Integration of the Technology Readiness and Adoption Models for Assessing IT Use among SMEs in Indonesia

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Abstract: In developing a company, the interaction between the customer and the company is very important in relation to the development of a company. The use of technology-based systems is certainly very much needed and service to customers. In this case, the company must improve technology-based system services so that customers can easily obtain information or other knowledge from the company. Building technology-based systems require the readiness to operate, develop and improve technology. This article will begin with how to develop the technology readiness of an SME company so that it can undergo the activities of the company well, and will end with a practical discussion whether the application of IT technology in SME companies require deeper development or just simply there. The aim of the research is to deepen our understanding of the role of technology in its use in SME companies in terms of marketing and serving customers.

1 INTRODUCTION

To be able to survive in the development of the company, in this case, new economies, belonging SMEs, are encouraged to adopt a technology development. Businesses that do not adopt the philosophy and practice the application of information technology will be left behind by users. Furthermore, stated by Jerry Jesionowski, President of the US National Producers Association, in the wall street journal that small companies need to enter into the application of IT technology or they will be closed from an important part of the market (Shah Alam et al., 2011).

For the success and improvement of a country's economy and social development, entrepreneurship plays a major role that contributes to economic improvement. Entrepreneurial activity is a precondition for the success of economic growth, development, job creation, social welfare and political stability(Eggers et al., 2013, Filser and Eggers, 2014).

The development of small and medium enterprises (SMEs) is very important in developing countries for the role of society in terms of economic improvement; improving the distribution of income and sales, productivity, efficiency and structure and economic foundations during the economic downturn (Abdullah et al., 2011). In this case Indonesia, the role

of entrepreneurship is very important to make Indonesia become a developing country (Nugroho, 2015).

Along with increasing universal competitiveness in the market and economic region, it is now SMEs must develop themselves in order to have and have strong competition. SME business development has been well developed and highly regarded by the Government of the Republic of Indonesia as stated in the Long-term Development Plan (RPJP) 2005 - 2025, as a contribution to the greater economic development and competitive spirit . To achieve this, it is very important to reinforce and develop SMEs, and one of its development strategies is through the application and development of innovations and the utilization of technology. At the application level of technology, especially the application of information technology is very low, which is about 30 to 40% (2011).

Implementation the application of information technology can be intended as the use of technology-based systems to monitor information at all levels of organizations and business. The positive influence utilization of information technology applications for SMEs is a valuable performance improvement in the marketing division, communication, and network division, as well as on the planning division of resources, so as to improve financial management and all of operation achievement if information technology can be utilized properly (Fathian et al.,

3107

2008). From the results of the research that will be carried out and already mentioned, there will be two questions that will be given to guide the implementation of research on the exploration of this research namely.

Q1: How to understand the connection between technology readiness and technology adoption constructs?

Q2: How to develop the technology readiness and technology adoption models in terms of IT use among SMEs in Indonesia?

This paper is divided into five parts. The first part will explain the research is research program. Then followed by a literature review, research method, results and discussion, and conclusions in the second, third, fourth, and fifth sections respectively

2 LITERATURE REVIEW

A preliminary studies that have been done by Parasuraman (Parasuraman, 2000), was a study that explains how the level of readiness of users to the implementation of technology in an organization. Users are the level of maturity of a person who must have knowledge of information technology so it is easy to digest the application system that will be implemented. At the same time, the utility of a technology is the ultimate goal of the user to master the information communication and technology (A. Parasuraman 2014).

Parasuraman and Colby explain technological readiness as a tendency for people to get together and use new technologies to achieve goals at home and at work, TRI (Technology Readiness Index) developed by Parasuraman to measure a person's beliefs and thoughts in general about the application of technology. Someone thinking about the application of technology can be more positive right, that was optimism in speaking of application technology and also a tendency to gain discomfort and skepticism over the application of technology. That's why there are four dimensions in technology readiness: optimism, innovation, discomfort, and insecurity arise (Parasuraman and Colby, 2015, Parasuraman, 2000).

The first two measure of readiness technology are optimism and innovation benefactor that can update the readiness towards the use of technology, while for the rest that is discomfort and insecurity are considered as an inhibitor that can suppress the degree of readiness technology (Colby, 2016).

Parasuraman and Colby stressing that the readiness of applying a technology is a measurement

tool to provide perceptions or thoughts about the use of technology, not as a measure of one's ability or capacity to use technology. Based on the level of technology application readiness scores, users are classified into five sections: explorer, pioneer, skeptic, paranoids, and sluggish. Cruiser type has the top score in the benefactor dimension (optimism, innovative) and low score in the dimension of the inhibitor (discomfort, insecurity) (Parasuraman and Colby, 2015).

Explorers are easily enamored to new technology and become the first group to try it out. Meanwhile, on the other side, sluggish is the last group type to adopt new technology and has the top score on the dimensions of the inhibitor and the low score on the benefactor dimension. Meanwhile, three things another is pioneers, skeptics, paranoids have a more complex assumption of technology. Pioneers have high optimism and innovation like exploration, but at the same time, they can be easy stop using if they get any discomfort (Parasuraman and Colby, 2015, A. Parasuraman 2014).

Sceptics have low encouragement to use technology but they have too low obstacle rates so they need to be convinced about the utility of technology. Study on Parasuraman and Colby show that explorers and pioneer types incline to use new technologies earlier than others, the paranoid, technology is indeed interesting but they also take into consideration the risks factor, this indicated by a high level of discomfort (Rojas-Méndez et al., 2017).

Lucchetti and Sterlacchini who have studied several cases of SMEs that occurred in Italy and they found that attitude towards the adoption of Information and Communication Technology (ICT). The results of their research revealed that effective adoption and use of ICT was differentiated, depending on internal funds and technological skills the company that has been done and utilized, on the one hand, and the nature of the business, on the other (Lucchetti and Sterlacchini, 2004)

Harindranath et al. also found and tried to explain the reasons for the low use of ICT by UK SMEs. According to their findings, one of the main concerns of UK managers was the fear of limited use and obsolescence of an IT that will, moreover, require frequent updates. This happens because the unpreparedness of the user and the technology that will be used is an important problem in SMEs (Harindranath et al., 2008).

3 RESEARCH METHODS

The study of model development was conducted into four main stages (Fig. 1). First, the preliminary study (1) was carried out by conducting initial preparations, namely the study of literature and preparing the model to be developed including looking at the type of organization, and social aspects of the IS study, for example, usefulness, satisfaction, and readiness (Shah Alam et al., 2011, Eggers et al., 2013, Nugroho, 2015, Parasuraman, 2000, A. Parasuraman 2014, Rojas-Méndez et al., 2017). In addition to reviewing the literature, it was also carried out to formulate the research program to be conducted.
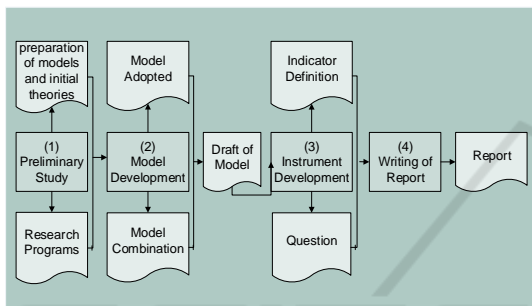

Figure 1: Research procedure

Then the second stage was modeling by adopting and combining the models that have been developed (2) which produce a draft model.

Third, the results of the draft model, then produce instrument development. At this stage, the researchers define indicators in their development, and then develop questions from each item measurement considering the study context.

Finally, the implementation of research instrument development was then reported. As explained in this paper, the design of the proposed model consists of two main parts, namely the self-developed model and the question list question (Table 1).

Table 1: List of the models and theories

The Models and Theories	References
Theory of information processing	(Davis and Yen, 1998)

The Models and Theories	References
Readiness model technology	(Parasuraman and Colby, 2015, Parasuraman, 2000, A. Parasuraman 2014, Rojas-Méndez et al., 2017)

IT Adoption	(Hanclova et al., 2015, Gangwar et al., 2014)
Professional and casual models of a model development	(Subiyakto and Ahlan, 2014, Subiyakto, 2017, Subiyakto et al., 2015)

Following the assumptions developed, Parasuraman and Colby's technology readiness model (Parasuraman and Colby, 2015) was later adopted, combined, and adapted in the second stage (2). A draft model was obtained which was then developed at the level of research instruments in the operational phase (3). Finally, the research model developed and the data collection instruments are then proposed in the reporting phase, in terms of conducting research.

4 RESULT AND DISCUSSION

The resulting model is a combination of the Parasuraman readiness model (Parasuraman and Colby, 2015), the Chatzoglou adoption model (Chatzoglou and Chatzoudes, 2016) and Zhu et al (Zhu et al., 2006) . Figure 2 shows the proposed model with eleven variables and 30 relational hypotheses.
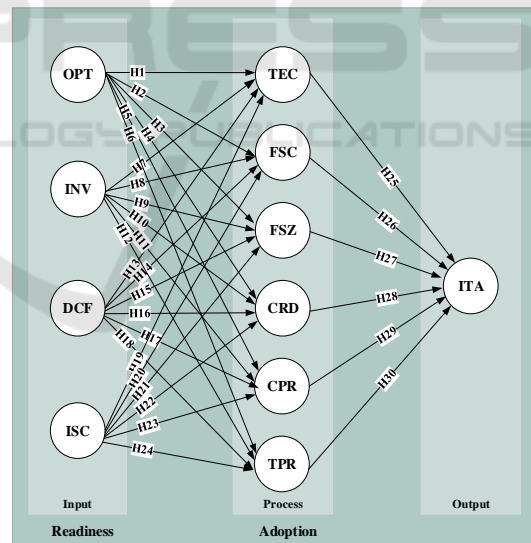

Figure 2: The Proposed model

Readiness, adoption, and adjustment of both models are carried out based on input process output logic (IPO) theory of information processing (Anfara Jr and Mertz, 2014) and process logic and causal concepts of development model (Belout and Gauvreau, 2004). The authors hypothesize that technology readiness model variables (Parasuraman and Colby, 2015) (i.e., [OPT] Optimism, [INV]

innovation, discomfort [DCF], and insecurity [ISC]) influence adoption in Chatzoglou SMEs (Chatzoglou and Chatzoudes, 2016) and Zhu et al. (Zhu et al., 2006) (i.e., Technology Competence [TEC], Firm Scope [FSC], Firm Size [FSZ], Customer Readiness [CRD], Competitive Pressure [CPR], Lack of Trading Partner Readiness (TPR), and IT Adoption [ITA]).

The level of an organization's technology is an important element that can influence the adoption model and implementation of IS / IT innovation. According to Zhu et al. (Zhu et al., 2006) the level of a technology is strongly influenced by technological competencies and employee technical skills and suggested that technology competencies, firm scope, firm size, consumer readiness, competitive pressure and lack of readiness trading partners used to assess IT Usage among SMEs in Indonesia.

Table 2: List of the variables (Chatzoglou and Chatzoudes, 2016, Parasuraman and Colby, 2015, Zhu et al., 2006)

Codes	Names	Definitions
OPT	Optimism	The level of confidence in believing that technology adoption might occur.
INV	Innovation	The level of confidence of seeing that adoption technology is part of a system.
DCF	Discomfort	The level of confidence in knowing that technology is uncomfortable.
ISC	Insecurity	The level of confidence of distrust that technology adoption can be properly implemented and concerns about potentially harmful consequences
TEC	Technology Competence	The level of confidence of technologies (hardware) that enable an organization to develop processes
FSC	Firm Scope	The level of confidence of horizontal expansion of an enterprise's operations
FSZ	Firm Size	The level confidence of which to a larger company may have a competitive advantage over its smaller counterparts
CRD	Customer Readiness	The level of confidence of a combination of consumer willingness and Internet penetration
CPR	Competitive Pressure	The level of confidence to affect the industry structure, and leverage new ways to outperform rivals, thus changing the competitive environment
TPR	Lack of Trading Partner Readiness	The level confidence of status of its trading partners along the value chain, since for an electronic trade to take place, it is necessary that all trading partners adopt compatible electronic trading systems
ITA	IT Adoption	The level of confidence to which a company adopts a technology for the development of its industry

Table 3: List of the indicators (Chatzoglou and Chatzoudes, 2016, Parasuraman and Colby, 2015, Zhu et al., 2006)

Codes	Names	Definitions
OPT1	Easiness	The level connected to system achievement to get freedom from obstacles, difficulties, and problems
OPT2	Connectivity	The level connected to the system achievement so that it is connected successfully with the existing system
OPT3	Efficiency	The level connected to the system achievement to get output with comparison of the resources needed to achieve output
OPT4	Effectiveness	The level connected to the ability of the system to reach its utilization targets
OPT5	Productivity	The level connected to the system support to produce output compared to the revenue needed to producing output
INV1	Solve Problem	The level connected to the system support for make solutions to subject
INV2	Independency	The level connected to the system able to support user free from the influences
INV3	Challenges	The level connected to the system support to successfully repair or get things in difficult situations or conditions
INV4	Stimulation	The level connected to the system support to reach something that is and is developing, or enhanced
INV5	Strength of Competition	The level connected to the system capabilities to support users so that they can be more successful than their competitors
DCF1	Complication	The level connected to the system view that is confusing and difficult to understand and modify
DCF2	Difficulty	The level connected to the system conditions that cannot be easily operated or used
DCF3	Dependence	The level connected to the system conditions that require other parties to run the system
DCF4	Lack of Support	The level connected to a system that has no source, or is sufficient, from the needs in its operation
DCF5	Incompatibility	The level connected to the circumstances where there is a discrepancy
ISC1	Failure	The level connected to the circumstances where unpleasant or dangerous systems can occur
ISC2	Threat	The level connected to the system situation that could cause harm or danger
ISC3	Reducing Interaction	The level connected to the application of a system that makes human relations less in size, quantity, and interest
ISC4	Distraction	The level connected to use the system to get attention and avoid people thinking about something else
ISC5	Incredulity	The level connected the system is doubtful of its use
TEC1	Technologies	The level connected to hardware and software devices in carrying out work processes so that it is easy to implement
TEC2	Internet	The level connected to this type of work in the context of the use of technology
TEC3	Intranet	The level connected to the relationship between users and other users in a work environment

TEC4	E-mail	The level connected to correspondence using electronic mail so that it is easy to reach
TEC5	Tools	The level connected to use of the device so that it is easy to connect to each other and easy to use
FSC1	Reaches	The level connected to business reach that can be achieved in terms of marketing
FSC2	Variation	The level connected to types of work that can be done according to capacity
FSC3	Establishment	The level connected to Strengths and weaknesses of the firm being developed
FSC4	Operationalization	The level connected to ongoing production activities
FSC5	Geographic's	The level connected to the state of the work atmosphere in the process activity
FSZ1	Data	The level connected to seeing the amount of data used based on the size of the firm
FSZ2	Clustering	The level connected of a small group of people or things that are very close to each other
FSZ3	Employees	The level connected to a number of employees used
FSZ4	Classified	The level connected to a category of industrial types produced by looking at the magnitude of activity
FSZ5	Model	The level connected to a model used in the firm is adjusted to the number of employees
CRD1	Strategic	The level connected to carefully planned to get the desired results
CRD2	Consumer	The level connected to someone who buys and uses goods and services
CRD3	Penetration	The level connected to companies or teams are against each other before entering the computer era
CRD4	Industry	The level connected to people and organizations involved in producing goods
CRD5	Driver	The level connected to something that makes important things happen, for example in an organization or economy
CPR1	Competitive	The level connected to companies or teams are against each other
CPR2	Pressure	The level connected to attempts to persuade, thread, or force someone to do something
CPR3	Structure	The level connected to a company's strengths in dealing with the times
CPR4	Analysis	The level connected to the process of studying or examining something in detail in order to understand it or explain it
CPR5	Integration	The process of becoming involved completely in its activities
TPR1	Beyond	The level connected to a company must have a far-sighted thinking to build together
TPR2	Supply Chain	The level connected to the process involved in supplying a product to someone
TPR3	Compatible	The level connected to ideas or systems that are compatible can exist together
TPR4	Business partner	The level connected of relationships that are caring for the

		development of the organization together
TPR5	Significant	The level connected to company relationships
ITA1	Adoption	The level connected to decide to use or accept a particular idea, method or attitude
ITA2	Facilitators	The level connected to helps a person or organization to find a solution to a problem
ITA3	Coefficient	The level connected of a number written before a variable.
ITA4	Framework	The level connected to a set of principles, ideas etc that you use when you are forming your decisions and judgments
ITA5	Adaptation	The level connected to the process of changing something so that it can be used for a different purpose

In terms of model development (Subiyakto et al., 2015), this study will provide two main points, namely, the confidence and validity of the problem. First, the implementation of this research was carried out transparently and clearly, as explained in the research method section. Readers can pay attention to how the authors use the assumption of model readiness development (Parasuraman and Colby, 2015) and adoption (Chatzoglou and Chatzoudes, 2016, Zhu et al., 2006, Tarutė and Gatautis, 2014), combine the two models, and adjust variables, indicators, and questions, in terms of the construct of system utilization. This can be noted with certainty that the clarity of the model of the study development process can show the point of confidence for the development of the model. Second, in addition to utilizing assumptions, combinations and processes of adaptation, readers can also pay attention to how questions can be taken upside down referring to indicators, variables, and assumptions. The above variable is defined as the state where the level of readiness and adoption model developed will express it characteristics in terms of assessing IT use among SMEs in Indonesia

In short, it is clear that the transparency of the model development process and the model rationality developed can be two contributions from this research.

Table 4: List of the questionnaire statements

Codes	Statements of the questionnaires
OPT1	System is free from obstacles, difficulties, and problems
OPT2	System can be connected success with the existing system
OPT3	System runs in within limited resources
Codes	Statements of the questionnaires
OPT4	System runs in within the maximum output
OPT5	System can be run in a measurable and effective manner
INV1	System is a problem-solving tool for users

INV2	System helps users to be free from the influences
INV3	System supports users for reaching goals in a difficult condition
INV4	System encourages users for reaching goals
INV5	System supports users to be more successful than their competitors
DCF1	System confuses users in using it
DCF2	System cannot be used simply
DCF3	System cannot be used freely
DCF4	System is used without full operating system support
DCF5	System is not in accordance with the development plan
ISC1	System was not successfully operated in accordance with its development planning
ISC2	System is in a condition that can cause harm or danger
ISC3	System will make users less in association
ISC4	System makes users not focus on their interests
ISC5	System is no doubt used for technology improvement and development
TEC1	Systems and technologies used are easy to implement
TEC2	Ease of using the internet as a work facility
TEC3	System used in internal supports work activities
TEC4	System support in the case of correspondence so as to facilitate work
TEC5	System is the use of tools that are very supportive in activities
FSC1	System can reach and can be relied upon to support marketing
FSC2	System is able to maximize work well according to capacity
FSC3	System is not easy to error if the data capacity is increasing
FSC4	System is able to be connected to all units so that the activity goes well
FSC5	System is that the device can work well despite the transfer of labor
FSZ1	System is capable of having resources and can facilitate adoption
FSZ2	System is what can increase the level of economy and large income
FSZ3	System is something that can bear the risk in the initial stages of business
FSZ4	System is able to create a model by putting forward results in accordance with the number of employees
FSZ5	System is able to adopt technology with trading partners so that it can be integrated
Codes	Statements of the questionnaires
CRD1	System is able to connect consumers with existing technology
CRD2	System is what can translate technological innovation into a profit
CRD3	System is the readiness of consumers for technology penetration
CRD4	System is to provide improvements to the technological process developed
CRD5	System is the development in the field of facilities to facilitate consumers in accessing technology
CPR1	System is capable of changing competition rules so that they are more competitive in competition

CPR2	System is capable of utilizing new ways of competitive competition
CPR3	System is what can affect the structure of the industry to be more efficient
CPR4	System is to provide new means to increase competition through technological developments
CPR5	System is able to facilitate customers so that they can increase company profits
TPR1	System is one that requires tighter integration with customers and suppliers
TPR2	System is that which facilitates the supply chain in the company
TPR3	System is able to produce data analysis properly so that decisions taken are correct and correct
TPR4	System is able to connect all trading partners by adopting a compatible electronic trading system
TPR5	System is able to provide Internet-enabled services for each other
ITA1	System is the development of technology so that it can follow the method that has been used
ITA2	System is technology development that can solve problems based on available data
ITA3	System is able to repair and read customer numerical data based on technology readiness
ITA4	System is capable of solving problems and providing ideas for technological development and decision making
ITA5	System is designed according to the needs and development of the company

5 CONCLUSIONS

This study will improve understanding of how the link between readiness and IT adoption factors in terms of development in SMEs and how to integrate readiness models and adoption IT models in terms of system use and development. The authors propose a combination model by integrating four readiness model variables and six variables from the adoption IT model, in terms of SME development. In addition to the process of developing clarity, a coherent relationship between models, variables, indicators, and questions from each indicator is also shown by the author. In regard to the limitations of the study around the understanding, assumptions, and perspective issues of the author; In addition to the limitations recommended to be a consideration point for future work, the proposed model and its instruments can also be recommended to proceed to the examination and development stage.

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