adopt (ITA) is the dependent variable. Each of the 10 variables is a latent variable measured with more than one indicator.

These 10 variables may be categorized into 3 groups which reflect the nature of the constructs represented by the variables. There are: 4 variables representing Technology Context concerned with how firm represented by owner perceive information systems adoption in the context of technology (Perceived Usefulness, Perceived Ease of Use, Familiarity, and Perceived Technology Risk); 4 variables representing organization context (Owner's ICT Knowledge & Innovativeness, Organization Support, and Managerial Productivity); and 2 variables associated with environment context (Competitive Pressure and Government Policy) all variables are hypothesized influencing SMEs intention to adopt Information Systems both direct and indirect. Table 3 below listed all hypotheses associated with the theoretical model in Figure 1.

Table 3
Research Hypotheses

Hypothesis	Reference
H1: Perceived Usefulness significantly affects Intention to Adopt	[11], [19]
H2: Perceived Ease of Use significantly affects Perceived Usefulness	[16], [19]
H3: Perceived Ease of Use significantly affects Intention to Adopt	[16], [19]
H4: Familiarity significantly affects Perceived Ease of Use	[24], [25]
H5: Perceived Technology Risk significantly affects Intention to Adopt	[24], [26], [27]
H6: Owner ICT Knowledge and Innovativeness significantly affects Intention to Adopt	[10], [28], [29]
H7: Organization Support significantly affects Intention to Adopt	Subramanian & Nosek as cited in [18]
H8: Managerial Productivity significantly affects Intention to Adopt	Subramanian & Nosek as cited in [18]
H9: Competitive Pressure significantly affects Intention to Adopt	[2], [10], [30], [31]
H10: Government Policy significantly affects Intention to Adopt	[9], [31]

Note: Level of significance is determined at a level of 0.05 or less.

Theoretical model proposed in figure 1 was constructed using latent variables which can be measured using two or more indicators. Each indicator is measured using 5 levels Likert scale developed in previous study referenced in Table 3 to improve validity and reliability of the measuring instrument. All instruments are identified as interval scale in analyses.

Table 3
List of Indicators Used to Measure Latent Variables

Variable (Label)	Type of Measure	Measuring Instrument
Perceived Usefulness (PU)	5 indicators: PU1, PU2, PU3, PU4, PU5	[11], [19]
Perceived Ease of Use (PEOU)	5 indicators: PEOU1, PEOU2, PEOU3, PEOU4, PEOU5	[16], [19]
Familiarity (FAM)	4 indicators: FAM1, FAM2, FAM3, FAM4	[24], [25]
Perceived Technology Risk (PTR)	6 indicators: PTR1, PTR2, PTR3, PTR4, PTR5, PTR6	[24], [26], [27]
Owner ICT Knowledge and Innovativeness (OIKI)	4 indicators: OIKI1, OIKI2, OIKI3, OIKI4	[10]
Organization Support (OS)	6 indicators: OS1, OS2, OS3, OS4, OS5, OS6	[18]
Managerial Productivity (MP)	6 indicators: MP1, MP2, MP3, MP4, MP5, MP6	[18]
Competitive Pressure (CP)	5 indicators: CP1, CP2, CP3, CP4, CP5	[6], [10], [31], [32]
Government Policy (GP)	4 indicators: GP1, GP2, GP3, GP4	[9], [31]
Intention to Adopt (ITA)	3 indicators: ITA1, ITA2, ITA3	[11], [19], [26]

Data were collected from 419 respondents, but only the ones filled by SME owners or managers were selected, leaving 384 questionnaires tabulated into SPSS worksheet. Twenty more samples among them were removed because they were found as outliers following the advice from Kline [22]. Total samples to be analyzed now becomes 364 which were considered adequate for this study.

Exploratory Factor Analysis was done using Principal Component Analysis to test the construct's discriminant and

convergent validity of the latent variables. Each variable was measured using a group of indicators with factor loadings of magnitude at least 0.4 and an associated eigenvalue of at least 1. The result shows five indicators were having significant cross-loading to other factors and were not measuring only its factor. The removed factors were: PTR2, OS5, OS6, CP1, CP5 due to the reasons mentioned earlier. Hence these five factors will not be included in further analysis.

The internal reliability of each variable was measured using Cronbach Alpha coefficients. A coefficient of 0.7 or above indicates good reliability [23]. The reliability test result shows all coefficients are all good except for Perceived Usefulness was slightly below 0.7 but considered still adequately reliable as shown in Table 2.

Respondents profile shows there were 215 males (59%) and 149 females (41%) spreading in 6 urban areas of Surabaya. The majority of respondents coming from Surabaya (29%) and Sidoarjo (26%), followed by more remote areas Gresik (19%), Mojokerto (14%), Bangkalan (6%) and Lamongan (6%). The largest age group of respondents was between 30-39 years old (53%), followed by 21-29 years old (30%). Those two age groups were the majority of respondents which indicates the productive age for becoming owner or manager of SMEs are between those two age groups. In terms of their experience in using Information Systems, 66% of respondents were testifying they have been using Information Systems between 1-5 years, which indicates they are not respondents who were computer illiterate. Furthermore, around 61% express their experience in online sales activity.

An interesting additional fact shows that 274 out of 364 respondents ever failed in starting-up their business at least once. This may open another opportunity for further study on the relationship between start-up failure and their further success.

Furthermore, the shaded cells shown in correlation table in Table 2 indicates significant correlation linked with hypothesized causal effect in Table 3. Perceived Technology Risk (PTR), Organization Support (OS), Managerial Productivity (MP), and Government Policy (GP) were shown to be statistically insignificant which may mean their hypothesized causal effect also insignificant. Furthermore, there were several significant correlations among model variable that are not in the hypothesis list that may suggest additional causal effects.

Table 2
Correlation Table

	PU	PEOU	PTR	FAM	OIKI	OS	MP	CP	GP
PU	1								
PEOU	**.290****	1							
PTR	.248**	.331**	1						
FAM	.072	**.416****	.231**	1					
OIKI	.156**	.351**	.302**	.233**	1				
OS	.389**	.402**	.177**	.297**	.149**	1			
MP	.387**	.356**	.196**	.229**	.216**	.571**	1		
CP	-.255**	-.097	-.079	-.092	-.041	-.004	-.027	1	
GP	-.003	.004	.016	.005	-.039	.007	.036	.043	1
ITA	**.249****	**.133***	.029	.051	**.162****	-.050	-.026	**-.708****	-.026

* indicates the correlation is significant at the 0.05 level (2-tailed).
** indicates the correlation is significant at the 0.01 level (2-tailed).
Note: Shaded cells point out significant correlations in hypothesized causal effects in Table 3.

III. Results and Discussion

Result findings of this study were done by analysing the proposed theoretical model and measure the goodness of fit. Modifications to the proposed theoretical model may be done to increase the goodness of fit value. Subsequently, discussion about significant effect caused by determinants of Intention to Adopt (ITA) as listed in Table 3 will be done as guidance for formulating policy in technology adoption. Generally, factors with significant large effect will be prioritized in implementing managerial implication.

A. Result Findings

The result of SEM analysis of theoretical model was done using IBM AMOS software version 21. The result of SEM analysis is shown in Figure 3. In Figure 3 and throughout the consequent results of effects, the following agreement is used: the unstandardized effect is shown first with the symbol *, **, or *** to point out statistical significance at a level of 0.05, 0.01, or 0.001, respectively, and no symbol indicates that the effect is statistically insignificant at a level of 0.05 or less. Inside parentheses, the standardized effect is shown and classified as: small (S) if its magnitude is less than 0.1; medium (M) if between 0.1 and 0.49; or large (L) if larger than or equal to 0.5 [33].

Model	N	NC (χ^2/df)	RMR	GFI	AGFI	NFI	IFI	CFI	RMSEA
Theoretical Model	364	12.918	0.023	0.923	0.698	0.784	0.797	0.789	0.181
			R^2: Perceived Ease of Use (0.173), Perceived Usefulness (0.084), Intention to Adopt (0.532)						
Note: R^2 is the proportion of the variance of each endogenous variable that is explained by the variables affecting it.									

Figure 2: Fit Statistics for the Theoretical Model

The model fit statistics for the theoretical model in Figure 3 are displayed in Figure 2 above and it shows modifications to achieve Goodness of Fit are needed. Modification to proposed theoretical model was done by removing insignificant and small causal effect in Figure 3. Additionally, plausible significant correlation found in Table 2 may be added as an optional causal effect. The Specification Search feature available in IBM AMOS software enables the iteration of several possible model modifications. Based on the advice from [34], model modification with smallest Normed Chi-Square (NC) was proposed as the final model shown in Figure 4.

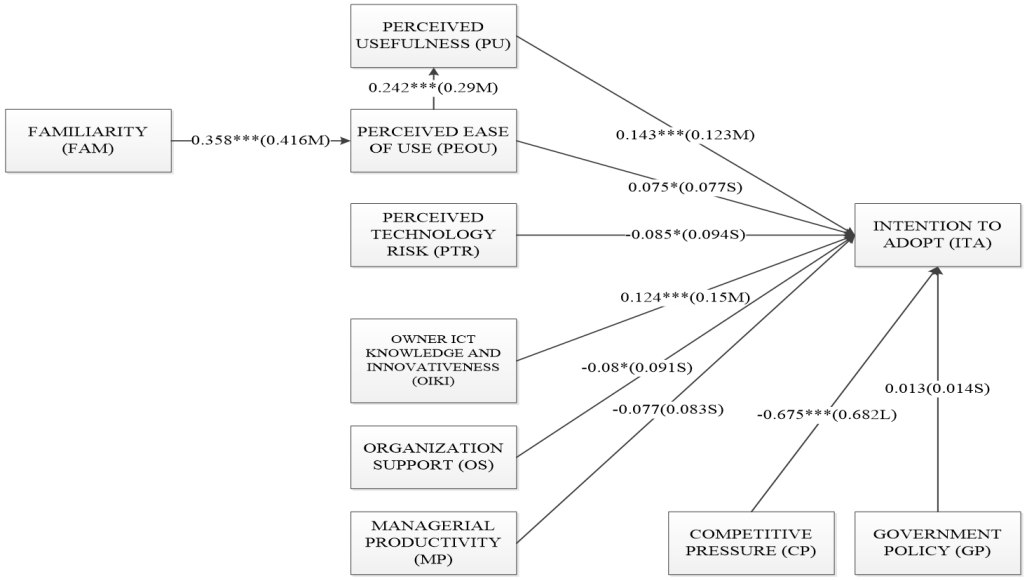

Figure 3: Total effects in the Theoretical Mode

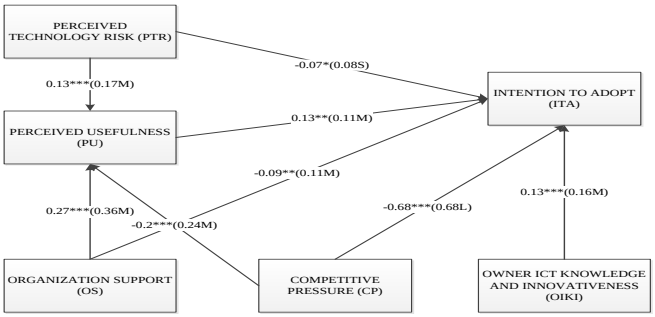

Figure 4: Total effects in the Final Model.

Model	N	NC (χ^2/df)	RMR	GFI	AGFI	NFI	IFI	CFI	RMSEA
Modified Model	364	0.988	0.002	0.999	0.981	0.998	0.999	0.999	0.000
			R^2: Perceived Usefulness (0.242), Intention to Adopt (0.536)						
Note: R^2 is the proportion of the variance of each endogenous variable that is explained by the variables affecting it.									

Figure 5: Fit statistics for the final model

The fit statistics for the final model are displayed in Figure 5 above and it can be seen the Goodness of Fit has improved and showed a very good fit compared to the proposed theoretical model in figure 2. In addition, a reasonable proportion of the variance of endogenous variable Perceived Usefulness (PU) and Intention to Adopt (ITA) are explained by their causes, 24.2% and 53.6% respectively.

B. Discussion

This study was conducted with the intention of providing further understanding regarding the dominant factors of SMEs intention to adopt Information Systems in Gerbang Kertosusila. To accomplish this purpose, a holistic approach of factors influencing Information Systems adoption has to be chosen where the antecedents of Intention to Adopt were not only within the context of technology but also organization and environment context. Therefore, a combination of Technology-Organization-Environment framework and Technology Acceptance Model was used based on the earlier study by Gangwar *et al*. [11].

Based on the observation of total effects shown in Figure 4, empirical result shows that Perceived Technology Risk (PTR) has a direct negative but small effect towards Intention to Adopt (ITA), Perceived Usefulness (PU) has a direct positive medium effect to Intention to Adopt (ITA), Organization Support (OS) has a direct negative medium effect to Intention to Adopt (ITA), Owner ICT Knowledge and Innovativeness (OIKI) has direct positive medium effect to Intention to Adopt (ITA), and remarkably Competitive Pressure (CP) has a direct negative large effect towards Intention to Adopt (ITA).

Two dominant determinants of Intention to Adopt (ITA) in this study were Competitive Pressure (CP) and Owner ICT Knowledge and Innovativeness (OIKI). A study by Stockdale & Standing [35] supports the idea of how SMEs are generally identified to have barriers, such as lack of resources and knowledge, the skill levels of business operators, lack of trust in the IT industry. A further barrier is the lack of recognition of the potential to improve business appropriate to the effort and costs of adoption and lack of understanding of the realizable benefits. The explanation behind these two variables was trivial. In the context of developing countries like Indonesia, usually the focus of SMEs is more on the survival due to the big population of people who were living and starting up business. Associating the facts published by Stockdale & Standing [35] this study confirms the role of both Competitive Pressure (CP) and Owner ICT Knowledge and Innovativeness (OIKI) towards Intention to Adopt (ITA).

IV. CONCLUSIONS

This study examines the determinants of the use of information systems by SMEs that want to expand and increase their business performance. The research method for this study is to test and develop a theoretical model derived from the results of previous studies. From a theoretical perspective research shows that Perceived Usefulness (PU), Perceived Technology Risk (PTR), Owner ICT Knowledge and Innovativeness (OIKI), and Competitive Pressure (CP) are important antecedents for SMEs intentions in adopting the Information Systems, among them ICT Knowledge and Innovativeness (OIKI), and Competitive Pressure (CP) were the factors that need more attention. From the comparison with findings from previous studies have shown that these

studies support the majority of their findings but also to identify important effects not previously reported about the indirect effects of the Perceived Technology Risk (PTR), Organization Support (OS), and Competitive Pressure (CP) to the Intention to Adopt (ITA).

In the light of the theory and empirical findings seem that SMEs, consultants, IT vendors and related parties who wish to apply information systems face significant challenges. In particular, not every SMEs who want to adopt Information Systems has the same level of understanding in terms of human resource readiness and understanding of the dynamics of their environment.

In order to increase the external validity of these results, especially the new findings, there is a need for repeated research especially considering the fact that almost half of the respondents (42 percent) a high school education or below, which may introduce bias in answering some of the questions in the questionnaire. The subsequent study may seek to target more people with higher education level to be able to answer questions related to complex variables such as Perceived Usefulness (PU), Perceived Ease of Use (PEOU), and Perceived Technology Risk (PTR) which showed significant effect in the past studies. Furthermore, this study does not place limits on the difference between a sophisticated information system with full-featured than the system of simple information that just acts as transaction records without analysis capabilities and automation. Future studies may be proposed by considering both types of Information Systems which may need to be separate analysis to get a more specific result.

ACKNOWLEDGMENT

This article publication and it supporting materials were made possible by research grant program from Indonesian Ministry of Research, Technology, and Higher Education.

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