Assessing the Information Technology Governance Trust Using Readiness And Usability Models: A Model Development Study

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***ABSTRACT*— Information Technology Governance (ITG) is important for schools and stakeholders to manage rights and responsibilities for decision-making processes. Institutional policies, systems, and users are the basic components of the proposed ITG model. The success of ITG is a primary concept in this topic. It occurs when users have a good level of trust in IT. The success of ITG implementation depends on the IT knowledge. There are several dimensions to measure in ITG implementation: readiness model, usability model, and input-process-output model. The researchers included level of trust into the input-process-output model, thus a new model of ITG implementation is obtained. Instead of using empirical evidence, this study develops the ITG implementation model by using theories from previous studies. The model is proposed and developed by incorporating the Nielsen usability model and the Parasuraman readiness model into the input-process-output model. The result is a model of IT governance trust that consists of 9 variables in 23 influential relationships. This study also shows coherent aspects of the process model, the causal model, and the questionnaire of each indicator.**

Keywords— IT Governance; combination model; usability; readiness; IPO model

I. INTRODUCTION

In principle, information technology (IT) has become an enabler for organizations to achieve their goals [1]. Satia argues that the use of computers play a significant role in education so that it is required for students and teachers [2]. As shown by Ling, IT is useful for users from the risk of use and perceived technology [3]. Koufaris argues that the IT ease of use begins with understanding the website in order to reduce asymmetric information, process, and information behavior as well as to increase the online trust level [4]. Bianchi argues that IT users should have beneficial goals when implementing IT for work performance improvement [5].

Subiyakto argues that there are two indications of successful information system (IS) implementation [6]. They are the effectiveness and efficiency of task completion as well as business processes. According to Lee, trust in ICT is the accumulation of the level of trust present in every use of IT [7].

Dahiya sees that ICT development potentially gives positive impacts on public services [8]. Satia argues that, for a business to be carried out by means of communication, the development of business infrastructure cannot be separated from IT development [2].

Jogiyanto [9] argues that an IT system strategy is built and applied based on IT system functionality, efficiency, memory, satisfaction, and readiness [10]. Godoe argues that understanding the adoption of technology readiness is important [10]. It is interesting to continue the ITG study through a new ITG model. Some variable constructs are interrelated, and some other are combined. It is necessary to conduct IT governance studies continuously to improve and explore IT governance [11-14]. Several ITG models are developed by referring to previous theories.

This study aimed to get a better understanding about the mutual influence of readiness and usability. In addition, this study assessed the level of trust in ITG by using the readiness model and the usability model. There are two questions in this study:

Q1: What is the conceptual relation between readiness and usability of technology?

Q2: How are IT readiness and usability integrated into a model?

The discussion of this paper is divided into 5 sections. The first section is conceptual introduction. The second section is literature review, in which theoretical frameworks are discussed. In the third section, research method is described. The fourth section presents the results and discussions. The final section is conclusion.

II. LITERATURE REVIEW

A. Readiness Model

Upon the use of the system, users prefer the adoption and integration of new technologies to achieve their desired goal [15]. Readiness system is comprised of four influential dimensions, namely hopefulness, breakthrough, discomfort, and insecurity. Hopefulness is a belief that technology can improve control, flexibility, and efficiency and a positive perspective of technology. Breakthrough is a user's desire for new product or technology services. Discomfort is a negative attitude toward technology which may lead to lack of confidence and technology acceptance. Insecurity is the distrust of technological security especially regarding the security of personal data. Through these dimensions, Parasuraman proposed a readiness model namely Technology Readiness Index (TRI).

B. Usability Model

Madan proposed the following questions that relate to the usefulness of technology [16]:

- How satisfied is the user with the IT usage based on his or her expectations and time of use?
- How many errors may occur when the user is using IT?
- How relevant is IT to the user's skill level and job/task?
- What are the strategies for mastering IT effectively and proficiently?
- To what extent may IT improve job performance, and how many people are needed to address IS problems?

Nielsen formulated problems from the usability theory [17], which are:

- How is the user able to remember (memorability) or maintain knowledge after a certain period of time and continue to remember the updates?
- How may the user perceive the easiness of IT usage and the effectiveness in completing the tasks and problems?
- How is the quality of information technology available at that time easy to learn and use in completing their respective tasks and problems?
- Efficiency: How may IT assist the user to do his or her works in a simple way and solve the problems that may emerge?
- How do you achieve a level of satisfaction (free from discomfort) and lead to a positive attitude toward IT products from the user side?
- What is the number of errors caused by IT implementation including the level of security error, which impacts on the data usage and storage, and vice versa ?

The Nielsen usability model consists of 5 dimensions:

- Effective in learning IT (related to the level of learning ability) that existed at the time.
- Efficient in assisting the completion of work and tasks from the use of IT that existed at the time.
- Easy to learn and remember from the IT that existed at the time.
- Lack of error tolerance from the use of IT at the time.
- Providing satisfaction, attractiveness, and at the same time fun when using IT that existed at the time.

C. Integrating Model

Integration model is a combination of two or more models. Based on the IPO model [18], the authors tried to integrate the readiness model and the usability model. The author's adoption of the model was based on how Subiyakto integrated the readiness model [15] and the success model [19] into one model, namely the IPO model [18]. The authors followed the integration process conducted by Subiyakto to adopt the model – integrating the readiness model [15] and usability model [17] into one model, with an addition of a variable trust factor [7] into the integration process. Finally, the IT governance trust model, a model of trust in IT governance, was formed. In connection with modern IT, there is a relationship related to the definition of usefulness in IT. Axup argues that IT products should be able to be perceived and used efficiently [20]. Tsourella argues that gender and age may influence the IT adoption and perceived usefulness [21].

D. Trust Variable

The variable trust is one of the important variables that influence ITG [7]. Trust is defined as follows:

- Trust is accumulated values from history and expected values for the future.
- Trust can be measured quantitatively in order to evaluate the physical component values, value chain, and human behavior for decision-making processes.
- Trust is applied to the social, cyberspace, and physical domains.
- An entity is "trusting" at a given time if there is an assumption that the other entity will become exactly as the first entity expected.
- Trust denotes the relationship between two entities when each believes that the other will behave exactly as expected.
- Trust is a strong belief in the reliability and correctness of information or in the ability and disposition of entities to act appropriately in certain contexts.
- Trust is dependence on someone's character, ability, strength, or truth.

E. IT governance

According to Tonneli, IT governance is a capability that is very important for IT strategic alignment and business delivery [13]. The relational mechanism between IT and business is a determining factor for IT performance and positively correlates with organizational performance.

Benaroch argues that the board-level ITG is responsible for monitoring managerial IT decisions and provides policies for controlling IT resources [11]. The companies need to determine their board IT competency level. In addition, it is expected that CIO turnover is lower in IT-intensive companies where the change can be more disruptive.

Zhang also explains that IT governance is an important precursor of IT capabilities, builds superior IT capabilities, and indirectly creates companies achieving competitive advantage [14].

III. RESEARCH METHOD

Based on prior model development studies [6, 18], there are four main steps (Fig. 1) to create a model development study.

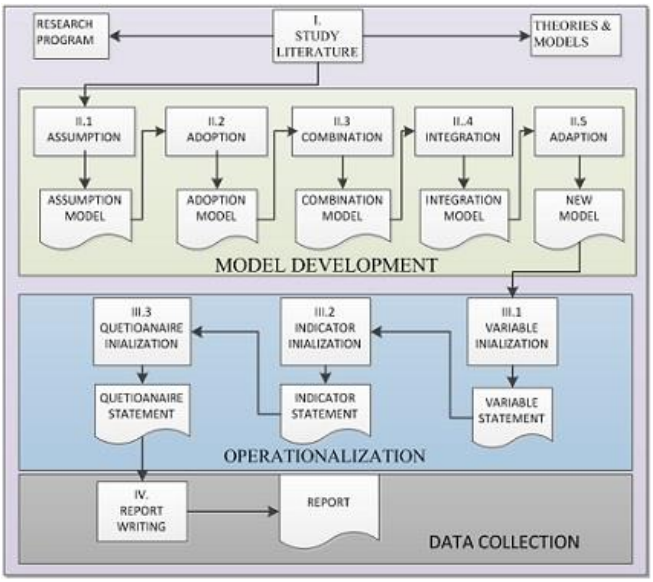

Fig. 1. The research procedure

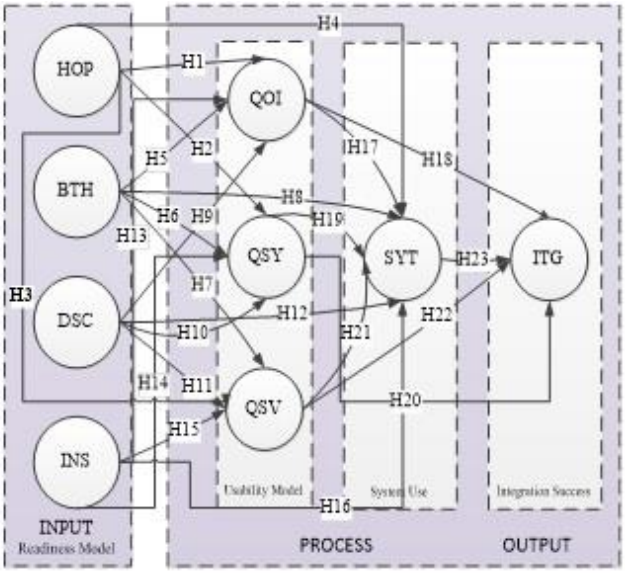

Fig. 2. The proposed of ITG model

The first step is to look at IT governance in schools that already have a computerized system in all academic and non-academic activities [22], then researchers conduct literature studies related to the usefulness of developing the model for initial research initiation.

The second step is to develop a model with the assumption, adoption and integration between usability [17] and readiness [15], the level of satisfaction associated with readiness [23], a combination and adaptation of the IPO model [18], and finally the variable trust incorporated as a proposed model for shape IT governance.

The third step is to define variables and indicators, followed by developing questions in relation to assessing a new system model.

In the final step, researchers applied the writing results into the research, which was then reported and assessed for the proposed new model.

TABLE I. ELEMENT OF THE THEORIES AND PRIMARY MODELS

The Theories and Primary Models	Reference
Technology readiness model	[10, 15]
Technology usability model	[16, 17]
Information technology governance	[1, 11-14, 22]
Causal model and progress model development	[6, 7, 12, 18, 24, 25]

IV. RESULT AND DISCUSSION

The proposed model with its nine variables and 23 relational ideas is shown in Fig 2. The development model was generated from the integration of the readiness model [15] and the usability model [17].

Following the assumptions of Subiyakto's IPO model, the readiness model consists of a number of variables [15], namely hopefulness (HOP), breakthrough [BTH], discomfort [DSC], and insecurity [INS], overall positioned in the model input dimensions. On the other hand, the usability model [17] contains quality of information [QOI], quality of system [QSY], and quality of service [QSV]. Integration of the readiness model and the usability model with and addition of the variable trust as proposed in the implementation of IT governance will be brought up in a trust system [SYT] to produce IT governance [ITG] as the main objective.

The proposed trust variable in the expectations of ITG quality serves as a product (Q1). Trust as a proposed variable is integrated into the IPO model [18] as the cause of the development model [6, 7, 12, 18, 24, 25], and finally, a relational hypothesis emerges and is developed to meet influential relationships between models (Fig 2). Overall, the logic of the integration of the variable trust into the IPO model [18] becomes a linear presentation. The following tables explain the variables definition and indicators of the models and questions proposed (Q2).

TABLE II. VARIABLES AND DEFINITIONS [6, 15, 17]

Var	Definitions
HOP	The quality of belief that IT will probably happen.
BTH	The quality of IT being an advanced system.
DSC	The quality of perception that IT is an unpleasant condition
INS	The quality of distrust of IT integration as to whether it is able to handle harmful potentials
QOI	The quality of IT based on the consistency of user expectations
QSY	The quality of IT content
QSV	The quality of excellent IT services
SYT	The quality of the satisfaction level of users when they are utilizing of the IT
ITG	The achievement of IT governance

TABLE III. INDICATORS AND DEFINITIONS [6, 15, 17]

No	Indicators	Definitions
HOP1	Convenience	The quality of system ability to be free from constraints, difficulties, and troubles
HOP2	Access Time	The quality of IT ability to connect with other IT systems
HOP3	Efficient Way	The quality of IT in producing maximum output from minimum resources
HOP4	Effective Way	The quality of IT in achieving high performance
HOP5	Productize	The quality of system support in producing an output when being compared to the resources needed to produce an output
BTH1	Solution	The quality of system support in finding solutions to problems.
BTH2	Freedom	The quality of system support in being free from controls or influences
BTH3	Heavy lifting	The quality of system support in achieving something within a problem
BTH4	Encourage Improve	The quality of system support in enabling something to happen, develop, or stimulate
BTH5	Convincing Win	The quality of system in supporting users to be more successful
DSC1	Sophistication	The quality of system feature being confusing or difficult to deal with
DSC2	Trouble	The quality of IT operation as to whether a real process is not easily operated
DSC3	Reliance	The quality of IT performance when other parties need to operate it
DSC4	Loss of Support	The quality of IT operation performance which is lacking support from others
DSC5	Unsuitable	The quality of being unsuitable
INS1	Fiasco	The quality of a system likelihood of posing possible danger
INS2	Menace	The quality of a system that could cause harm or dangerous situation
INS3	Cut down Communication	The quality of IT implementation in reducing the size, amount, and importance of human interactions
INS4	Interaction	The quality of IT utilization in receiving more attention and focus from people
INS5	Uncertainty	The quality of system being dubious in its utilization
QOI1	Precision	The suitableness quality of the produced information which is the real standard
QOI2	Suitability	The quality of IT processing in planned time duration
QOI3	Complete Way	The quality of IT processing all operations with nothing missing
QOI4	Continuity	The possibility of IT implementation to demonstrate operations, services, maintenance, or qualities by the same information
QOI5	Appropriate	The impact quality of IT with its subject matters
QSY1	Ability to use	The quality of IT being free from constraints, difficulties, and troubles
QSY2	Stabilize skill	The quality of IT having easy maintenance
QSY3	Interlude	The length of time IT system takes for responding user commands
QSY4	Access Time	The quality of IT system being operable according to requirements
QSY5	Harmless	The irresistible quality of IT from the unexpected attacks

TABLE III. (CONTINUED) INDICATORS AND DEFINITIONS [6, 15, 17]

No	Indicators	Definitions
QSV1	Sensitiveness	The quality of IT implementation in making a response in an appropriate way, at the appropriate time and under an appropriate situation
QSV2	Move Easily	The quality of IT in adapting to requirements
QSV3	Sanctuary	The quality of integrated IT implementation in serving users safely
QSV4	Access Time	The quality of IT service in suiting functional requirements
QSV5	Extra Service Time	The quality of IT service scope in exceeding functional requirements
SYT1	Efficient Way	The quality of IT implementation in attaining maximum achievement outputs
SYT2	Effective Way	The quality of IT system capability to fulfill user needs
SYT3	Resilience	The quality of IT in adapting to and suiting required demand
SYT4	Generally Pleasure	The quality of making users pleased with the overall aspect of the system
ITG1	IT Efficient Way	The quality of IT output value
ITG2	IT Effective Way	The quality of IT system capability to fulfill user's desire.
ITG3	User Pleasure	The quality of IT in helping users create business value.
ITG4	Productivity Development	The quality IT implementation in improving output
ITG5	Competitive advantage	The quality of integrated favored by users connected to the business competitions

TABLE IV. THE QUESTIONNAIRE STATEMENTS [6, 15, 17]

Variable	Statement of The Questionnaires
HOP1	The IT implementation is free from troubles.
HOP2	The IT can be accessed easily by other systems.
HOP3	The IT can be operated with minimal resources.
HOP4	The IT can be operated with maximal outputs.
HOP5	The IT can be operated in an efficient, effective way.
BTH1	The system is a tool and is used to help users solve problems
BTH2	The system is a tool and is used to control or helps users.
BTH3	The system is a tool and is used to support users and tackle difficult situation or problem.
BTH4	The system is a tool and is used to achieve a goal and encourage users
BTH5	The system is a tool and is used to support users to be more understanding than their competitors.
DSC1	The system is not familiar to users.
DSC2	The system is not fully supported in its operation.
DSC3	Users are confused when using the system.
DSC4	Users cannot use the system easily.
DSC5	Users cannot operate the system freely.
INS1	Users cannot operate the systems according to the development plan.
INS2	The system is harmful or dangerous to users.
INS3	The system makes fewer interactions with users.
INS4	The system is unfocused to users.
INS5	The system is corrupt to use.
QOI1	Information is produced accurately.
QOI2	Information is produced at most fitting time.
QOI3	Information is produced completely.
QOI4	Information is produced consistently within the system operation.
QOI5	Information is produced relevant to users' needs.
QSY1	The system is convenient to use.
QSY2	Users can maintain the system implementation easily.
QSY3	Users feel that the system is able to respond quickly.
QSY4	Users feel that the system is able to carry out all of planned functions.
QSY5	Users feel that the system is safe to use.
QSV1	Users feel that the system renders services quickly.

TABLE IV. (CONTINUED) THE QUESTIONNAIRE STATEMENTS [6, 15, 17]

Variable	Statement of The Questionnaires
QSV2	Users feel that the system renders adaptive services for them.
QSV3	The system renders harmless services.
QSV4	The system gives a contribution to the requirements of users.
QSV5	The system gives its contribution based on the required functions.
SYT1	Users are happy with the efficiency of the system.
SYT2	Users are happy with the effectiveness of the system.
SYT3	Users are happy with the system's ability to be moved easily.
SYT4	Users are happy with the performance of the system.
ITG1	The integration of the system is performed efficiently.
ITG2	Integration of the system is performed effectively.
ITG3	The integration of the system improves user satisfaction.
ITG4	The integration of the system improves the operational productivity of the institution.
ITG5	The integration of the system is performed efficiently.

In developing the model, some initial conclusions are drawn. Firstly, the conduct of the research is transparent as explained in the research method. Secondly, questions can be reversed based on indicators, variables, and assumptions.

The study of the perspectives development model [26] demonstrates how to assess the validity. In the beginning, the study is conducted intelligibly, and this serves as the validity trust point. In this study, the authors use the development assumptions, adopt the readiness model [15] and the usability model [17], combine both models, and adapt variables, indicators, and questions in relation to IT governance. To validate this study the authors invite readers to see inversely based on the indicators, variables, and assumptions besides the utilization of the assumptions, adoption, combination, and adaptation processes. Referring to Subiyakto [25] and Eddie [26], the authors describe that the model has been validated based on how the model can present a real phenomenon.

The authors refers to the model of the validity point in the validity model [25]. The model validity point is concerned about how the model can present the real phenomenon. It can be done by employing the inverse retrieval from the model development process. The cohesive interrelation between the proposed model and the question measurement may present the validity point of the model.

There are two contributions from the research: the transparency of the development model will be processed and the rationality model will be developed. Different model propositions can be shown from the use of other understandings, assumptions, and perspective points. Thus, it is necessary to re-evaluate the model and the instruments of the research due to the research's limitations, which can serve as a consideration for future works.

V. CONCLUSION

This study explains the connection between readiness and usability in terms of IT governance implementation and how to combine readiness and usability models in the use of information technology. The author proposes a combination model by integrating four readiness model variables and 3 variables from the usability model to generate system trust. In the end, IT governance is formed. As a consideration for future research, this study has some limitations in the theory understanding, assumptions, problem perspectives, the proposed model, and the instruments to proceed to the examination stage.

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