TRANSFORMASI: Jurnal Manajemen Pemerintahan Vol 14, No. 1, 2022, pp. 1-11
Website:http://ejournal.ipdn.ac.id/JTP, **e-ISSN 2686-0163, p-ISSN 085-5192**
Faculty of Government Management, Governance Institute of Home Affairs (IPDN)

e-Government Acceptance Model During Covid-19 Crisis in Tainan City, Taiwan

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Received: Oct 05 ,2021
Revised : Mei 27 ,2022
Accepted: Jun 11 ,2022
Available Online: Jun 30 ,2022

Abstract

This research examines the Technology Acceptance Model (TAM) in implementing e-Government during the COVID-19 pandemic in Taiwan. Furthermore, it builds government network infrastructure and develop Internet applications. Internet penetration as the first stage of this development began in 1998 and the second stage intends to promote the different services. The third phase simplifies information services to make them more proactive and accessible to the general population. In the fourth phase, e-government uses more Web 2.0 social networks to offer innovative services that actively address public needs. Finally, the fifth phase is projected to transform Taiwan into a smart nation with people-friendly services, an open, transparent, intelligent government, and evidence-based successful policies. The data were collected through a questionnaire survey on Tainan City's users of E-Government services. Furthermore, structural model analysis was performed using smartPLS 3.0., while TAM measured the use of e-government. The results showed that the influential factors are perceived ease of use, perceived usefulness, and information quality. The system's quality has no significant effect on the use of e-government in the era of the COVID-19 pandemic in Tainan City.

Keywords: *E-Government, Technology Acceptance Model, COVID-19*

DOI: https://doi.org/10.33701/jtp.v14i1.1861

Abstrak

Penelitian ini mengkaji *Technology Acceptance Model (TAM)* pada implementasi *E-Government* pada masa krisis covid-19 di Taiwan. Tahapan pengembangan *e-government* di Taiwan dimulai pada tahun 1998, yang menunjukkan tahap pertama yaitu penetrasi internet. *E-government* dimaksudkan untuk membangun infrastruktur jaringan pemerintah dan mengembangkan aplikasi internet: tahap kedua adalah tujuan *e-government* untuk mempromosikan layanan internet pemerintah. Kemudian fase ketiga, *e-government*, dimaksudkan untuk menyederhanakan layanan informasi menjadi proaktif dan mudah diakses oleh publik. Fase keempat, *e-government* menggunakan lebih banyak jejaring sosial Web 2.0 untuk menawarkan layanan inovatif yang lebih aktif memenuhi kebutuhan publik. Terakhir, *e-government* fase kelima diharapkan menjadi Taiwan yang cerdas, memberikan layanan yang nyaman bagi masyarakat, menerapkan pemerintahan yang terbuka, transparan, dan cerdas, serta mengoptimalkan kebijakan efektif berbasis bukti. Data untuk penelitian ini dikumpulkan melalui survei kuesioner pada masyarakat Kota Tainan yang telah menggunakan layanan E-*Government.* Analisis model struktural dilakukan dengan menggunakan smartPLS 3.0. Hasil penelitian menunjukkan bahwa penggunaan *e-government* di Kota Tainan dapat diukur dengan menggunakan *Theory Acceptance Model*. Hasil penelitian menunjukkan bahwa faktor-faktor yang mempengaruhi penggunaan e-government di Kota Tainan adalah persepsi kemudahan penggunaan, persepsi manfaat, dan kualitas informasi. Sementara itu, kualitas sistem tidak berpengaruh signifikan terhadap penggunaan *e-government* di era pandemi COVID-19 di Kota Tainan.

Kata Kunci: E-Government, Model Penerimaan Teknologi, COVID-19

INTRODUCTION

Environment changes, globalization, and digital emergence can create public value through government services. This has become critical for the introduction of innovative government services and the improvement of national competitiveness. e-government uses a crucial approach to improve government effectiveness and efficiency following the advancement of information and communication technology (Iqbal et al., 2020).

Silckok (2001) explained that access and delivery of government services could improve citizens, business partners, and employees through technology. Meanwhile, Agostino (2020) stated that the COVID-19 pandemic impacted the development of digital transformation in the provision of public services. Therefore, all government or public entity is now eager to speed digitally to improve public services (Mat Dawi et al., 2021; Yasir et al., 2020).

The likelihood of using a system is measured by its acceptance (Venkatesh et al., 2000; Xie et al., 2017). Organizations are expected to comprehend the reason people accept or reject information systems to forecast, explain, and promote user acceptance (Davis et al., 1986). In this case, Al Shibly and H. Tadros (2010) developed and used various models to understand user acceptance of information systems. The Technology Acceptance Model (TAM) (Davis, 1989; ELKheshin & Saleeb, 2020), adapted from the Theory of Reasoned Action (TRA) (Venkatesh and Davis, 2003),

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seems to be the most widely used (Sebetci, 2015; Venkatesh et al., 2003).

However, several TAM research investigated the impact of system characteristics as the antecedent of perceived convenience and usefulness (Wixom & Todd, 2005). In some of the technology acceptance literature, Venkatesh et al. (2003) emphasized the need to develop this literature explicitly and consider the characteristics of systems and information. Recent research that used TAM as a theoretical framework excluded the behavioral construct because it does not fully influence the perceived usefulness and convenience in anticipated behavior (Venkatesh et al., 2003).

Lumbanraja (2020), in a research on the dimensions of success of Information Systems, suggested that System Quality affects perceived benefits, user satisfaction, and system use. Furthermore, Wixom & Todd (2005) developed an integrated model based on technology acceptance and user satisfaction. This model was tested using a sample of 465 technology users from seven organizations regarding data processing software. Information and system characteristics explain 75% variance for their corresponding qualities. A significant effect of system and information qualities was obtained on perceived usefulness and convenience.

Based on Wixom & Todd (2005), TAM provides limited guidance on influencing usage through design and implementation. In addition, perceived benefits and convenience are abstract concepts that yield general information. The quality significantly affects the use of information systems. (Davis, 1989) noted that future technology acceptance should analyze the effects of these variables on usefulness, ease of use, and user acceptance. Dahi & Ezziane (2015) investigated the implementation of e-government in Australian citizens using the TAM model. Chan et al. (2010) conducted a research on the actual use of the system with perceived usefulness and convenience. The results did not support the predictions of the TAM theory.

The basic constructs of TAM do not fully influence user acceptance of e-government. Therefore, it is necessary to look for other factors to predict better and increase the acceptance of e-government. Another area that has not gotten much attention is system characteristics as external factors. Davis et al. (1989) did not include other factors explicitly into the TAM model to impact system use through perceived usefulness and convenience. These external variables are system characteristics, organizational structure, training, and preferences (Davis, 1989). The system's characteristics can influence views since they constitute an external input.

Over the past three decades, Taiwan has been widely recognized for creating production efficiencies and driving an efficient economy to be more advanced. It is one of the most critical supply chains in the global information and communication technology

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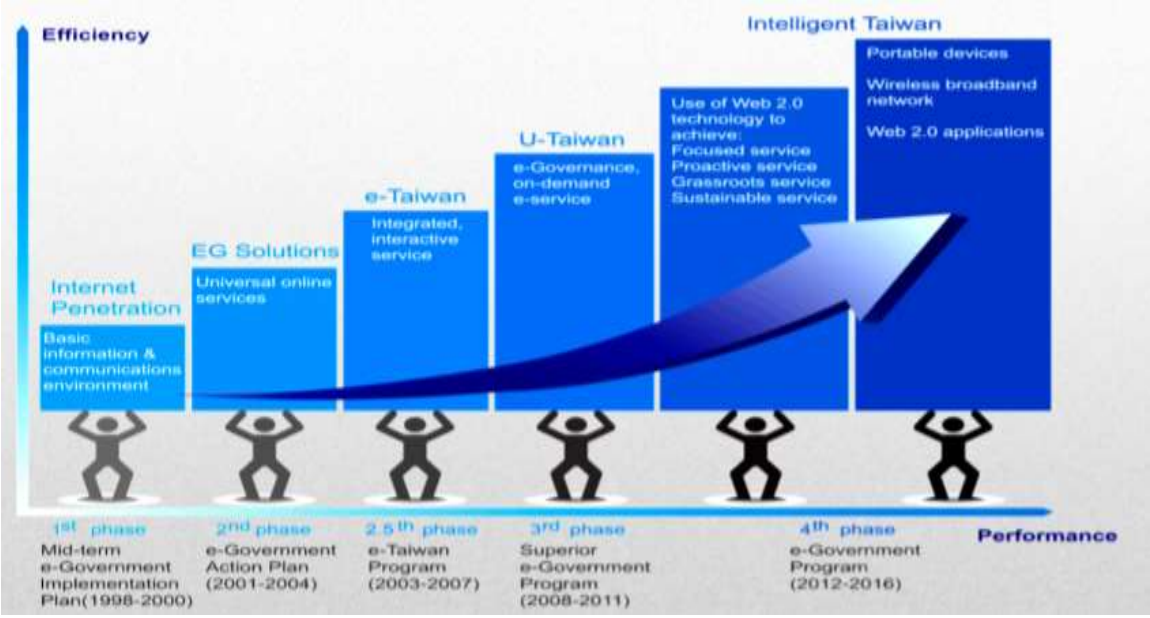
industry. With the advancement of technology, the Taiwan government is rapidly capitalizing on existing advantages and potential by constructing a strong infrastructure with inventive digital talents from diverse disciplines and producing advanced technologies. For example, it may shift from a governance-focused approach to a creative and demand-driven one to meet possibilities in the digital economy (Anggraini & Iqbal, 2020; Fridayani & Iqbal, 2020).

To promote e-government policies, the Taiwan government proactively solves social problems to create public value through a vision based on "convenience," efficiency, and 24 hours service (Yang et al., 2012). In this fifth phase of e-government development, the following goals were considered, to combine theory and practice in surveying and analyze e-government. It tracks changes and long-term policy impacts, as well as enhances Taiwan's planning capabilities to improve policy planning. Furthermore, it systematically builds an international network database, records the performance and development of digital government, and develops network platforms and knowledge-sharing mechanisms. It also supports international communication and cooperation in digital governance, builds global connections, and enhances Taiwan's international collaboration (Yang et al., 2012).

Figure 1
Roadmap E-Government in Taiwan



Source: Fridayani & Iqbal, 2020

The stages of e-egovernment development in Taiwan began in 1998, which showed the first phase, namely internet penetration. E-government is intended to build network infrastructure and develop internet

DOI: https://doi.org/10.33701/jtp.v14i1.1861

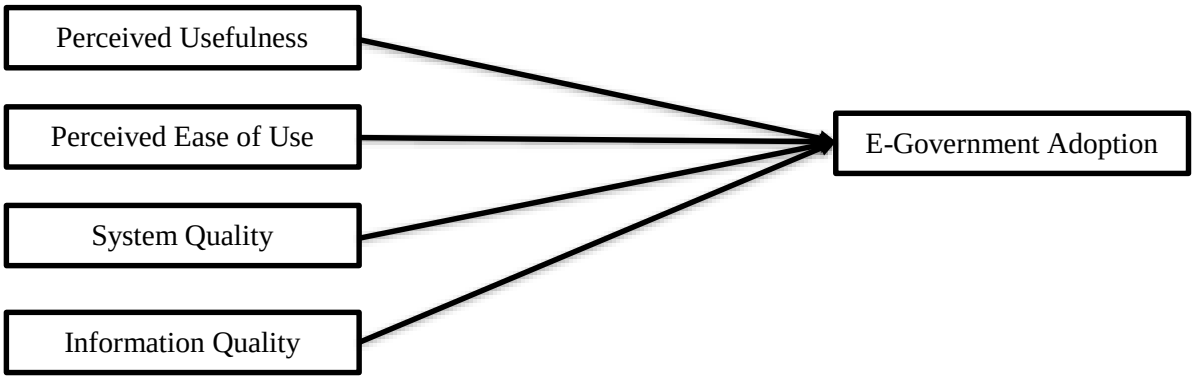
applications. The second phase envisioned the e-government to promote internet services. Meanwhile, the third phase is intended to simplify information services to be proactive and easily accessible to the public. The fourth phase uses more Web 2.0 social networks to offer innovative services that more actively meet public needs. Finally, the fifth phase is expected to provide convenient services for the people, implement an open, transparent, and smart government, and optimize evidence-based effective policies.

METHODS

Quantitative analysis was used to evaluate theories, give facts or data, and illustrate the link between variables, form concepts, comprehend or define many things. This research uses a questionnaire and literature to obtain data for analyzing the phenomenon. The population is the Tainan City people, and the sample of 100 respondents was calculated using the Slovin formula. The results of the questionnaire were then processed using SmartPLS 3.0 software.

The proposed research framework is adopted from (Hmoud et al., 2010), which analyzed the factors that affect the acceptance of e-government. These factors are System Quality, Information Quality, Perceived Ease of Use, and Perceived Usefulness of Benefits, as depicted in Figure 2.

Figure 2
Research Framework



Source: *Primary Data, 2022*

The hypotheses proposed are as follows:

H1: Perceived Usefulness has a significant influence on e-government adoption in the COVID-19 era

H2: Perceived Ease of Use has a significant influence on e-government adoption in the COVID-19 era

H3: System Quality has a significant influence on e-government adoption in the COVID-19 era

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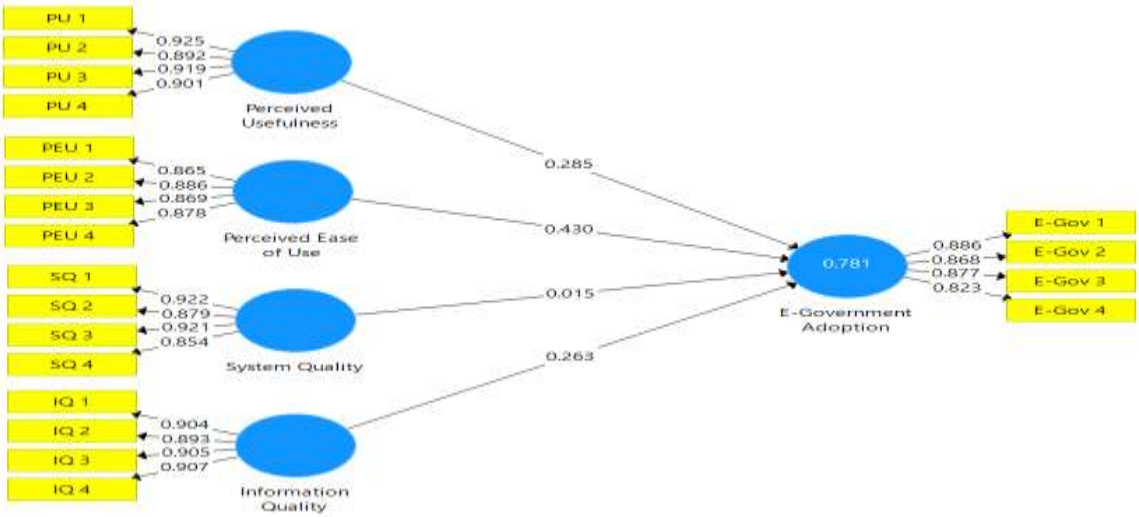
H4: Information Quality has a significant influence on e-government adoption in the COVID-19 era.

RESULT AND DISCUSSION

Figure 3 shows the results of the Outer Model used to measure the level of validity of the research indicators and the influence of the independent variable on the dependent. In addition, Table 1 shows the variable validity and the research reliability test.

Figure 3
Outer Model Result



Source: *Primary Data, 2022*

Table 1.
Validity and Reability Test

Variable's	Cronbach's Alpha	rho_A	Composite Reliability	AVE
E-Gov Adoption	0.886	0.888	0.921	0.746
Information Quality	0.924	0.926	0.946	0.814
Perceived Ease of Use	0.898	0.898	0.929	0.765
Perceive Usefulness	0.930	0.934	0.950	0.827
System Quality	0.917	0.930	0.941	0.800

Source: *Primary Data, 2022*

1. Validity Test Result

The first and second criteria, such as Convergent and Discriminant Validity, can be seen from the outer model, namely the AVE value. The validity data has a limited value and can be stated to be valid. The AVE value is valid when the score is more than 0.50, but the data cannot be valid when it is less than 0.05. The validity data from the cross-loading with a limit value is valid. The cross-loading value is valid when the score is more than 0.50; when it is less than 0.50, the data cannot be valid.

The validity test results in Figure 3 and Table 1 show that all indicators in each research variable consisting of E-Government Adoption, Information Quality, Perceived Ease of Use, Perceive

DOI: https://doi.org/10.33701/jtp.v14i1.1861

usefulness, and System Quality have a loading factor value greater than 0.500. These variables have an AVE value greater than 0.500, hence, it can be concluded that all questions in all research variables are declared valid or have met convergent validity.

2. Reliability Test Result

Based on the output of composite reliability and Cronbach's alpha in Table 1, the value of each construct is above 0.70. E-Government Adoption variable has Composite Reliability and Cronbach's Alpha values of 0.921 and 0.886, while the Information Quality variable has 0.946 and 0.924. Furthermore, Perceived Ease of Use has Composite Reliability and Cronbach's Alpha values of 0.929 and 0.898, while Perceive Usefulness variable has 0.950 and 0.930. Finally, the System Quality variable has Composite Reliability and Cronbach's Alpha values of 0.941 and 0.917. The composite reliability value and Cronbach's alpha value in Table 1 show that each construct's value is above 0.70. Therefore, each construct in the estimated model has good reliability.

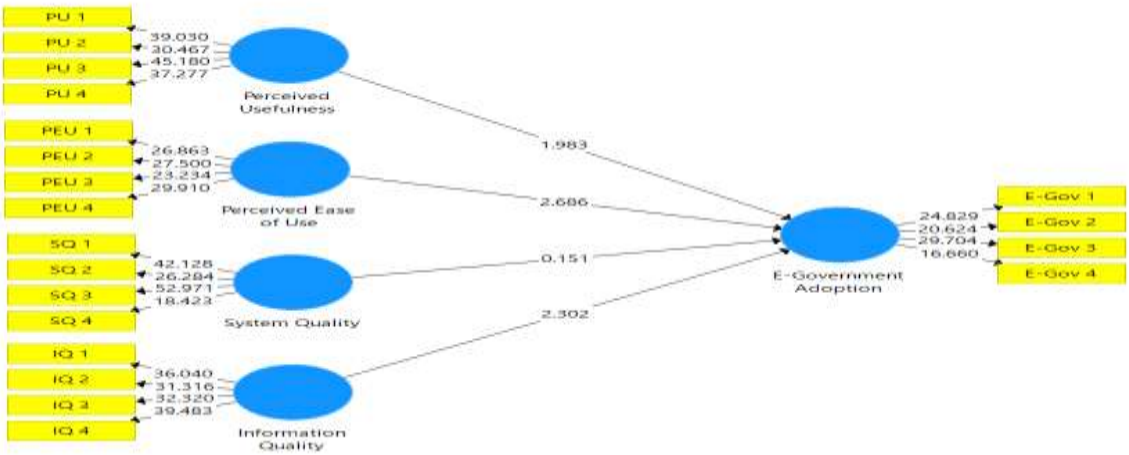
3. Regression Test Result

Figure 3 shows that the e-government adoption variable is obtained at 0.781, which can explain the effect of Information Quality, System Quality, Perceived Ease of Use, and Perceived Usefulness on the e-government adoption variable of 78.1%. If it is associated with the Rule of Thumb for R Square testing according to (Ghozali, 2006: 27), the structural model which has an R-square (R2) result of 0.67, 0.33, and 0.19 indicates "good," "moderate," and "weak" model. As a result, there is a moderate effect between trust and output variables.

4. Hypotheses Test Result

The results of hypothesis testing can be seen in Figure 4.

Figure 4
Hypothesis Test Result



Source: *Primary Data, 2022*

Figure 4 and Table 2 show that the system quality, information quality, perceived usefulness, and perceived ease of use variables are positive.

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Therefore, the independent variable directly affects the dependent, meaning that the value of the independent variable can positively or negatively affect e-government acceptance. A hypothesis can be accepted in the Smart PLS bootstrapping test when the T-Statistic value is more than 1.96, and the P-Value is less than 0.05. Conversely, the hypothesis is rejected when the T-Statistic value is less than 1.96 and the P-Value is more than 0.05.

In Table 2, the System Quality (SQ) variable has a T-Statistic and P-Value of 0.151 and 0.880, respectively. This shows that the SQ variable has no significant effect on e-government adoption during the COVID-19 era. Meanwhile, the information quality (IQ), Perceived Usefulness (PU), and Perceived Ease of Use (PEOU) variables have a T-Statistic value of more than 1.96 and a P-Value less than 0.05. This shows that information quality, Perceived Usefulness (PU), and Perceived Ease of Use (PEOU) variables significantly affect e-government acceptance.

5. Discussion

The results show that perceived usefulness and benefits significantly influence e-government acceptance. The testing hypothesis one (H1) is not in line with the research by (Hmoud et al., 2010), which stated that perceived benefits do not significantly affect e-government acceptance. However, this aligns with the research by (Davis, 1989; Venkatesh et al., 2000; Wixom & Todd, 2005), which stated that perceived usefulness significantly influences user acceptance of information systems. Based on respondents' answers to information system users, it is an e-government facility. Users benefit from the existing facilities to improve performance, productivity, and effectiveness in getting services in the era of the COVID-19 pandemic. Users of information systems are more likely to employ e-government facilities to access public services because of the benefits. By increasing the use of e-government, the risk of spreading COVID-19 in offices will be lower.

The results show that perceived ease of use significantly influences e-government acceptance. This indicates that perceived convenience influences users to use or utilize e-government facilities. Testing the second hypothesis (H2) is in line with Al (Hmoud et al., 2010) research, where the perception of convenience significantly influences e-government acceptance. The results are also in line with (Davis, 1989; Venkatesh et al., 2000; Wixom & Todd, 2005), where perceived ease of use significantly influence user acceptance of information systems. According to the respondents' responses, users feel comfortable accessing and utilizing e-government facilities. Users have no significant difficulty in accessing facilities. Furthermore, they believed that these facilities are not complex and could be easily manipulated. The emergence of internet services is significant during the COVID-19 pandemic. To combat the spread, the government stopped on-site services in addition to promoting residents to use their phones.

The results showed that the quality of the system did not have a significant effect on e-government acceptance. Therefore, an exemplary system quality may not necessarily influence users to

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utilize e-government facilities. On the other hand, poor system quality may not discourage users from using e-government facilities. The results of testing the third hypothesis (H3) are not in line with (Hmoud et al., 2010), where the system's quality has a dominant influence on e-government acceptance. This indicates the higher the quality of the present system in e-government services, the more users will accept it, but this conclusion is not accepted in this research.

Based on the respondents' questionnaire answers, it was argued that the quality of the e-government facilities in Tainan City did not significantly affect users in the era of the COVID-19 pandemic. They tend to access these facilities because of the demands and requirements imposed by the Tainan City government. During the pandemic, the Tainan City and Taiwan Governments implemented social distancing to prevent viral transmission. These restrictions promote the government to implement e-service or e-government for some public services. Therefore, people do not have to go directly to the office to access services. The government bureaucracy and the delivery of information depend on an integrated information system through the internet or intranet networks.

Good system quality makes it easier to use e-government facilities. The results show that the quality of information significantly influences e-government acceptance. Therefore, good information quality can influence users to utilize e-government facilities. Poor quality of information can certainly make users reluctant to use e-government facilities. The results of testing the fourth hypothesis (H4) are not in line with (Hmoud et al., 2010), where the quality of information significantly influences e-government acceptance. This implies the higher the quality of the information offered, the more likely users will adopt e-government.

CONCLUSION

Rachel Silcock (2001) explained that e-government uses technology to improve access and delivery of government services. This service benefits citizens, business partners, and employees. (Agostino et al., 2020) stated that the COVID-19 pandemic impacted the development of digital transformation in the provision of public services. In the face of the pandemic, every public agency or government entity is eager to speed digitally to maximize public services.

The behavior of e-government in Tainan City can be measured using TAM. The factors that influence the use of e-government are perceived ease of use, perceived usefulness, and information quality. Meanwhile, system quality does not significantly affect the use.

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