






“Adoption of e-government by Indonesian state universities: An application of Technology Acceptance Model”

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ADOPTION OF E-GOVERNMENT BY INDONESIAN STATE UNIVERSITIES: AN APPLICATION OF TECHNOLOGY ACCEPTANCE MODEL

Abstract

E-government is the use of internet platforms to deliver governmental services to citizens with the goal of improving government efficiency, transparency, and participation. This study aims to find out what factors determine the rate at which public university in Indonesians accept e-government services. This study uses the Technology Acceptance Model (TAM). TAM is a traditional model of technology diffusion that is an essential conceptual criterion. It drives acceptance consisting of perceived usefulness and perceived ease of use. The results of this paper back up the original TAM hypothesis. Based on the data collected and analyzed, the study concludes that three influencing factors, namely perceived usefulness (PU), perceived ease of use (PEU), and perceived risk (PR), are significantly related to the intention to use e-commerce government. However, trust and social influence do not significantly affect the intention to use e-government services. This paper has significant implications for policy-makers and government officials who want to see the growth of e-government usage in Indonesia. When attempting to market a new online system from the perspective of human-computer interaction, it becomes evident that designers must consider how users perceive the risks.

Keywords

education, e-government, technology acceptance model,
trust, social influence, university

JEL Classification

L86, M15

INTRODUCTION

The growth of structures and infrastructure in different parts of the country has slowed the country's progress. Indonesia's unevenly constructed infrastructure exacerbates the digital divide in Indonesia. According to Puspitasari and Ishii (2016), the digital gap is a societal difference in information and communication technologies that arises when community members have unequal access to technology infrastructure. To run a country as large as Indonesia with a large population requires sufficient resources and a sound information system to help serve the Indonesian government with the existing system (Howard, 2001; Ndou, 2004). The ICT development gap index in Indonesian regions is different, with Jakarta as the provincial capital rating 7.41 out of ten and Papua province earning only 2.41 out of ten (Badan Pusat Statistik, 2017).

Meanwhile, the number of Indonesians using the internet continues to rise. According to Badan Pusat Statistik (2017), in 2011, 12.28% of Indonesians said they used the internet regularly, increasing to 21.98 percent in 2015. In 2017, according to Internet World Stats (2017), Indonesia had an internet user ratio of as much as 50.4 percent of the total population.

The ability to access and remember information gained through online activities has also improved as a result of internet use, implying that users have acquired computer self-efficacy. Given Indonesia's favorable internet usage trend, the current administration should focus on offering e-government services. With so many opportunities for service enhancement, Indonesia's e-government implementation has a promising future. In 2003, President Susilo Bambang Yudhoyono signed an executive order outlining a long-term strategy for all government agencies to utilize e-government services (The Government of Indonesia, 2003). Susanto (2015) and Subriadi et al. (2015) mention several agencies in Indonesia that have pioneered e-government services in their agencies, such as the state treasury and taxes, the police, and the national immigration service. However, it is not entirely done online because it still requires face-to-face interactions such as face-to-face interviews.

Even though the advantages of deploying e-government services show that they are desperately needed in Indonesia, e-government has been attempted in several developing countries. However, it failed to realize the disconnection between e-government service demand and the country's degree of development.

1. LITERATURE REVIEW

According to Fang (2002), cutting-edge communication technologies to improve the quality of government services, resulting in benefits for both citizens and governments, is known as e-government. The main purpose of e-government is to make it easier for citizens to access public services. If e-government services are properly deployed, it will benefit the state. In addition, it will impact other areas, as governance procedures, in general, will improve. E-government is defined as applying cutting-edge technology to improve the quality and delivery of government services for the benefit of both the government and the people (Fang, 2002). Several scholars have uncovered elements that influence the adoption of e-government from both the government and citizens' perspectives (Susanto & Aljoza, 2015; Dimitrova & Chen, 2006; Kumar et al., 2007; Puspitasari & Ishii, 2016; Susanto & Goodwin, 2013; West, 2004; Susanto, 2015; Rokhman, 2011).

The benefits of e-government include the ability to search archives online, reduced time to obtain data even more, and increased quality of government services through promoting engagement between the government and its citizens (Fang, 2002; West, 2004; Holmes, 2001). E-government services have much promise for any country, including Indonesia, to develop their government systems. E-government has the ability to change the way government works by enhancing citizen trust and improving service quality (Susanto & Aljoza, 2015; West,

2004). Additionally, e-government saves money and improves convenience by providing public services (Holmes, 2001).

TAM was developed to describe how people respond to new technologies such as computers. Although factors impacting technology acceptability can vary depending on the situation, Davis (1989) is more concerned with the psychological aspects of the user than with the technological aspects of the gadget. TAM can also be used to determine whether or not e-government should be adopted as new technology. Other unknown factors, such as e-government adoption, may impact technology adoption. The significant elements driving technology acceptance are perceived usefulness (PU) and perceived ease of use (PEU) (Davis, 1989).

Perceived ease of use (PEU) was frequently identified as one of the incentives for adopting new technologies. The projected benefits or good effects that will be received after using technology as opposed to before using it are referred to as perceived benefits (Lee, 2009). According to Ahn and Bretschneider (2011), PEU was one of the early adopters of e-government services. Hence, PEU may have a role in determining whether or not to use e-government services. Perceived usefulness (PU) is defined as "the prospective user's subjective probability that employing a given application system will improve his or her job performance in an organizational environment" (Davis, 1989). PEU will be included in the PU component of the conceptual model in this study.

Each technology has its unique set of characteristics. Numerous extrinsic factors can influence e-services adoption. In the case of Indonesian online immigration services, a study from the Indonesian immigration services site discovered two elements that drive e-government adoption and are actually the most critical factors that influence e-government adoption: trust and social influence. Higher trust is linked to a higher willingness to adopt technology, which is also a good relationship. Susanto and Aljoza (2015) mentioned that adoption is also influenced by social groups, which implies that increased social impact usually increases the desire to adopt the technology. Susanto and Goodwin (2013) conducted a study on SMS-based e-government adoption with a sample of 25 countries. They found that the characteristics influencing e-government adoption consisted of fifteen factors; trust in government, perceived risk, perceived value for money, and perceived comfort are just a few of these traits. Two primary elements are crucial in predicting total technology adoption in user experience (UX) studies. Performance and satisfaction are the two elements in question. Performance and satisfaction in UX study appear to be significantly related to the PU dimension. The idea goes that if a technology works well, it is beneficial and can lower a user's workload, while how well it performs also affects user pleasure (Roto et al., 2009).

As technology evolves and becomes a part of everyday life increasingly, Indonesian residents will have no choice but to utilize e-government services in the future. Several criteria have been identified as crucial in studying public adoption of technology, including PU and PEU (Davis, 1989; Susanto & Aljoza, 2015). Other additional components are introduced into the conceptual model to understand better the processes underpinning public adoption and acceptance of e-government services. PEU is also commonly cited in UX research, mainly in the context of application user interaction design. UX research and user interaction research, as well as cognitive psychology, have a lot in common. User interface designs can be modified to improve an application of PEU by using what is known about how human cognitive processes work (Durrani & Durrani, 2009).

Perception of uncertainty and citizenship of mind are two more factors that have been shown to have

an impact on e-government adoption. The media and human communication can have a considerable impact on e-government adoption. Dimitrova and Chen (2006) show that people with a greater civic-mindedness are more likely to interact with government officials and take an active interest in government activities linked to government trust. They were most likely prompted to attempt online services after previous dealings with the authorities on the ground. According to Al-Hujran et al. (2015), the TAM model is being used in Jordan to incorporate cultural, social, and political components into e-government adoption. They discovered that variances influenced citizens' perceptions and attitudes regarding e-government services in national cultures. Arab culture, for example, has a tighter social structure compared to Western culture, where there is more peer pressure, causing people of Arab culture to adopt a greater awareness of their surroundings. Social influence may be more significant than other variables in such instances. Another cultural phenomenon found in Indonesia, particularly in rural regions, is that neighbors are frequently treated as blood relatives. Due to the legacy of the caste system, Indonesians in rural areas are particularly attracted to economic and social status differences (Kreager, 2006). According to Al-Hujran et al. (2015), in Indonesia, honor and respect are still strongly prized, bringing about the idea of power distance. It is concerned with the less powerful members of society suffering an unequal power distribution. People who perceive their power distance as higher are more prone to be convinced by influential people in their community to use e-government services rather than making their own decision.

Featherman and Pavlou (2003) and Lee (2009) mentioned that perceived risk (PR) had been found as a determinant of new technology adoption. The term "perceived risk" relates to worry about accepting negative consequences due to utilizing cutting-edge technology (Featherman & Pavlou, 2003; Lee, 2009). Worry of getting more harm than good, apprehension of failure at a task, and even apprehensions about losing one's privacy can all deter people from using new technologies. This is one of the few studies in Indonesia that examines how people use e-government services. Susanto and Aljoza (2015) take one step further by

including PR as a component that integrates with established conceptual frameworks. In a country with a significant population, like Indonesia, every government sector can profit from e-government services. As a result, the public's faith in the government grows, service standards have been raised, and government transactions are made more convenient (Fang, 2002; Holmes, 2001; Howard, 2001; West, 2004).

PR is classified by Featherman and Pavlou (2003) into seven categories: performance, privacy, psychological, time, financial, social, and total risk. These PR elements can be related to the type of threat they pose; separating risk groups can also aid researchers in identifying distinct types of problems that may impact technology adoption. Al-Hakami and Slovic (1994) discovered that PR has an inverse relationship with PU. People who believe technology is truly beneficial tend to downplay possible risks, resulting in a lower PR score. People who regard technology as dangerous, on the other hand, are more prone to overlook its possible advantages. As a result, it is critical to consider the model's interaction between these two concepts.

According to Kumar et al. (2007), who researched the Canadian e-government system, user perceptions of e-government adoption should be researched further since it is critical to have an e-government system designed with people in mind. Davis (1989) concept of PEU is strongly related to this observation. Using a human-centered approach to design, various demographic groups will use the e-government system, increasing the number of people who use it. Increased public knowledge is another strategy to boost the adoption factor of e-government. Extensions, according to Indraningsih (2011), Hosen (2012), and Strauss et al. (1991), play a crucial role in informing the broader public about new ideas, possibly increasing their desire to adopt the new technology. Venkatesh and Davis (1996) investigated the factors that may have an impact on PEU. They considered socio-psychological aspects such as general computing beliefs and efficacy, as well as technical usability and user interaction characteristics. As a result, their findings imply that providing training interventions and extensions boosts user acceptance in response to more significant

user interaction. As a result, one of the elements impacting technology adoption could be the availability of extension services. Extension programs, for example, have been demonstrated to be effective in raising public awareness about agricultural technology, especially in rural regions (Strauss et al., 1991; Hosen, 2012; Indraningsih, 2011).

The role of social media in the growth of e-government is also seen as critical. If social media is used correctly, it may be quite beneficial. In order to its extensive accessibility, social media is seen as an effective means to reach citizens of various socioeconomic statuses and degrees of computer competence. Sawalha et al. (2019) stated that government agencies should take advantage of social media because it can help to increase communication quality between citizens and enterprises. Moreover, it can reach and empower citizens by displaying soft power through their social media accounts; citizens may also use social media to reach a wider audience and empower themselves. Nye Jr (2004) mentioned that soft power is the employment of cultural and entertainment components in government messaging to civilians to make them appear unauthoritative, cool, and non-coercive.

Finally, while the usage of communication technology and online information has grown generally recognized, certain people still have trouble accessing the essential technology due to uneven infrastructure development. Given that the initial adoption stage involves physical access to technology, infrastructure development is a top priority in e-government development. Residents are not always willing to use e-government services, even if they have physical access to technology. As a result, it is critical to understand the numerous elements that influence Indonesia's adoption of e-government.

2. AIMS AND HYPOTHESES

This study attempts to discover what factors influence the rate at which Indonesians embrace e-government services at public universities. The TAM model was used to develop the research hypotheses. PU, PEU, PR, trust, and social influence are all elements that influence the intention to adopt e-government. When considered together, the fol-

lowing hypotheses are presented:

- H1: *Perceived usefulness significantly and positively affects the intention to use e-government adoption.*
- H2: *Perceived ease of use significantly and positively affects the intention to use e-government adoption.*
- H3: *Perceived risk significantly and positively affects the intention to use e-government adoption.*
- H4: *Trust significantly and positively affects the intention to use e-government adoption.*
- H5: *Social influence significantly and positively affects the intention to use e-government adoption.*

3. METHODS

Purposive sampling was utilized to identify the population, which consisted of lecturers in the universities. The University of Indonesia, the University of National Development Veterans Jakarta, and the University of Riau are among the universities that have been chosen. A total of 105 samples were used in this study. E-government adoption refers to the intention to use or employ e-government services shortly. Davis (1989) defines PEU as the degree to which potential users believe the target system to be hassle-free. Perceived usefulness is defined as “the prospective user’s subjective likelihood that utilizing a given application system will increase his or her job performance in an organizational context.” Merriam-Webster (1983) defines trust as “a secure belief in someone or something’s character, aptitude, strength, or veracity.” Not to be confused

with trust in e-government infrastructure, trust is confined to the level of trust citizens place in their government. Social influence is a social force tied to the social circle, including friends and acquaintances. This study investigates the relationship between variables using structural equation modeling (SEM).

In addition, data for this study was collected through the dissemination of email-based questionnaires. The information gathered is the result of a survey conducted using Google Forms. Each variable has its own measurement in this study, which was based on earlier research. Table 1 lists the various measurement methods.

4. RESULTS

The population of this study is lecturers from state universities in Indonesia. Samples were selected using the purposive sampling technique. Table 2 shows a description of the data in this study.

Table 2. Description of respondents

Characteristics	Information	Frequency	Percentage
Gender	Men	40	38.09
	Women	65	61.91
Age	21-30 years	10	9.6
	31-40 years	40	46.2
	41-50 years	30	26.9
	> 50 years	25	17.3
University	UPNVJ	54	82.7
	UNRI	40	17.3
	UI	11	10.48
Work experience	2-5 years	16	5.8
	6-10 years	22	21.2
	11-15 years	40	42.3
	> 15 years	27	30.8
Education	Master	70	66.67
	Doctor	35	33.33

After filtering the research population data (Table 2), the study analyzed the Structural Equation Model

Table 1. Measurement of variables

Variable	Scale	Item Statement	Source
PU	Likert	5	Susanto and Aljoza (2015), Dimitrova and Chen (2006), and Lee (2009)
PEU	Likert	5	Cheng et al. (2006)
PR	Likert	5	Featherman and Pavlou (2003)
Trust	Likert	5	Kumar and Natarajan (2020)
SI	Likert	5	Kumar and Natarajan (2020)
IU	Likert	3	Susanto and Aljoza (2015)

(SEM) with the SmartPLS version 3.0 application. The descriptive statistics for the data are presented in Table 3.

Table 3. Descriptive statistics

Variable	Total Item Statement	Mean	Standard Deviation (SD)
PU	5	4.13	0.648
PEU	5	4.33	0.781
PR	5	3.58	0.564
T	5	4.36	0.637
SI	5	3.67	0.823
IU (EA)	3	3.57	0.937

The mean for perceived usefulness is 4.13, with an SD of 0.648, according to the descriptive data in table 3 above. Then, for perceived ease of use, the mean is 4.33, with an SD of 0.781. Furthermore, perceived risk has a mean of 3.58 and an SD of 0.564. Meanwhile, the average score for trust is 4.36, with a 0.637 SD. Social influence has a mean of 3.67 and an SD of 0.823. Finally, with an SD of 0.937, the mean for intention to use is 3.57.

Table 4. Reliability and convergent validity

Variable	Average Variance Extracted (AVE)	Composite Reliability (CR)	Cronbach's Alpha (CA)
PU	0.864	0.831	0.89
PEU	0.765	0.876	0.87
PR	0.752	0.874	0.79
T	0.658	0.786	0.73
SI	0.857	0.792	0.84
IU (EA)	0.803	0.915	0.74

Hair et al. (2013) explain that the reliability test, which includes the CR and CA test findings, the minimum value for standard CR is 0.7, while the minimum value for CA is 0.7. As can be shown, all of the variables included in this study matched the criteria for good construct dependability. Meanwhile, the results of the AVE, as reported by Garson (2016), show that the standard or minimal value for the convergent validity test performed is 0.50. All of the tests conducted on the variables

in this study yielded results larger than 0.50. As a result, all of the variables utilized in this study can be regarded valid.

The results showed that PU ($\beta = 0.325$, $t = 2.971$) was the most accurate predictor of IU. PEU ($\beta = 0.258$, $t = 2.466$) was the second most important predictor of IU. Furthermore, in other words, PR ($\beta = 0.403$, $t = 3.330$) was found to be a predictor of IU, supporting *H1*, *H2*, and *H3*. Furthermore, the results of this analysis revealed that trust was one of the predictors that did not affect IU ($\beta = 0.229$, $t = 1.065$). Similarly, the findings of this study revealed that one of the factors that did not affect IU was social influence ($\beta = 0.272$, $t = 1.309$). Therefore, it can be concluded that *H4* and *H5* are rejected.

5. DISCUSSION

The PLS analysis reveals a substantial and positive association between PU and IU, indicating that PU has an effect on IU. The findings of the relationship between PU and IU are consistent with other findings in the IS study. For example, PU is a predictive component of hospital usage behavior. According to Rawstorne et al. (2000), it has a positive and considerable impact on the adoption of IU technology in hospitals. In their study of health care professionals' intentions to embrace technology for reporting systems of unfavorable events in hospitals, Wu et al. (2008) found a strong link between PU and plans to use the reporting system and the healthcare system in general. Prayoga and Abraham (2016) found that PU substantially impacts CI using the "Internet of Things" health devices.

According to Elkaseh et al. (2016), PU has a considerable impact on predicting teachers' and students' willingness to use social networking platforms in e-learning, consistent with this study. In

Table 5. PLS path algorithm and bootstrapping

Variable	Path Coefficient (Original Sample)	T-Statistics	P-Values
PU → IU	0.325	2.971	0.021
PEU → IU	0.258	2.466	0.014
PR → IU	0.403	3.330	0.000
T → IU	0.229	1.065	0.137
SI → IU	0.272	1.309	0.513

a similar vein, Shittu et al. (2016) found that PU has a beneficial impact on IU ability to use technology to instruct students in their study on IT pre-service teacher readiness. Several previous research on e-commerce supports the conclusions of this study. Similarly, Mou et al. (2017) found PU as an IU determinant. Furthermore, the findings of Al-Mamary and Shamsuddin (2015) in the communication system are consistent with the conclusions of this study since they show a positive link between PU and IU in the telecommunications company in Yemen. Consistency, Kumar and Natarajan (2020) found that PU has a significant and positive relationship with e-health services continuance usage in hospitals of India.

Given the above reasoning, it is not unexpected that this study found PU to be a substantial predictor of consumers' propensity to use e-government. It is apparent that system users (workers) have seen the advantages of utilizing it to complete work duties, which can be linked to greater speed in completing work tasks, productivity, and individual performance at work. To put it another way, the more valuable the system is, the more potent individual IUs are despite the fact that all users are almost required to use the system.

The empirical findings of this investigation revealed a strong and positive association between PEU and IU, as expected. The findings support Huang et al. (2016), who discovered a favorable and substantial association between PEU and IU. The conclusions of this study are similarly consistent with the findings of most previous e-learning studies. Cigdem and Ozturk (2016), for example, concur that PEU has an impact on students' IU in e-learning.

According to Abdullah et al. (2017), the hotel website's PEU is a crucial factor affecting customer IU in hotel reservations. In line with Kumar and Natarajan (2020), this study found that PEU has a significant relationship with e-health services continuance usage in hospitals of India. As a result, a number of specialists believe PEU is one of the elements influencing individual acceptance and adoption of new technology. According to Davis et al. (1992), PEU in individuals is usually what determines whether or not a person accepts and uses technology. In other words, the user in-

terface and its complexity significantly impact the decision to employ new technology. As a result, a well-designed system with accessible interactive features has the potential to influence a user's decision to utilize it. In a similar vein, according to Davis (1989), TAM ease of use in the workplace is a motivating factor that increases employee performance.

According to the explanation above, a person's readiness to accept and use a system or technology is determined by his capacity to comprehend its PEU. Although employees are required to utilize e-government, their intentions to use the system play a bigger part in ensuring that the system is fully adopted and used in universities. As a result, these findings add to the body of knowledge about the use of information in government institutions. Given the preceding, sound system design makes it easier for employees to embrace and use technology to improve the organization's overall performance.

The PLS analysis supports *H3* because it reveals a substantial and positive association between PR and IU, indicating that PR affects IU. This shows that people are prepared to try out new technologies if they believe they will be helpful in some manner to them. A stronger intention to use e-government services is linked to better PR, implying that the responses are looking for potential benefits from using such services. Featherman and Pavlou (2003) found that an increase in PR led to a decrease in IU. To put it another way, if a user believes technology is simple to use, he or she also believes the risk of making a mistake while using it is low, resulting in a lower PR.

The results of the PLS analysis show that trust is not a significant factor affecting IU. This study contradicts the study on the hospitals of India that found that trust has a significant relationship with e-health services continuance usage (Kumar & Natarajan, 2020). Intention to use does not appear to have a significant association with trust in government, though there could be various reasons for this. The Indonesian government's activities are only recently becoming more transparent. Indonesians have long been unaware of how the state budget is spent on development.

Furthermore, under President Soeharto's New Order era (1966–1998), the frequency of examples of corruption and nepotism lowered public trust in the government system. Increased openness of government activities can assist Indonesians in gaining trust in their government due to the proliferation of e-government services. Provided the government continues to provide services with integrity, it may help build trust. Due to the nature of the questions asked, PR can mitigate the impact of trust on e-government adoption intentions.

Finally, the results of the PLS analysis show that social influence is not a significant factor affecting IU. Surprisingly, the intention to use e-government was unaffected by SI, although Rogers (2003) emphasizes the importance of social influence in the adoption of new technology. The inclusion of questions about becoming a social leader through e-government services as a factor in the model encompasses these nuances, despite the fact that

the findings of this study contradict this hypothesis. Because of the impact of others, one of the poll questions questioned the use of e-government. The third-person effect probably happened among this study's survey respondents.

Another reason for the study's lack of relevance of social influence is that the participants are all highly educated. The impression of the power distance is the most significant distinction between highly educated urban Indonesians and rural citizens, who are more likely to be uneducated (Al-Hujran et al., 2015). Because rural Indonesians value local opinion leaders, social influence is the most powerful component. For example, Kiai, or religious leaders in rural East Java, are frequently held in great regard by their communities as having absolute knowledge of all things. People will most likely reject e-government (or other technologies) if Kiai says something that makes it sound bad (Al-Hujran et al., 2015; Kreager, 2006).

CONCLUSION

This study examined the relationship between the factors that influence e-government in universities that use e-government. The findings showed that PU had a considerable impact on IU. The findings of this study show that IU's willingness to utilize the system is influenced by users' positive perceptions of its utility in job task performance. PEU has a significant effect on IU. This suggests that people who perceive more ease of use in e-government adoption are more likely to use it than those who are dubious. Finally, PR has a significant effect on IU. This shows that people are prepared to try out new technologies if they believe they will help them in some way.

Furthermore, trust does not affect IU. The trust in the e-government services' security system, and the distinction between trust in government and trust in system security may become even more blurred. IU is unaffected by social influence. This is because if in this survey the question asks if respondents use e-government services because their friends do, respondents may decline to admit that their friends persuaded them, implying a minor relationship.

This paper contributes to the body of knowledge on the growth of e-government in Indonesia by using larger sample size and a better conceptual model. While the TAM can anticipate consumer acceptance of new technical features, other factors that could influence decision-making should not be overlooked. TAM must consider PR, SI, and trust, as well as more complicated interactions between factors, to have a deeper understanding of technology adoption. This study's findings could help Indonesia's e-government services flourish in two ways. First, PR is directly related to the intention to use technologies; developers may concentrate on increasing security and program flow while avoiding potential back-end issues. Potential adopters will benefit from any effort to lower perceived risk through frequent use. Second, the findings of this study can be applied not only to Indonesia but also to other Southeast Asian nations with similar levels of economic development.

AUTHOR CONTRIBUTIONS

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