Acceptance of Information Technology Security Among Universities: a Model Development Study

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Abstract

This study aims to investigate the acceptance model of information technology security among religious higher education institutions in Indonesia, especially focusing on lecturers. This study adopts the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) model with the addition of additional variables, namely security, privacy, and trust. As reflected in various studies of information systems (IS), many IS models are developed by adopting, combining, and adapting previous models. The researcher in this study developed his model based on input-process-output logic as well as processional and causal models of the information systems (IS) success model. The resulting model has a structure with ten variables and 43 indicators. The relationship between variables is explained through 19 influence links. In addition, in the implementation of the study, the authors break down the model into more detailed assessment instrument levels. Although this model development study may have limitations related to the assumptions used and the researcher's understanding, it has the potential to make a theoretical contribution in terms of the proposition of the new model. In addition, it is important to consider transparency in the development of proposed models and data collection instruments presented as practical points for further research in the context of religious higher education institutions in Indonesia.

Keywords: Acceptance Model, Security; Trust, Perceived Privacy, Perceived Security

1. Introduction

Religious higher education has a crucial role in shaping the character and knowledge of the younger generation in Indonesia. In the midst of the rapid development of information technology, technology adoption is becoming increasingly important in providing effective and efficient learning experiences. Lecturers in religious higher education institutions play a central role in facilitating the use of information technology in academic environments. However, the acceptance and adoption of information technology among lecturers has its own challenges, especially related to security, privacy, and trust in the technology used [1]–[5].

The importance of maintaining information technology security within religious higher education institutions in Indonesia is becoming increasingly prominent given the sensitivity of data and information processed in this context. Lecturers need to believe that the use of technology will maintain data integrity and individual privacy. In addition, trust in technology is also an important factor in the adoption of information technology [6]–[8]. Lecturers and faculty need to feel confident that the technology they use can support the learning process and does not threaten privacy and security.

In order to overcome these challenges, the Adoption model of UTAUT2 becomes a relevant theoretical framework. This model has been widely used in the context of technology acceptance by users and identifies key factors influencing technology adoption [9]–[11]. With the addition of security, privacy, and trust variables, this study aims to understand the relationship between these factors and the adoption of information technology among lecturers in religious higher education institutions in Indonesia. This research is expected to provide a deeper understanding of the factors influencing the adoption of information technology among lecturers in religious higher education institutions in

Indonesia. Through this research, it is expected to identify effective strategies to increase the adoption of information technology in this context, taking into account aspects of security, privacy, and trust. In this context, this study has two research questions for guiding the exploration process:

RQ1: How is the relationship between the adoption of information technology and the acceptance of technology among lecturers in religious higher education institutions?

RQ2: How can the adoption of information technology be developed in the context of the use of technology among lecturers in religious higher education institutions?

This article is structured in five parts, starting with the background of the research and the goals to be achieved. Furthermore, the literature review explains the theoretical framework and related research. The methods describe the methodological parts of the study. It is then followed by the results and discussion part. The conclusions part summarizes the research findings and their implications in increasing the adoption of information technology among lecturers in religious higher education institutions in Indonesia.

2. Literature Review

Research on the acceptance of information technology in the context of higher education institutions, particularly those focusing on aspects of security, privacy, and trust, has become an increasingly relevant topic in the digital age. Information technology acceptance models have been widely used to understand the factors influencing the adoption and use of information technology in various organizational contexts. In this regard, the model of UTAUT2 has become a widely adopted theoretical framework. This model identifies several important variables that affect technology acceptance, such as Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Hedonic Motivation (HM), Price Value (PV), Behavioral Intention (BI), and Actual Use (AU).

However, in the context of religious higher education institutions in Indonesia, there is a need to integrate security, privacy, and trust factors in the information technology acceptance model. Information technology security has become an increasingly pressing issue given the cyber-attacks and security threats that can harm religious higher education institutions. Religious higher education institutions often store sensitive data and personal information of students and staff, so protecting information security is critical. In addition, privacy is also a major concern in the digital environment, especially regarding the use of personal data by religious higher education institutions. Ensuring data privacy in the context of information technology acceptance is becoming increasingly relevant in the face of rapid information technology development.

The level of trust in technology is also an important factor in the acceptance and use of information technology by lecturers or lecturers in religious higher education institutions. Lecturers and lecturers need to feel confident that the information technology used is safe, reliable, and prioritizes data privacy to increase acceptance and use of the technology. Therefore, integrating trust variables in technology acceptance models becomes critical in this context. In order to develop an information technology acceptance model that is appropriate to the context of religious higher education institutions in Indonesia, this study adopts the UTAUT2 model as a basis, and adds three important variables, namely Trust (TR), Perceived Privacy (PP), and Perceived Security (PS). The integration of these variables is expected to provide a more holistic insight into the factors influencing the adoption of information technology among lecturers in religious higher education institutions in Indonesia.

3. Methodology

The first stage is conducting a literature review by reading relevant literature related to the case study in this research. Next is the model development, where the adopted model is based on UTAUT2 with variables including PE, EE, SI, HM, PV, BI, and AU [15][21] with the addition of three variables, namely TR, PP, and PS [1][7][16][22]..

Then, the research design is conducted, followed by instrument development, which involves designing the questionnaire. The next step is data collection, which involves determining the population and sample size for the research. After the data is collected, it is analyzed, discussed, and the results are interpreted. Finally, conclusions are

drawn from the research findings, and recommendations are provided for future research in the form of a research report. For a clearer understanding, the research stages can be seen in the research framework in Figure 1.
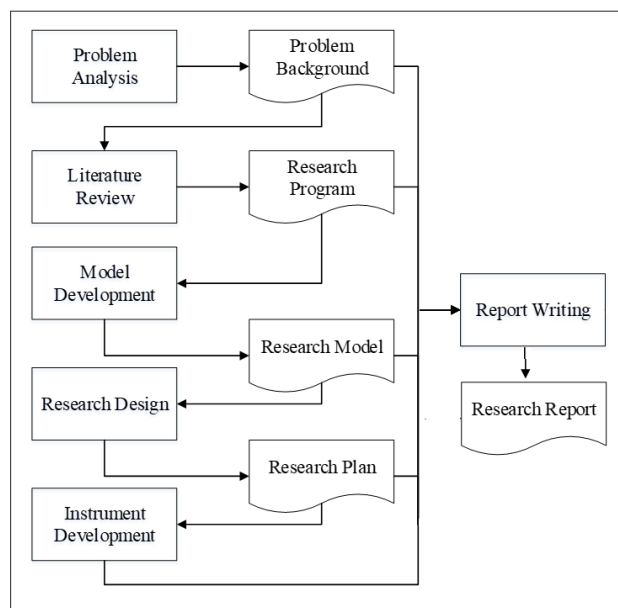

Figure 1. Research Procedure

4. Results and Discussion

Figure 2 shows a model development design that is the result of previous development research. This suggests that in many cases, Information Systems research is more likely to adopt existing models than to conduct empirical studies [12]–[14]. Overall, the design of this model was developed by combining, adopting, and adjusting the technology acceptance model and adding security, privacy, and trust variables [1][10][11]. The model adopted is based on UTAUT2 with variables including PE, EE, SI, HM, PV, BI, and AU [15][21] with the addition of three variables namely TR, PP, and PS [1][7][16][22].
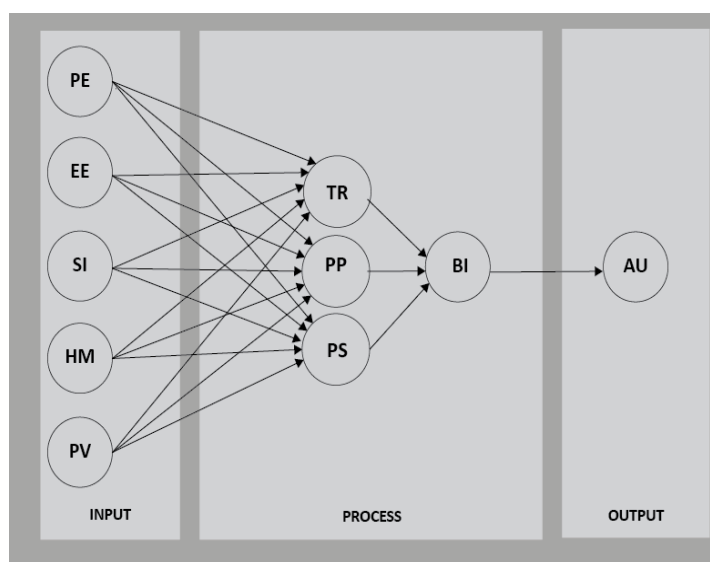

Figure 2. The Proposed model

Reference to previous studies that have applied the principle of Input – Process – Output (IPO) [12]–[14] in development research, leads researchers to assume that the formation of information system models can also be understood within a similar IPO framework. Within the scope of the dimension of the information system development

model [17] specifically in the process and outcome dimensions of the IPO framework. In more detail, combining the processes of system creation and system utilization is considered as a single process, which in this case refers to the product life cycle [18], [19].

Table 1. Explanation of Research Variables [15] [16][20]–[27]

Variable	Definition
PE	Users' perception of IT's impact on performance. If they see IT enhancing outcomes or performance, adoption is likely.
EE	Individuals' perception of the ease of using information technology. When users find it user-friendly and effortless, they are more inclined to adopt it.
SI	Influence from peers on IT adoption. If individuals sense support for a specific IT, they're more likely to adopt.
HM	Satisfaction in IT use. If it brings joy, users are more likely to adopt.
PV	Perceived benefits over costs. If benefits outweigh effort, adoption is likely.
TR	Trust in IT security & institutions. Key variable in UTAUT2, enhancing tech acceptance by ensuring security and trust.
PP	User perception of data privacy and security in IT. In security context, PP indicates their belief in personal data safety from unauthorized access.
PS	Users' perception of IT security. PS signifies how secure users believe the system is from threats or breaches.
BI	Reflects users' intent to use IT daily. Strong intent, shaped by factors like Performance Expectancy and Effort Expectancy, drives adoption.
AU	Measures actual IT usage in real-life. In security, it gauges users' implementation of security measures.

Table 2. Table 2. Explanation of Research Indicators [1][15][16][20]–[27]

Indicators	Definition
Perceived usefulness (PE1)	Users' perception of IT enhancing task performance.
Outcome expectations (PE2)	Users' expectations of positive benefits from IT.
Job/task relevance (PE3)	Users' belief in IT's relevance to their tasks.
Job/task facilitation (PE4)	Users' belief in IT easing task execution.
Perceived ease of use (EE1)	Users' perception of IT's ease of use.
Perceived complexity (EE2)	Users' perception of IT complexity.
Perceived effort (EE3)	Users' perception of effort needed for IT use.
Perceived learnability (EE4)	Users' confidence in quick IT mastery.
Perceived compatibility (EE5)	Users' belief in IT aligning with prior knowledge.
Subjective Norm (SI1)	Users' perception of social expectations for IT use.
Social Image (SI2)	Users' belief in IT enhancing social image.
Social Factors (SI3)	Users' susceptibility to social influences on IT adoption.
Enjoyment (HM1)	Users' satisfaction and joy in using specific IT.
Playfulness (HM2)	Users' playful or fun experience with IT.
Interest (HM3)	Users' interest and enthusiasm in IT use.
Novelty (HM4)	Users' interest in IT due to novelty.
Cost (PV1)	Users' perception of financial costs tied to specific IT.
Value for Money (PV2)	Users' assessment of value vs. costs for IT use.
Economical (PV3)	Users' perception of IT as an economic solution.
Perceived Integrity (TR1)	Users' perception of institution/IT system integrity.
Perceived Competence (TR2)	Users' perception of institution/IT system competence.
Perceived Benevolence (TR3)	Users' perception of institution/IT system intentions.
Trustworthiness (TR4)	Users' trust in the institution/IT system.
Reliability (TR5)	Users' belief in institution/IT system reliability.
Privacy Concern (PP1)	Users' concern about personal info disclosure with IT use.

Perceived Loss of Control (PP2)	Users' feeling of loss of control over personal info with IT use.
Perceived Regulatory (PP3)	Users' belief in effective privacy regulations with IT use.
Perceived Vulnerability (PP4)	Users' feeling of vulnerability to personal info misuse with IT use.
Perceived Trustworthiness (PP5)	Users' trust in the institution/IT system for privacy protection.
Perceived Security Control (PS1)	Users' sense of control over info security with IT use.
Perceived Security Risks (PS2)	Users' perception of security risk to their info with IT use.
Perceived Security Protection (PS3)	Users' perception of adequate security measures with IT use.
Perceived Security Precaution (PS4)	Users' diligence in applying security measures with IT use.
Perceived Security Assurance (PS5)	Users' confidence in the security of their info with IT use.
Intention to Use (BI1)	Users' intention to use IT in daily routines.
Willingness to Use (BI2)	Users' desire and willingness to use IT based on perceptions.
Future Use (BI3)	Users' intention to persistently use IT.
Adoption Intention (BI4)	Users' intention to actively adopt IT.
Usage Frequency (AU1)	Users' frequency of actual IT use.
Duration of Use (AU2)	Users' duration of IT use per instance.
Variety of Use (AU3)	Users' utilization of various IT features.
Extent of Use (AU4)	Users' application of IT in diverse life aspects.
Task Performance (AU5)	Users' success in achieving goals with IT.

In this research, two key concepts, namely trust and validity of issues, will be proposed which will be detailed in detail, as outlined in the research method. The approach used in this study refers to the model adopted based on UTAUT2 with variables including PE, EE, SI, HM, PV, BI, and AU [15][21] with the addition of three variables namely TR, PP, and PS [1][7][16][22] which is then combined with adjustments to variables, indicators, and questions to build a new framework of use. In addition to combining assumptions and making adjustments, the order of questions in the questionnaire will also be arranged based on the number of indicators, variables, and assumptions that exist. Thus, we can clearly understand the more detailed characteristics in evaluating the adoption of information technology among lecturers at the Institute of Religious Higher Education in Indonesia.

Table 3. Table 3. Research Indicator Statement [1][15][16][20]–[27]

Indicator	Definitions
Perceived usefulness (PE1)	Believe that the use of information technology will improve the effectiveness or performance of the tasks.
Outcome expectations (PE2)	Have expectations that the use of information technology will result in positive benefits and advantages.
Job/task relevance (PE3)	Believe that the use of information technology is relevant and important for work or tasks.
Job/task facilitation (PE4)	Believe that the use of information technology will make it easier or facilitate the execution of work or tasks.
Perceived ease of use (EE1)	Believe that the use of information technology will be easy to do without much effort.
Perceived complexity (EE2)	Perceive information technology as something complex or difficult to use.
Perceived effort (EE3)	Perceive that the use of information technology will require significant effort or effort.
Perceived learnability (EE4)	Believe that can quickly learn and master the use of information technology.
Perceived compatibility (EE5)	Believe that the use of information technology is in line with previous knowledge and experience.
Subjective Norm (SI1)	Believe that important people in life, such as friends, family, or superiors, expect the use of certain information technology.
Social Image (SI2)	Believe that the use of information technology will enhance the social image in the eyes of others.
Social Factors (SI3)	Influenced by social norms, social pressure, or other social influences in adopting information technology.
Enjoyment (HM1)	Feel happy and satisfied when using certain information technology.

Playfulness (HM2)	Enjoy using information technology.
Interest (HM3)	Interested and have a high level of interest in using information technology.
Novelty (HM4)	Interested in adopting information technology because of the novelty and uniqueness it offers.
Cost (PV1)	Feel that the financial cost of using certain information technology is worth it.
Value for Money (PV2)	Feel that information technology provides value for the cost incurred.
Economical (PV3)	Perceive information technology as an economical solution in achieving goals or meeting needs.
Perceived Integrity (TR1)	Feel that the institution or information technology system has high integrity.
Perceived Competence (TR2)	Feel that the institution or information technology system has adequate expertise and competence.
Perceived Benevolence (TR3)	Feel that the institution or information technology system has good intentions and prioritizes the interests of users.
Trustworthiness (TR4)	Trust the institution providing the information technology system.
Reliability (TR5)	Feel that the institution or information technology system can be relied upon to provide consistent and accurate services.
Privacy Concern (PP1)	Concerned about the disclosure of personal information when using information technology.
Perceived Loss of Control (PP2)	Feel that the use of information technology can lead to a loss of control over personal information.
Perceived Regulatory (PP3)	Believe that there are effective regulations and mechanisms for privacy protection in the use of information technology.
Perceived Vulnerability (PP4)	Feel vulnerable to the misuse of personal information when using information technology.
Perceived Trustworthiness (PP5)	Feel that the institution or information technology system can be trusted to protect users' privacy.
Perceived Security Control (PS1)	Have control over the security of their information when using information technology.
Perceived Security Risks (PS2)	Perceive risks to information security when using information technology.
Perceived Security Protection (PS3)	Feel that there are adequate security protection mechanisms in the use of information technology.
Perceived Security Precaution (PS4)	Feel the need to implement security precautions when using information technology.
Perceived Security Assurance (PS5)	Feel that the information technology system provides security assurance for their information.
Intention to Use (BI1)	Use information technology in daily life.
Willingness to Use (BI2)	Desire to use information technology without coercion.
Future Use (BI3)	Intend to continue using information technology repeatedly over a longer period of time.
Adoption Intention (BI4)	Will adopt information technology for active use.
Usage Frequency (AU1)	Frequently use information technology.
Duration of Use (AU2)	Use information technology for a long time each time using it.
Variety of Use (AU3)	Use various features or functions provided by information technology.
Extent of Use (AU4)	Use information technology in various aspects of life.
Task Performance (AU5)	Successfully complete tasks using information technology.

5. Conclusion

In this study, a comprehensive model has been successfully developed to explore aspects of information technology acceptance among religious higher education institutions in Indonesia, focusing on lecturers. This model adapts the theoretical framework of UTAUT2 as a key foundation, which has proven effective in understanding technology adoption across multiple contexts. However, to illustrate the complex realities of religious higher education

environments, three additional variables of relevance, security, privacy, and trust, have been incorporated into the model.

The results of the analysis illustrate a more complete picture of the factors that influence the acceptance of information technology among lecturers or lecturers. The adopted model integrates UTAUT2 variables, such as PE, EE, SI, HM, PV, BI, and AU with the addition of three variables namely TR, PP, and PS. These additional variables provide a deeper dimension of security, privacy, and trust in information technology adoption, which is particularly relevant to the context of religious higher education institutions.

In conclusion, this study makes a valuable contribution in enriching the understanding of the factors influencing the acceptance of information technology among religious higher education institutions. The adopted model describes a more holistic framework, integrating key aspects of UTAUT2 with additional variables that provide deeper insights into security, privacy, and trust. The practical implication of these findings is the importance of paying attention to and ensuring the availability of a safe, reliable, and privacy-preserving environment in the implementation of information technology among lecturers. It is hoped that the results of this research can provide valuable guidance in the development of successful and sustainable information technology application strategies in religious higher education institutions in Indonesia.

6. Declarations

6.1. Author Contributions

6.2. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

6.3. Funding

6.4. Institutional Review Board Statement

Not applicable.

6.5. Informed Consent Statement

Not applicable.

6.6. Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

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