An Empirical Examination of E-Government Adoption in Indonesia

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Doctor of Philosophy

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Declaration

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and, ethics procedures and guidelines have been followed. I acknowledge the support I have received for my research through the provision of an Australian Government Research Training Program Scholarship.

Alvedi Chandra Sabani

Melbourne, 16 July 2021

Dedication

This thesis is dedicated to my family, to whom I am indebted forever.

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List of Abbreviations

ADOPT	adoption of e-Government
AGFI	adjusted goodness of fit index
AMOS	analysis of the moment structure
AVE	average variance extracted
BCHEAN	Business College Human Ethics Advisory Network
CB-SEM	covariance-based SEM
CFA	confirmatory factor analysis
CFI	comparative fit index
CITC	Communications and Information Technology Commission
COVID-19	coronavirus disease-19
CR	critical ratio
Df	degree of freedom
DOI	diffusion of innovations
DTPB	decomposed theory of planned behaviour
EEXPE	effort expectancy
EFA	exploratory factor analysis
EGOV	electronic government
FCOND	facilitating conditions
fsQCA	fuzzy-set Qualitative Comparative Analysis
G2B	government-to-business
G2C	government-to-citizens
G2CS	government-to-civil society and communities
G2G	government-to-government
GAM	e-Government adoption model
GFI	goodness of fit index
GOF	goodness of fit
GOVEN	government encouragement
ICT	information and communication technology
ICTLI	information and communication technology literacy
IDT	innovation diffusion theory
IQUAL	information quality

IS	information systems
IS Success	information systems success model
KMO	Kaiser–Meyer–Olkin
MI	modification indices
NFI	normed fit index
PEOU	perceived ease of use
PI	personal innovativeness
PISCF	participant information sheet and consent form
PLS	partial least squares
PLS-SEM	partial least squares-structural equation modelling
PU	perceived usefulness
QCA	qualitative comparative analysis
RMSEA	root mean square error of approximation
SCT	social cognitive theory
SDT	self-determination theory
SE	standard error
SEM	structural equation modelling
SFL	standardised factor loadings
SINFL	social influence
SPSS	Statistical Product and Service Solutions
SQUAL	service quality
SR	standardised residuals
SRMR	standardised root mean residual
SRW	standardised regression weight
TAM	technology acceptance model
TAM2	extended technology acceptance model
TPB	theory of planned behaviour
TRA	theory of reasoned action
UN	United Nations
UMEGA	unified model of e-Government adoption
UTAUT	unified theory of acceptance and use of technology
VAF	variance accounted for
VIF	variable inflation factor
4IR	Fourth Industrial Revolution

Abstract

Countries across the world have been implementing electronic government (e-Government) to improve the delivery of public services for citizens. Consequently, enhancing citizens' uptake of e-Government services has become a fundamental issue. As countries have reached different stages of e-Government development and maturity, the factors affecting its acceptance and usage might vary and have significant implications for adoption-diffusion strategies. However, investigations of these criteria are limited, particularly from the perspective of the citizens from developing countries such as Indonesia. Moreover, studies have reported inconsistent findings regarding the critical factors influencing the adoption of many technologies, including e-Government services. A reasonable explanation is that the adoption of e-Government has thus far been studied using models that do not fully capture the complexity of e-Government adoption from the citizens' perspective. This research develops a model, which posits that adoption does not depend on individual factors but on specific configurations of factors. Understanding the configurations and collective effect of the critical factors for the successful adoption of e-Government would have major theoretical implications and deliver a unique contribution to e-Government and technology adoption research.

A mixed-methods approach was adopted for this study. A research model was initially developed based on the literature, mostly from developing countries, underpinned by the unified theory of acceptance and use of technology (UTAUT). The research model was then revised with qualitative data obtained from a field study. Qualitative data were collected via interviews with 15 e-Government users in Indonesia. Along with some common factors, namely, performance and effort expectancy, the thematic analysis of the interviews identified two emerging factors that may influence citizens to use e-Government services: perceived transparency and government encouragement. Next, a survey of 314 Indonesian citizens was used to validate the revised model and its associated relationships between constructs. Structural equation modelling (SEM) was used to evaluate the significance of performance expectancy, effort expectancy, social influence, facilitating conditions, perceived transparency, perceived security, information quality, system quality, information and communications technology literacy and government encouragement in the adoption and use of transactional e-Government services from the perspective of citizens in Indonesia. The study proposes and evaluates several new moderation and mediation roles in the research model that have not been

adequately discussed in the literature. The model explains 76.5% of the variance in the adoption of e-Government services, which is higher than the baseline UTAUT model.

Fuzzy-set Qualitative Comparative Analysis (fsQCA) was applied to complement the findings from SEM in investigating why citizens accept and resist e-Government services. The fsQCA findings suggest three configurations that would lead Indonesian citizens to adopt e-Government and two that would lead Indonesian citizens to use e-Government services. These configurations have not been explored in previous studies. The results indicate an overall solution coverage of 84.5% for the intention to adopt and 82.5% for the use of e-Government. This suggests that a substantial proportion of e-Government adoption and use is covered by the proposed solutions. From the model proposition analysis, the research model for the adoption of e-Government shows 99.7% consistency, which is significantly higher than the 80% threshold for a research model to be useful and justify theory advancement. Further, fsQCA also provides two configurations that explain why Indonesian citizens are resistant to the adoption and use e-Government services, making a unique contribution to the literature.

The research contributes to e-Government research from both theoretical and practical perspectives. From the theoretical perspective, the UTAUT is extended by incorporating exogenous factors including information quality, system quality and information and communications technology literacy, as well as endogenous factors such as perceived transparency and perceived security. These factors are important for e-Government adoption and use in developing countries such as Indonesia. This study also identifies which factors are essential or non-essential for the adoption and use of e-Government and which combinations of factors are more or less important than others. In practice, this research offers governmental and public organisations with suggestions to improve the uptake of e-Government. This information can be used to formulate better strategies and policies for the continuous development of e-Government in Indonesia and other developing countries.

This research investigates the critical factors for the adoption and the of e Government from the perspective of citizens. There are other stakeholders with different perceptions of the adoption of e Government, such as businesses and public organisations. These stakeholders may have various thoughts, needs and expectations regarding the adoption of e Government. Future research should consider the perceptions of these stakeholders to broaden the scope of the study to obtain a comprehensive understanding of the issues that affect the adoption and use of e Government.

Keywords

e-Government; adoption; use; developing country; UTAUT; Indonesia; SEM; fsQCA; qualitative; quantitative; mixed-methods

Chapter 1. Introduction

1.1 Research Background

The fourth industrial revolution (4IR) can be summarised as the evolution of a connected and more intelligent society (Spicer 2016). The 4IR is relevant to the purpose of governments and critical to the future of democratic governments. Citizens are rapidly embracing digital emersion in everyday life (Patil, Rana & Dwivedi 2018). Technology dominates human interaction and has become a key driver of expectations for interactions with other entities (Schwab 2017), such as public organisations, through the electronic government (e-Government). Therefore, 4IR acts as a platform that enables and encourages citizens to participate in the public decision-making process.

During the coronavirus disease-19 (COVID-19) crisis, information and communications technology (ICT) has played a vital role in promoting health and safety and maintaining economies and societies. Digital technologies, through information sharing and online services provision, have kept governments and citizens connected during the pandemic. ICT has also enabled governments to make timely policy decisions based on real-time data and analytics, enhance the capacities of authorities for better coordination and deploy evidence-based services to those in need (United Nations 2020).

E-Government is defined as the use of ICT for improving the delivery of public services to citizens and businesses (Kurfalı et al. 2017; Mirchandani et al. 2008). It has numerous benefits for various stakeholders, including public organisations, businesses and citizens. From the public organisation perspective, the development of e-Government enhances information sharing between government institutions (Puspitasari & Ishii 2016). In addition, it streamlines processes in public organisations, improving their efficiency and effectiveness (Debjani, Umesh & Gupta 2012). For businesses, e-Government facilitates online public procurement (Sambasivan, Wemyss & Rose 2010) and enables seamless two-way communications between businesses and public organisations (Susanto & Goodwin 2013). For citizens, e-Government improves the quality of public service delivery (Nam 2014) and the transparency of public decision-making (Deng, Karunasena & Xu 2018). It also and encourages the involvement of citizens in public administration (Heeks & Bailur 2007). As a result, many governments have fast-tracked the implementation of e-Government services (United Nations 2020).

The development of the e-Government system trails certain paths, levels of maturity, stages or phases (Dwivedi et al. 2017; Verkijika & De Wet 2018). The countries implementing e-Government have different missions and objectives. However, the gradual development of an e-Government system in any country follows some unique levels of service maturity for evolution (Dwivedi et al. 2017; United Nations 2018). Each level represents different service patterns, levels of technological sophistication, types of interaction, security requirements and reengineering processes (Al-Soud, Al-Yaseen & Al-Jaghoub 2014; Debjani, Umesh & Gupta 2012; Krishnan, Teo & Lim 2013; Shareef et al. 2011). These levels describe the sequential development of a service.

A review of e-Government development literature (Al-Soud, Al-Yaseen & Al-Jaghoub 2014; Deng, Karunasena & Xu 2018; Krishnan, Teo & Lim 2013; Sabani, Deng & Thai 2019a; Shareef et al. 2011; United Nations 2018) leads to the identification of four stages, (a) emergence, (b) enhancement, (c) transaction and (d) connection, as shown in Figure 1.1.

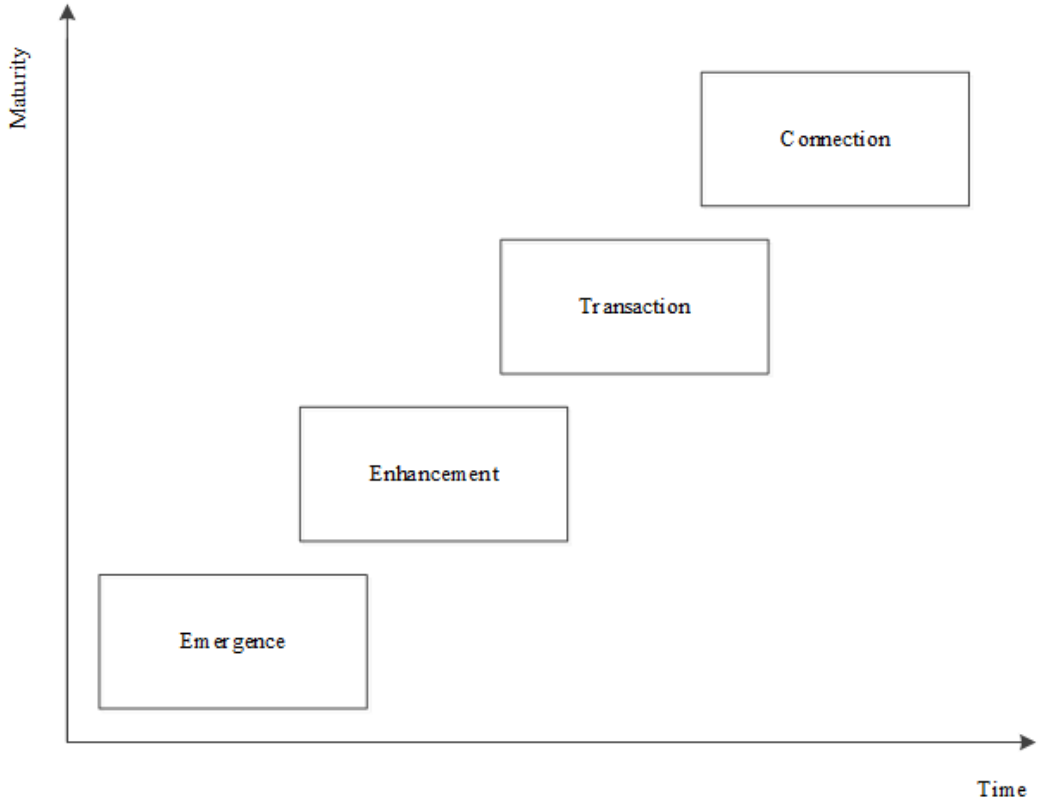

Figure 1.1 An Overview of E-Government Development Stages. Adapted from Sabani, Deng and Thai (2019a) and United Nations (2016).

The emergence stage of e-Government development facilitates information delivery from the government to the public (United Nations 2016). It is the initial stage where the government

provides static information online. This stage focuses on delivering information such as government contact information and policy announcements. The quality of information is the primary concern within this stage (Wangpipatwong, Chutimaskul & Papasratorn 2009). The development of technologies raises citizens' expectations for e-Government to deliver services beyond information delivery (Debjani, Umesh & Gupta 2012). This urges governments to enhance their e-Government to the next stage.

The enhancement stage of e-Government development is about facilitating simple communication between the government and the public (United Nations 2016). It is an intermediate phase where the government provides dynamic information and basic one-way transactions. A common example of this type of transaction is online feedback, where citizens can submit their complaints about a physical government service to the official website. The availability of one-way services is one of the main concerns within this stage, along with information quality (Mishra & Mishra 2011).

The transaction stage of e-Government development is about improving the delivery of public services through e-Government (United Nations 2016). This stage focuses on establishing two-way interactions between e-Government stakeholders, including citizens and public organisations (Irani, Al-Sebie & Elliman 2006). In the transaction stage, citizens begin to take an active role in their participation in e-Government services (Beynon-Davies 2007). A typical example is the online taxation portal. E-Government at this stage enables citizens to file their tax returns online, where previously it could only be done by physically visiting the taxation office (Karunasena & Deng 2012).

The connection stage of e-Government development is about redefining the delivery of public services by providing the one-stop integrated e-Government system in which citizens can immediately access public services (United Nations 2016). This is the final stage of e-Government development, and it assumes that horizontal connections exist between government institutions and vertical connections exist among central and local government. It also assumes that reliable infrastructure is in place with support systems established (Shareef et al. 2011). This stage also requires established transactional e-Government services (United Nations 2020).

The implementation of e-Government by following a defined set of stages is not a simple task. Many developing countries are struggling to fully attain the transaction stage of e-Government,

including India (Samuel et al. 2020), Indonesia (Sabani 2021), Mauritius (Lallmahomed, Lallmahomed & Lallmahomed 2017), Pakistan (Asmi, Zhou & Lu 2017), Saudi Arabia (Almukhlifi, Deng & Kam 2019a), Turkey (Kurfalı et al. 2017) and Vietnam (Van Thanh, Yoon & Hwang 2018). This thesis examines the adoption of e-Government by citizens in developing countries such as Indonesia; therefore, it is appropriate to focus on the transaction stage of e-Government.

1.2 Research Problem

Despite the progressive development of e-Government across the world, the adoption of e-Government in developing countries is still far from satisfactory (United Nations 2018). The unsatisfactory adoption of e-Government has been widely acknowledged in the literature. Prahono and Elidjen (2015), for example, showed that only 15.6% of e-Government services in Indonesia were fully accessible and functional. Almukhlifi, Deng and Kam (2019b) found the adoption of e-Government in Saudi Arabia was ineffective due to the strong presence of cultural elements such as *wasta*. Meanwhile, Shuib, Yadegaridehkordi and Ainin (2019) examined the low uptake of e-Government in Malaysia due to poor satisfaction. Shahzad et al. (2019) showed that citizens in Pakistan were reluctant to adopt e-Government due to security concerns. These studies have described potential issues with the adoption of e-Government in developing countries and demonstrate that there may be critical factors that have not been adequately investigated. Therefore, there is a need to investigate the critical factors that might influence citizens' adoption of e-Government in developing countries.

Further, countries at different stages of e-Government development might benefit from different implementation strategies (Sabani, Deng & Thai 2019a). For example, the enhancement and transaction stages differ in characteristics and functionality. In the enhancement stage, citizens can only view and collect government information or download forms and publications. These are examples of one-way communication. At this stage, citizens cannot communicate with the government service system through this interface, and the government authority does not respond to the user electronically (Gottschalk 2009; United Nations 2018). In the transaction stage, two-way communication is established. Through government websites, citizens can interact with public administrations to resolve issues electronically, for example, by sending e-mails or using chat rooms (Obi & Naoko 2016). This stage equates to more sophisticated public services.

Citizens' adoption criteria will likely differ for different stages of e-Government development, which might have significant implications to e-Government adoption strategies. However, there has been limited investigation into these criteria (e.g., factors associated with the stage of e-Government development) while exploring adoption models for e-Government. Therefore, research and development of a specific model for evaluating the adoption of transactional e-Government services are required, particularly from the perspective of citizens in developing countries such as Indonesia.

1.3 Research Context

The current research aims to examine the adoption of e-Government from the perspective of citizens in developing countries. Specifically, this study focuses on the Indonesian context of e-Government adoption. Indonesia is one of the developing countries pursuing e-Government implementation. The South-East Asian nation comprises thousands of volcanic islands and is one of the most populated developing countries, with over 270 million citizens (World Bank 2020). According to a recent study by Polling Indonesia, conducted in cooperation with the Indonesian Internet Providers Association, internet penetration in Indonesia had reached over 73% of the total population in 2020 (APJII 2020). Due to the dispersion of the Indonesian population throughout the archipelagic country and the trend of technological developments across the globe, the Indonesian Government believes that e-Government is the most suitable platform to serve its citizens (Republik Indonesia 2014). Indonesia is a suitable context for this study given the rapid development of its e-Government and its large number of online citizens.

The Indonesian Government officially introduced the e-Indonesia initiative for facilitating the development of e-Government in 2001 (Republik Indonesia 2014). In the latest development program, the Indonesian Government has committed to spending US$6.78 billion for e-Government development from 2014 to 2019 (Republik Indonesia 2014). The Indonesian Government has set six active milestones for the e-Indonesia initiative (Indonesian e-Government program), as presented in Figure 1.2. The main objectives of the six-year plan include (a) improving the delivery of public services, (b) closing the digital divide, (c) suppressing corruption through the transparency of e-Government, (d) enhancing the quality of education, (e) supporting the country's growth and (f) enriching the quality of life of Indonesian citizens (Napitupulu et al. 2018; Republik Indonesia 2014; Sabani, Deng & Thai 2019a). Five e-development programs have been adopted and implemented to achieve these

objectives, including the (a) open government program, (b) human resource development program, (c) ICT infrastructure investment program, (d) public participation improvement program and (e) policies and institutional development programs (Obi & Naoko 2016; Republik Indonesia 2014).

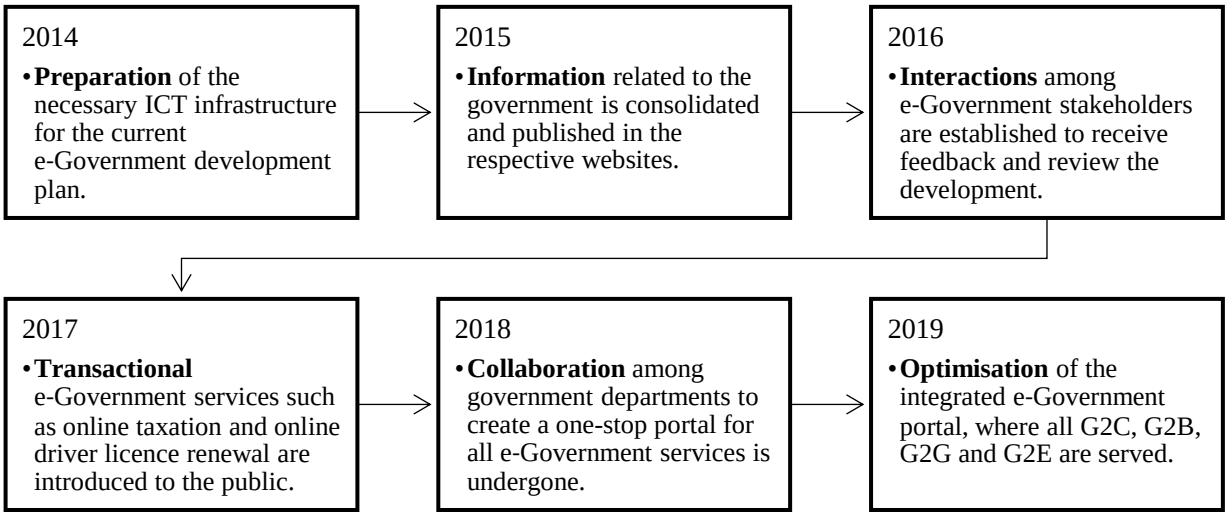

Figure 1.2 The Roadmap for E-Government Development in Indonesia (Republik Indonesia 2014)

Figure 1.3 presents an overview of e-Government development in Indonesia. The development program aims to improve the efficiency, effectiveness and transparency of the delivery of public services by implementing various e-Government services (Obi & Naoko 2016; Republik Indonesia 2014; Waseda University 2017). The program is supported by other plans, including the development of human resources in the public organisation, investments in ICT infrastructure to distribute e-Government servers throughout the national broadband network, improvements in public participation to develop citizen-oriented e-Government, formulation of policies and institutional changes to further support the development of e-Government. These plans are expected to create a supportive environment for the effective development of e-Government in Indonesia.

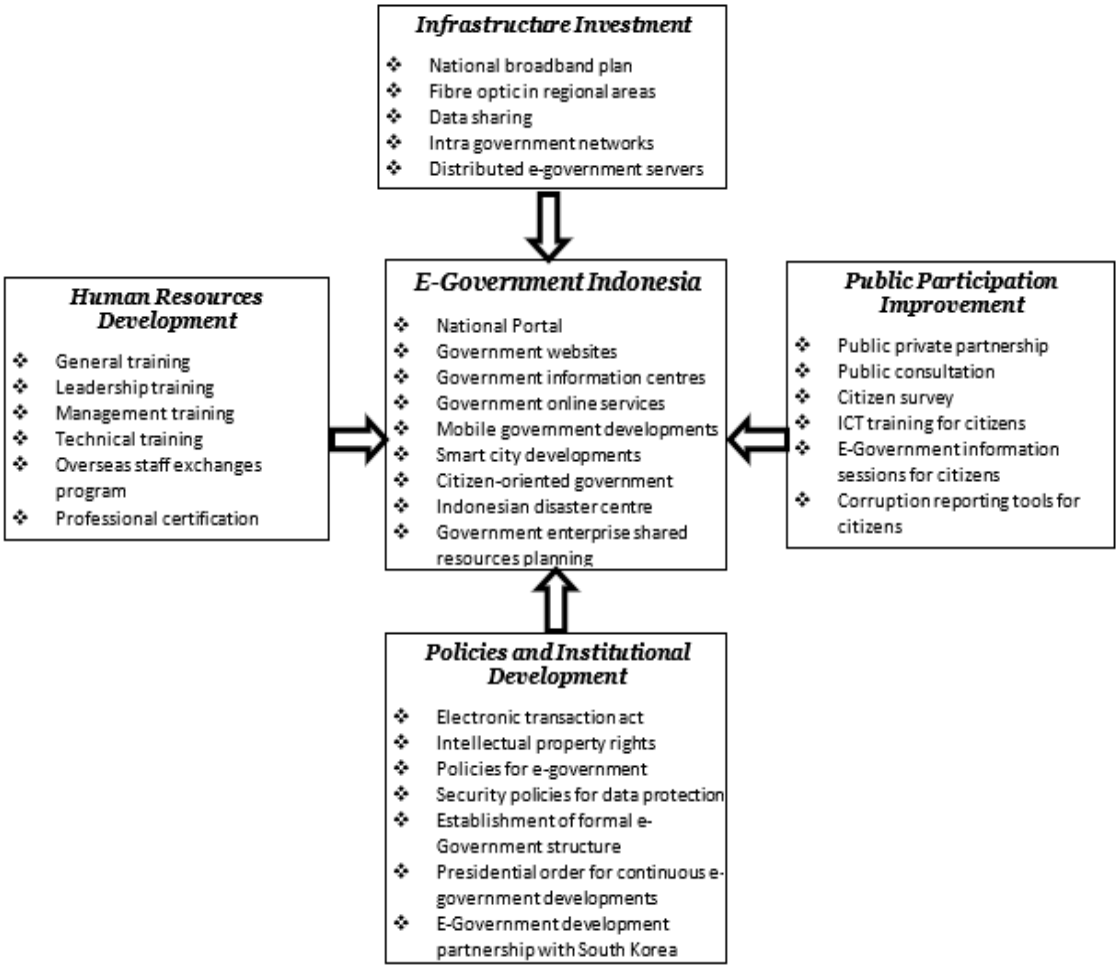

Figure 1.3 An Overview of E-Government in Indonesia (Obi & Naoko 2016; Republik Indonesia 2014; Waseda University 2017)

Despite substantial investment in e-Government development in Indonesia, the adoption of e-Government in society is still far from satisfactory (Jacob et al. 2019; Mutaqin & Sutoyo 2020; Sabani 2021). Based on the e-Government ranking of the United Nations Survey 2008–2020 (United Nations 2020), Indonesia did not show a significant improvement in e-Government development (see Table 1.1). Development has been stagnated despite substantial e-Government expenditure.

Table 1.1 South-East Asian E-Government Rankings (United Nations 2020)

Rank	Country	2008	2010	2012	2014	2016	2018	2020
1	Singapore	23	11	10	10	4	7	11
2	Malaysia	34	32	40	59	60	48	47
3	Thailand	64	76	92	54	77	73	57
4	Brunei	87	68	54	179	83	59	60
5	Philippines	66	78	88	51	71	75	77
6	Vietnam	91	90	83	65	89	88	86
7	Indonesia	106	109	97	110	116	107	88
8	Cambodia	139	140	155	137	158	145	124
9	East Timor	155	162	170	186	160	142	134
10	Myanmar	144	141	160	172	169	157	146
11	Laos	156	151	153	137	148	162	167

The low adoption level of e-Government in Indonesia is further reflected in the e-Government Participation Index (EPI). EPI demonstrates the performance of e-participation through government mechanisms and how the government has promoted interaction between the citizens and public organisations (United Nations 2020). Figure 1.4 shows a comparison of EPI between Indonesia and the closely related country (geographically and culturally) of Malaysia.

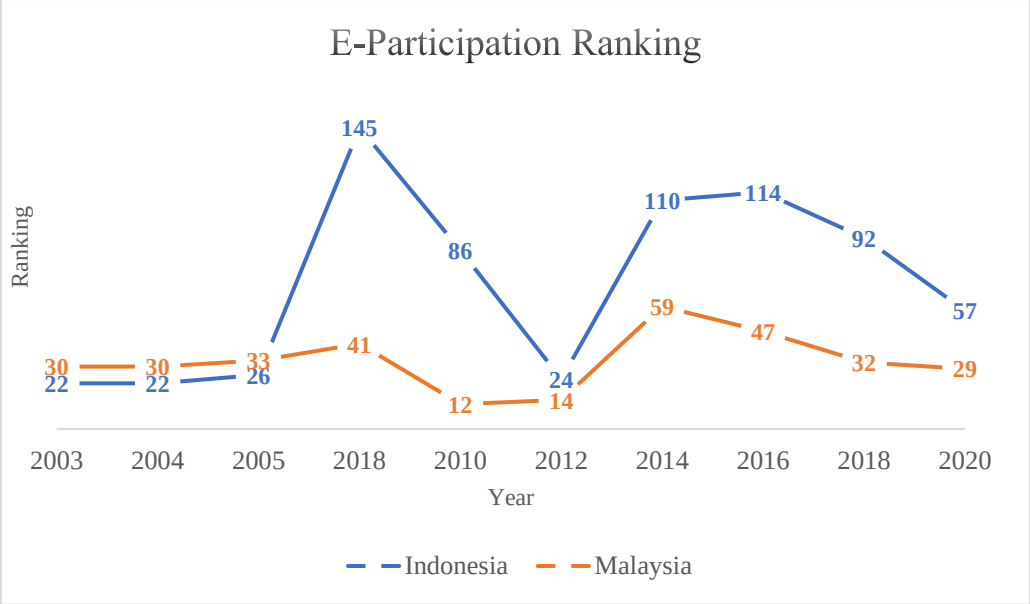

Figure 1.4 EPI Comparison between Indonesia and Malaysia

The slow adoption of e-Government in Indonesia is evident in the literature. For example, Maslihatin (2016) found that the average citizen satisfaction index of e-Government services across the country is very poor. Puspitasari and Ishii (2016) attributed the low adoption of e-Government in Indonesia to the computer-based accessibility of most e-Government services, whereas mobile phones are the preferred communication channel. Mutaqin and Sutoyo (2020) evaluated a digital invitation service (*e-punten*) and found that local ICT infrastructure must be improved to support the adoption of e-Government services in Indonesia.

The majority of these studies have focused on the technological factors for the adoption of e-Government; however, other factors may need to be considered. Napitupulu et al. (2018) asserted that e-Government failure could largely be attributed to viewing e-Government from the technological perspective while ignoring non-technological factors. Palaco et al. (2019) suggested that non-technological issues cause e-Government failure more often than technological issues. In addition, Sabani, Deng & Thai (2018) suggested that the success of e-Government is more reliant on non-technological factors, including human factors (citizens), than technological factors. Therefore, understanding the critical factors associated with e-Government adoption from a citizens' perspective may help the Indonesia Government better plan its e-Government initiatives. Moreover, as several developing countries are in comparable stages of e-Government development (United Nations 2018), this research will provide a useful reference for other developing countries.

1.4 Research Aims and Questions

The objective of this research is to propose an e-Government adoption model for better understanding the transaction stage from the citizen perspective in developing countries such as Indonesia. Specifically, this research aims to (a) identify critical factors for the adoption of transactional e-Government services from the perspective of Indonesian citizens, (b) evaluate the configurations of the critical factors that lead citizens to adopt and use e-Government services and (c) analyse the configurations of the sufficient and necessary factors that lead citizens to reject e-Government services in the context of developing countries such as Indonesia.

The primary research question to address the aims for this study is:

> ***RQ:*** *What are the critical factors for evaluating the adoption of transactional e-Government services from the perspective of citizens in Indonesia?*

The following secondary questions were formulated to help answer the primary research question:

> ***SRQ1:*** *What factors influence the adoption of transactional e-Government services in Indonesia?*
>
> ***SRQ2:*** *What are the relationships among identified factors for evaluating the adoption of transactional e-Government services in Indonesia?*
>
> ***SRQ3:*** *What are the configurations of factors that would lead citizens to accept and resist the adoption and the use of transactional e-Government services in Indonesia?*

1.5 Motivation for the Research

The motivation to undertake this research includes five aspects. First, countries have reached different stages of e-Government development (Obi & Naoko 2016; United Nations 2020), and the factors affecting the acceptance and usage of e-Government at different developmental stages might vary and have significant implications for adoption-diffusion strategies (Idris 2016; Mirchandani, Johnson Jr & Joshi 2008; Ovais Ahmad, Markkula & Oivo 2013).

However, there is limited literature investigating these criteria, particularly from citizens' perspective in developing countries such as Indonesia.

Second, reviewing the existing literature on e-Government adoption by citizens (Akhtar Shareef et al. 2014; Alzahrani, Al-Karaghouli & Weerakkody 2017; Deden et al. 2017; Gupta, Bhaskar & Singh 2016; Idris 2016; Meijer 2015; Rana et al. 2017; Shahzad et al. 2019; Urbina & Abe 2017; Venkatesh et al. 2016; Warkentin et al. 2002), it can be inferred that adoption models in the literature are generally conceptual. Shareef et al. (2011) suggested that 'extensive empirical studies among the actual users to validate and generalize the models are absent'. Further, studies that have attempted to validate e-Government adoption models have not integrated multidisciplinary perspectives of e-Government adoption (Dwivedi et al. 2017; Shareef et al. 2016).

Third, despite the potentially significant effects of e-Government on public administrations, organisations, citizens and society, only a few systematic and thorough studies have been undertaken to comprehensively integrate non-technological factors related to citizens' adoption of e-Government (Bertot, Jaeger & Grimes 2012; Dwivedi et al. 2017; Jaeger et al. 2007; Rana et al. 2017). Citizens' behaviour is complex in adopting new technology-driven systems (Mutaqin & Sutoyo 2020; Shahzad et al. 2019; Shareef et al. 2016). Therefore, a study that integrates technological and non-technological factors to evaluate the citizens' adoption of e-Government is required.

Fourth, existing models for evaluating the adoption of e-Government are either designed for countries where e-Governments are mature or generalised without considering the maturity of e-Government development (Kurfalı et al. 2017; Shareef et al. 2011; Voutinioti 2013; Williams, Rana & Dwivedi 2015). Therefore, these models are unsuitable for developing countries where e-Government development is at the early transaction stage. Therefore, this research is justified by the need for a new model capable of capturing the uniqueness of the e-Government adoption in developing countries. Understanding citizen adoption behaviour will help improve e-Government practices and development.

Finally, and most importantly, there is a lack of evaluation regarding the collective effects of critical factors leading to citizens' adoption and use of e-Government services. The majority of e-Government adoption studies only focus on identifying and testing the effects of individual factors for the adoption of e-Government services (Almukhlifi, Deng & Kam 2019a; Deden et

al. 2017; Deng, Karunasena & Xu 2018; Gupta, Bhaskar & Singh 2016; Idris 2016). Understanding the sufficient and necessary criteria that lead to the successful adoption of e-Government would have important theoretical and managerial implications.

1.6 Research Methodology

The selection of an appropriate research methodology should be determined by the nature of the research (Creswell & Plano Clark 2011). The aim of this research, to examine the adoption of e-Government services in Indonesia, is both exploratory and confirmatory. The exploratory aspect relates to studying citizens' perceptions and the factors influencing their adoption of e-Government. The confirmatory aspect focuses on testing and validating the research model for the adoption of e-Government. The combination of exploratory and confirmatory aspects of the research implies that a mixed-methods approach is appropriate for the study (Arnon & Reichel 2009). The mixed-methods approach involves qualitative and quantitative methods to adequately address the research question (Creswell & Plano Clark 2011). This approach has been successful for studying e-Government at the national level (Ahmed & Shirley 2014; Das, DiRienzo & Burbridge Jr 2009; Karunasena & Deng 2012).

In the qualitative study, e-Government users in Indonesia were interviewed to adequately assess the research problem and further derive a rich conclusion. Semi-structured interview questions were developed based on the literature review. A preliminary study was conducted with the help of academics, higher degree research scholars and e-Government users to refine the interview questions. The exploratory aspect of this research was addressed by undertaking a deductive thematic analysis of the qualitative data collected from the interviews.

The quantitative study involved a survey of Indonesian citizens about their use of e-Government services. The survey was developed based on the review of the related literature and findings from the thematic analysis. A preliminary study was conducted with the help of academics, higher degree research scholars and e-Government users to confirm the content validity of the questionnaire. The research model and use of the survey was validated and tested using structural equation modelling (SEM) for the confirmatory aspect of this research. Finally, fuzzy-set qualitative comparative analysis (fsQCA) was applied to investigate the collective effects of identified critical factors that would ultimately lead to the adoption and use of e-Government services. Further, fsQCA was utilised to investigate the configurations of factors

for low adoption or use of e-Government services, making a unique contribution to e-Government adoption research.

1.7 Significance of the Research

This study has implications for theory building and management practice. From the theoretical perspective, this research presents and validates a research model for examining the adoption and use of e-Government services from the perspective of citizens in Indonesia. The research provides a holistic model incorporating variables that are relevant to e-Government adoption. The development and integration of new variables are considered major theoretical contributions (Reay & Whetten 2011; Venkatesh & Bala 2008; Webster & Watson 2002; Whetten 1989). Such extensions enhance the understanding of e-Government adoption, particularly from a citizen perspective in developing countries such as Indonesia.

Further, this study focuses on the necessary and sufficient factors for citizens to adopt and use e-Government services that have not been addressed in previous studies (Almukhlifi, Deng & Kam 2019a; Alzahrani, Al-Karaghouli & Weerakkody 2017; Deng, Karunasena & Xu 2018; Gupta, Bhaskar & Singh 2016; Idris 2016; Nam 2014). Prior studies found inconsistent effects of the factors influencing the adoption of many technologies, including e-Government (Dwivedi et al. 2017; Venkatesh et al. 2003; Verkijika & De Wet 2018; Williams, Rana & Dwivedi 2015). A plausible explanation for this inconsistency is that the adoption of e-Government has been studied using models that asses critical factors individually and do not fully capture the complexity of e-Government services, particularly regarding citizens' perspectives. This research develops a holistic model that posits that adoption does not depend on individual factors but on specific configurations of factors. Understanding the configurations and collective effects of the critical factors for successful e-Government adoption would have major theoretical implications and provide a unique contribution to e-Government and technology adoption research.

This research also contributes to the literature on the mixed-methods approach and its role in e-Government research. Specifically, this research further establishes how a mixed-methods approach can be utilised in e-Government research to fulfil the exploratory and confirmatory research objectives by complementing qualitative and quantitative data. It provides insights into how various mixed methods and strategies for formulating research questions, collecting and analysing qualitative and quantitative data and complementing findings can fulfil the

research objectives. Therefore, this research demonstrates the applicability of the mixed-methods approach in the e-Government domain for obtaining a comprehensive understanding of the research phenomenon.

From the practical perspective, this research provides a comprehensive investigation into the adoption of e-Government, which will help stakeholders to better understand e-Government adoption. For instance, findings from this research offer the government and public organisations in developing countries with relevant suggestions for improving e-Government adoption. Prioritising the factors perceived by citizens as having a substantial influence on their adoption of e-Government is necessary. Such suggestions can lead to better strategies and policies for the continuous improvement of e-Government in developing countries.

1.8 Structure of the Thesis

This thesis follows the structure recommended for mixed-methods research (Creswell & Plano Clark 2011) with eight chapters, as shown in Figure 1.5.

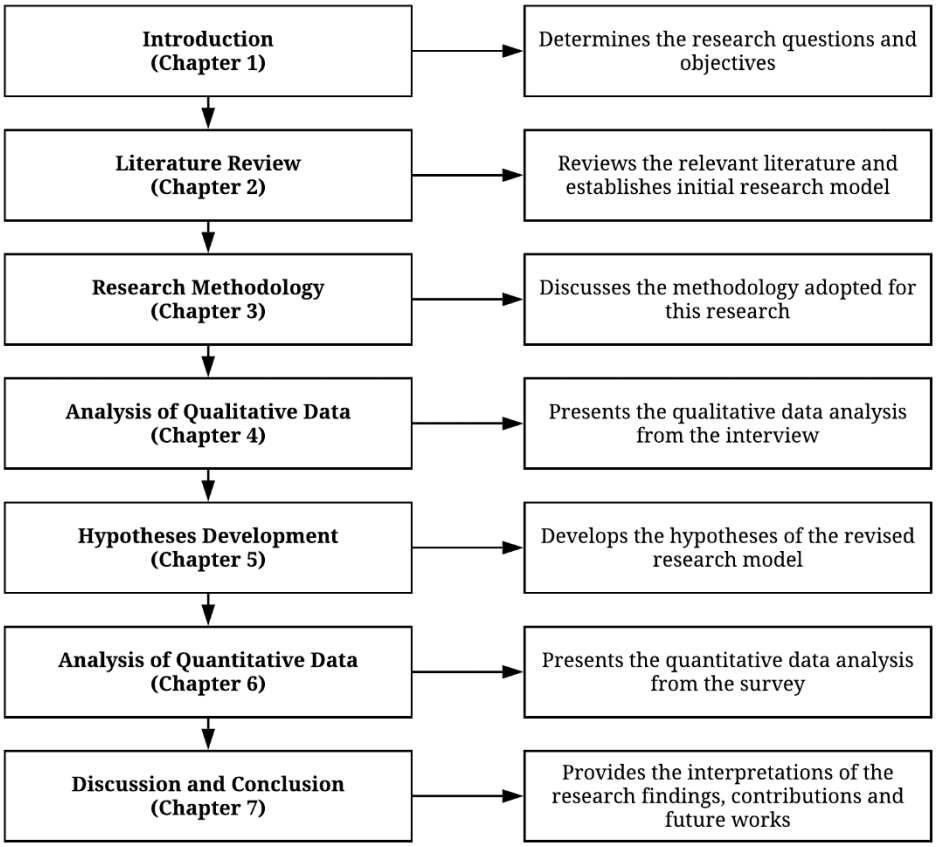

Figure 1.5 An Overview of the Thesis

Chapter 1 is the introductory chapter focusing on the background, motivation and aim of the research; research questions; approaches to the research; and the thesis structure.

Chapter 2 presents a comprehensive review of the literature regarding the development of e-Government in developing countries. Existing studies on the adoption of e-Government are critically examined. The issues and concerns in these e-Government adoption studies are deliberated. This chapter justifies the need for conducting the research and leads to the development of a conceptual model to investigate the critical factors for the adoption of e-Government in developing countries such as Indonesia. The proposed model helps develop the interview questions and facilitates the analysis of interview data using deductive thematic analysis.

Chapter 3 describes the methodology used to answer the research questions. The mixed-methods approach for this research is discussed. The implementation of the research methodology is then described by detailing the qualitative and quantitative approaches.

Chapter 4 focuses on analysing the qualitative data collected through interviews. This chapter discusses the procedures for analysing the qualitative data and reports the qualitative findings. An overview of the thematic analysis technique followed by a discussion of the approach to thematic analysis is presented. The findings from the thematic analysis are reported using a set of themes presented on a thematic map.

Chapter 5 develops the hypotheses of the proposed research models based on the literature review and qualitative analysis. This chapter also details the measurements used to develop the research questionnaire.

Chapter 6 presents the quantitative data analysis. It discusses the procedures for analysing the quantitative data and reports the quantitative results. The chapter begins by presenting an overview of the data analysis procedures and then explains how raw quantitative data were prepared for SEM analysis. The chapter then provides the SEM and fsQCA data analysis.

Chapter 7 concludes the thesis. This chapter discusses the findings and reviews the research questions to confirm the research accomplishments. It discusses the research implications based on the data analysis. In particular, this chapter provides a discussion of the research findings, built upon theoretical and practical perspectives. It also describes the contribution to the body of knowledge in e-Government research and discusses the limitations of the research. Suggestions for further research are also presented.

Chapter 2. Literature Review

2.1 Introduction

Having introduced the background, problem, context, objective and overview of this research in the previous chapter, this current chapter continues with a review of the relevant literature regarding e-Government adoption in developing countries. Existing studies on the adoption of e-Government are critically examined. The issues and concerns in these e-Government adoption studies are deliberated. This chapter justifies the need for conducting the research and leads to the development of a conceptual model to investigate the critical factors for the adoption of e-Government in Indonesia.

2.2 An Overview of E-Government

E-Government is defined as the use of ICT to effectively and efficiently deliver government services to citizens and businesses (United Nations 2020). The concept can be described in many ways. For example, Hwang and Syamsuddin (2008) express e-Government as a way of improving communication between governments and citizens. Pudjianto et al. (2011) view e-Government as a process of enhancing the relationship between governments and their stakeholders. Nam (2014) considers e-Government as the delivery of public services through the adoption of digital technologies. Sabani, Deng & Thai (2019a) perceive e-Government as the use of ICT to redefine public services to make them more accessible, accountable, and effective. Regardless of how it is described, e-Government has raised citizens' expectations for public services delivery, including new effective, efficient and contemporary services delivered over the internet (Al-Soud, Al-Yaseen & Al-Jaghoub 2014).

E-Government can be approached from multiple perspectives, including e-administration, e-society, e-services and e-citizens (Heeks 2008; Jones, Hackney & Irani 2007), as illustrated in Figure 2.1. First, the e-administration approach involves improving government processes by reducing costs, enhancing performance and connecting public organisations, and empowering government employees (Choi et al. 2016; Jones, Hackney & Irani 2007; Wahid 2009). E-administration aims to promote transparency and accountability, leading to better e-Government applications within public organisations (Almukhlifi, Deng & Kam 2019b; Yasar & Giovanni 2007). Second, the e-society approach focuses on establishing partnerships

between the government and societies, including businesses, civil societies and non-profit organisations (Baabdullah, Nasseef & Alalwan 2016; Jones, Hackney & Irani 2007). E-society aims to foster collaboration in building the social and economic capacities and capital of local communities (Lee, Chang & Berry 2011; Sá, Rocha & Cota 2016). Third, the e-services refer to the online public services that are available on the e-Government system. It concentrates on delivering public services to citizens and businesses in an efficient and innovative manner (Heeks & Bailur 2007; United Nations 2018). Finally, the e-citizens approach focuses on the interaction between public organisations and citizens by obtaining inputs from citizens to encourage public participation, support accountability and improve public services (Heeks & Bailur 2007; Karunasena & Deng 2012). The multidimensional nature of the e-Government concept leads to four types of e-Government: government-to-business (G2B), government-to-government (G2G), government-to-citizens (G2C) and government-to-civil society and communities (G2CS).

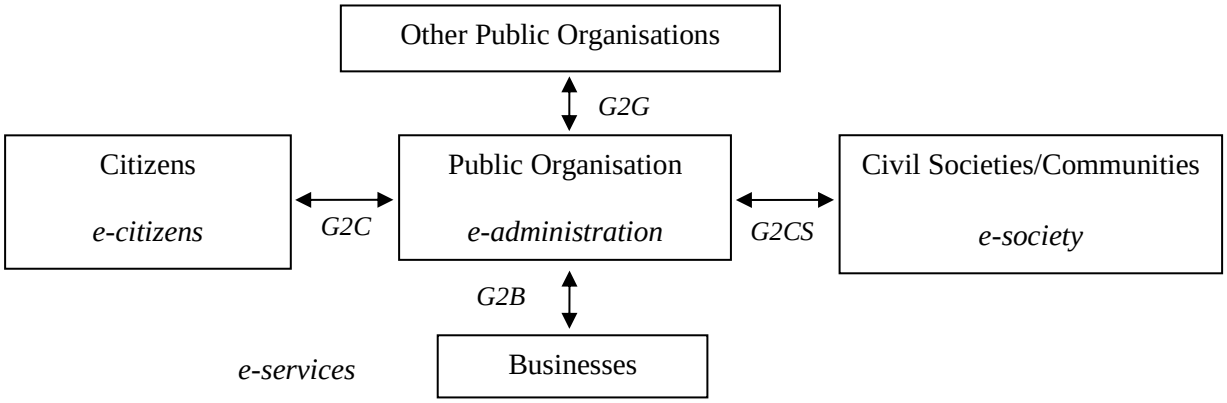

Figure 2.1 An Overview of E-Government

G2B e-Government involves the interaction between the government and businesses (Heeks 2008). It involves providing information and facilitating the government to conduct business-specific transactions, such as the provision of tax returns to businesses, paying for the goods and services procured for public organisations and facilitating businesses in their dealings with the government (Tongur & Engwall 2014; United Nations 2018). In this form of e-Government, public organisations interact with private organisations to perform different transactions electronically (Fang 2002). G2B aims to enhance the relationship between public organisations and businesses by improving their connectivity (Lee, Tan & Trimi 2005). The most common example is the electronic procurement service. This service enables transparent bidding

processes for businesses where they previously had to contact the government for updates throughout the bidding process.

G2G e-Government involves building the backbone of e-Government by developing the ICT infrastructure at the organisational level (Karunasena & Deng 2012). It enables information sharing within the public organisation or externally with other public organisations (Heeks 2008; United Nations 2018). Specifically, it deals with the information exchange between government institutions and employees at national, provincial and local levels (Deden et al. 2017). G2G e-Government ensures the consistency and accuracy of public information due to efficient collaboration between public organisations (Sharifi & Zarei 2004). Sharing the same databases between public organisations can lead to informed public decisions (Zheng et al. 2013). The goal of G2G e-Government includes better coordination among government bodies, standardised procedures and greater efficiency for the government to serve the public (United Nations 2016). An example of G2G e-Government is the collaboration between the Australian Department of Home Affairs and the relevant law enforcement, governmental agencies and criminal justice systems to prevent terrorist attacks, cybercrime and high-technology crimes and to protect civil rights (Australian Government Department of Home Affairs 2019).

G2C e-Government focuses on efficient interactions between governments and citizens (Heeks 2008). It mainly concerns the use of e-Government to improve the delivery of public services (Deng, Karunasena & Xu 2018). For instance, G2C e-Government enables citizens to lodge passport applications online instead of physically visiting the immigration office and potentially waiting in long queues (Karunasena & Deng 2012). However, G2C e-Government is not limited the delivery of public services; it also involves citizens' participation in governmental decision-making (Evans & Yen 2006). For example, G2C e-Government facilitates expressing opinions on public policies using online tools. This study aims to evaluate the critical factors for the adoption of e-Government from the perspective of citizens; therefore, it is appropriate to focus on the G2C type of e-Government.

Finally, G2CS e-Government facilitates the development of the knowledge-based society (Heeks & Bailur 2007; United Nations 2018). It focuses on improving the quality of life in communities and delivering specific services for satisfying the needs of vulnerable groups, including children, women and persons with disabilities (Heeks & Bailur 2007; Yildiz 2007). The Indonesian 'Fisik@net' project is an example of G2CS e-Government where the government provides e-learning content for children to support their science education

(Republik Indonesia 2014). Table 2.1 presents an overview of e-Government from these four perspectives and their implementation.

Table 2.1. An Overview of E-Government and its Implementation

Types	Dominant Characteristics	Platform	Examples
G2B	Communication, collaboration, commerce	e-service	• posting bids on the e-procurement service • applying for building permits • filling social insurance applications
G2G	Communication, coordination, standardisation of information and services	e-administration	• establishing knowledge-sharing centres • project management cooperation • collaboration between public organisations
C2C	Communication, transparency, accountability, effectiveness and efficiency	e-service	• lodging tax returns • renewing driver's licences • payment gateway for public services and fines
G2CS	Communication, coordination, transparency and accountability	e-society	• reporting disasters to government websites • delivering e-learning contents • communicating public policy

Note: Adapted from Heeks (2008); Jones, Hackney & Irani (2007); and United Nations (2018)

The implementation of e-Government has various benefits. For example, it improves the efficiency of public organisations by reducing processing costs (Deng 2008). E-Government provides citizens with a convenient channel to communicate with public organisations (Deng, Karunasena & Xu 2018). It also encourages the involvement of citizens in the government (Heeks & Bailur 2007) while raising public awareness of government programs (Ahmed & Shirley 2014). Importantly, e-Government improves the transparency of public decision-making (Bertot, Jaeger & Grimes 2010). As a result, numerous countries have introduced e-Government initiatives (United Nations 2016).

2.3 E-Government Adoption Studies: A Review

The increasing development of e-Government worldwide has led to a growing interest in understanding the adoption of e-Government in various circumstances. This interest has resulted in numerous models being developed from different perspectives (Al-Mamari, Corbitt & Gekara 2013; AlAwadhi & Morris 2008; Deng, Karunasena & Xu 2018). For example, Debjani, Umesh and Gupta (2012) proposed a service quality model for assessing e-Government adoption in India. Alghamdi and Beloff (2016) developed a model for evaluating e-Government adoption from the business sector perspective. Alzahrani, Al-Karaghouli and Weerakkody (2017) and Sulistyowati et al. (2020) proposed an e-Government adoption model focusing on trust levels. Despite some progress in modelling e-Government adoption, there is a lack of research investigating the citizens' perspective. This is especially evident in developing countries, where e-Government development is commonly stagnant at the transaction stage (Obi & Naoko 2016; United Nations 2020).

The aim of this study is to develop an e-Government adoption model for better understanding the adoption of e-Government at the transaction stage from the perspective of citizens in developing countries such as Indonesia. A review of the relevant literature has been conducted to achieve this aim. An extensive literature search was performed across multiple reputational databases, including Emerald, Google Scholar, ScienceDirect, Scopus, Springer and Web of Science, to ensure sufficient review coverage.

Search terms were used to ensure that no relevant studies were missed. The terms 'adoption', 'acceptance' and 'implementation' are often used interchangeably in the literature. As a result, those terms including 'e-Government adoption', 'e-Government acceptance' and 'e-Government implementation' were used as search terms. The search led to the identification of 4,428 studies related to e-Government adoption published in the last two decades. Figure 2.2 presents an overview of the e-Government adoption studies, and Figure 2.3 visualises related themes using VOSviewer (Perianes-Rodriguez, Waltman & Van Eck 2016; Van Eck & Waltman 2014), colours categorise interrelated themes and the size of circles illustrates the number of keywords appearance in publications (larger circles indicates more publications contain such keywords).

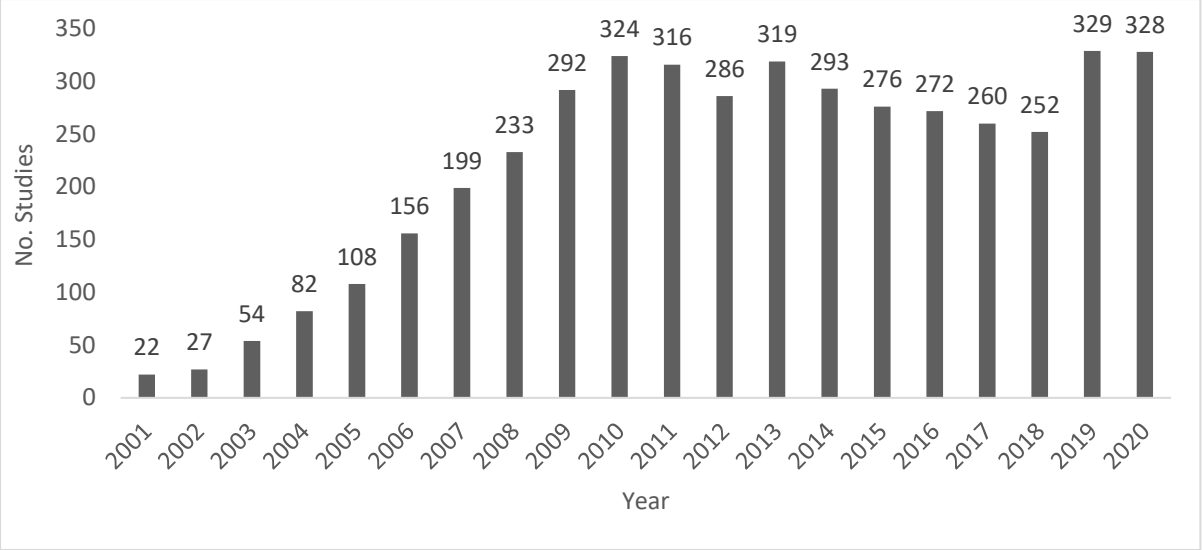

Figure 2.2 An Overview of E-Government Adoption Studies (2001–2020)

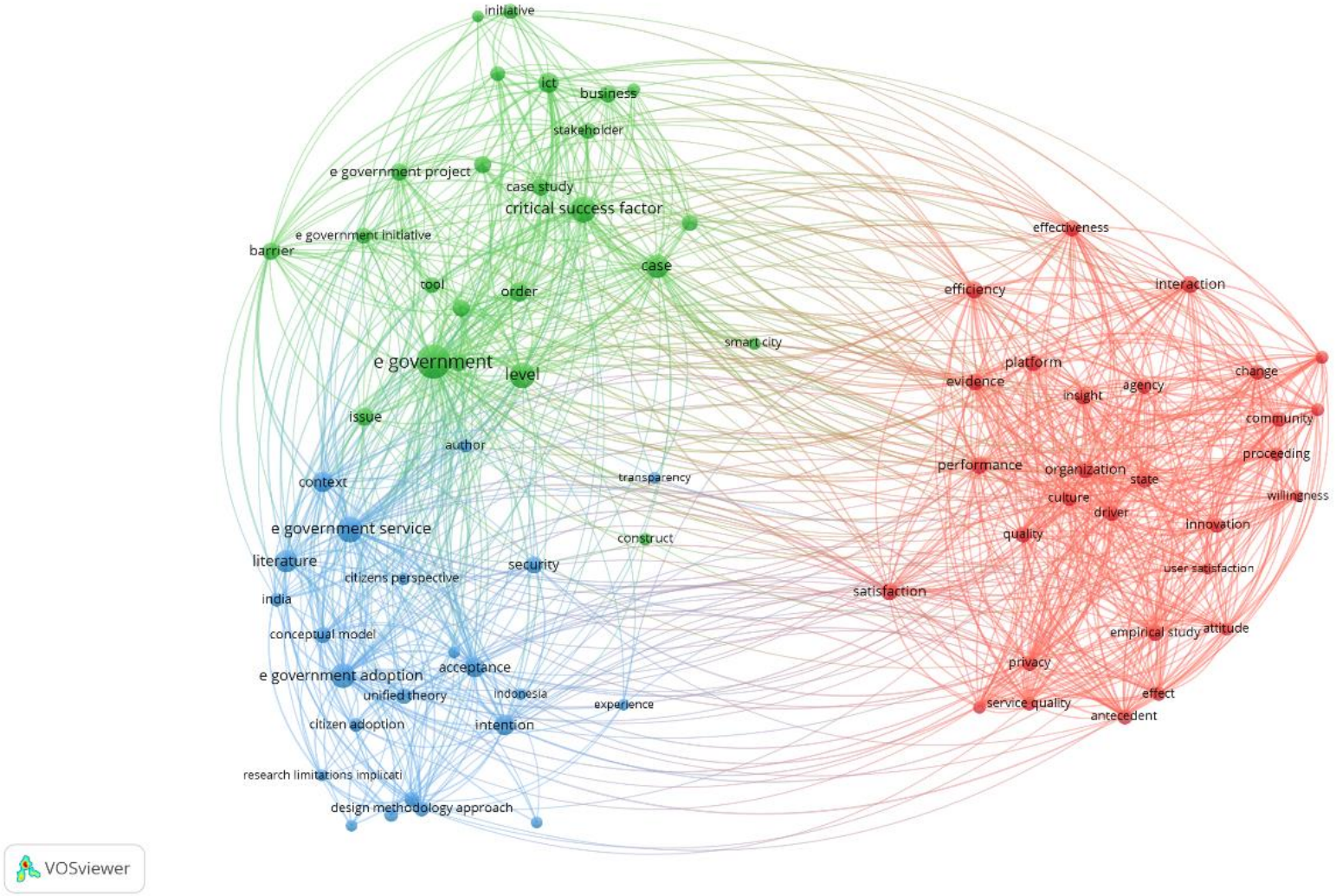

Figure 2.3 Network Visualisation Themes on the Adoption of E-Government

This study focuses on understanding the critical factors for the adoption of e-Government. Therefore it is essential to carefully screen the pool of articles to only include relevant articles and exclude papers that focus on other areas outside the scope of this study. As a result, the initial pool of identified studies was screened. This led to the exclusion of 4,160 studies from the collection. As a result, 268 studies were identified that relate to the investigation of critical factors for e-Government adoption. These studies helped develop Section 2.3.1. Figure 2.4 presents an overview of the selected studies, and Figure 2.5 visualises the related themes using VOSviewer (Perianes-Rodriguez, Waltman & Van Eck 2016; Van Eck & Waltman 2014) colours categorise interrelated themes and the size of circles illustrates the number of keywords appreance in publications (larger circles indicates more publications contain such keywords).

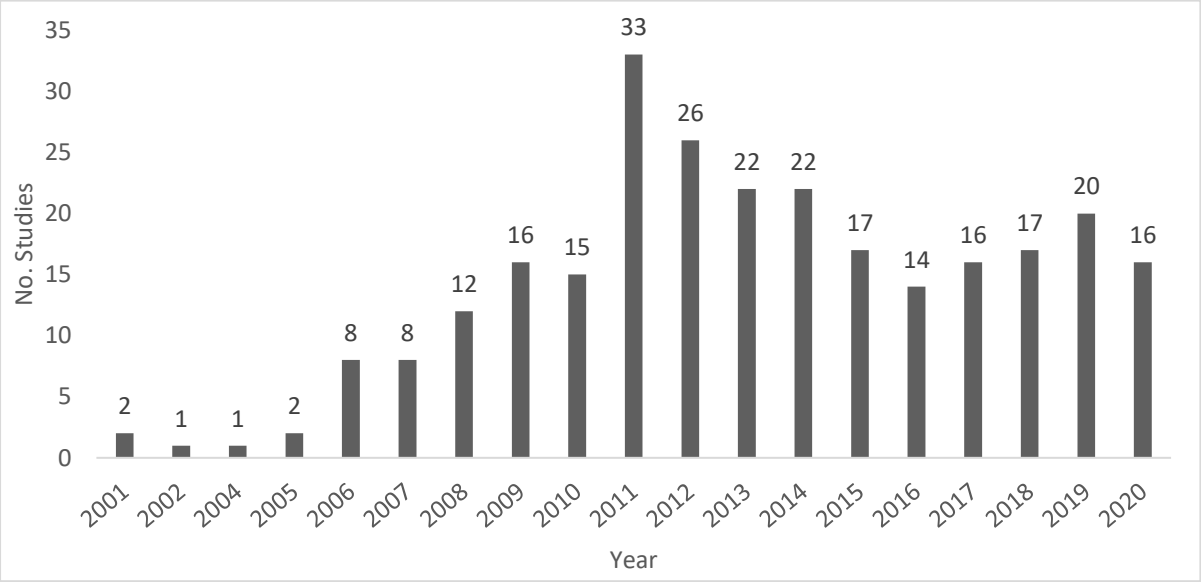

Figure 2.4 An Overview of Studies on the Critical Factors for E-Government Adoption (2001–2020)

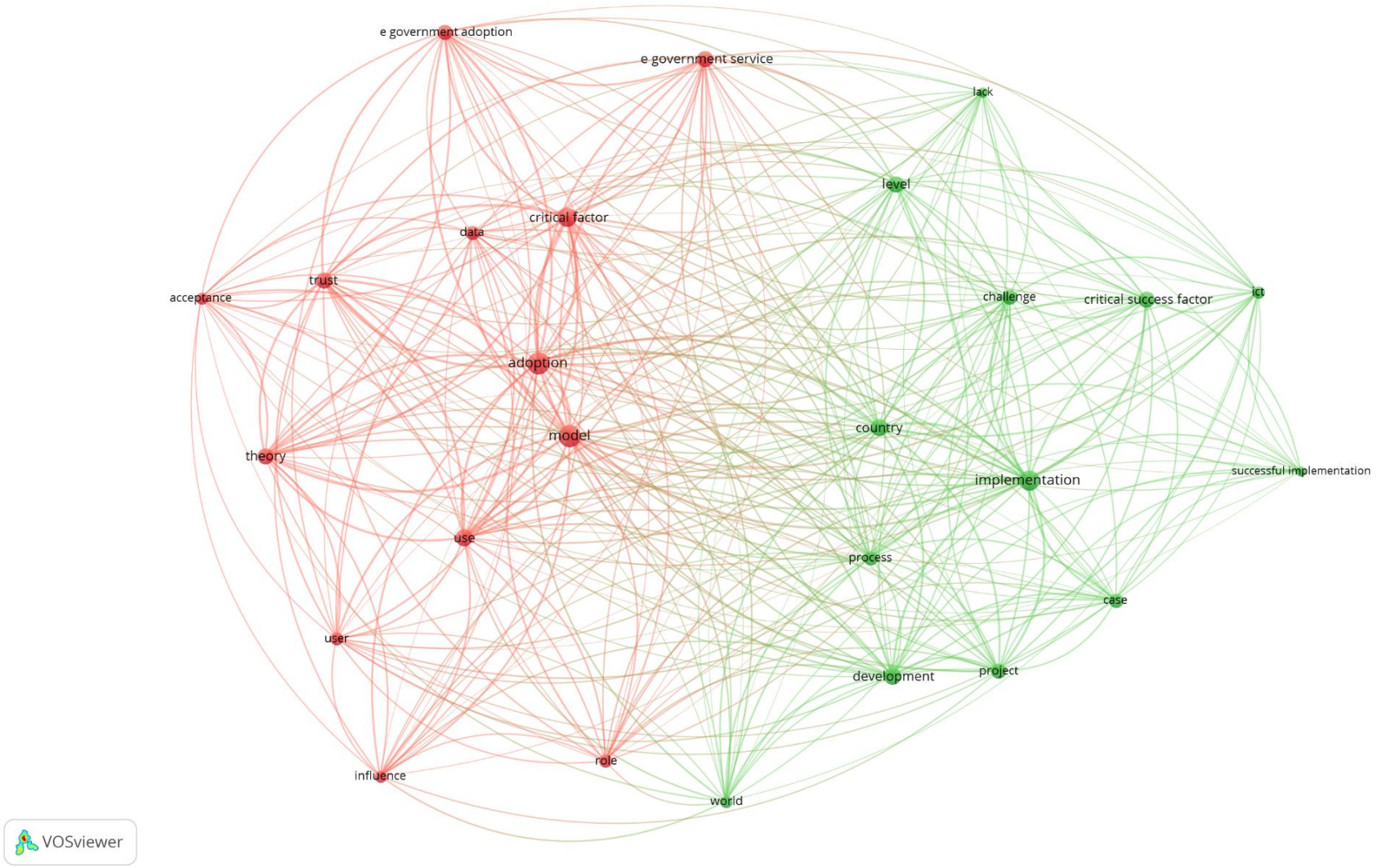

Figure 2.5 Network Visualisation Themes for the Critical Factors for E-Government Adoption

An initial analysis of the 268 selected studies provides an overview of publication type and country classification. As presented in Figure 2.6, most of these studies were reported at international conferences (112 papers), followed by journals (94 papers). Only 35% of these studies were conducted in developing countries. This demonstrates the need for more studies on e-Government adoption from the perspective of developing countries.

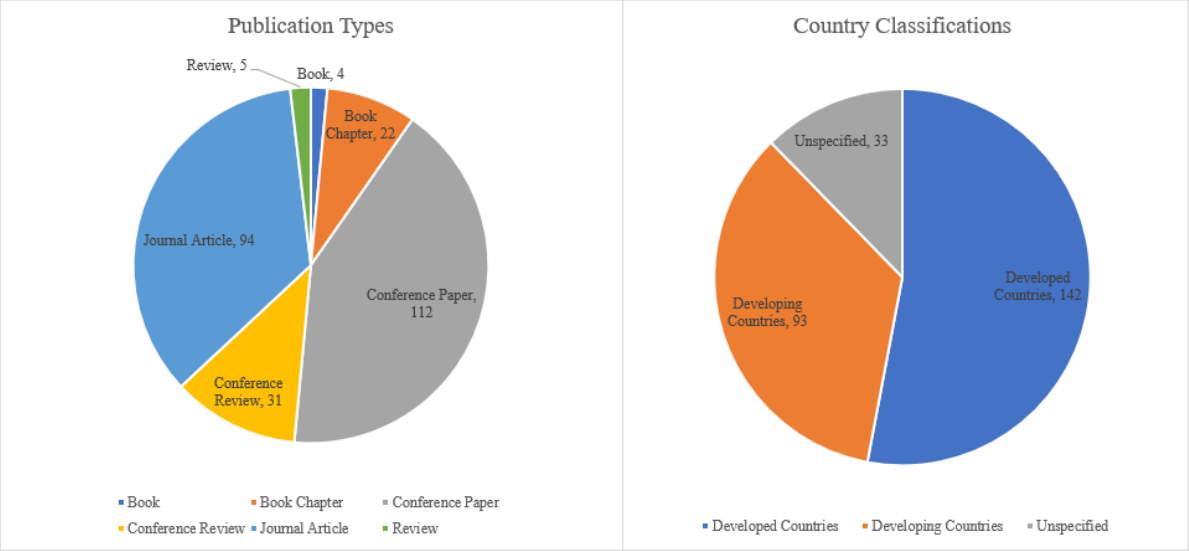

Figure 2.6 An Overview of Selected E-Government Adoption studies by Publication Types and Country Classifications

2.3.1 Benefits of E-Government Adoption

One of the major research areas in e-Government studies as well as one of the primary reasons for adopting e-Government is the range of benefits it offers. Much of the earlier information system (IS) research on e-Government focused on the benefits it offered citizens and governments (Al-Haddad & Hyland 2011; Al-Haddad, Hyland & Hubona 2011; Anindra, Supangkat & Kosala 2018; Cupido & Ophoff 2014; Horst, Kuttschreuter & Gutteling 2007; Jacob et al. 2019; Pappas et al. 2018; Susanto & Goodwin 2013; Zeebaree et al. 2020). Table 2.2 shows some key benefits of e-Government. These include improving accessibility of public services, building trust, cost reduction, enhance public participation, improve efficiency, information sharing, improving the reach of public services and increased user satisfaction.

Table 2.2 The Key Benefits of Adopting E-Government Systems

Benefit	Description	References
Accessibility	Access to government information and public services anywhere and anytime.	Alraja, Hammami & Alhousary (2015), Idris (2016), Ngwenya (2011)
Builds trust	Helps to build trust between public organisations and citizens.	Carter & Bélanger (2005), Munyoka & Maharaj (2019), Warkentin et al. (2002)
Cost saving	Cost, in terms of money and time, is one of the most important factors for the adoption of e-Government. Citizens can save in terms of travel costs, time away from work and other resources associated with accessing government services in person.	Al-Haddad & Hyland (2011), Deng, Karunasena & Xu (2018), Moon & Norris (2005)
Efficiency	Providing public services efficiently and effectively to citizens is one of the main benefits of e-Government.	Mirchandani, Johnson Jr & Joshi (2008), Samuel et al. (2020), Sabani, Deng & Thai (2018)
Information sharing	Sharing information between public organisations and government agencies to build an integrated database.	Agbabiaka and Ojo (2014), Elenezi et al. (2017), and Laato et al. (2020)
Public participation	Improving the capability of citizens to be involved in public decision-making with the adoption of e-Government.	Chu et al. (2017), Jones, Hackney & Irani (2007), Meijer (2015)
Reach of public services	E-Government utilises ICT to enhance the reach of public services and information provided to citizens in remote areas.	Anindra, Supangkat & Kosala (2018), Furuholt & Wahid (2008), Urbina & Abe (2017)
User satisfaction	Improves user satisfaction by providing high-quality public services.	Puthur, Mahadevan & George (2015), Shuib, Yadegaridehkordi & Ainin (2019), Venkatesh et al. (2016)

The benefits of e-Government adoption are often correlated. For instance, the accessibility of public services leads to greater interaction between citizens and public organisations and, therefore, improves public participation while building trust (Alraja, Hammami & Alhousary 2015; Cupido & Ophoff 2014; Kurfalı et al. 2017; Rotta et al. 2019; Sandoval-Almazan & Gil-Garcia 2012; Verkijika & De Wet 2018). In turn, cost savings, efficiency and improved reach lead to user satisfaction (Ghareeb, Darwish & Hefney 2019; Gupta, Bhaskar & Singh 2016; Sachan, Kumar & Kumar 2018; Samuel et al. 2020). E-Government systems have been developed worldwide for the benefits described here. However, the adoption process is not an easy task for many countries due to several challenges, which will be explored in the next section.

2.3.2 Challenges for E-Government Adoption

The e-Government literature has provided a large body of evidence for the challenges citizens and governments face with e-Government adoption. The majority of early literature focused heavily on technological themes such as the digital divide and infrastructure development (As-Saber & Hossain 2007; Bélanger & Carter 2009; Hermana & Silfianti 2011; Khamis & Van der Weide 2016; Rana, Dwivedi & Williams 2013; Sipior, Ward & Connolly 2011; van Deursen & van Dijk 2011; Weerakkody et al. 2012).

More recent research has focused on organisational factors such as budget, organisation structure and raising awareness of e-Government initiatives (Antoni, Syaputra & Nasir 2019; Apleni & Smuts 2020; Franke et al. 2015; Kristiansen et al. 2009; Mansoori, Sarabdeen & Tchantchane 2018; Moatshe & Mahmood 2011; Naranjo-Zolotov et al. 2019). Contemporary research focuses on inclusiveness, security and trust (Agrawal, Kumar & Singh 2021; Eid, Selim & El-Kassrawy 2020; Habib, Alsmadi & Prybutok 2020; Khan et al. 2021; Munyoka & Maharaj 2019; Shahzad et al. 2019). Several studies perceive the trust between public organisations and citizens as one of the benefits of e-Government (Alshehri & Drew 2010; Jacob et al. 2019; Voutinioti 2018), while others deem trust as a challenge when adopting e-Government services (Khan et al. 2021; Mensah 2019; Munyoka & Maharaj 2019; Sulistyowati et al. 2020). These studies suggest that building trust between citizens and public organisations is necessary for successful e-Government adoption; otherwise, trust will remain a significant challenge for adopting e-Government. Trust is also associated with security and privacy (Alharbi, Papadaki & Dowland 2017; Khan et al. 2021; Munyoka & Maharaj 2019). Table 2.3 summarises some of the key challenges to the adoption of e-Government.

Table 2.3 Challenges to the Adoption of E-Government

Challenge	Description	References
Budget	Sophisticated e-Government services require an extensive development budget and supporting resources.	Antoni, Syaputra & Nasir (2019); Kristiansen et al. (2009); Moatshe & Mahmood (2011)
Digital divide	The disparity between individuals who engage with digital technology and those who do not is evident in many developing countries.	Forti et al. (2014); Puspitasari & Ishii (2016); van Deursen & van Dijk (2011)
Inclusiveness	Governments must serve all members of society, irrespective of their physical capabilities (e.g., people with disability, people who are blind or deaf), and provide quality services for citizens. Online services must be designed with appropriate interfaces.	Agrawal, Kumar & Singh (2021); Moreno et al. (2018); Nakatumba-Nabende et al. (2019)
Infrastructure development	Countries implementing e-Government have struggled to develop an adequate infrastructure to take advantage of new technologies and communications tools. Even if possessing the will, many developing countries do not have the infrastructure necessary to immediately deploy e-Government services and may lack advanced and secure technical infrastructure.	Ahmed & Shirley (2014); Saxena (2017); Zeebaree et al. (2020)
Lack of trust	Trust is the main challenge of e-Government services; building trust with citizens is necessary for the successful implementation of e-Government. Without trust, citizens who are already reluctant to use technology might avoid or reject e-Government services that ask for detailed personal information.	Carter & Bélanger (2005); Munyoka & Maharaj (2019); & Warkentin et al. (2002)
Low awareness	Awareness involves familiarity with a particular public service or e-Government initiative and its benefits. Awareness has been identified as a challenge for e-Government adoption, particularly in developing countries.	Rana, Dwivedi & Williams (2013); Rehman, Esichaikul & Kamal (2012); Samuel et al. (2020)

Organisational structure	E-Government adoption triggers inevitable changes for organisations; therefore, the adoption strategy should consider how to restructure existing organisational models, roles, responsibilities, training and employees' needs.	Apleni & Smuts (2020); Karunasena & Deng (2012); Mansoori, Sarabdeen & Tchantchane (2018)
Privacy and security	It is essential to protect citizens' personal information stored on e-Government databases while making effective use of that information. This is one of the main reasons why citizens and public organisations refrain from adopting e-Government services.	AlKalbani et al. (2017); El-Haddadeh, Tsohou & Karyda (2012)

Despite the challenges described in Table 2.3, the adoption of e-Government is inevitable due to its benefits that outweigh the challenges. Therefore, e-Government adoption is widely pursued in developed and developing countries.

2.3.3 Characteristics and Factors for E-Government Adoption in Developed Countries

Numerous studies have been conducted to better understand the factors for adopting e-Government from multiple perspectives. These studies can be classified into two different contexts: developed and developing countries (Alzahrani, Al-Karaghouli & Weerakkody 2017; Deng, Karunasena & Xu 2018; Gupta, Bhaskar & Singh 2016; Karunasena & Deng 2012; Nam 2014; Shareef et al. 2011).

The uniqueness of the developed countries attracts much attention in e-Government research with respect to the adoption of e-Government under various circumstances (Chen et al. 2007; Lee, Tan & Trimi 2005; Nawafleh 2018). Such uniqueness of the developed countries is usually reflected in multiple elements. For example, developed countries often have well-established economies and a long history of democracy. The ICT infrastructure in developed countries is usually adequate for e-Government development. Living standards in these countries are typically high. Further, there are qualified human resources professionals to carry out various tasks by providing adequate professional training and education. Internet accessibility in developed countries is generally high, improving public service delivery through e-Government (Chen et al. 2007; Nawafleh 2018). These characteristics mean that developed countries are leaders in e-Government development (Lee, Tan & Trimi 2005). Figure 2.7

presents an overview of developed countries' characteristics concerning e-Government adoption.

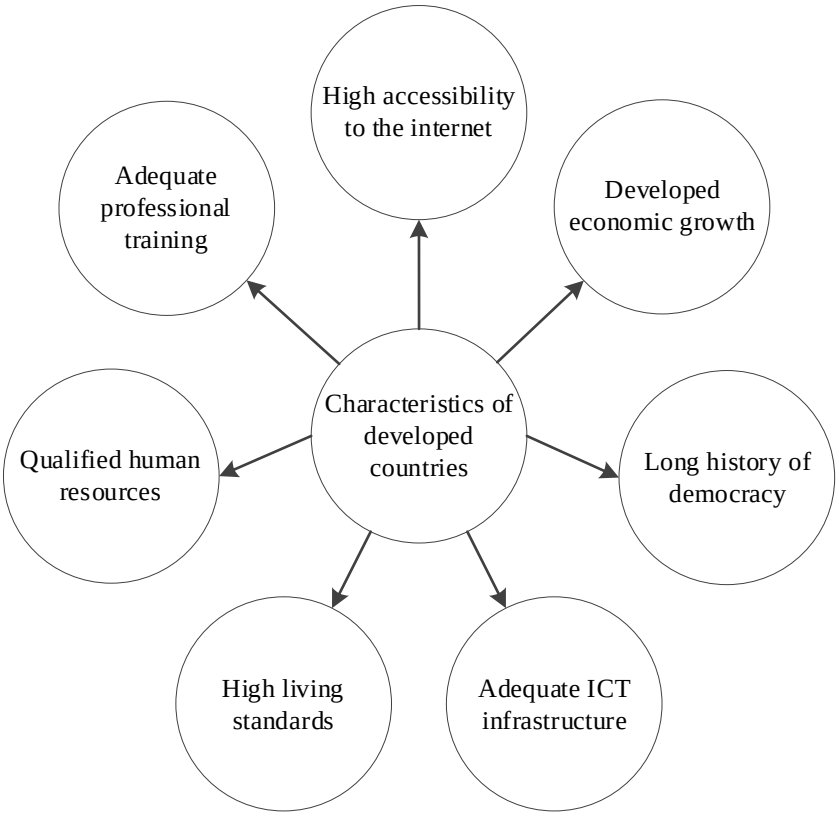

Figure 2.7 An Overview of the Characteristics of Developed Countries

Numerous studies have investigated the adoption of e-Government in developed countries. E-government research in developed countries has usually focused on three perspectives: technology, supply and demand. Technology-focused research explores the characteristics and readiness of technology and ICT infrastructure for e-Government development. For example, Yao and Murphy (2007), explored the factors influencing the adoption of electronic voting in the United States. The technology acceptance model (TAM) was utilised for better understanding the adoption of the electronic voting system. The data were collected from 453 citizens using a survey and analysed using SEM. This study revealed that system mobility, privacy and accuracy were critical factors for adopting the electronic voting system. In addition, Barnes and Vidgen (2006) examined the influence of e-Government quality characteristics on the use of e-Government in the United Kingdom. A mixed-methods approach was adopted to explore the use of e-Government from a technological perspective. The data were collected from 420 participants for the quantitative results and 273 participants for the

qualitative results. The study used the triangulation technique and revealed that service interaction, usability and information quality were crucial for the use of e-Government in the United Kingdom. Furthermore, Persaud and Persaud (2013) investigated the factors influencing e-Government adoption in Canada. They used multiple regression analysis to analyse 437 responses. The results showed that the content of public organisation websites, personalisation, accessibility and friendliness of website design were critical factors for adopting e-Government in Canada.

The supply-focused e-Government research explores the organisational aspects of e-Government development. These studies examine regulatory requirements, public policies, organisational resources and organisational strategies for improving the adoption of e-Government. Many supply-focused studies have been conducted to evaluate the adoption of e-Government. For example, Husin, Evans and Deegan (2016) adopted a mixed-methods approach to evaluate e-Government adoption in Australia. The data were collected from 166 participants using a survey. In addition to the survey, 19 participants took part in semi-structured interviews. The results showed that public organisation policies and top management understanding were essential for the adoption of e-Government. Another example from Jans et al. (2016) who investigated e-Government adoption in Dutch municipalities. The study analysed 429 municipalities in the Netherlands by examining the timing of e-Government adoption. It showed that political alignment, past performance and policy network resources directly influenced the development of e-Government from the perspective of public organisations. Focusing on an exploratory study, Hossain and Chan (2015) examined the adoption of open government data in public organisations in Australia. The study adopted a qualitative methodology of semi-structured interviews to collect data from public organisations. The data were analysed using the content analysis technique (An et al. 2013; Sahu, Deng & Molla 2018). The study revealed that political leadership, institutional pressures, management commitment, skilled human resources and financial resources were organisational factors that influenced the adoption of open government data in public organisations in Australia.

Demand-focused e-Government adoption research concerns e-Government users. It focuses on assessing various requirements, perceptions, expectations and needs of individual citizens in their adoption of e-Government. For example, Schaupp and Carter (2010) developed a model to explore factors influencing the adoption of e-filing in the United States. A survey was used

to collect data from 239 citizens. The data were analysed using SEM. The results showed that trust in the internet, trust in the system, perceived risk and optimism bias influenced the adoption of e-filing in the United States. Horst, Kuttschreuter and Gutteling (2007) evaluated the factors that influence the adoption of e-Government in the Netherlands. TAM was used to explore citizens' perceptions of e-Government. Survey data were collected from 238 participants and analysed using SEM. The results indicated that perceived usefulness, perceived risk, personal experience, perceived behavioural control, subjective norm and trust in e-Government were critical factors for e-Government adoption. Taking on a cross sectional study, Carter et al. (2016) proposed a combined model based on the TAM to explore factors influencing the adoption of e-Government in the United States and the United Kingdom. A total of 105 surveys were collected from the United States and 140 from the United Kingdom. The data were analysed using SEM. The results revealed that disposition to trust, perceived ease of use, perceived usefulness and trust in the internet were critical factors for the adoption of e-Government in the United States and the United Kingdom. Table 2.4 presents an overview of factors influencing the adoption of e-Government in the context of developed countries.

Table 2.4 An Overview of Factors that Influence the Adoption of E-Government in Developed Countries

Perspective	Description	Factors		References
Technology	The exploration of the critical factors for the adoption of e-Government from the technological perspective	▪ assurance ▪ accessibility ▪ availability of cloud-based services ▪ reliability ▪ responsiveness ▪ service quality ▪ system integration	▪ service consistency ▪ database integration ▪ privacy concerns ▪ system consistency ▪ service integration ▪ website design ▪ system mobility	Barnes & Vidgen (2006); Yao & Murphy (2007); Sipior, Ward & Connolly (2011); Persaud & Persaud (2013)
Supply	The investigation of the critical factors for the adoption of e-Government from the perspective of e-Government system providers	▪ managerial innovation-orientation ▪ policy authority ▪ management capacity ▪ public organisations collaboration ▪ institutional power ▪ participation in professional networks ▪ management commitment ▪ top management understanding ▪ financial resources ▪ organisational centralisation ▪ political alignment	▪ past performance ▪ policy network resources ▪ organisational preparedness ▪ political leadership ▪ institutional pressure ▪ leadership support ▪ state government size ▪ staff constraints ▪ skilled human resources ▪ work routineness	Moon & Norris (2005); Niehaves (2007); Reddick (2009); Ferro & Sorrentino (2010); Yun & Opheim (2010); Jans et al. (2016); Husin, Evans & Deegan (2016); Hossain & Chan (2015); Hossan & Ryan (2018)
Demand	The examination of the critical factors for the adoption of e-Government from the perspective of e-Government users	▪ positive disconfirmation ▪ perceived ease of use ▪ perceived usefulness ▪ subjective norm ▪ performance expectancy ▪ effort expectancy ▪ knowledge ▪ social influence ▪ facilitating conditions ▪ satisfaction ▪ motivation	▪ perceived behavioural control ▪ personal interaction ▪ optimism bias ▪ transition costs ▪ perceived risk ▪ regret aversion ▪ inertia and habit ▪ switching costs ▪ channel choice preference ▪ positive personal experience ▪ disposition of trust	Carter & Bélanger (2005); Horst, Kuttschreuter & Gutteling (2007); Bélanger & Carter (2008); Schaupp & Carter (2010); Piehler, Wirtz & Daiser (2016); Carter et al. (2016); Schmidthuber, Hilgers & Gegenhuber (2017); Rey & Medina (2017)

2.3.4 Characteristics and Factors for E-Government Adoption in Developing Countries

There are several differences between developed and developing countries (Chen et al. 2007). For example, there is often inadequate ICT infrastructure for e-Government implementation in developing countries (AlKalbani et al. 2017) and a lack of transparency in public decision-making (Almukhlifi, Deng & Kam 2019b). The lack of relevant strategies and public policies in these countries may also affect e-Government development (Chen et al. 2007; Ndou 2004). Further, there is often a shortage of qualified human resources professionals for the development of e-Government in developing countries (Chen et al. 2007). The abundance of unique cultures in developing countries makes e-Government adoption complicated and challenging (Alshehri & Drew 2010). Figure 2.8 presents an overview of the characteristics of developing countries concerning e-Government adoption.

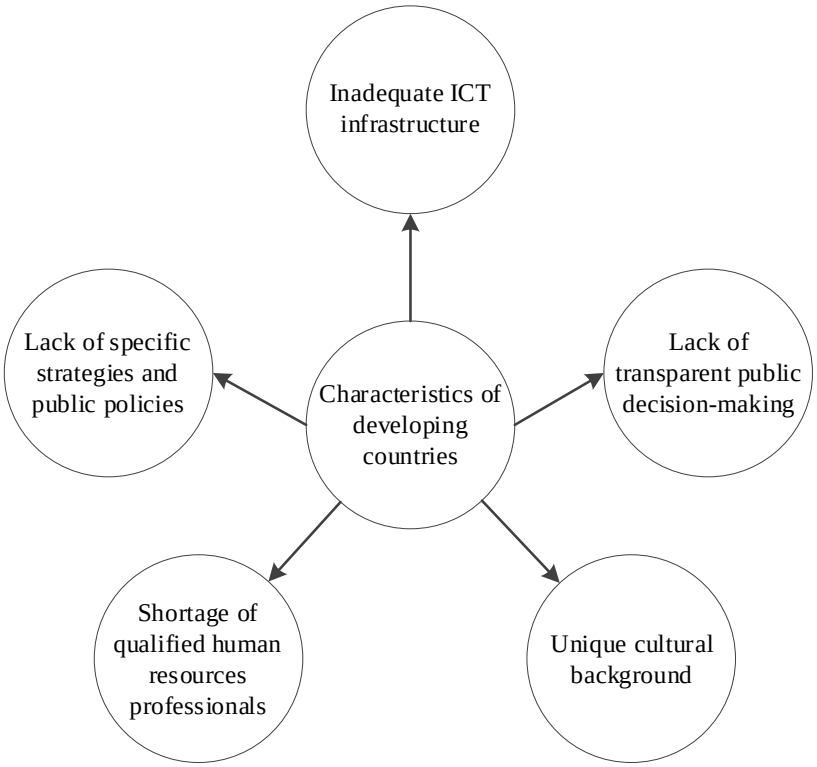

Figure 2.8 An Overview of the Characteristics of Developing Countries

Inadequate ICT infrastructure is a challenge for e-Government implementation in developing countries (Ndou 2004). Improving ICT infrastructures, such as telecommunications networks, servers and databases systems, is imperative for implementing e-Government in developing countries (Alshehri & Drew 2010; Basu 2004). Adequate infrastructure is a prerequisite for

delivering public services through e-Government (Chen et al. 2007) and improves citizens' access to e-Government services (Alshehri & Drew 2010). Additionally, it enables public organisations to seamlessly interact with citizens. Therefore, establishing adequate infrastructure is a high priority for e-Government development in developing countries.

The lack of transparent public decision-making in public organisations increases the challenges for developing e-Government in developing countries (Bhuiyan 2010; Nkohkwo & Islam 2013). Often, citizens do not understand how public decisions are made in public organisations (Almarabeh & AbuAli 2010). This is due to the absence of public information and procedures that show the rationale behind decision-making. Therefore, this absence of transparency in public decision-making would threaten the success of e-Government projects (Bhuiyan 2010). Bidding for public tenders, for example, is provided through e-Government without transparent requirements or clear criteria in several developing countries (Ciborra & Navarra 2005). Therefore, citizens might question how the development of e-Government will reduce corruption and improve the transparency of public decision-making. As a result, it is critical to consider such characteristics above for better understanding the adoption of e-Government in developing countries.

The lack of specific strategies and policies that regulate the use of e-Government increases the challenges for its development (Ndou 2004). E-Government development requires appropriate strategies and policies to regulate electronic activities such as electronic payment, electronic mail usage, data protection and electronic crime cases (Alshehri & Drew 2010). The availability and effectiveness of such strategies and policies can help to develop e-Government successfully; however, many developing countries do not have them in place (Ndou 2004). The absence of such strategies and policies can decelerate the development of e-Government in various circumstances (Lam 2005).

A shortage of qualified human resources professionals hinders the development of e-Government in developing countries (Chen et al. 2007; Ndou 2004). E-Government development requires highly qualified ICT staff who possess relevant skills and experience (Al Nagi & Hamdan 2009). Many developing countries suffer from a chronic lack of qualified ICT staff because of inadequate education and training opportunities (Ndou 2004). This shortage of human resources affects the design, installation and maintenance of e-Government services.

Several studies have discussed the importance of technological factors for the adoption of e-Government in developing countries. For example, Hermana and Silfianti (2011) found that the unbalanced distribution of ICT infrastructure among provinces in Indonesia created digital divides. Pudjianto et al. (2011) showed that poor accessibility and usability are the main factors that hinder the adoption of e-Government in Indonesia. Karunasena and Deng (2012) showed the importance of ICT infrastructures, including computers, database servers and network systems, for creating supportive conditions for e-Government. Susanto and Goodwin (2013) highlighted the importance of having multiple e-Government access channels to support e-Government adoption. Shahzad et al. (2019) examined the effects of information security and service functionality on the adoption of e-Government in Pakistan.

There are several e-Government adoption studies that consider the supply perspective in the context of developing countries. For instance, Chen et al. (2007) found that many government employees in developing countries have insufficient ICT training due to financial conditions. Prananto and McKemmish (2007) analysed a case study from Indonesia to discover that government involvements, political supports and policy enforcements are the three most critical factors to ensure successful e-Government adoption. Furuholt and Wahid (2008) add that a shortage of competent staff to administer e-Government is a challenge for its adoption in Indonesia. Dahlan (2008) adds that a standard operating procedure for e-Government needs to be established across departments to support the adoption of e-Government.

Further, several studies have explored the adoption of e-Government from the demand perspective in developing countries. For example, As-Saber and Hossain (2007) found that trust in e-Government can engage more citizens. Mirchandani, Johnson Jr and Joshi (2008) showed that citizens of closely related countries could have diverse expectations for their e-Government. Lin, Fofanah and Liang (2011) studied the adoption of e-Government in The Gambia and found that citizens in the regional area often had limited internet access and computer literacy. Al-Kalbani, Deng and Kam (2015) found that a lack of trust in information security discourages citizens from participating in e-Government. Idris (2016) found that citizens' awareness of online initiatives is typically low in developing countries. Rodrigues, Sarabdeen and Balasubramanian (2016) reported that user satisfaction is highly correlated with the adoption of e-Government in the United Arab Emirates. Deng, Karunasena and Xu (2018) proposed a public value-based model for evaluating the performance of e-Government in

developing countries. Table 2.5 presents an overview of e-Government adoption research in developing countries.

Table 2.5. An Overview of E-Government Adoption Research in Developing Countries

Perspective	Description	Factors		References
Technology	The exploration of the critical factors for the adoption of e-Government from the technological perspective	▪ accessibility ▪ responsiveness ▪ service quality ▪ information security ▪ service channel ▪ performance ▪ usability	▪ digital divide ▪ ICT infrastructure development ▪ ICT infrastructure readiness ▪ privacy concerns ▪ website design	Hermana & Silfianti (2011); Pudjianto et al. (2011), Krishnan & Teo (2012); Karunasena & Deng (2012); Susanto & Goodwin (2013); Shahzad et al. (2019)
Supply	The investigation of the critical factors for the adoption of e-Government from the perspective of system providers	▪ ICT training ▪ policy enforcement ▪ political support ▪ regulatory requirement ▪ standard operating procedure	▪ bureaucracy ▪ coordination ▪ government involvement ▪ financial condition ▪ staff constraints	Chen et al. (2007); Prananto & McKemmish (2007); Dahlan (2008); Furuholt & Wahid (2008); Kim, Kim & Lee (2009); Kristiansen et al. (2009); Sá, Rocha & Cota (2016)
Demand	The examination of the critical factors for the adoption of e-Government from the perspective of e-Government users	▪ public value ▪ internet exposure ▪ social influence ▪ user satisfaction	▪ awareness ▪ computer literacy ▪ trust ▪ computer self-efficacy	As-Saber & Hossain (2007); Lin, Fofanah & Liang (2011); Al-Kalbani, Deng & Kam (2015); Idris (2016), Rodrigues, Sarabdeen & Balasubramanian (2016); Deng, Karunasena & Xu (2018)

Research into the adoption of e-Government has mainly focused on the infrastructure and supply sides of e-Government (Karunasena & Deng 2012; Mirchandani, Johnson Jr & Joshi 2008). These are beneficial from a government perspective for improving the service for e-Government stakeholders. However, these studies often fail to consider citizens' requirements and expectations of e-Government.

2.3.5 Factors Related to E-Government Development Stages

As presented in Section 1.1, there are four stages of e-Government maturity, including (a) emergence, (b) enhancement, (c) transaction and (d) connection (Sabani, Deng & Thai 2019a; United Nations 2018). The emergence stage of e-Government involves facilitating information delivery from the government to the public (United Nations 2016). It is the initial stage, where the government provides static information online. This stage focuses on delivering information, such as government contact information and policy announcements. The quality of information is the primary concern within this stage (Wangpipatwong, Chutimaskul & Papasratorn 2009). The enhancement stage of e-Government involves facilitating simple communication between the government and the public (United Nations 2016), where the government provides dynamic information and basic one-way transactions. One of the most common examples is online feedback, where citizens can submit their complaints about the physical government service to the official website. In addition to the information quality, system quality and the availability of one-way services become the main concern on this stage (Mishra & Mishra 2011).

The transaction stage of e-Government involves improving the delivery of public services through e-Government (United Nations 2016). This stage focuses on establishing two-way interactions between e-Government stakeholders, including citizens and public organisations (Sabani, Deng & Thai 2019a). Citizens begin to take an active role in their participation in e-Government services (Beynon-Davies 2007). A typical example is the online taxation portal. E-Government at this stage enables citizens to file their tax returns online, where previously, this could only be done by physically visiting the taxation office (Karunasena & Deng 2012). The connection stage of e-Government involves redefining the delivery of public services by providing a one-stop integrated e-Government system in which citizens can immediately access all kinds of public services (United Nations 2016). This is the final stage of e-Government development and it assumes that horizontal connections between government institutions and vertical connections among central and local government are in place. This represents a reliable

infrastructure with the full support capacity (Shareef et al. 2011). Each stage has different characteristics and functions, leading to different influential factors for e-Government development, as illustrated in Figure 2.9

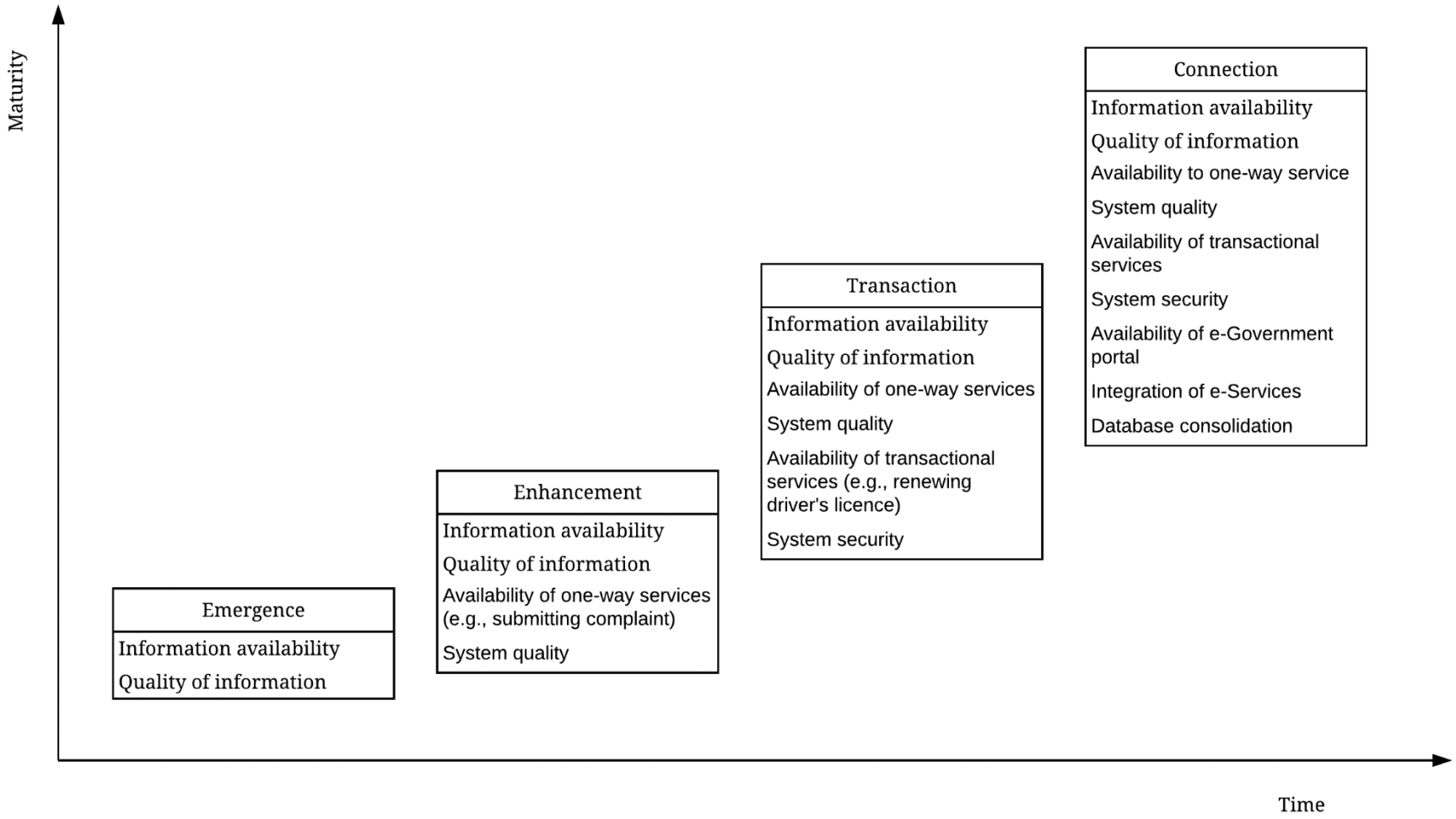

Figure 2.9 Important Factors based on E-Government Maturity Level. Adapted from Ghareeb, Darwish and Hefney (2019); Kumar et al. (2017); Mishra and Mishra (2011); Sabani, Deng & Thai 2019 (2019); Shareef et al. (2011); United Nations (2016); and Wangpipatwong, Chutimaskul & Papasratorn (2009).

Countries at different developmental stages of e-Government require different adoption strategies for successful implementation. As discussed in Section 1.1, the enhancement and transaction stages differ in characteristics and functionality. In the enhancement stage, citizens can only view and collect government information or download forms and publications (one-way communication). At this stage, the government authority does not respond to the user electronically (Gottschalk 2009; United Nations 2018). In the transaction stage, two-way communication is established via e-Government services where citizens can interact with public administrations (e.g., using chatrooms) and obtain more sophisticated public services including passport renewal and tax lodgement. As a result, citizens' adoption criteria for different stages of e-Government are unlikely to be the same, and these might have significant implications. However, limited literature has investigated and considered these criteria (e.g., factors associated with stages of e-Government development) while exploring adoption models for e-Government (Kurfalı et al. 2017; Shareef et al. 2011; Voutinioti 2013; Williams, Rana & Dwivedi 2015). Considering that citizens have requirements for the adoption of e-Government at different levels of service maturity, further research into developing a specific model for evaluating e-Government adoption from citizens' perspective in developing countries is required.

Most developing countries, including India (Samuel et al. 2020), Indonesia (Sabani 2021), Mauritius (Lallmahomed, Lallmahomed & Lallmahomed 2017), Pakistan (Asmi, Zhou & Lu 2017), Saudi Arabia (Almukhlifi, Deng & Kam 2019a), Turkey (Kurfalı et al. 2017) and Vietnam (Van Thanh, Yoon & Hwang 2018) are still struggling to fully attain the transaction stage of e-Government. Since this research is engaged in examining the adoption of e-Government by citizens in developing countries, the current study focuses on the transaction stage of e-Government.

2.4 Dominant Theories for Evaluating Critical Factors for the Adoption of E-Government

Critical factors are those that are crucial in the decision-making process. These factors play a vital role in determining the success or failure of a decision. The factors are considered critical when the proper or wrong implementation of a particular factor would lead to an advantageous or disadvantageous position, respectively (Alzahrani, Al-Karaghouli & Weerakkody 2017; Deden et al. 2017; Gupta, Bhaskar & Singh 2016; Nam 2014; Prananto & McKemmish 2007).

The critical factors for the adoption of e-Government are strongly related to the application of theories to investigate the phenomenon (Dwivedi et al. 2017; Verkijika & De Wet 2018). Several theories have been used for investigating how and why citizens adopt e-Government. Such theories can be classified into two streams (Venkatesh et al. 2003). One stream focuses on the individual acceptance of technology by looking at the intention to use as a dependent factor (Davis 1989). Another stream examines satisfaction or net benefits to measure the success of technology adoption (DeLone & McLean 1992). These theories offer significant contributions to the literature by investigating various perspectives for better understanding the adoption of e-Government. Table 2.6 summarises the critical factors relating to the dominant theories and models commonly used in the literature.

Table 2.6. An Overview of Dominant Theories and Models in E-Government Adoption Studies

Theory/Model	Critical Factors	Source
Technology Acceptance Model (TAM)	• perceived usefulness • perceived ease of use	Davis (1989)
Information Systems Success Model (IS Success)	• system quality • information quality • user satisfaction	DeLone & McLean (1992)
Unified Theory of Acceptance and Use of Technology (UTAUT)	• performance expectancy • effort expectancy • social influence • facilitating conditions	Venkatesh et al. (2003)
E-Government Adoption Model (GAM)	• perceived service response • availability of resources • computer self-efficacy • perceived ability to use • multilingual option • perceived information quality • perceived trust • perceived uncertainty • perceived awareness • perceived security • perceived functional benefit • perceived image • perceived privacy	Shareef et al. (2011)
Unified Model of Electronic Government Adoption (UMEGA)	• performance expectancy • effort expectancy • social influence • facilitating conditions • attitude • perceived risk	Dwivedi et al. (2017)

2.4.1 Technology Acceptance Model

Davis (1989) formulated TAM to examine users' intentions towards the adoption of new technology. TAM suggests that when individuals are presented with a new system, two factors

will influence their decision to accept or reject the adoption. The first factor is the perceived usefulness, which is defined as the degree to which a person believes that using the system would enhance job performance. The second factor is the perceived ease of use, which is defined as the degree to which a person believes that using the system would be free from effort. Figure 2.10 presents TAM.

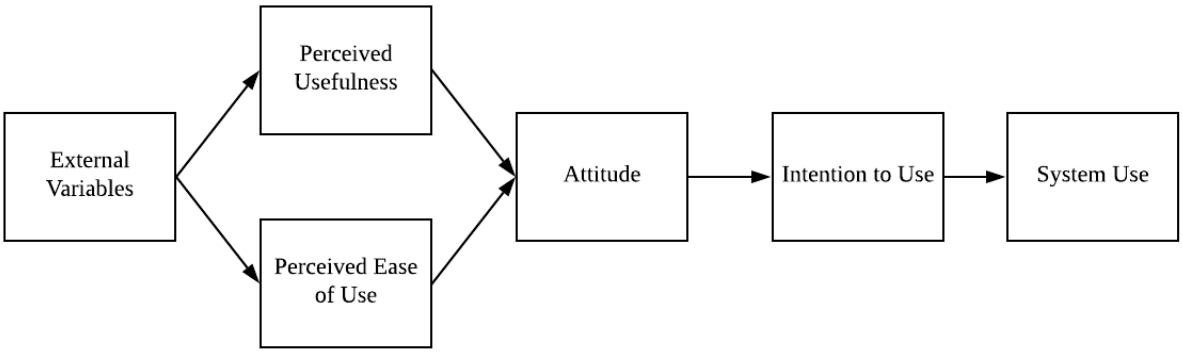

Figure 2.10 The Technology Acceptance Model

TAM has become one of the most popular theories in e-Government adoption studies. The use of TAM for investigating citizen adoption of e-Government assumes that citizens' intentions to adopt e-Government are influenced by the perceived usefulness and the perceived ease of use. For example, Susanto and Aljoza (2015) extended TAM with social influence and individual trust in public service to investigate the adoption of e-Government in Indonesia. Al Khattab et al. (2015) adopted TAM to investigate the effect of trust and risk perception on citizens' intentions to use e-Government services in Jordan. Asmi, Zhou and Lu (2017) utilised TAM to investigate e-Government in Pakistan, leading to the identification of trust, social influence, perceived ease of use and perceived usefulness as influential factors. Üstün, Handan and Pourmouso (2017) extended TAM with attitude, anxiety and perceived benefit to examine e-Government services in Turkey. Adiyarta et al. (2018) extended TAM with four technology readiness factors to evaluate the adoption of e-Government services in Indonesia. Almukhlifi, Deng & Kam (2019b) applied TAM to investigate the moderation effect of transparency on the perceived usefulness of e-Government in Saudi Arabia. Table 2.7 presents a summary of studies using TAM to investigate e-Government.

Table 2.7. A Summary of Studies Using TAM to Investigate Citizen Adoption of E-Government

References	Methodology	Critical Factors
Susanto & Aljoza (2015)	Interview	Perceived ease of use, perceived usefulness, individual's trust in an online public service and social influence.
Al Khattab et al. (2015)	Survey	Perceived ease of use, perceived usefulness, perceived risk and trust in electronic channels.
Asmi, Zhou & Lu (2017)	Survey	Trust, social influence, perceived ease of use and perceived usefulness.
Üstün, Handan & Pourmouso (2017)	Survey	Saving time, anxiety, perceived benefit, perceived ease of use and attitude.
Adiyarta et al. (2018)	Survey	Perceived ease of use, perceived usefulness, optimism, innovativeness, insecurity and discomfort.
Almukhlifi, Deng & Kam (2019b)	Survey	Perceived usefulness, perceived ease of use, computer self-efficacy and transparency.

An integration of several theories is commonly used for better investigating the critical factors influencing e-Government adoption. Innovation diffusion theory (IDT), theory of reasoned action (TRA), theory of planned behaviour (TPB), decomposed theory of planned behaviour (DTPB), TAM, extended technology acceptance model (TAM2), diffusion of innovations (DOI) are often combined to investigate the adoption of e-Government. For example, Rana et al. (2015) revised and extended DTPB with TAM2 and IDT to assess citizen adoption of transactional e-Government systems in India. Roy et al. (2015) integrated TPB with TAM to identify factors influencing the use of local e-Government services in Canada. Wirtz, Piehler and Daiser (2015) combined TRA and TAM to examine citizen adoption of e-Government portals in Germany. Almuraqab (2017) applied DOI and TAM to assess mobile government adoption from the perspective of citizens in the United Arab Emirates. Saxena (2017) used TAM and TPB to evaluate the relationship between ICT infrastructure and the acceptance of mobile government from the perspective of Indian citizens. Shuib, Yadegaridehkordi and Ainin (2019) combined TAM and DOI to investigate citizen satisfaction regarding the adoption of e-Government in Malaysia. Table 2.8 presents a summary of these studies, among others.

Table 2.8. A Summary of Studies Using TAM and Other Theories to Investigate Citizen Adoption of E-Government

Reference	Theories/Models	Methodology	Critical Factors
Rana et al. (2015)	DTPB + IDT + TAM2	Survey	Perceived usefulness, perceived trust, self-efficacy, facilitating conditions, attitude, subjective norm and perceived behavioural control.
Roy et al. (2015)	TPB + TAM	Mixed	Perceived usefulness, perceived ease of use, perceived risk, trust and attitude.
Wirtz, Piehler & Daiser (2015)	TRA + TAM	Survey	Perceived ease of use, perceived usefulness and personal interaction.
Almuraqab (2017)	IDT + TAM	Survey	Perceived ease of use, social influence, trust in technology and compatibility.
Saxena (2017)	TPB + TAM	Survey	Perceived usefulness, perceived ease of use, trust, self-efficacy and attitude.
Shuib, Yadegaridehkordi & Ainin (2019)	DOI + TAM	Survey	Perceived usefulness, perceived ease of use, compatibility, relative advantage, image, trust in government, perceived information quality and computer self-efficacy.

2.4.2 Information Systems Success Model

DeLone and McLean (1992) introduced the IS Success model to analyse the successful adoption of technologies from the user satisfaction perspective. The model develops three critical factors, information quality, service quality and system quality, to measure user satisfaction with new technology. Figure 2.11 presents the IS Success model.

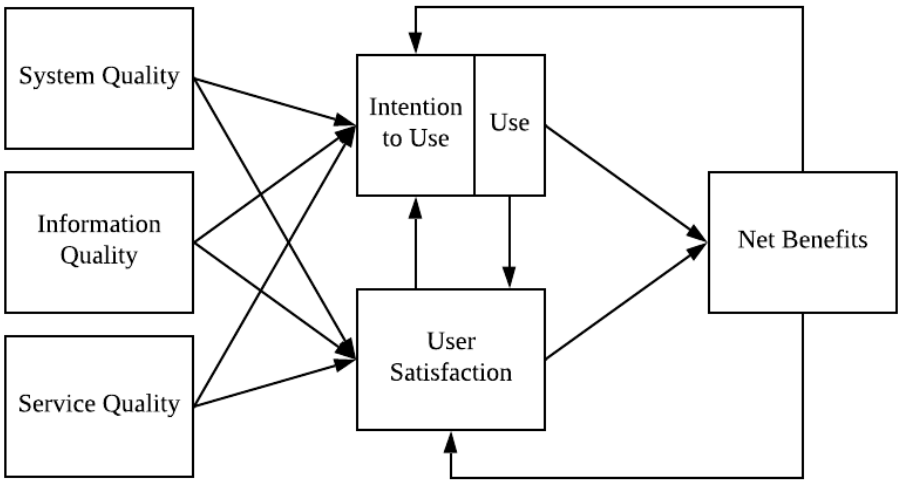

Figure 2.11 Information Systems Success Model

Several studies apply IS Success and combine it with other models to examine the adoption of e-Government from the user cognitive perspective. For example, Rehman, Esichaikul and Kamal (2012) integrated IS Success with TAM to investigate critical factors influencing e-Government adoption in Pakistan. Mellouli, Bentahar and Bidan (2016) integrated IS Success with DOI to investigate citizens' trust in online tax filing in Tunisia. Hidayanto et al. (2017) adopted social cognitive theory (SCT) to evaluate the intention of Indonesian citizens to participate in e-Government services. Alzahrani, Al-Karaghouli and Weerakkody (2017) conducted a systematic literature review to develop a conceptual model based on the IS Success model for analysing the critical factors that influence trust in e-Government adoption. Table 2.9 presents a summary of these studies, among others.

Table 2.9. A Summary of Studies Using SCT and IS Success to Investigate Citizen Adoption of E-Government

References	Theories/Models	Methodology	Critical Factors
Rehman, Esichaikul & Kamal (2012)	IS Success + TAM	Survey	Perceived ease of use, perceived usefulness, paralinguistic web support, ICT infrastructure, awareness, perceived risk, information security, transaction security, service quality, information quality, trust in the internet and trust in the government.
Mellouli, Bentahar & Bidan (2016)	IS Success + DOI	Mixed	Personnel innovativeness, trust in government and trust in the internet.
Hidayanto et al. (2017)	SCT + IS Success	Survey	Outcome expectation, self-efficacy, system quality and service quality.
Alzahrani, Al-Karaghouli & Weerakkody 2017 (2017)	IS Success	Conceptual	Information quality, system quality, service quality, user satisfaction and trust.

2.4.3 Unified Theory of Acceptance and Use of Technology

Venkatesh et al. (2003) consolidated the top eight adoption theories to develop the UTAUT model for investigating the adoption of technologies. The UTAUT has become one of the most widely-used theoretical lenses for investigating the adoption of specific technologies due to its simplicity, consistency and robustness (Williams, Rana & Dwivedi 2015). Four major factors for explaining the adoption of specific technologies using UTAUT are performance expectancy, effort expectancy, social influence and facilitating condition. Performance expectancy is described as the degree to which an individual believes that adopting the technology will result in better performance. Effort expectancy is referred to as the degree of ease in using the technology. Social influence is described as the degree to how an individual feels the importance that the others believe he or she should use the new technology. Facilitating condition refers to the degree to which an individual believes that a technical infrastructure exists to support the technology. These four factors determine the intention, which is the person's subjective probability of adopting new technologies (Venkatesh et al. 2003). Figure 2.12 presents the UTAUT model.

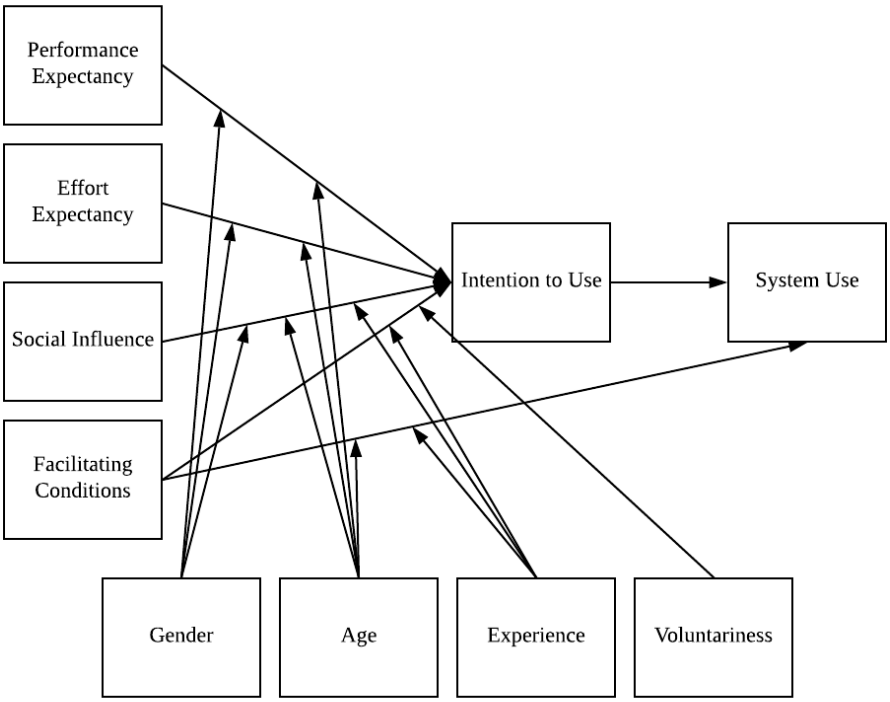

Figure 2.12 The Unified Theory of Acceptance and Use of Technology

The UTAUT has been adopted in e-Government adoption studies worldwide. Gupta, Bhaskar and Singh (2016), for example, extended UTAUT with trust and citizen satisfaction factors to identify the critical factors influencing e-Government adoption in India. Bhuasiri et al. (2016) integrated UTAUT with self-determination theory (SDT) to examine e-tax-filing acceptance in Thailand. Rodrigues, Sarabdeen and Balasubramanian (2016) applied UTAUT with user satisfaction to examine the adoption of e-Government services from the perspective of citizens in the United Arab Emirates. Lu and Nguyen (2016) combined UTAUT and IS Success to investigate the adoption of an online tax-filing service in Vietnam. Further, Rabaa'i (2017) adopted UTAUT to identify the cultural factors influencing e-Government adoption in Jordan. Hariguna (2017) extended UTAUT with information and service quality factors to study public behavioural intention to use e-Government services in Indonesia. Meanwhile, Kurfalı et al. (2017) investigated the role of trust in citizens' decisions to adopt e-Government in Turkey. Alharbi, Papadaki and Dowland (2017) extended UTAUT with grounded theory to analyse the effects of security and its antecedents on the intention to use e-Government services in Saudi Arabia. Sabani, Deng and Thai (2018) revised UTAUT to assess critical factors for adopting e-Government in Indonesia. These studies show that the UTAUT model is appropriate for

examining the adoption of e-Government in various contexts. Table 2.10 presents a summary of these studies.

Table 2.10. A Summary of Studies Using the Unified Theory of Acceptance and Use of Technology for Citizen Adoption of E-Government

Reference	Theories/Models	Methodology	Critical Factors
Gupta, Bhaskar & Singh (2016)	Extended UTAUT	Survey	Effort expectancy, performance expectancy, trust in technology, trust in government, citizen satisfaction and facilitating conditions.
Bhuasiri et al. (2016)	UTAUT + SDT	Survey	Performance expectancy, facilitating conditions, social influence, perceived credibility, perceived autonomy and perceived competence.
Rodrigues, Sarabdeen & Balasubramanian (2016)	Extended UTAUT	Survey	Attitudes, performance expectations, effort expectations, perceived security, facilitating conditions, perceived privacy, perceived uncertainty, trust in government and internet information quality.
Lu and Nguyen (2016)	UTAUT + IS Success	Survey	Performance expectancy, social influence, effort expectation, information quality, system quality and service quality.
Rabaa'i (2017)	UTAUT	Survey	Performance expectancy, effort expectancy, social influence and facilitating conditions.
Hariguna (2017)	Extended UTAUT	Survey	Performance expectancy, effort expectancy, facilitating conditions and perceived information quality.
Kurfalı et al. (2017)	UTAUT	Survey	Performance expectancy, social influence, facilitating conditions, trust of internet and trust in government.
Alharbi, Papadaki & Dowland (2017)	UTAUT2 + Grounded Theory	Mixed	Performance expectancy, social influence, facilitating conditions, habit, trust, privacy perception, security culture, cybersecurity law, user interface quality, general information security awareness and tangible security features.
Sabani, Deng & Thai (2018)	Extended UTAUT	Interview	Availability, accessibility, community expectation, efficiency, effort expectancy, government encouragement, ICT literacy, information security, information quality, performance expectancy,

	service functionality, social influence, transparency and usability.

2.4.4 E-Government-Specific Models

Different theories and models of technology adoption have been used to investigate the adoption of e-Government from various perspectives; however, in their original forms, they do not consider any e-Government-specific factors, such as trust, risk, security or privacy. As a result, Shareef et al. (2011) proposed the e-Government adoption model (GAM) to discover the critical factors for the citizen adoption of e-Government at different stages of service maturity. In addition to GAM, Dwivedi et al. (2017) introduced the unified model of e-Government adoption (UMEGA) by extending the UTAUT model with perceived risk to measure the adoption of e-Government. Several studies have adopted GAM and UMEGA. For example, Akhtar Shareef et al. (2014) utilised GAM to identify the critical factors affecting citizen adoption of e-Government at the transactional stage in Canada. Lallmahomed, Lallmahomed and Lallmahomed (2017) combined GAM with UTAUT to identify critical factors influencing the adoption of e-Government in Mauritius. Verkijika and De Wet (2018) extended the UMEGA with trust and computer self-efficacy to examine the adoption of e-Government in Sub-Saharan Africa. Table 2.11 presents a summary of these studies.

Table 2.11. A Summary of Studies using GAM and UMEGA for Citizen Adoption of E-Government

References	Theories/Models	Methodology	Critical Factors
Akhtar Shareef et al. (2014)	GAM	Survey	Perceived awareness, availability of resources, computer self-efficacy, perceived ability to use, multilingual option, perceived information quality, perceived trust, perceived uncertainty, perceived security, perceived functional benefit and perceived image.
Lallmahomed, Lallmahomed & Lallmahomed (2017)	GAM + UTAUT	Survey	Performance expectancy, effort expectancy, social influence, facilitating conditions, perceived price value, perceived awareness, computer self-efficacy, trust government, trust in internet and resistance to change.
Verkijika and De Wet (2018)	Extended UMEGA	Survey	Performance expectancy, social influence, perceived risk, computer self-efficacy, attitudes and facilitating conditions.

In summary, previous studies have proposed different models to evaluate various critical factors for citizen adoption of e-Government (Asmi, Zhou & Lu 2017; Hidayanto et al. 2017; Rabaa'i 2017; Üstün, Handan & Pourmouso 2017; Wirtz & Daiser 2016). However, these studies do not have an agreement on the critical factors for e-Government adoption. Further, these studies are not reliable for explaining the citizen adoption of e-Government in developing countries. This is due to (a) inconsistent findings regarding the factors influencing the adoption of many technologies, including e-Government; (b) a lack of empirical evidence for the generalisability of the research findings; (c) a lack of consideration for e-Government development stages; (d) a lack of consideration for e-Government-specific factors; and (e) a lack of consideration for contextual factors in developing countries, such as citizens' ICT literacy that is evidenced to be vital in developing countries (Rana & Dwivedi 2015; Susanto & Goodwin 2013) . These limitations call for the development of a model for identifying the critical factors for citizen adoption of e-Government at the transaction stage in developing countries such as Indonesia, and also for evaluating the collective influence of combined critical factors leading to the adoption and use of e-Government services.

This study, therefore, proposes a research model for examining the adoption of e-Government from the perspective of citizens in developing countries such as Indonesia. Specifically, this study intends to examine the configurations of combined critical factors that collectively influence citizens in their decisions to adopt e-Government at the transaction stage from the

perspective of Indonesian citizens. This study can help the governments of developing countries to better plan their e-Government initiatives. Further, understanding the configurations and collective effects of the critical factors leading to the successful adoption of e-Government would have major theoretical implications and provide a unique contribution to e-Government and technology adoption research.

2.5 Development of the Initial Conceptual Research Model

This study aims to develop and test a research model for evaluating the adoption of e-Government at the transaction stage from the perspective of citizens in developing countries. A UTAUT-based research model was developed to achieve this aim. This choice was made for several reasons. Foremostly, the UTAUT is a unified model that has incorporated and outperformed all other technology adoption models (Venkatesh et al. 2003). Specifically, it comprises the top eight adoption theories in the IS domain (Venkatesh et al. 2003). The key factors of the UTAUT are inherited from established factors that are proven to be prominent in prior models (Venkatesh et al. 2003). Performance expectancy, for example, is derived from the perceived usefulness of TAM and TAM2, the relative advantage of DOI and IDT, and the outcome expectations of SCT. Effort expectancy is rooted in the perceived ease of use of TAM and the complexity of DOI. Social influence is established from the subjective norm of TRA, TPB and DTPB; social factors of the model of personal computer utilisation (MPCU); and the image of IDT. Facilitating conditions are adopted from the behavioural control of TPB and DTPB, facilitating conditions of MPCU and the compatibility of IDT. Therefore, the UTAUT is the most appropriate choice to represent all other dominant theories of technological adoption. In addition, the UTAUT is also proven to be the most reliable model for useful insights into technology adoption from the perspective of users (Venkatesh, Thong & Xu 2012). From a review of relevant literature, it is also evident that the UTAUT is the most robust theory for investigating the critical factors for the adoption of e-Government under various circumstances (Dwivedi et al. 2017; Verkijika & De Wet 2018). This further shows that the use of the UTAUT is appropriate for this study.

In addition to the UTAUT constructs, this research partially adopts the DeLone and McLean model of IS success (DeLone & McLean 2003) to better understand citizens' perceptions towards e-Government services at the transaction stage. As a result, two core constructs of the model, information quality and system quality, are adopted in the research model. Further, the

proposed model integrates additional factors, including perceived security (derived from the UMEGA and GAM) and ICT literacy (derived from GAM's computer self-efficacy). These additional factors are essential to e-Government adoption research from the perspective of citizens in developing countries. These two factors are deemed to play a vital role in influencing citizens' decision to adopt e-Government. The integration of the UTAUT and these factors would help to achieve more robust explanations of the adoption of e-Government from the perspective of citizens in developing countries.

Figure 2.13 presents the proposed research model for investigating the critical factors for e-Government adoption from the perspective of citizens in developing countries.

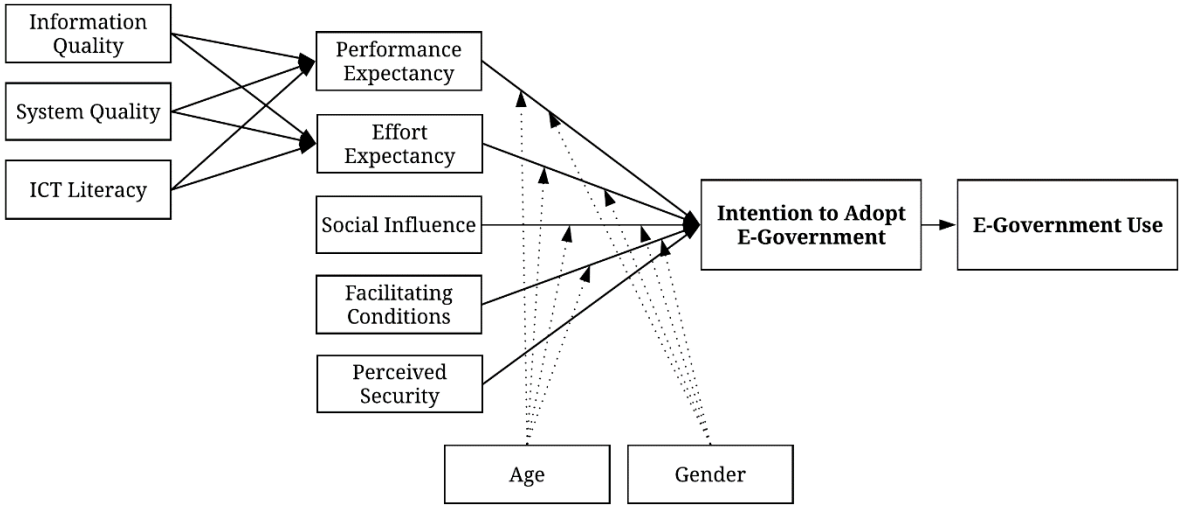

Figure 2.13 The Initial Conceptual Model Developed for the Current Research

2.5.1 Performance Expectancy

Performance expectancy encompasses the degree to which an individual believes that adopting e-Government would lead to better performance (Venkatesh et al. 2003). It is believed to significantly influence the adoption of e-Government (Kurfalı et al. 2017). Performance expectancy positively and significantly influences the adoption of e-Government. For example, Sabani, Deng and Thai (2019b) found that performance expectancy plays a critical role in encouraging citizens to request public services through e-Government. Deng, Karunasena and Xu (2018) emphasised that citizens adopt e-Government for accessing and using public services because they consider that e-Government will bring them benefits, including a

reduction in costs and a saving time and effort. Hung, Chang and Kuo (2013) asserted that the greater the performance expectancy, the more likely e-Government would be adopted.

2.5.2 Effort Expectancy

Effort expectancy describes the amount of effort that citizens must make to learn new technologies (Venkatesh et al. 2003). It is also believed to significantly influence the adoption of e-Government (Kurfalı et al. 2017). Effort expectancy is one of the most prominent components to support the adoption of e-Government. For instance, Kurfalı et al. (2017) found that enhancing effort expectancy can encourage citizens to adopt e-Government. Puspitasari and Ishii (2016) identified that low effort expectancy leads to poor adoption of e-Government. Shareef et al. (2011) argued that when citizens found it easy to use e-Government, their decisions to adopt e-Government were improved.

2.5.3 Social Influence

Social influence is the degree to which citizens perceive the importance of others' perceptions when deciding to adopt e-Government. (Venkatesh et al. 2003; Venkatesh, Thong & Xu 2012). It is recognised to affect the adoption of e-Government (Dwivedi et al. 2017; Verkijika & De Wet 2018; Voutinioti 2013). Rana et al. (2017) demonstrated that pressure from family, friends and co-workers influenced an individual's intention to adopt a socially acceptable system such as e-Government. Ahmad and Khalid (2017) further add that these pressures encourage citizens to recognise the advantage of innovation and embrace the need to adopt e-Government. Susanto and Aljoza (2015) found that social influence was highly correlated with the adoption of e-Government in developing countries.

2.5.4 Facilitating Conditions

Facilitating conditions refer to citizens' perceptions of the resources and support available for e-Government adoption (Venkatesh et al. 2003; Venkatesh, Thong & Xu 2012). It significantly influences the adoption of e-Government in developing countries (Kurfalı et al. 2017; Ovais Ahmad, Markkula & Oivo 2013; Susanto & Aljoza 2015; Verkijika & De Wet 2018). Puspitasari and Ishii (2016), for example, demonstrated the importance of multiple device access to support e-Government adoption. Idris (2016) showed that supportive infrastructure and the adoption of e-Government are highly correlated. Mirchandani, Johnson Jr and Joshi

(2008) emphasised that facilitating conditions must be maintained throughout the adoption process to ensure its success.

2.5.5 Perceived Security

Perceived security refers to the extent to which citizens feel protected against security threats resulting from the use of e-Government (Debjani, Umesh & Gupta 2012). It directly influences the adoption of e-Government (Munyoka & Maharaj 2019; Shahzad et al. 2019).For example, Al-Kalbani, Deng and Kam (2015) discussed how a breach of information security might ruin citizens' trust in e-Government. Posthumus and Von Solms (2004) asserted that an e-Government system needs to be protected from unauthorised access by ensuring information is only accessible to the right users to support the adoption. The internet is the primary medium for e-Government to serve citizens (Nam 2014). However, it may not be safe, as the security of users' private information may be threatened (Debjani, Umesh & Gupta 2012; Mishra & Mishra 2011). Citizens are, therefore, concerned about information security breaches, such as the misuse of information stored in e-Government. Consequently, citizens are often hesitant to adopt e-Government (Bélanger & Carter 2009).

2.5.6 Information Quality

Information quality is generally referred to as the value of the information retrieved from a system such as e-Government (Wangpipatwong, Chutimaskul & Papasratorn 2009). Citizens often look for public information according to their needs. Quality information can help citizens find e-Government useful (Berlilana, Hariguna & Nurfaizah 2017; Debjani, Umesh & Gupta 2012). High-quality information would encourage citizens to see the value of adopting e-Government. Previous studies found information quality to positively influence the perceived usefulness of TAM (Almukhlifi, Deng & Kam 2019b; Puthur, Mahadevan & George 2015), which is the basis of performance expectancy. In addition, the analysis of this factor would help to understand citizens' perceptions, confidence and trust in the information received from e-Government.

2.5.7 System Quality

System quality concerns the degree to which e-Government can provide citizens with better public services. It improves the citizens' perceptions of the usefulness of e-Government

(Almukhlifi, Deng & Kam 2019b). When citizens see that their public service needs can be well met online, they will likely find e-Government useful. This means that the quality of e-Government systems and services can improve the citizens' perceptions about e-Government usefulness. Therefore, higher system quality would help citizens to see the benefits of e-Government adoption. Further, system quality is appropriate for evaluating the adoption of e-Government at the transaction stage (Akhtar Shareef et al. 2014). Understanding system quality helps to understand citizens' demands towards the services provided by e-Government.

2.5.8 ICT Literacy

ICT literacy can be defined as the extent to which citizens believe in their ability to request public services through the adoption of e-Government. Citizens' expectations about the benefits of using e-Government depend strongly on their familiarity and skills with different functions of computers and other ICT devices (Rana & Dwivedi 2015). This means that citizens with a high level of ICT literacy are more likely to perceive e-Government as beneficial. ICT literacy can also potentially influence citizens' perceptions of the ease of using e-Government. A high level of ICT literacy would help citizens to learn and use e-Government. If citizens are confident in their capability regarding computers, they are more likely to request public services through the use of e-Government (Susanto & Goodwin 2013). This confidence can help overcome specific difficulties in using e-Government.

2.6 Conclusion

This chapter has presented a literature review related to e-Government development and adoption across the world. First, it provided an overview of the e-Government development process. Second, it reviewed e-Government adoption studies from different perspectives and theories to justify the necessity for developing a research model to investigate the critical factors for adopting e-Government in developing countries. Finally, based on the review of the literature and the use of the UTAUT, the proposed model developed in this chapter sets the foundation for designing and implementing the quantitative and qualitative analyses of the research. The proposed model developed in this chapter helps develop the interview questions and facilitates the analysis of interview data using deductive thematic analysis.

Chapter 3. Research Methodology

3.1 Introduction

Research methodology is a set of procedures used to identify, select, process and analyse information about a research topic (Creswell & Plano Clark 2011). It includes various research methods that can be used for collecting, analysing and interpreting the data. This includes selecting specific research methods that can be adopted and how these methods can be utilised for adequately answering the research question in the study (Creswell & Plano Clark 2011). The selection of an appropriate research methodology is vital for shaping how the research is conducted and has a significant effect on interpreting the collected data (Saunders, Lewis & Thornhill 2009). Therefore, selecting a proper research methodology can significantly enhance the quality of the research findings (Saunders, Lewis & Thornhill 2009).

This chapter details the research methodology used to answer the research questions in this study. It first presents the rationale for selecting the mixed-methods approach for the study. It then discusses the qualitative and quantitative research methodologies, which are implemented with a focus on the selection of a research sample, data collection and the selection of the statistical data analysis methods. A total of 15 interviews were conducted for the qualitative study and a total of 314 valid responses were received from the survey for the quantitative study.

3.2 Research Paradigms

A paradigm is a world view, a general perspective and a way of breaking down the complexity of the real world (Patton 1990). It entails a set of assumptions, beliefs and models concerning how a research problem should be addressed in specific situations (Lincoln, Lynham & Guba 2011). It intends to explain (a) how the world works, (b) how knowledge is excavated from the world, (c) what questions can be asked and (d) what methodologies can be used to answer these questions (Dills & Romiszowski 1997).

There are three underlying principles of a research paradigm, including ontology, epistemology and methodology (Lincoln, Lynham & Guba 2011). Ontology describes the belief that reflects an interpretation by researchers about what constitutes a fact, whether the phenomenon is

objective and external to the researcher or subjective and cognitively constructed by the researcher (Long et al. 2000). It is related to the nature of the particular phenomenon in the study (Lincoln, Lynham & Guba 2011). Epistemology refers to the theory of knowledge and how knowledge can be obtained in a specific situation (Lincoln, Lynham & Guba 2011). It relates to how we know and what we know in the real world (Lincoln, Lynham & Guba 2011). Methodology refers to a set of methods and techniques used to explore a particular phenomenon in a given context (Fonou-Dombeu & Huisman 2011). It is adopted to incorporate the ontological and epistemological principles into conducting the research activities These three principles guide, inform and shape how a researcher perceives the world in a study (Lincoln, Lynham & Guba 2011). As a result, the selection of the paradigm for a research project is based on the perceptions of the researcher about these principles as well as the relationship between research interpretation and values.

There are two distinct paradigms in social and business research that are most commonly agreed upon in existing literature. These are positivism and interpretivism (Bell, Bryman & Harley 2018). The positivism paradigm is a philosophy that explains what occurs in the phenomenon by investigating the causal relationship between existing constituent constructs (Lincoln, Lynham & Guba 2011). It is often characterised by (a) the adoption of a quantitative methodology to test and validate specific theories followed in the research; (b) the development of hypotheses, models or causal relationships between constructs; and (c) value-free interpretation of the collected data (Bell, Bryman & Harley 2018). The underlying intention of positivist research is to identify and evaluate the cause of the outcome in various circumstances.

In contrast, the interpretivism paradigm is a social science philosophy that supports the opinion that the social world can only be completely understood by subjective interpretation of reality and the related intervention (Creswell & Plano Clark 2011). Interpretivist research is usually characterised by (a) the subjective interpretation of the collected data for the research project, (b) the adoption of a qualitative methodology for acquiring and analysing the research data and (c) the researcher's involvement in the specific social setting of the study (Creswell & Plano Clark 2011). When implementing an interpretive paradigm, researchers must understand the differences among humans in our roles as social actors (Saunders, Lewis & Thornhill 2009). Table 3.1 presents an overview of positivism and interpretivism paradigms.

Table 3.1 Overview of Positivism and Interpretivism Paradigms

Characteristic	Positivism Paradigm	Interpretivism Paradigm
Ontology (study of reality)	*Objective reality* • External and independent reality is described as free from the researcher's consciousness and bias	*Subjective reality* • Internal and dependent reality cannot be described as free from the researcher's consciousness and bias
Epistemology (study of knowledge)	*Objectivism* • Knowledge is formulated and evaluated by empirically verifying the theories	*Subjectivism* • Knowledge is constructed by involving the researcher in social contexts
Methodology (study of research processes)	*Quantitative methodology* • Hypotheses and causal relationships among constructs are developed for testing and validating the theories • Sample size is large for generalisation • Research findings are considered highly reliable and valid	*Qualitative methodology* • Complexity, rich understanding and multiple interpretations of social contexts are focused on for generating theories • The sample size is small to generate theories for a specific context and transferability depends on data richness • Research findings are considered rigorous, credible and trustworthy
Relationship between research interpretation and values	*Objective interpretation* • Research interpretation is free from the researchers' values	*Subjective interpretation* • Research interpretation is influenced by the researchers' values

Note: Adapted from Bell, Bryman & Harley (2018); Creswell and Plano Clark (2011); Lincoln, Lynham & Guba (2011); and Saunders, Lewis & Thornhill (2009).

A third paradigm, pragmatism, combines positivism and interpretivism to emphasise the consequences of the research in a pluralistic nature. It often has an ontological stance similar to positivism and an epistemological stance similar to interpretivism. Pragmatists aim to develop a better understanding of the underlying structures and mechanisms of a particular phenomenon and pose questions that can be answered using the methods of positivism and interpretivism (Creswell & Plano Clark 2011). Pragmatism research allows the researcher to

use various research methods to investigate the research phenomena (Bell, Bryman & Harley 2018; Saunders, Lewis & Thornhill 2009).

3.2.1 Selection of the Research Paradigm

The current study falls within the pragmatism form of enquiry to explore the critical factors for the adoption of e-Government in developing countries. The exploratory element of this research aims to study citizens' perceptions towards the adoption of e-Government, and the confirmatory element aims to test and validate the research model for the adoption of e-Government. The pragmatic paradigm places the research problem at the centre and applies a mixed-methods approach to understanding the problem (Creswell & Plano Clark 2011). The choice of pragmatism is driven by the research questions rather than particular philosophical assumptions. Researchers adopting pragmatism are encouraged to focus on the 'what' and the 'how' of the research problem for obtaining multiple viewpoints, perspectives and standpoints using a mixed-methods approach (Creswell & Plano Clark 2011).

3.3 Approaches to Research Methodology

The selection of an appropriate research methodology is determined by the nature of the research and the chosen paradigm (Creswell & Plano Clark 2011). The aim of this research, to examine the adoption of e-Government in developing countries such as Indonesia, is exploratory and confirmatory. The exploratory aspect of the research aims to study citizens' perception towards adopting e-Government. Exploratory research often uses interviews to obtain data about how people's experiences are created and how social experiences are given meaning (Creswell 2009). Interview data are analysed to identify themes and patterns for constructing complete meanings of the situation being studied using multiple interpretations of people's experiences (Creswell 2009). The qualitative analysis of this research is expected to discover emerging critical factors that were not captured from the literature review by investigating themes and patterns. The confirmatory aspect of this research focuses on testing and validating the research model for the adoption of e-Government. This approach often uses pre-determined questionnaires to collect quantitative data and statistical data analysis to answer the research question (Creswell 2009).

The combination of exploratory and confirmatory research aspects suggests that a mixed-methods approach is appropriate for this study (Arnon & Reichel 2009). This mixed-methods

approach involves using qualitative and quantitative methods to adequately address the research question (Creswell & Plano Clark 2011). This approach has been successful for studying e-Government at the national level (Ahmed & Shirley 2014; Das, DiRienzo & Burbridge Jr 2009; Karunasena & Deng 2012).

A mixed-methods approach offers several research methodologies. Johnson, Onwuegbuzie and Turner (2007) classify three types of mixed-methods research methodologies based on the weight given to the quantitative and qualitative approaches deployed in answering the research question. These methodologies are (a) pure mixed-methods, (b) quantitative-dominant mixed-methods and (c) qualitative-dominant mixed-methods (Johnson, Onwuegbuzie & Turner 2007). When quantitative and qualitative components are given equal status, the methodology is generally referred to as pure mixed-methods (Creswell & Plano Clark 2011; Johnson, Onwuegbuzie & Turner 2007). As shown in Figure 3.1, a pure mixed-methods approach sits in the middle of the range. Qualitative-dominant mixed-methods rely more on interpretivism and qualitative approach. In this methodology, quantitative approaches play a secondary role (Creswell & Plano Clark 2011; Johnson, Onwuegbuzie & Turner 2007). Conversely, quantitative-dominant mixed-methods involve a greater emphasis on quantitative approaches and positivism, while qualitative approaches play a secondary role (Creswell & Plano Clark 2011; Johnson, Onwuegbuzie & Turner 2007). Figure 3.1 summarises the three basic mixed-methods approaches (Johnson, Onwuegbuzie & Turner 2007).

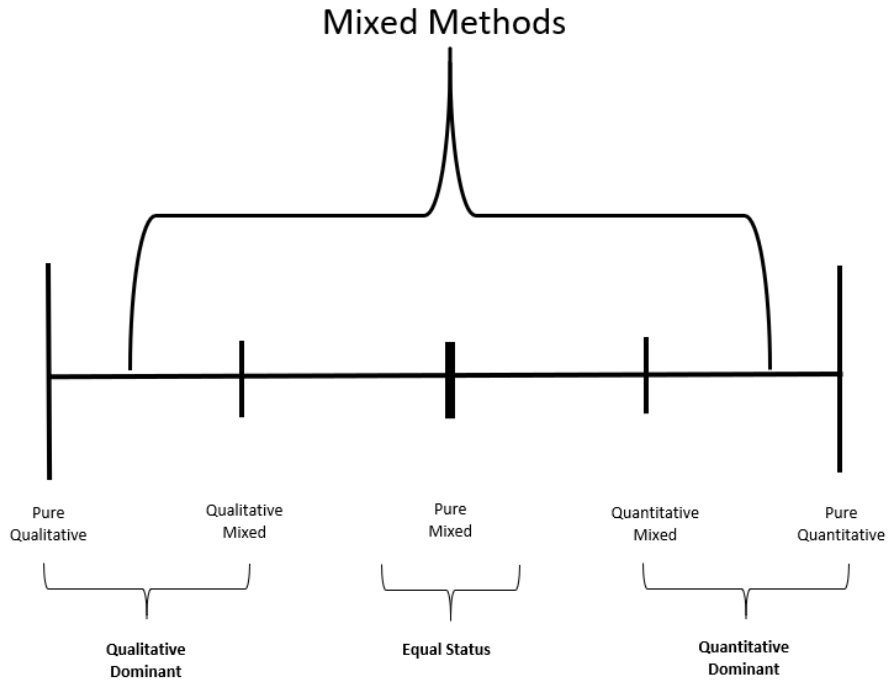

Figure 3.1 An Overview of the Three Mixed-Methods Methodologies. Adapted from Johnson, Onwuegbuzie & Turner (2007)

In addition, Creswell and Plano Clark (2011) provide another classification of mixed-methods approaches, including convergent parallel mixed-methods and sequential mixed-methods. Convergent parallel mixed methods involve merging quantitative and qualitative findings to analyse the research problem comprehensively. In sequential mixed methods, data are analysed in a sequence to elaborate and expand on the findings of one method with the other method. Researchers begin with in-depth interviews for explanatory purposes and then follow up with a survey questionnaire for confirmatory purposes or vice versa (Creswell & Plano Clark 2011).

This research adopts the sequential mixed-methods approach for several reasons. First, its strengths offset the weaknesses of both qualitative and quantitative research. For instance, qualitative research can be viewed as ineffective because of the potential for biased interpretations made by the researcher and the difficulty in generalising findings to a large group. Quantitative research does not have these weaknesses. Conversely, quantitative research may not be suitable for understanding the contexts in which people behave, something that qualitative research can compensate for. Thus, using both research types can strengthen each approach and compensate for the weaknesses of the other. Second, a mixed-methods approach achieves a more comprehensive understanding of the research problem than either quantitative or qualitative approaches alone. Finally, the sequential approach provides a complete model by

incorporating emerging factors that were not captured from the literature review before model validation. In summary, this approach is divided into phases, as presented in Figure 3.2.

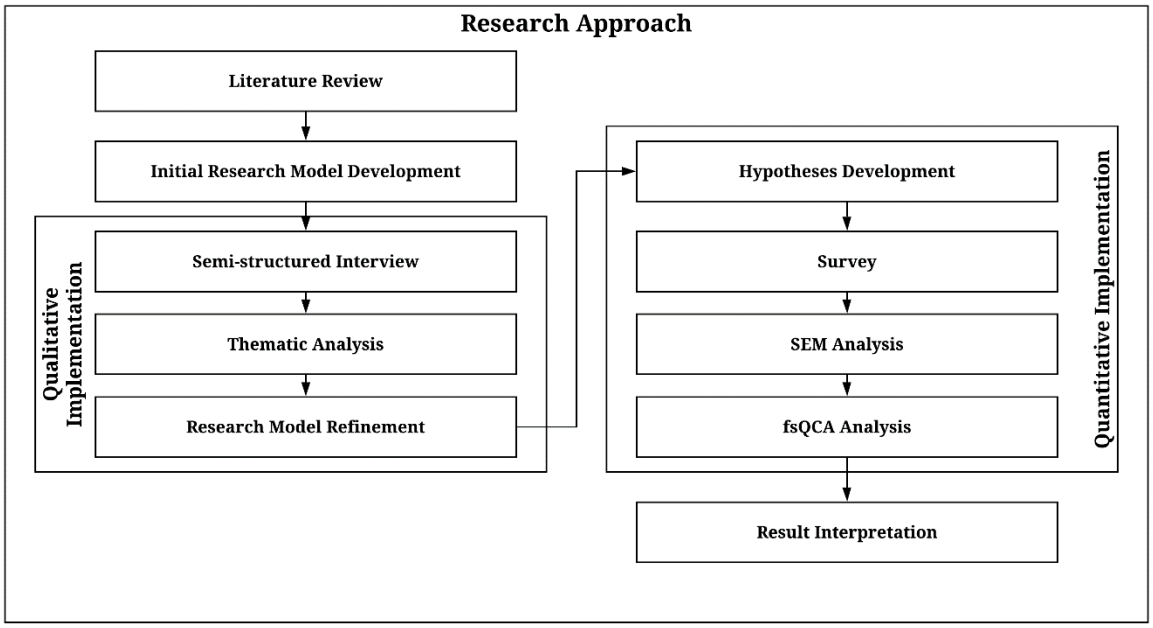

Figure 3.2 The Sequential Presentation of the Research Approach

The research began by analysing literature about the adoption of e-Government from various perspectives. The literature search used knowledge repositories, including journals, books, conference proceedings and case studies. The extensive literature search identified relevant works and the current literature gap. After considering the scope of this research, one issue was selected as the research objective. The objective was broken down into several research questions for greater control over the research topic. Based on the literature review, a preliminary research model of e-Government adoption in developing countries was developed.

3.4 Qualitative Design

The qualitative approach aims to discover emerging factors that were not captured from the literature review to be validated by quantitative data analysis. In addition, the qualitative analysis also aims to provide in-depth information regarding the critical factors for the adoption of e-Government in developing countries such as Indonesia. It commences with the formulation of the research question as follows:

SRQ1: *What factors influence the adoption of transactional e-Government services in Indonesia?*

3.4.1 Qualitative Data Collection

To adequately answer SRQ1, interviews with e-Government users in Indonesia were carried out to assess the research problem and derive a rich conclusion (Creswell & Plano Clark 2011). Semi-structured interview questions were developed based on the literature review. The interview questions were organised into two parts (see Appendix E). The first part focuses on the demographic information of the interviewees. The second part comprises general questions about the adoption of e-Government in Indonesia and specific questions about the factors that may influence citizens in the adoption of e-Government. Participants were also asked to rate the importance of each factor in terms of how it would influence their decision to adopt e-Government services. A feasibility study was conducted with the help of academics, higher degree research scholars and e-Government users to refine the interview questions.

The Indonesian version of the interview schedule (see Appendix D) was used for collecting data because interview participants were Indonesian citizens. Translation of the revised interview schedule from English to Indonesian after the preliminary test was necessary to ensure understanding and minimise misinterpretation. This was accomplished using two different linguistic specialists for the forward-backward translation method (Larkin, Dierckx de Casterlé & Schotsmans 2007). In this method, one linguistic specialist converted the survey from English to Indonesian while the other used the Indonesian version to convert it back to English. The two specialists then confirmed the meanings of the Indonesian version by comparing the two English versions. On this basis, modifications were made to the wording of some questions to ensure that the interview schedule was clear, consistent and understandable.

3.4.2 Interview Population and Sampling

The purposive snowball sampling method was used to select a suitable population sample for the interview. The idea behind purposive sampling is to concentrate on recruiting participants with particular characteristics to assist the relevant research (Howitt 2015). This research recruited fifteen participants across three provinces in Indonesia, namely, Banten, Jakarta and West Java. The selection criteria included being an Indonesian citizen over 18 years of age who had previously used e-Government services. Participants were chosen based on their

knowledge and experience in using e-Government services. This helped the researcher gain a deep understanding of the problem to help adequately answer the research question (Creswell & Plano Clark 2011; Howitt 2015). A total of 15 participants were selected based on their answers to the following screening questions:

- *Have you ever used e-Government services?*
- *What kind of e-Government services have you used?*
- *How often do you use e-Government services?*

3.4.3 Interview Administration

All interviews were conducted face-to-face and recorded with the participants' consent. Notes were taken to complement the recording. The transcribed data were analysed using theory-driven thematic analysis (Boyatzis 1998). Before conducting interviews, a copy of the letter of invitation and consent was presented to the participants. This included the title of the research, the research objective, the expectations from the participants, the benefits of participating, the risk of participating, participants' rights, the name and contact information of the researchers and RMIT Human Research Ethics Committees.

3.4.4 Analysis of Interview Data

In terms of qualitative data analysis, thematic analysis was utilised for its simplicity and minimal constraints on the data collection and analysis (Braun & Clarke 2006). In addition, the thematic analysis uncovers insights and reveals the similarities and differences between the responses of participants. A detailed discussion of this process and the findings of thematic analysis is presented in Chapter 4.

3.5 Quantitative Design

The implementation of the quantitative approach commences with the formulation of specific research questions as follows:

> ***SRQ2:*** *What are the relationships among identified factors for evaluating the adoption of transactional e-Government services in Indonesia?*

SRQ3: *What are the configurations of factors that would lead citizens to accept and resist the adoption and the use of transactional e-Government services in Indonesia?*

3.5.1 Quantitative Data Collection

To adequately answer the research questions, the research model needs to be tested and validated. The data were collected using a survey questionnaire to test and validate the research model. For this purpose, a close-ended questionnaire was developed with items from the qualitative analysis. There are several advantages of using close-ended questions in research (Creswell & Plano Clark 2011). For example, answers are easy to code and analyse and can often be coded directly from the questionnaire. The respondents often have a better understanding of the questions. As a result, the answers to close-ended questions are relatively complete.

3.5.2 Survey Instrument Design

The survey instrument includes three parts (see Appendices H and I). The first part describes the terms included in the survey instrument. The second part is designed to gather the participants' demographic information such as gender, age, education level, and occupation. The third part is used to explore the perception and opinion of individual citizens on the factors that may influence the adoption of e-Government in Indonesia. The survey instrument employs a seven-point Likert scale. This is due to its accuracy and capability in providing consistent results to be used in data analysis (Hair et al. 2010). A seven-point Likert scale is used in the survey to evaluate agreement regarding the specific measurement items under various constructs in the survey instrument. The value '1' indicates 'strongly disagree', and the value '7' indicates 'strongly agree'. The seven-point Likert scale is also applied for evaluating the importance of some specific constructs in the survey, where the value '1' indicates 'not important at all/extremely disagree' and the value '7' indicates 'extremely important/extremely agree'.

The survey instrument refinement included a pre-test. A pre-test aims to evaluate the content validity of the survey designed for collecting research data (Hair et al. 2010). In this step, experts in the field are invited to validate the survey instrument based on factors such as understandability, terminology, wording comprehensibility, logical sequencing and consistency (Hair et al. 2010). In this research, five academic experts in e-Government pre-

tested the survey instrument and provided specific comments for its improvement. These comments related to (a) rephrasing questions, (b) deleting questions and (c) suggesting questions. Based on these comments, the questionnaire was improved.

The survey participants were Indonesian citizens. Indonesian, or Bahasa Indonesia, is the official language of Indonesia. The survey questionnaire was translated into Indonesian to facilitate a quick response and better understanding. The translation was done using the forward-backward translation method (Bailey 2008). One translator converted a document from English to Indonesian, and then a different translator converted it back from Indonesian to English. Linguistic specialists translated the survey instrument into Indonesian to ensure the meaning was the same in the Indonesian and English versions.

3.5.3 Survey Population and Sampling

The selection of the survey population and sampling is a critical step in survey-based research (Lavrakas 2008). The survey sample should represent the population under investigation (Saunders, Lewis & Thornhill 2009) to ensure that substantial and representative data are collected (Zikmund et al. 2013). Three key issues should be carefully considered: the sampling method, sampling frame and sample size (Lohr 2019).

Non-probability sampling and probability sampling are two basic sampling methods (Lohr 2019). Non-probability sampling assumes that the study sample is chosen based on the subjective judgement of the researcher (Fowler Jr 2013). The probability of choosing each respondent from the population of interest is unknown (Sekaran & Bougie 2016). This method is more likely to be adopted when the study faces cost and time constraints, and it is also frequently used in studies that focus on a small number of respondents (Zikmund et al. 2013). Information richness may be achieved for gaining theoretical insights into a particular phenomenon. Since the non-probability sampling method tends to yield research findings that cannot be confidently generalised to the entire population (Bell, Bryman & Harley 2018; Lohr 2019), it is not relevant for this research.

In contrast, probability sampling is based on the assumption that the likelihood of choosing each respondent from the population of interest is known (Lohr 2019; Sekaran & Bougie 2016). In other words, every member of the target population has an equal chance of being randomly selected for the study (Fowler Jr 2013; Zikmund et al. 2013). Probability sampling allows the

researcher to gather data from a sample representing the entire population under investigation (Fowler Jr 2013; Lavrakas 2008; Teddlie & Yu 2007). As a result, the research findings can be confidently generalised to the whole population (Bell, Bryman & Harley 2018; Lohr 2019). With this advantage, the probability sampling method has been widely adopted in e-Government adoption studies such as Almukhlifi, Deng and Kam (2019a); Deng, Karunasena and Xu (2018); Samuel et al. (2020); and Eid, Selim and El-Kassrawy (2020). Consequently, the probability sampling method was chosen for this study, which aims to obtain a representative sample for investigating the adoption of e-Government from a citizen perspective.

The probability sampling technique was used to select the research sampling frame of Indonesian citizens above 18 years old (the minimum age to access e-Government). Determining an adequate sample size is critical to allow findings to be generalised to the entire population with the desired level of precision and confidence (Fowler Jr 2013; Lavrakas 2008; Teddlie & Yu 2007). Generalisation depends on various factors, such as the research objective, confidence interval and level, size of the population and statistical tests used (Sekaran & Bougie 2016). A general rule in SEM studies is that an adequate sample size is required for testing causal relationships among variables and maintaining stable estimates and power (Hair 2018; Hair Jr et al. 2016; Sarstedt et al. 2019). Therefore, it is crucial to establish a sufficient sample size for SEM analysis (Kline 2015).

There is no explicit rule for a minimum sample size for SEM (Anderson & Gerbing 1988; Kline 2015). Anderson and Gerbing (1988) suggest a sample size of more than 150 for SEM, but Kline (2015) recommends a minimum of 200 samples and suggests the sample size should depend on the complexity of the research model. This means that the greater the number of latent variables in the model, the more relationships or paths are estimated. The sample size is often calculated based on the cases-to-variables ratio, typically ranging from 5 to 10 (Hair 2018). In this study, there are 46 measurement items and, therefore, the minimum sample size is 230.

3.5.4 Survey Administration

After discussing the survey instrument and sample design of this study, this section focuses on the survey administration. Based on the sample size identified, the questionnaires were administered to Indonesian citizens above 18 years old. The data collection was conducted in

Indonesia between June 2018 and November 2018. The survey was electronically developed using the RMIT Qualtrics system and distributed on social media sites such as Facebook and LinkedIn. An invitation letter was attached explaining the study's ethical requirements under the guidelines of the RMIT Ethics Committee. A total of 314 valid responses were received from the survey.

3.5.5 Analysis of Survey Data

The research model was validated and tested using SEM and fsQCA to answer the confirmatory research questions. SEM is utilised to examine the causal relationship between the observed and the latent variables of the research model (Byrne 2010). SEM analyses the fitness of the hypothesised model to the sample data (Nachtigall et al. 2003). SEM is widely used as a powerful method for analysing multivariate data in various research projects (Hair et al. 2010). SEM allows for modelling the relationship between constructs and measurement items, and the relationships among constructs, in a research model (Chin 1998). It explores the structure of interrelationships between research constructs through a series of equations (Hair et al. 2010). It further examines to what extent the hypotheses in the research model are supported by the collected data in a given situation (Hair et al. 2010). These hypotheses can be rejected if the collected data does not conform to the proposed research model (Byrne 2013; Kaplan 2009). SEM has the flexibility to investigate the interplay between the research model under investigation and the data collected from the participants in a research project (Byrne 2013).

There are two types of SEM, including covariance-based SEM (CB-SEM) and partial least squares SEM (PLS-SEM). CB-SEM is based on the covariance matrix and tests specific relationships between multiple latent constructs to confirm theories in a research project (Hair 2018; Hair et al. 2010; Hair Jr et al. 2016). This is achieved by reproducing the covariance matrix by limiting the difference between the observed and estimated covariance matrices (Astrachan, Patel & Wanzenried 2014). As a result, CB-SEM lacks focus for explained variance (Hair et al. 2010). In CB-SEM, the model estimation requires various assumptions to be met, including the minimum sample size and the multivariate normality of the dataset (Hair 2018). CB-SEM is designed for use in reflective measurement models; therefore, it tends to produce misspecification when dealing with formative measurement models (Jarvis, MacKenzie & Podsakoff 2003). To avoid the limitations of CB-SEM with respect to minimum sample size, multivariate normality and the use of formative constructs, PLS-SEM is the preferred method for this study.

PLS-SEM is based on using total variance with a specific focus on maximising the explained variance of the dependent constructs to develop theories in a research project (Hair Jr et al. 2016). It has gained prominence in business research due to its flexible application in terms of sample size, unrestricted multivariate normality and the ability to assess formative constructs (Sarstedt et al. 2019). PLS-SEM yields estimates with high precision in a large sample-based and multivariate normality-based study (Hair Jr et al. 2016). This holds true for this study when all underlying assumptions associated with the use of SEM are satisfied. Given that items in the research model are formative, this study selects PLS-SEM for data analysis without any concern regarding the rigour and robustness of the research results.

This study uses PLS-SEM to analyse the quantitative data for investigating the critical factors for the adoption of e-Government in Indonesia. The rationale of using SEM in this research is due to (a) its potential ability to extend the theory, (b) its ability to simultaneously test several interrelated relationships among the constructs to validate the research model and (c) its ability to contain latent variables when expressing abstract concepts while accounting for measurement error (Hair et al. 2010; Kline 2015).

Five steps were followed when conducting PLS-SEM analysis of the dataset in this research, as shown in Figure 3.3. The first step involves conducting preliminary data analysis to prepare the dataset for further analysis. This step includes dealing with missing data, outliers and non-response bias assessment. The second step concerns performing the dimensionality assessment to examine the extent to which a set of measurement items fit together to reflect a theoretical construct (Clark & Watson 1995). Statistical Product and Service Solutions (SPSS, formally known as Statistical Package for Social Sciences) software, version 26, was used to perform the first and second steps.

The third step assesses the validity of the measurement model. One of the main purposes of using PLS-SEM is to explore the extent to which a proposed model fits the collected data (Hair et al. 2010). SmartPLS3 (Ringle, Wende & Becker 2015) software was used to assess the measurement model because all factors were formative.

The fourth step of the PLS-SEM analysis includes assessing the validity of the structural model. The structural model presents an overview of the strength of the path between the constructs in the study. Therefore, the model facilitates understanding the proposed relationship between the constructs in the model (Hair et al. 2010). It is assessed through the magnitude of variance

explained for each dependent variable (R^2), the paths coefficient and the *P*-value (Byrne 2013). SmartPLS3 was used for the structural validity assessment. The final step in the PLS-SEM analysis is to summarise the results based on the measurement model analysis and the structural model analysis. A detailed discussion of this process and findings of PLS-SEM analysis is presented in Chapter 6.

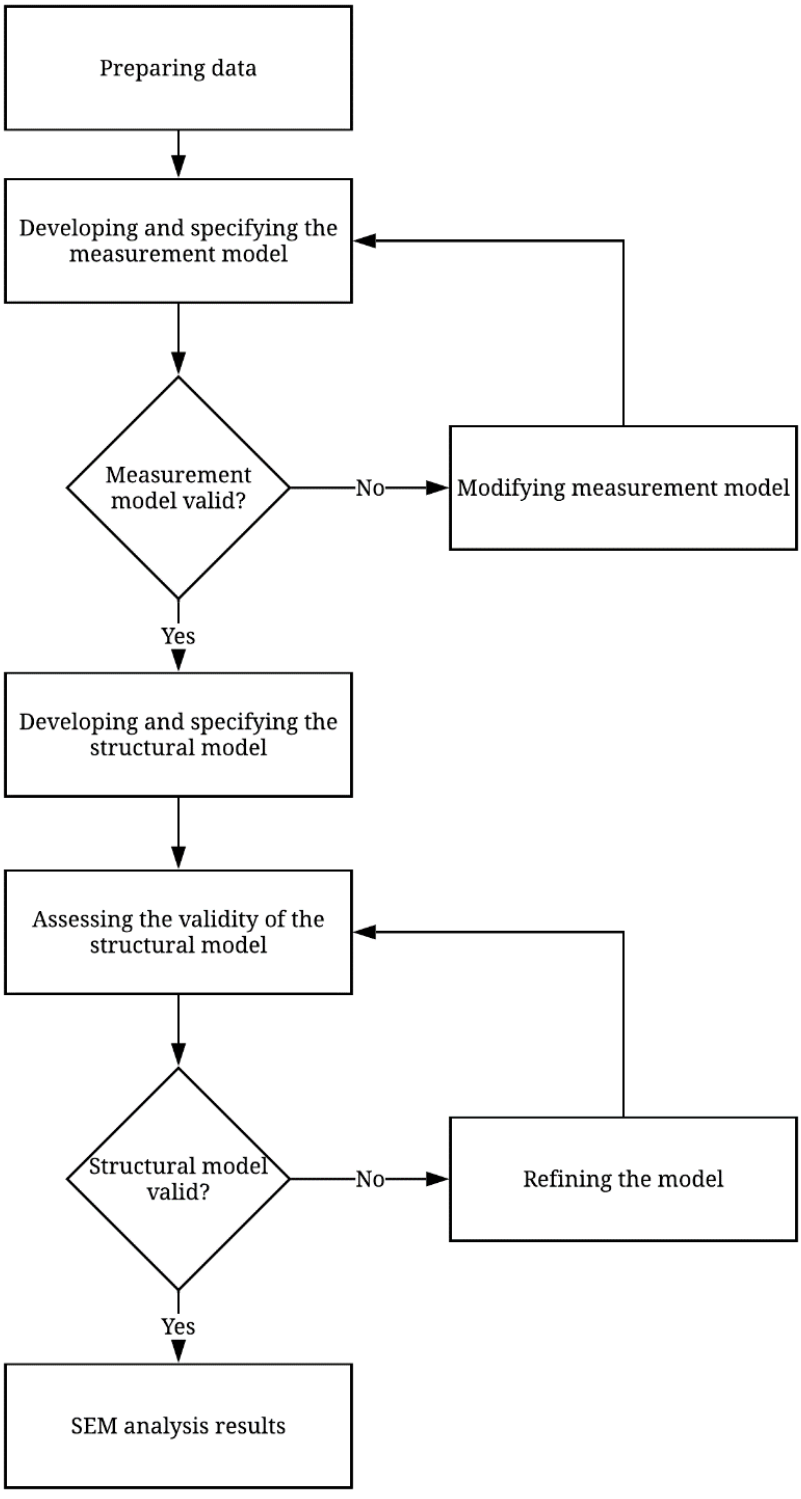

Figure 3.3. An Overview of the Procedures for PLS-SEM Analysis. Adapted from Hair (2018) and Hair Jr et al. (2016).

Qualitative comparative analysis (QCA) is an asymmetric data analysis technique that combines the logic of qualitative approaches, which are rich in contextual information, with quantitative methods that deal with large numbers of cases and are more generalisable than symmetric theories and tools (Pappas & Woodside 2021). QCA studies are designed to combine techniques from qualitative and quantitative approaches, taking the best attributes from both methodologies. Qualitative inductive reasoning, with data being analysed 'by case' and not 'by variable' (Ragin 2000; Ragin & Davey 2016), is combined with quantitative empirical testing, as sufficient and necessary conditions identify outcomes through statistical methods (Olya & Al-ansi 2018; Ordanini, Parasuraman & Rubera 2014).

The fsQCA tool is based on fuzzy sets and can capture conditions that are (1) sufficient or necessary to explain the outcome and (2) insufficient on their own but are necessary parts of solutions that can explain the result. This is called an insufficient but necessary part of an unnecessary but sufficient (INUS) condition: an insufficient but necessary part of a condition which is itself unnecessary but sufficient for the result (Mackie 1965). Such conditions may be present or absent in a solution, or they may be conditions for which we 'do not care'. The 'do not care' situation indicates that the outcome may either be present or absent, and it does not play a role in a specific configuration. Necessary and sufficient conditions may be present or absent as core and peripheral elements. Core elements indicate a strong causal relationship with the outcome, and peripheral elements indicate a weaker relationship (Fiss 2011). Thus, using fsQCA, this study can identify which conditions are essential or not for an outcome to occur and which combinations of conditions are more or less important than others.

The use of fsQCA can offer numerous benefits. To capture combinations of factors that are sufficient for an outcome to occur, fsQCA uses qualitative and quantitative assessments and calculates the degree to which a case belongs to a set (Olya et al. 2021; Ordanini, Parasuraman & Rubera 2014; Ringle, Wende & Becker 2015), thus, creating a bridge between qualitative and quantitative methods. FsQCA uses calibrated measures, as data are transformed into the fuzzy range between 0 and 1.

FsQCA does not intend to measure the unique contribution of each variable to the overall observed data; instead, its objective is to identify complex solutions and combinations of independent variables. This action is both a limitation and strength of fsQCA. FsQCA requires researchers to know both the examined variables (conditions and outcome) and the underlying theory and context. This knowledge is used throughout the analysis for (1) data calibration, (2)

simplifying the multiple solutions and (3) interpreting the results. Researchers should make decisions at the different stages based on their knowledge of what is typical in qualitative analysis (Pappas & Woodside 2021). Despite the potential for subjective bias, researchers' knowledge and understanding of the field and research problem can lead to a richer analysis and understanding of the data (Woodside 2014). Figure 3.4 details each step of the fsQCA process.

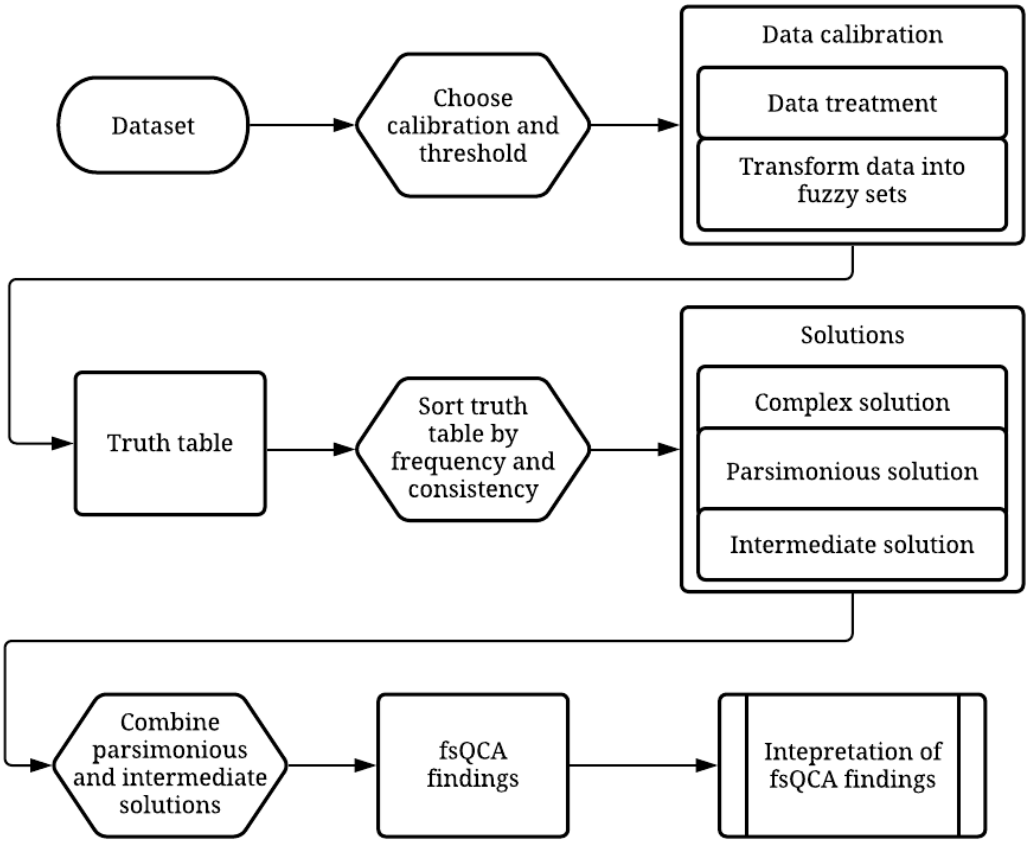

Figure 3.4 An Overview of the Procedures for fsQCA. Adapted from Pappas and Woodside (2021).

The most important step in fsQCA is data calibration. When a variable or construct is measured with multiple items, computation of one value per construct is needed as it will be used as input in fsQCA. For each case (row) in the dataset, one value for every construct (column) is needed. The simplest method is to calculate the mean of all the items to obtain one single value per case (Pappas & Woodside 2021). Further, fsQCA does not test for construct reliability and validity, as these tests refer to the measures and not the analysis method. If the constructs used in a study

need to be tested for their reliability and validity, this is done before fsQCA. Therefore, PLS-SEM analysis is conducted before fsQCA in this study.

Instead of traditional methods or working with probabilities, data in fsQCA are transformed from ordinal or interval scales into degrees of membership in the target set, which shows if and how much a case belongs to a specific set. In addition, fsQCA can calculate the presence of a condition or its negation. The negation of a condition is referred to in the literature as the absence of a condition, and the two terms have been used interchangeably based on how the absence is calculated (Fiss 2011; Ragin 2008). The term 'absence' has also been used to describe when the condition is irrelevant in a configuration (Pappas et al. 2016), similar to the 'do not care' term often used in previous studies (Fiss 2011; Ragin 2000).

In fsQCA, variable calibrations are mandatory for forming fuzzy sets with their values ranging from 0 to 1 (Ragin 2008). Considering a fuzzy set as a group, the values from 0 to 1 define if and at what amount a case belongs to this group. Because all values range from 0 to 1, a case with a fuzzy membership score of 1 is a full member of a fuzzy set (fully in the set), and a case with a membership score of 0 is a full non-member of the set (fully out of the set). If a membership score is 0.5, it means a case is exactly in the middle and would be both a member of the fuzzy set and a non-member. This type of case is known as the intermediate set. The intermediate-set point is the value where there is maximum ambiguity about whether a case is more in or out of the target set (Pappas & Woodside 2021).

Data calibration can be achieved either directly or indirectly. In the direct calibration, three qualitative breakpoints, which define the level of membership in the fuzzy set for each case (fully in, intermediate, fully out), need to be selected. In the indirect method, the measurements need to be rescaled based on qualitative assessments. A measure can be calibrated differently depending on what one is investigating. Either method may be chosen, depending on the researcher's substantive knowledge of the data and underlying theory (Berg-Schlosser et al. 2009). The direct method is adopted in this study as it recommended and more common (Pappas & Woodside 2021). Three values corresponding to full-set membership, full-set non-membership and intermediate-set membership are set. This can lead to more rigorous studies that are easier to replicate and validate because it is clear how the thresholds have been chosen (Pappas et al. 2016; Pappas & Woodside 2021). Since this study adopts seven-point Likert scales (1 = not at all, 7 = very much), the values of 6, 4 and 2 were used as thresholds as suggested by previous studies (Ordanini, Parasuraman & Rubera 2014; Roy et al. 2018).

The fsQCA calculates three solutions, namely, the complex solution, parsimonious solution and intermediate solution. A solution refers to a combination of configurations supported by a high number of cases, where the rule the combination leads to the outcome is consistent. The complex solution presents all the possible combinations of conditions when traditional logical operations are applied. In general, because the number of identified configurations can be large, the number of complex solutions can be extensive. These may include configurations with several terms, interpreting the solutions rather difficult and, in most cases, impractical (Pappas & Woodside 2021). For this reason, these solutions are further simplified into parsimonious and intermediate solution sets.

The parsimonious solution set is a simplified version of the complex solution based on simplifying assumptions. It presents the most important conditions that cannot be left out from any solution. These are classified as core conditions (Fiss 2011) and are identified automatically by fsQCA. The significant difference between parsimonious and complex solutions is that the complex solution excludes counterfactual cases involving limited simplification, while the parsimonious solution includes any counterfactual combination that can contribute to a logically more straightforward solution.

Finally, the intermediate solution is obtained when performing counterfactual analysis on the complex and parsimonious solutions, including those only theoretically plausible (Ragin 2008; Ragin & Davey 2016). The intermediate solution uses a subset of the simplifying assumptions used to compute the parsimonious solution, which should be consistent with theoretical and empirical knowledge. Based on previous knowledge, variables should be considered only present, only absent or either in explaining the outcome (Pappas & Woodside 2021). By default, either present or absent is computed. Decisions made concerning the connection between each causal condition and the outcome need to be based on theoretical or substantive knowledge (Fiss 2011). The intermediate solution is part of the complex solution and includes the parsimonious solution. While core conditions appear in both parsimonious and intermediate solutions, the conditions that are eliminated in the parsimonious solution and appear only in the intermediate solution are classified as peripheral conditions (Fiss 2011). A simple way to identify the core conditions involves examining the parsimonious solution, since it does not include peripheral conditions. Combining the parsimonious and intermediate solutions can offer a more detailed and holistic view of the research findings (Fiss 2011).

3.5.6 Result Interpretation

The final step of the research involved interpreting the results obtained from the thematic analysis, PLS-SEM and fsQCA. The final interpretation of the results is based on the collective findings from the three data analysis methods. This approach will provide a complementary and holistic view of the results from this mixed-methods research.

3.6 Conclusion

This chapter describes the selection of the appropriate research methodology to answer the research questions. After reviewing various research methodologies, the sequential mixed-methods approach was adopted. In the sequential mixed-methods approach, data is analysed in a sequence to elaborate and expand on the findings of one method with the other method. This research begins with qualitative interviews, followed by a quantitative survey. The interview results were analysed using thematic analysis to revise the research model. The revised model was validated and tested using SEM and further evaluated using fsQCA. The sequential mixed-methods approach was chosen due to its capacity to provide comprehensive and robust findings, providing the researcher with a better understanding of the research problems, and its ability to overcome the weaknesses associated with standalone qualitative and qualitative approaches.

Chapter 4. Analysis of the Qualitative Data

4.1 Introduction

This study collects the qualitative data from semi-structured interviews to validate the proposed research model (developed in chapter 2; see figure 2.14) for the adoption of e-Government from the perspective of citizens in developing countries such as Indonesia. The interview questions are developed based on a review of the related literature. Such questions are divided into three parts. The first part focuses on the demographic information of the participant. The second part includes general questions about the experience and motivation of participants in the adoption and the use of e-Government services. The third part consists of specific questions on the factors for the adoption and the use of e-Government services from the perspective of citizens. The interview questions were pre-tested with the help of academics, higher degree research scholars, and e-Government users as previously explained the Chapter 3.

This chapter is organised as follows. Firstly, an overview of thematic analysis is discussed. Secondly, an overview of the participants is presented. Thirdly, A comprehensive discussion of the findings of thematic analysis is then presented with the use of thematic networks map. Finally, a revised research model from the qualitative data analysis is deliberated.

4.2 An Overview of Thematic Analysis

This research employs thematic analysis to study the qualitative data from fifteen semi-structured interviews. Thematic analysis is a systematic way of categorising complex qualitative data into a number of themes for increasing the accuracy in understanding and interpreting people's experience on a phenomenon (Attride-Stirling 2001; Howitt 2013). A theme is a "pattern found in the information that at minimum describes and organises the possible observations and at maximum interprets aspects of the phenomenon" (Boyatzis 1998). The core of the thematic analysis is the capacity to summarise complex qualitative data by identifying the underlying dominant themes which appear and re-appear within the data set (Howitt 2015).

There are two approaches of thematic analysis that exist in the literature. These two are the data-driven inductive thematic analysis, and theory-driven deductive thematic analysis

(Attride-Stirling 2001; Boyatzis 1998). In the data-driven inductive thematic analysis, themes are derived purely from the collected data. As a result, the themes identified from the data in the data-driven inductive thematic analysis may demonstrate a little connection to the specific interview questions that have been asked from the interviewees (Braun & Clarke 2006). Such an analysis is helpful to explore new areas of research that emerge from the data (Boyatzis 1998). This, however, ignores the theoretical interest in the area or topic (Braun & Clarke 2006).

In theory-driven deductive thematic analysis, themes are derived from the existing theoretical concerns (Braun & Clarke 2006). The theory-driven deductive approach is the most frequently used approach that can lead to the development of codes and themes based on theories familiar to researchers (Boyatzis 1998). The theory-driven deductive thematic analysis is extremely useful for researchers to replicate, extend or refute previous research (Boyatzis 1998). The theory-driven deductive thematic analysis, therefore, is the most appropriate approach for this research.

There are three types of themes that exist in the thematic analysis, including the basic themes, the organising themes, and the global themes (Attride-Stirling 2001). Basic themes are the lowest level themes derived from the initial code attached to segments of data (Attride-Stirling 2001). Organising themes are the middle-order themes that classify the basic themes into groups for representing similar matters (Attride-Stirling 2001). Global themes are the highest-level themes that encompass the principal in the data as a whole (Attride-Stirling 2001). Such themes encapsulate related organising themes together to present an argument for answering the research question. Based on the three kinds of themes, a thematic network map can be developed which shows the important themes at multiple levels and the relationships among them (Attride-Stirling 2001). In the thematic map developed in this chapter, the global themes, organising themes and basic themes are shown respectively, in the shape of rectangles, ovals, and rounded rectangles. Figure 4.1 shows an overview of thematic map (Attride-Stirling 2001).

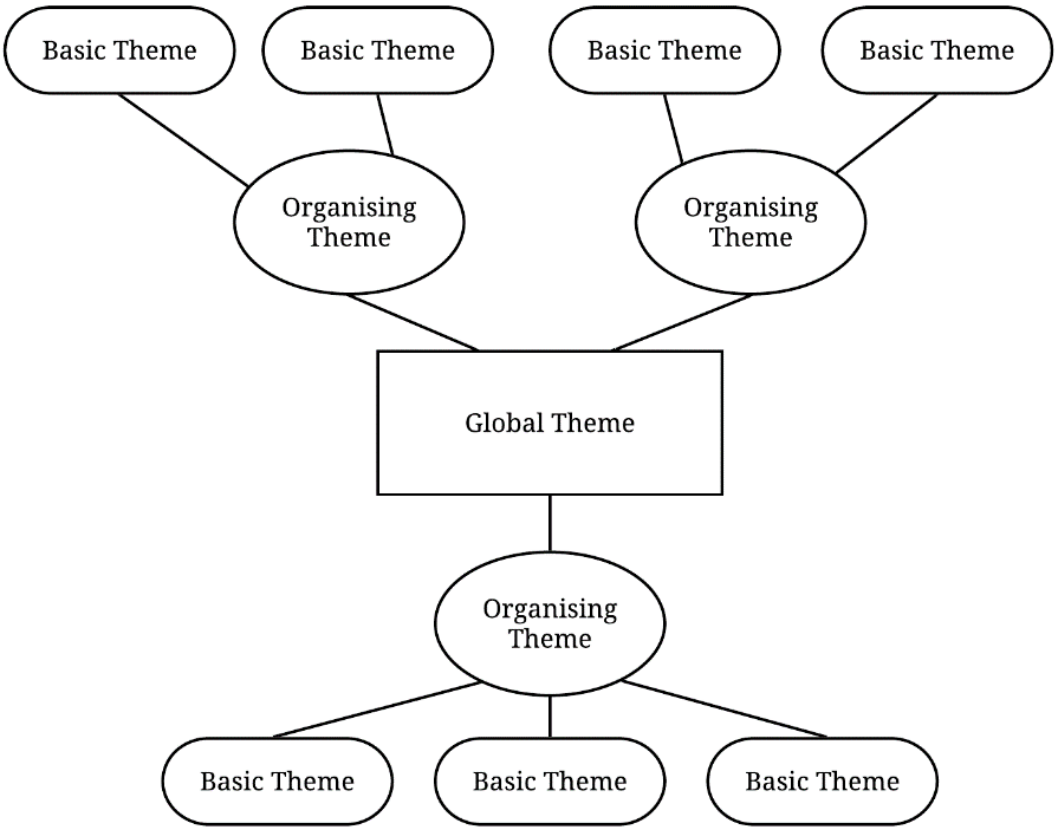

Figure 4.1 An Overview of Thematic Map (Attride-Stirling 2001)

The thematic analysis entails several phases. The first phase is familiarising with the transcribed text to get a better understanding of the whole data set. The second phase is the initial coding which involves assigning specific codes to the transcribed text. In this study, codes are created in a deductive manner by reviewing the data with specific classifications based on pre-existing theoretical concerns (Howitt 2013). The third phase involves searching for themes based on the initial coding. Themes are identified by reviewing each code to sort into meaningful clusters (Attride-Stirling 2001; Howitt 2013). The fourth phase is to review the themes by splitting certain themes into two or more themes, and converging overlapping themes (Braun & Clarke 2006). The fifth phase is to define and name themes based on the essences of what each theme is about (Braun & Clarke 2006). The sixth phase is to produce the report by developing thematic maps that show the important themes at multiple levels and their relationships (Attride-Stirling 2001). Figure 4.2 shows the steps in thematic analysis.

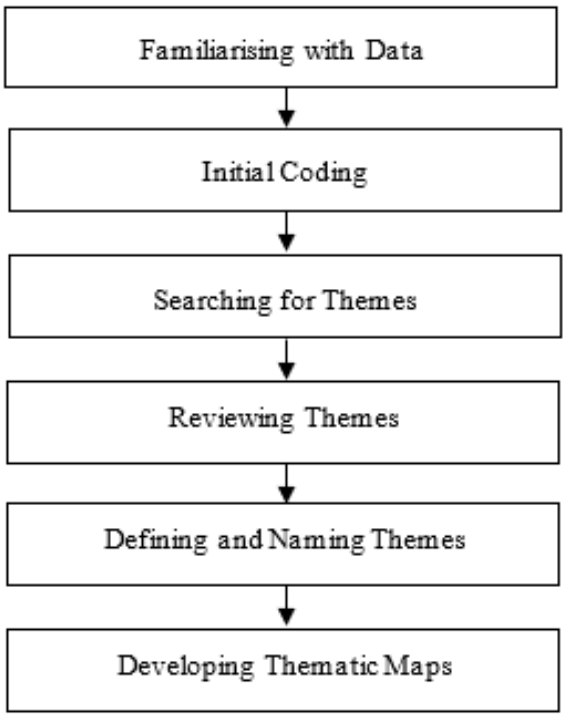

Figure 4.2 Thematic Analysis Flowchart (Attride-Stirling 2001; Braun & Clarke 2006)

This research adopts the theory-driven thematic analysis for analysing the interview data with the use of the research model developed in chapter 2. The use of thematic analysis in this research is due to four main features (Braun & Clarke 2006). Firstly, the capacity of thematic analysis to summarise key features of a complex and large volume of data is an advantage of using it. Secondly, thematic analysis can provide social interpretations of complex qualitative data by generating unanticipated insights, and underlining similarities and differences across the data set. Thirdly, the fact that thematic analysis is a relatively easy and quick method to analyse large and complex data is another reason for using thematic analysis in this research. Fourthly, the ability to generate findings in a way that is accessible to a wide range of stakeholders is another advantage of thematic analysis.

4.3 Validity and Reliability

The trustworthiness in terms of validity and reliability of the research findings are always critical in qualitative research (Nowell et al. 2017). Five types of trustworthiness criteria are widely discussed in qualitative research, namely, (a) credibility, (b) transferability, (c) dependability, (d) confirmability, and (e) reflexivity (Korstjens & Moser 2018; Nowell et al. 2017; Shenton 2004). Credibility generally refers to the accuracy of the research findings

reported by the researcher. Transferability is about establishing the domain to which a study's findings can be generalised. Dependability refers to accurately describing the meaning given by the participants to the research phenomena which is being studied by the researcher. Confirmability is concerned with establishing that the researcher's interpretations and findings are derived from the data. Reflexivity refers to the evidence of the decisions and choices made by the researcher regarding theoretical rationalisation developed from research fitting the data.

Various procedures were applied to ensure the credibility, transferability, dependability, confirmability, and reflexivity of the research. To ensure credibility, the research notes taken during the interviews were cross-checked with the digitally recorded interviews. Furthermore, the recorded interviews were listened to many times before being transcribed (Braun & Clarke 2006). To ensure transferability, the identified themes were checked against each and every interview transcript during the data analysis stage to ensure generalisation of the themes across multiple interview transcripts (Attride-Stirling 2001; Braun & Clarke 2006; Nowell et al. 2017). To ensure dependability, informal conversations were made with selected interviewees during the thematic analysis stage for clearing up the areas of miscommunication. Furthermore, feedback was obtained from the selected interviewees for the thematic analysis findings for making sure that their viewpoints, experience, thoughts, and feelings were interpreted and portrayed accurately in the research (Korstjens & Moser 2018). To maintain the confirmability during the thematic analysis process, pattern matching and explanation building were performed (Braun & Clarke 2006). In addition, interviewees' exact wording was provided as direct quotations in the thematic analysis findings (Shenton 2004).

The reflexivity is ensured in this research in several ways. Spending significant time on collecting data by studying the interviewees and their backgrounds helps the researcher build more detailed theoretical explanations for the thematic analysis findings. Moreover, time spent on discussing and explaining the research findings is extremely useful in this research for identifying specific problems that may occur in the thematic analysis process.

4.4 **Profile of Participants**

As previously discussed in section 3,4, this research employed purposive and snowball sampling and recruited fifteen participants across three provinces in Indonesia, namely Banten, Jakarta, and West Java. The selection criteria include Indonesian citizen of more than 18 years of age and have previously used e-Government services. Participants were chosen based on

their knowledge and experience in using e-Government services. These participants have diverse demographic characteristics, as shown in Table 4.1.

Table 4.1 Profile of Interview Participants

#	Age Group	Gender	Education	Occupation	Frequency of Using E-Government
1	21-30	Male	Bachelor Degree	Private Sector Employee	Rarely (once in a year)
2	21-30	Male	Bachelor Degree	Medical Doctor	Often (once in 3 months)
3	21-30	Female	Master Degree	Private Sector Employee	Sometimes (once in 6 months)
4	31-45	Male	Master Degree	Self-Employed	Very often (once in a month)
5	21-30	Male	Diploma	Self-Employed	Often (once in 3 months)
6	21-30	Female	Bachelor Degree	Private Sector Employee	Sometimes (once in 6 months)
7	21-30	Male	High School	Student	Very rarely (less than once in a year)
8	21-30	Male	Bachelor Degree	Public Sector Employee	Often (once in 3 months)
9	46-60	Female	Bachelor Degree	Public Sector Employee	Very often (once in a month)
10	46-60	Male	Master Degree	Academic	Often (once in 3 months)
11	21-30	Male	Master Degree	Public Sector Employee	Often (once in 3 months)
12	21-30	Male	Bachelor Degree	Private Sector Employee	Rarely (once in a year)
13	31-45	Male	Diploma	Private Sector Employee	Rarely (once in a year)
14	31-45	Female	Bachelor Degree	Private Sector Employee	Sometimes (once in 6 months)

15	18-20	Female	High School	Private Sector Employee	Very rarely (less than once in a year)

The demographic distribution is analysed across the participants' age group, gender, educational level, occupation type and the frequency of using e-Government. Table 4.1 presents a summary of the demographic data. In relation to the age group, the majority of respondents are young adults in the range of 21 to 30 years old and followed by 31 to 45 years old and 46 to 60 years old, respectively. There is only one participant of the age 18 to 20 years old, and there is no interview participant older than 60 years.

In terms of gender distribution, 67% are male, 33% are female. The level of education of respondents is also examined. The majority of interviewees have a university degree, including 47% hold bachelor's degrees and 13% have postgraduate qualifications. In addition, 13% of the respondents have diploma certificates, and 27% finish high school. In relation to the occupation of the respondents, a majority of the respondents that is at 47% comes from the private sector, 20% work in the public sector and 13% are self-employed. Additionally, one interviewee is a university student, one is a medical doctor and another one is academic. Regarding the frequency of using e-government, the majority of respondents are non-frequent e-Government users with only using e-Government services once in six months or less, and six interviewees are frequent e-Government users.

As shown in Table 4.1, similar to other studies (Almukhlifi, Deng & Kam 2019b; Kurfalı et al. 2017; Mensah & Mi 2019), the respondents are diverse from multiple age groups, genders, education and occupation. In addition, there is also a variety in the frequency of using e-Government services, which leads to diversity in the level of knowledge and experience in the adoption of e-Government.

4.5 Research Findings

The thematic analysis has assessed eight factors, including performance expectancy, effort expectancy, social influence, facilitating conditions, perceived security, ICT literacy, service quality and information quality, as well as two emerging factors, including perceived transparency and government encouragement. In addition, participants are also asked to rate the level of importance of each factor in relation to how such a factor would influence their decision to adopt e-Government services. Following the discussion provided in Section 4.2,

Figure 4.3 draws the summary of the thematic analysis network is presented in global themes, organising themes, and basic themes are shown respectively, in the shape of rectangles, ovals, and rounded rectangles.

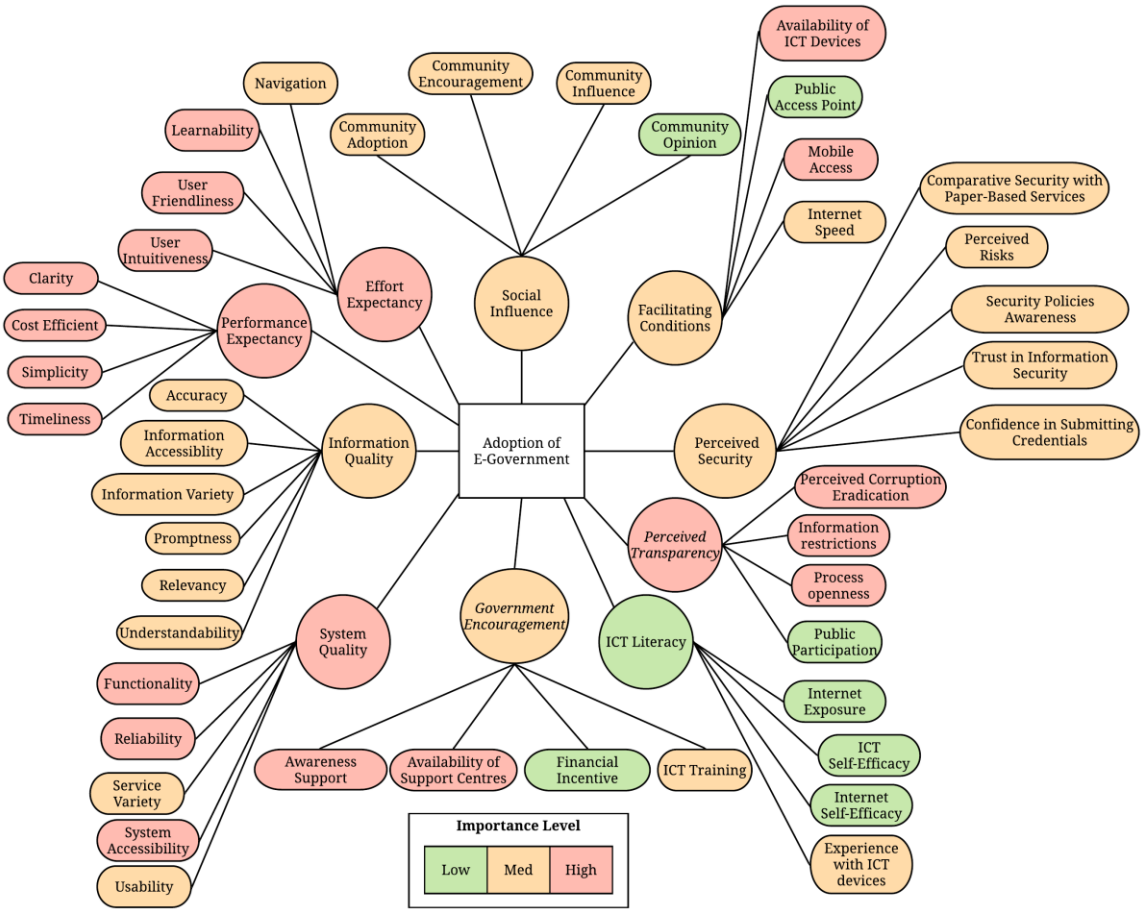

Figure 4.3 A Summary of Thematic Analysis Network Map

4.5.1 Performance Expectancy

Performance expectancy is about the ability to accomplish a specific task through the use of e-Government with a lesser expenditure of cost, time and effort (Deden et al. 2017). Earlier studies acknowledged the effect of performance expectancy on the adoption of e-Government in developing countries, including Pakistan (Ovais Ahmad, Markkula & Oivo 2013), Saudi Arabia (Alshehri et al. 2012), Turkey (Kurfalı et al. 2017), and India (Saxena 2017). This research further confirms and adds that performance expectancy is, in fact, the most important factor for nine interviewees to adopt e-Government in Indonesia. Interviewees believe that e-Government has enabled them to access public services without time and space constraints, as explained by a senior manager at a private company as follows:

"Improving performance and efficiency is the main reason why I am using e-Government. With e-Government, I do not have to take a day off to report my annual tax, as the online service is available 24/7 whereas taxation offices only open on standard working hours."

It is also shown that e-Government streamlines public services to become simpler, faster and more cost-effective. Citizens can reduce the number of physical visits to government offices by using e-Government services. Interviewees, therefore, believed that e-Government saves their time and money, as well as making their lives easier. This assertion was supported by another private sector employee who noted that:

"E-Government makes it (government-related services) simpler, cheaper and faster, as we do not need to come and waste our time in the long queue. In that regards, it is very efficient."

4.5.2 Effort Expectancy

Effort expectancy is about the quality of being easy to use e-Government (Debjani, Umesh & Gupta 2012). It can be assessed by measuring the level of effort that citizens must make to access e-Government. Effort expectancy plays a significant role, especially in the early stage of e-Government adoption, as humans by nature often hesitate to adopt a new system (Puspitasari & Ishii 2016). The adoption of e-Government is found to be improved when the effort expectancy is enhanced (Susanto & Goodwin 2013). In the context of Indonesia, the majority of the interviewees further stressed that effort expectancy is the most prominent component to support the adoption of e-Government, as illustrated by a university lecturer's answer as follows:

"I have seen a few potentially great e-Government services without clear information on how to use it, thus I ended up not using the system, which is not good. The government should provide a clear procedure or a video to educate on how to use the particular service. Otherwise, it is a waste of development as no one will use it."

Accessing public information and services through e-Government system is a direct way of accessing government information and an alternative to relying on third party channels such as

newspapers, radio and private television channels. This study shows that e-Government is considered a more reliable source of public information than alternative sources. However, many citizens often face difficulties in accessing e-government websites due to poor navigation design, which may lead to the low uptake of e-government. This assertion was supported by an employee at public sector who noted that:

> *"I have been eager to use e-government to renew my STNK (Vehicle Registration Certificate). However, the navigation of the system on the Police website, from my experience, were a nightmare, it was very difficult to use.*

4.5.3 Social Influence

Apart from performance expectancy and effort expectancy that have been widely discussed in the literature (Deden et al. 2017; Hermana & Silfianti 2011; Mirchandani, Johnson Jr & Joshi 2008), findings from the current research also establish that social influence significantly affects the adoption of e-Government. Social influence is defined as the compression by a person's proximity to take specific actions or adopt certain values (Venkatesh et al. 2003; Venkatesh, Thong & Xu 2012). It can be measured by the degree to which an individual perceives the importance of others' opinions on the adoption of e-Government. Findings in this research specifically indicate that the influence of family, friends and co-workers has some impact on an individual's intention to adopt a socially acceptable system such as e-Government, which has not been adequately explored in the Indonesian e-Government research. This is demonstrated by an employee at a startup company who stated that:

> *"I use e-government to report my income tax because coworkers recommend and help my to use the (e-filling) system. Now, I am actively encouraging the use of e-Government to my friends and families."*

Under these social pressures, individuals are encouraged to recognise the advantage of innovation and embrace the need to adopt e-Government to satisfy their needs of public services. This is a new finding that has not been fully examined in other e-Government adoption studies. The cultural aspect of collectivism which is featured in the Indonesian society may play a significant role in this factor, and thus further research on a different context is required.

4.5.4 Facilitating Conditions

In the context of e-Government, facilitating conditions refer to the quality of being able to reach e-Government services (Idris 2016). This includes the ability to access e-Government from multiple devices including personal computers and mobile phones, and public places such as public libraries and government offices. It was found in this research that this factor is also important to the adoption of e-Government, which is also in line with what was reported in the literature (Jaeger et al. 2007; Puspitasari & Ishii 2016). The interest of citizens in accessing government system through mobile phones is also revealed from this study. The delivery of government services and information through mobile phones is considered valuable due to the convenience, mobility and personalised nature of this mode of delivery. It was indicated through the thematic analysis that mobile phones are the preferred communication channel for majority of the interviewees in accessing e-Government, as explained by a high school student that:

> *"Mobile phone is my preferred device to access e-Government, as I spend most of the time away from computers."*.

Due to limited internet data access and availability of ICT devices, the value of accessing e-Government system through public access points including kiosks and front office counters is another important theme discovered in this study. Particularly, for specific services involving a significant amount of data entry such as online tax lodgement, citizens demand for public access at libraries and government offices due to (a) time savings and monetary benefits that citizens receive by obtaining services from computerised counters, (b) convenience for citizens, and (c) reduction of corruption in the provision of public services that is very common in Indonesia. This is demonstrated by a business owner who stated that:

> *"The government should provide computers for public use at immigration and taxation offices."*

Public access points in libraries and public organisations are very much valued. This can lead to a dramatic improvement in the performance of public organisations in delivering public services.

4.5.5 Perceived Security

Perceived security can be defined as the extent to which users perceive that e-Government system is secured (Alharbi, Papadaki & Dowland 2017; Munyoka & Maharaj 2019; Shahzad et al. 2019). This relates to the implementation of policies and procedures for securing the information in e-Government (Debjani, Umesh & Gupta 2012), such as the protection of information from unauthorised access, by ensuring that information is only accessible to the right users (Posthumus & Von Solms 2004). It is envisaged that issues relating to information security may ruin the trust of citizens in adopting e-Government, since personal and sensitive information may be leaked out and used for malicious purposes if they are not securely protected through e-Government services. Many interviewees claimed that they are afraid to disclose their sensitive information such as bank and credit card details to public organisations. Taking necessary measures to prevent unauthorised access to citizens' sensitive information in e-government systems is important. Moreover, this study reveals that the disclosure of identifying information such as names, telephone numbers, email and postal addresses, is an issue for many interviewees. Citizens would expect that only authorised officials have access to their and protect information. This is elaborated by a university lecturer noting his experience:

> *"I have seen a potential misuse due to mishandling of data from the department of education. The department implemented an online database of students from primary to university level to subdue fake certificate issues. When my child was graduating from elementary school, I searched up by his name and school. The system somehow displayed all his details, including home address and landline. It was a concern to me, although the department has now fixed it."*

It has been argued in the existing literature that citizens are concerned about the information security breach (AlKalbani et al. 2017; El-Haddadeh, Tsohou & Karyda 2012), such as those in the potential misuse of information stored in e-Government databases. Consequently, citizens may hesitate to adopt e-Government due to security concerns. The findings of this research, however, have shown another perspective noting that paper-based services also carry similar or even greater risk compared to the online ones. This is reflected through the opinion of a public sector employee as follows:

"I have no problem with submitting my sensitive information online, as sometimes you have to live with your personal data at risk. For example, if we are talking about the manual submission directly to the office, the file can be misplaced, misused and other problems."

In addition, findings from the interviews highlight the importance of having an official account for information security confidence in using e-Government services. An interviewee, believing that establishing an official developer account for e-Government applications can increase citizens' confidence and eliminate confusions from third-party applications, argued that "The government should have an official account at App Store, so we know the application is secured and legit".

4.5.6 Information Quality

Information quality which refers to the value of the information provided by e-Government (Wangpipatwong, Chutimaskul & Papasratorn 2009) was also found to be important in e-Government adoption. The value of information quality is an important organising theme discovered in this study. It is abstracted from the basic themes of (a) accurate, (b) relevant, (c) up-to-date, and (d) simple and understandable information. It can be assessed by measuring the value of the supplied information, based on its accuracy, relevancy, and timeliness. Specifically, accuracy refers to the degree of errors relating to the information provided; relevancy is about the degree of match between the information provided and the information requested; and timeliness measures if the information is provided at the right time (Wangpipatwong, Chutimaskul & Papasratorn 2009). In this research, the interviewees confirmed the importance of information quality and how this factor positively influences the adoption of e-Government as it does in other studies (Almukhlifi, Deng & Kam 2018; Deng, Karunasena & Xu 2018). A business owner remarked as follows:

"For e-Government to be successful, it has to provide up-to-date and accurate information. I have to be able to trust the information I receive from e-Government before I want to use the system."

This research also revealed that having access to the latest and accurate information which is provided in an understandable manner increases citizens' confidence in adopting

e-Government as it could affect the level of trust, which is crucial to the adoption. A tax accountant elaborated this as follows:

> *"When I browse a government website, the first thing I check is whether they have a new post or announcement. If there is no recent update, I am very sceptical of using the service or believing that the information provided is still relevant."*

4.5.7 System Quality

System quality refers to the performance of system including reliability, flexibility, data quality, and integration (DeLone & McLean 2003; Nam 2014). It can be assessed by measuring the extent that e-Government system performs as expected in fulfilling the citizens' requirements (Yasar & Giovanni 2007). The findings suggest that system quality is important to the adoption of e-Government. This research further shows that a bad experience of using e-Government services can significantly demotivate citizens to adopt e-Government. This view is elaborated by an account manager at a private firm as follows:

> *"I have a horrible experience with using e-Government. For me, to use e-Government again, the system has to be proven working properly; otherwise, I will not touch the system. When I tried to lodge my tax online last year, the server kept crashing, and I had to resubmit all my data as there was no autosave function. It was such a terrible experience. I ended up lodging it manually, which took me a whole day, but at least it got the job done."*

The functionalities of e-Government services are valued by the citizens. Specifically, complex e-Services that facilitate citizens to renew drivers' licences, land permits, and vehicle registrations are appreciated by citizens. Simple e-Services that provide facilities to track the status of an application submitted, to download forms, and to search databases are also regarded as valuable. Both simple and complex functionalities of e-Services help citizens to save money and time due to the convenience that they provide to citizens. A majority of the interviewees stressed that the government should have an inclusive e-Government system to make citizens' aware of the available e-Government services and their value for citizens. In this relation, the findings show that there is a need for an integrated one-stop portal of all kind of e-Government services, as elaborated by a medical doctor in the following:

"I am not quite sure what e-Government services are available due to low publicity…. the government should create a one-stop portal for citizens to check and find all kind of e-Government services available."

It is also noted that interconnecting e-Government services from multiple public organisations under one system would create further benefits to citizens and thereby; strengthen the adoption of e-Government. The fact that individual e-Government systems of different public organisations are not connected to share public information wastes citizens time in visiting multiple public organisantion offices for obtaining public services.

4.5.8 ICT Literacy

ICT literacy is about the extent that citizens are confident in the ability to use ICT peripherals at an adequate level to perform a specific task (van Deursen & van Dijk 2011). This would potentially affect individuals' perception of performance expectancy, effort expectancy and system quality. If a citizen is confident in his or her capability regarding computers, she or he is more likely to access public services through the adoption of e-Government (Susanto & Goodwin 2013). Such confidence can help to overcome specific difficulties in using e-Government. This is elaborated by an IT professional as follows: "*For me, e-Government services are not too difficult to use, because I am used to online services such as e-commerce systems. When I am facing a problem with online services, I usually search online for solutions and troubleshoot myself".*

In the case of Indonesia, although the country has a high level of internet and technology usage, there are still many citizens, particularly older generations, who have a low level of ICT literacy and may not be able to fully utilise e-Government services. This is elaborated by another IT professional as follows: *"I believe the current e-Government is designed for intermediate ICT users, whereas it should be designed to cater all kind of people including those who are not literate with ICT."*

The above findings are also echoed by another interviewee that suggests e-Government services in Indonesia are not designed user-friendly enough for people who are not experienced with using using ICT devices to access online services. In the opinion of a product manager at a public listed company: *"It was not easy but I managed to learn how to use e-Government*

services, once you have learned, it is not that difficult. However, I feel this learning curve can be quite steep for people who are not skilled in using computers and internet such as my parents".

4.5.9 Government Encouragement

Government encouragement – emerged as a new factor from the thematic analysis –can be defined as the actions taken by the government to support the adoption of e-Government. Government encouragement can be assessed by measuring the level of effort taken and incentives provided by governments to encourage their citizens to adopt e-Government. In this respect, a medical doctor shared his opinion about the poor awareness of e-Government services in Indonesia as follows:

> *"The socialisation of e-Government services aside from e-filling for the tax is very poor, how are we supposed to adopt the service if we do not know the existence of them in the first place."*

This research also highlights the need for ICT training and the availability of support centres to encourage and help citizens to adopt e-Government. This is elaborated by a business owner as follows:

> *"I found it quite difficult to use e-filling system and there was a lack of support system. The government should provide training, or at least helpline such as a call centre where I can get necessary helps and supports"*

Furthermore, the respondents of this research suggest that the government may encourage and inspire its citizens to use e-Government services through awareness building using social media (e.g., YouTube) and social networking sites (e.g. Facebook, Twitter). This is suggested by a university lecturer as follows:

> *"The government might have provided several e-Government services, but the awareness is very low due to the lack of publicity. YouTube and social media advertisement should be utilised to raise awareness."*

4.5.10 Perceived Transparency

Perceived transparency is defined as the degree to which the users perceive that the adoption of e-Government would increase the accountability of public organisations. It emerges from the thematic analysis as one of the most important factors that influences the adoption of e-Government services from the perspective of citizens. It relates to the availability of relevant decision-making information and procedures to citizens through e-Government.

Informing citizens through the internet about public organisations' activities such as how a public organisation's budget is managed and how public funding is spent is valuable. Disclosing information relating to the issues such as on which projects the government is investing, on what basis tenders are awarded, to whom tenders are awarded, the progress of the projects already undertaken is also appreciated by citizens. Such disclosure helps to fight corruption in public organisations, thereby increasing the transparency and accountability of the government. This is elaborated by a senior engineer at a state-owned enterprise as follows:

> *"I have been paying tax for years, yet I have no idea how this fund is spent. The government has developed e-filling but not e-reporting."*

There is a strong demand for public organisations to disclose their decision-making processes online. The facilities for citizens to make online inquiries about various public services, for example, making online inquiries about the status of an application submitted or inquiring about the reasons why an application is rejected, are also valued. This is reflected through the opinion of a freelance architect as follows:

> *"Before the introduction of e-Government, it was very difficult to find a clear procedure on how to upgrade my land and building development permits. Now, with this mobile application, I can track the progress of my application and contact the responsible personnel for my query easily."*

4.6 Revised Research Model

From the thematic analysis, government encouragement and transparency were emerged and added to the research model. Figure 4.4 presents the revised research model for investigating the critical factors for e-Government adoption from the perspective of citizens in Indonesia. Emerging factors and new relationships are highlighted in bold.

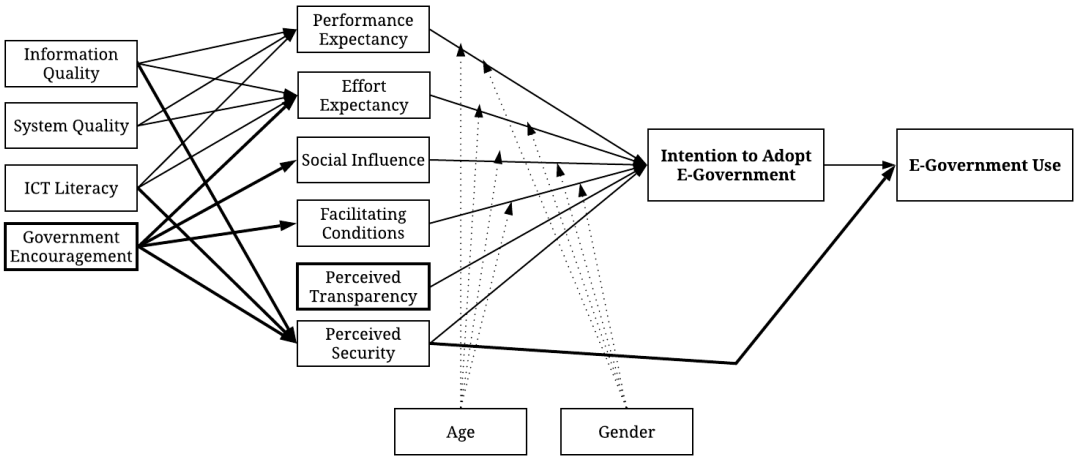

Figure 4.4 The Revised Model Developed for the Current Research

The revised model refines the relationships of all factors and incorporates new factors including perceived transparency of public decision making and government encouragement as contextual factors that are unique to developing countries such as Indonesia. Public organisations in Indonesia are often criticised for the lack of transparency and high level of corruption (Kristiansen et al. 2009; Prahono & Elidjen 2015). Promoting the transparency of public decision making by developing e-Government has become the main focus for the Government of Indonesia to fight corruption (Obi & Naoko 2016).

Throughout the COVID-19 pandemic, governments have shared information through their national portals, mobile apps, and social media platforms. A review of the national portals of 193 United Nations Member States indicates that governments have exhibited increasing levels of transparency when reporting and sharing crisis-related information (United Nations 2020). Governments have demonstrated great agility in developing dedicated COVID-19 portals and government-supported apps to provide continually updated information and resources. Several governments must be highly commended for rapidly developing and deploying innovative online services designed to contribute to the fight against COVID-19.

In relation to government encouragement, failures in the adoption of e-Government in Indonesia and many other developing countries are often due to the lack of government support for citizens to adopt e-Government (Liang et al. 2017; Nurdin, Stockdale & Scheepers 2012; Verkijika & De Wet 2018). About 85% of e-Government initiatives in Indonesia suffer sustainable failures; these e-Government services may work at the beginning of the adoption,

but then they are eventually left behind after a certain period (Hwang & Syamsuddin 2008). Therefore, analysing the significance of transparency and government encouragement in the revised model would be beneficial to better understand the adoption of e-Government in Indonesia. Detailed discussion about this revised model is presented in Chapter 5.

4.7 Conclusion

This chapter presented the findings of the qualitative data and proposed a research model. Qualitative data were generated from interviews with fifteen e-Government users in Indonesia. The main objective of this qualitative study is to test the applicability of the initial model proposed earlier, and to explore the dimensionality of related constructs. In addition, two factors, including perceived transparency and government encouragement, was emerged from the qualitative study. These two factors further enhanced the research model that was developed in Chapter 2. The revised model sets the foundation for designing and implementing the quantitative analysis of the research.

Chapter 5. Hypotheses Development

5.1 Introduction

In chapter 4, the initial research model has been revised using the data from the qualitative field study. This current chapter develops the hypotheses of the proposed research model. The hypotheses were based both on extant literature, where possible, as well as the field study; however, a couple of hypotheses were developed from the field study alone. In total, twenty-one hypotheses have been identified. This chapter also provides the details of the measurement item, which will be used to develop the questionnaire for the quantitative survey. Most of the instruments are developed from literature while are contextualised in the context of the current study. Similarly, the items developed from the qualitative study were strengthened by existing literature where found.

5.2 The Formulation of Hypotheses

5.2.1 Performance Expectancy

Performance expectancy refers to the extent to which an individual believes that adopting technologies such as e-Government services would attain a better performance (Venkatesh et al. 2003). In this research, the performance expectancy is about the degree to which citizens believe in the adoption of e-government would improve performance by accomplishing specific tasks with a smaller outlay of monetary cost, time and effort (Dwivedi et al. 2017; Venkatesh, Thong & Xu 2012). It can be measured by process clarity, time efficiency, and cost efficiency (Sabani, Deng & Thai 2019b). Process clarity measures if the process of obtaining information and services from e-government is easily understood. Time efficiency measures if the process of obtaining information and services from e-government is done faster than the paper-based approach. Cost efficiency measures if the process of obtaining information and services from e-government is less expensive than the paper-based approach.

Performance expectancy positively and significantly influences the adoption of e-government in developing countries. Sabani, Deng & Thai (2019b), for example, find the performance expectancy plays a critical role in encouraging Indonesian citizens to request public services through e-government platforms. Similarly, Deng, Karunasena and Xu (2018) emphasise that Sri Lankan citizens adopt e-government for accessing and using public services because they

consider that the use of e-government will bring them benefits including a reduction in costs and a saving of time and effort. Also, Hung, Chang and Kuo (2013), in their review of mobile e-government services in Taiwan, assert that the greater the performance expectancy, the more likely the adoption of e-government is. A similar finding was reported by Verkijika and De Wet (2018), which suggest performance expectancy is a significant predictor of citizens' attitudes towards the adoption of e-government services in sub-Saharan Africa. However, this association has not always been universal, as Krishnaraju, Mathew and Sugumaran (2016) are unable to find a significant relationship between performance expectancy and e-government adoption in India, which suggests the necessity to the the influence of performance expectancy on e-Government adoption in Indonesian context.

The UTAUT conceptualises the relationship between performance expectancy and intention to use technologies is moderated by gender and age, such effect is stronger for men and, more specifically, younger men (Venkatesh et al. 2003; Venkatesh, Thong & Xu 2012). Interestingly, many studies in the field of e-government research (Berlilana, Hariguna & Nurfaizah 2017; Deden et al. 2017; Jacob & Darmawan 2019; Kurfalı et al. 2017; Mutaqin & Sutoyo 2020), including the UMEGA (Dwivedi et al. 2017) do not incorporate such moderators. This might be because Venkatesh, Thong and Xu (2016) omit the moderation effects of age, gender, experience, and voluntariness from the baseline model following the evaluation of the parsimony of UTAUT. Another potential explanation for excluding moderators is due to the asymmetrical distribution of age and gender in the dataset (Kurfalı et al. 2017; Tan 2013; Van Schaik 2011). Nevertheless, age and gender are integral to the UTAUT model (Venkatesh et al. 2003; Venkatesh, Thong & Xu 2012) that need to be tested and validated. Based on the above discussion, the following hypothesis is developed:

H1: Performance expectancy may have a positive effect on the intention to adopt e-government and this relationship will be moderated by age and gender.

5.2.2 Effort Expectancy

Effort expectancy refers to the amount of effort that individuals must make to learn technologies (Venkatesh et al. 2003) such as using e-government. This suggests that citizens will generally be more inclined to adopt and use e-government solution that requires minimal effort to learn. Effort expectancy can be measured by user intuitiveness, system navigation, learnability, and understandability (Puspitasari & Ishii 2016; Susanto & Goodwin 2013;

Venkatesh, Thong & Xu 2012; Williams, Rana & Dwivedi 2015). User intuitiveness is about the extent to which citizens believe the e-government system is self-explanatory. System navigation concerns the extent to which citizens believe the e-government system is easy to direct. Learnability relates to the extent to which citizens become quickly familiar with e-government. Understandability refers to the extent to which citizens believe the e-government system is easy to comprehend.

Effort expectancy is one of the most prominent components to support the adoption and the use of e-government, particularly in developing countries. Kurfalı et al. (2017), for instance, find the enhancement of effort expectancy can encourage citizens to adopt e-government in Turkey. Puspitasari and Ishii (2016) identify the low effort expectancy leads to poor uptake of e-government in Indonesia. Shareef et al. (2016), in a cross-cultural study of three countries including Bangladesh, Canada, and Germany, argue that when citizens find it easy to use e-government services, their decisions to adopt and use e-government would be improved. However, this relationship has also not always been universal, as Verkijika and De Wet (2018) fail to establish a significant relationship between effort expectancy and e-government adoption in sub-Saharan Africa. This also suggests effort expectancy is still required to be tested and validated. In addition, the UTAUT also suggests that the relationship between effort expectancy and intention to adopt new technologies is moderated by gender and age, such that the effect was stronger for women, particularly older women (Venkatesh et al. 2003; Venkatesh, Thong & Xu 2012). Based on the above discussion, the following hypothesis is developed:

H2: Effort expectancy may have a positive effect on the intention to adopt e-government and this relationship will be moderated by age and gender.

5.2.3 Social Influence

Social influence refers to the degree to which citizens perceive the importance of others' perceptions in the decision to adopt and use a given technology (Venkatesh et al. 2003; Venkatesh, Thong & Xu 2012). This suggests that citizens will generally be inclined to adopt and use e-Government services if important others (family, friends and colleagues) approve and recommend of using such a technology (Verkijika & De Wet 2018). Social influence can be measured by community adoption, community motivation, community opinion, and community support (Kurfalı et al. 2017; Rana et al. 2017; Shareef et al. 2011; Venkatesh,

Thong & Xu 2012; Williams, Rana & Dwivedi 2015). Community adoption refers to the level of e-government uptake from citizens' community. Community motivation relates to the level of encouragement from citizens' community to adopt e-government. Community opinion concerns the feedback from citizens' community about the adoption of e-government. Community support refers to level of assistance from the community to help citizens adopting of e-government.

Social influence is recognised to affect the adoption of e-government (Dwivedi et al. 2017; Verkijika & De Wet 2018; Voutinioti 2013). Rana et al. (2017) demonstrate the pressure of family, friends, and co-workers has some impact on Indian citizens' intention to adopt a socially acceptable system such as e-government. Ahmad and Khalid (2017) further add that these pressures encourage citizens to recognise the advantage of innovation and embrace the need to adopt e-government in the United Arab Emirates. Susanto and Aljoza (2015) find social influence is highly correlated with the adoption of e-government in developing countries. Similar to performance expectancy and effort expectancy, the relationship has not always been universal. Lallmahomed, Lallmahomed and Lallmahomed (2017), for example, fail to find support for the significant positive influence of both effort expectancy and social influence on the intention to adopt e-government systems in Mauritius. This further suggests that social influence is required to be tested and validated. Furthermore, the UTAUT also suggests that the effect of social influence on intention to adopt was moderated by gender and age, such that effect was strongest for older women. Based on the above discussion, the following hypothesis is developed:

H3: Social influence may have a positive effect on the intention to adopt e-government and this relationship will be moderated by age and gender.

5.2.4 Facilitating Conditions

Facilitating conditions refer to individuals' perceptions of the resources and support available to technologies (Venkatesh et al. 2003; Venkatesh, Thong & Xu 2012). It captures the objective factors in the environment that affect individuals' likelihood of using a given technology (Maruping et al. 2017). In the e-government field, facilitating conditions is about the degree to which citizens believe that there are adequate resources available that can facilitate them to access e-Government services (Verkijika & De Wet 2018). It can be measured by the availability of ICT infrastructure, availability of multiple platforms access, and availability of

community access points (Dwivedi et al. 2017; Puspitasari & Ishii 2016; Venkatesh, Thong & Xu 2012; Williams, Rana & Dwivedi 2015). Availability of ICT infrastructure refers to the extent to which citizens believe adequate infrastructure exists to support the adoption of e-government. Availability of multiple platforms access relates to the ability to use e-government from various devices, including personal computers and mobile phones. Availability of community access points demonstrates the ability to use e-government from public places.

Facilitating conditions are shown to significantly influence the adoption of e-government in developing countries (Kurfalı et al. 2017; Ovais Ahmad, Markkula & Oivo 2013; Susanto & Aljoza 2015; Verkijika & De Wet 2018). Puspitasari and Ishii (2016), for example, demonstrate the importance of multiple devices access to support the adoption of e-government in Indonesia. Idris (2016) further adds that supportive infrastructure and the adoption of e-government are highly correlated. Kurfalı et al. (2017) emphasise that facilitating conditions need to be maintained throughout the adoption process to ensure its success. This shows that facilitating conditions are required to be tested and validated. In addition, the UTAUT also suggest that the effect of facilitating conditions on the intention to adopt is moderated by age, such an effect was strongest for older people (Venkatesh et al. 2003). In addition, Venkatesh, Thong and Xu (2012) further suggest that facilitating conditions on the intention to adopt is also moderated by gender, such effect was strongest for women, particularly older women. Based on the above discussion, the following hypothesis is developed:

H4: Facilitating conditions may have a positive effect on the intention to adopt e-government and this relationship will be moderated by age and gender.

5.2.5 Perceived Transparency

Perceived transparency is defined as the degree to which the users perceive that the adoption of technologies such as e-Government would increase the accountability of public organisations (Al-Hujran et al. 2015; Bertot, Jaeger & Grimes 2012; Venkatesh et al. 2016). It can be reflected by perceived corruption eradication, information restrictions, process openness, and public participation (Almukhlifi, Deng & Kam 2019b; Sabani, Deng & Thai 2018; Venkatesh et al. 2016). Perceived corruption eradication refers to the extent to which citizens perceive the adoption of e-Government would suppress corruptions. Information restrictions demonstrate the extent to which public organisations provide citizens with public

information online with no restrictions. Process openness is reflected by the availability of clear procedures in using e-Government. Public contact transparency presents the extent to which public organisations provide citizens with public contact information online to improve interactions. Public participation refers to the capability of citizens to be involved in public decision-making with the use of e-Government.

From the thematic analysis, it is evident that perceived transparency is one of the most critical factors that influence Indonesian citizens to adopt e-Government. Improving transparency with the use of e-Government has become the primary focus of the Indonesian Government to reduce the high level of corruption (Obi & Naoko 2016; United Nations 2018; Waseda University 2017; World Bank 2018). Perceived transparency would encourage citizens to enjoy the benefits of the adoption of e-Government. With the availability of public information and procedures online, citizens may find e-Government more useful. The availability of public information would improve the uptake of e-Government services (Almukhlifi, Deng & Kam 2019a; Dwivedi et al. 2017). It is also argued that citizens perceive the adoption of e-Government would suppress corruptions (Rana & Dwivedi 2015) and enable participation in public decision making (Sabani, Deng & Thai 2018) to lead the better adoption of e-Government. Based on the above discussion, the following hypothesis is developed:

H5: Perceived transparency may have a positive effect on the intention to adopt e-Government and this relationship will be moderated by age and gender.

5.2.6 Perceived Security

Perceived security refers to the extent to which citizens feel protected against security threats resulting from the use of e-government (Debjani, Umesh & Gupta 2012). It can be measured by perceived risk, trust in the e-government system, willingness in submitting credentials and visibility of information security (Dwivedi et al. 2017; Kurfalı et al. 2017; Posthumus & Von Solms 2004; Shareef et al. 2011). Perceived risks relate to the degree of uncertainty citizens has when adopting e-government. Trust in the e-government system is about the degree of confidence of citizens regarding the security of e-government. Willingness in submitting credentials concerns the extent of readiness of citizens to submit sensitive information to e-government. Visibility of information security refers to the clarity of information with respect to the implementation of security policies in e-government.

Perceived security directly influences the adoption of e-government (Munyoka & Maharaj 2019; Shahzad et al. 2019). Al-Kalbani, Deng and Kam (2015), for example, discuss the breach of information security may ruin the trust of citizens to adopt e-government. Posthumus and Von Solms (2004) assert e-government system needs to be protected from unauthorised access, by ensuring that information is only accessible to the right users to support the adoption. Internet is the primary medium for e-government to serve citizens (Nam 2014). It is, however, not the safest place as it has many threats to the security of users' private information (Debjani, Umesh & Gupta 2012; Mishra & Mishra 2011). Citizens are therefore concerned towards the information security breach, such as the misuse of information stored in e-government. Consequently, many citizens are often hesitant to adopt e-government (Bélanger & Carter 2009). Based on the above discussion, the following hypothesis is developed:

H6a: Perceived security may have a positive effect on the intention to adopt e-government and this relationship will be moderated by age and gender.

Governments have paid considerable attention to improving the security e-Government systems across the world (Alharbi, Papadaki & Dowland 2017; AlKalbani et al. 2017; Joo & Hovav 2016; Munyoka & Maharaj 2019; Shahzad et al. 2019). The thematic analysis findings suggest that citizens who have the intention to adopt e-Government services are reluctant to use e-Government services due to security concern. This is elaborated by an interviewee as follows: *"I am interested to use e-Government services but I am a bit reluctant due to security and privacy concerns"*. Such concerns are evident and stronger in developing countries where security policies and measures are considerably poor compared to developed countries (AlKalbani et al. 2017; Habib, Alsmadi & Prybutok 2020; Khan et al. 2021; Munyoka & Maharaj 2019; Oni et al. 2019). Perceived security, therefore, can potentially strengthen the relationship between the intention to adopt and the use of e-Government services in Indonesia. In other words, perceived transparency would further encourage Indonesian citizens to use e-Government. Going beyond intention, the improvement of perceived security would transform the intention of citizens to use behaviour. Based on the above discussion, the following hypothesis is developed:

H6b: Perceived security may have a positive effect on e-government use

5.2.7 Information quality

Information quality refers to the value of the information retrieved from a system such as e-government (DeLone & McLean 2003; Deng, Karunasena & Xu 2018; Elenezi et al. 2017; Mutaqin & Sutoyo 2020; Wangpipatwong, Chutimaskul & Papasratorn 2009). It can be assessed by evaluating the accuracy, availability, relevancy, timeliness, understandability, and completeness of the information (DeLone & McLean 2003; Deng, Karunasena & Xu 2018; Wangpipatwong, Chutimaskul & Papasratorn 2009). Accuracy is measured by the degree of errors within the information. Availability refers to the variety of e-government information. Relevancy is measured by the degree of match between the information requested and the information retrieved. Timeliness measures if the information is up to date. Understandability concerns the extent to which the information provided is comprehensible

Citizens often look for public information according to their needs. Quality information can help citizens to find e-government useful (Berlilana, Hariguna & Nurfaizah 2017; Debjani, Umesh & Gupta 2012). High quality information would encourage citizens to see the value of adopting e-government. Previous studies find information quality to positively influence the perceived usefulness of TAM (Almukhlifi, Deng & Kam 2019b; Puthur, Mahadevan & George 2015), which is the root of performance expectancy. In addition, the analysis of this construct would help to learn the citizens' perception, the confidence and the trust towards the information received from e-government. Based on the above discussion, the following hypothesis is developed:

H7a: Information quality may have a positive effect on performance expectancy.

Information provided by e-government can help citizens to use e-government in an effortless manner (Almukhlifi, Deng & Kam 2019b; Chomchalao & Naenna 2013; Sandoval-Almazan & Gil-Garcia 2012). If the quality of information is poor, citizens would spend a long time and extensive effort to learn and use e-government (Rana & Dwivedi 2015). High quality information would provide citizens with ease in handling various functions of e-government. Based on the above discussion, the following hypothesis is developed:

H7b: Information quality may have a positive effect on the effort expectancy.

The availability of public information such as public service procedures and contact information online can help citizens to see the transparency of public decision making, and thus encourage them to eventually use e-Government services (Almukhlifi, Deng & Kam 2019a; Sabani, Deng & Thai 2018). High quality information may potentially improve perceived transparency. Based on the above discussion, the following hypothesis is developed:

H7c: Information quality may have a positive effect on perceived transparency.

The clear information related to the implementation of security policies can boost citizens' confidence trust and use e-Government services (AlKalbani et al. 2017; Munyoka & Maharaj 2019; Shahzad et al. 2019). High quality information may potentially improve perceived security. Citizens who are not aware of the security related implementations due to the lack of information might be reluctant to adopt e-Government as noted by an interviewee *"I am quite sceptical regarding the security of my data, I am not sure how my information would be used and handled "*. Based on the above discussion, the following hypothesis is developed:

H7d: Information quality may have a positive effect on perceived security.

5.2.8 System Quality

System quality concerns the degree to which e-government can provide citizens with better public services. It can be measured by system reliability, service usefulness, system functionality, service variety and system availability (DeLone & McLean 2003; Kirui, Baguma & Peter 2016; Nam 2014; Yasar & Giovanni 2007). System reliability is the extent of which citizens believe e-government system trustworthy. Service usefulness is the extent of which citizens believe e-government services being beneficial. System functionality is the extent of which citizens believe e-government system to perform as intended. Service variety is about the comprehensiveness of e-government services being offered. System availability is about the accessibility of e-government systems.

System quality improves the perception of the usefulness of e-government from the perspective of citizens (Almukhlifi, Deng & Kam 2019b). When citizens see that their needs of public services can be well met online, they likely will find the use of e-government useful (Hariguna 2017). This means that the quality of e-government system and services can improve the perception of citizens on the usefulness of e-government (Sabani, Deng & Thai 2018). This

indicates higher system quality would help citizens to see the benefits of e-government adoption. Furthermore, this factor is prominent to evaluate the adoption of e-government at the transaction stage (Akhtar Shareef et al. 2014). Understanding system quality helps to learn about citizens' demands towards the services provided by e-government. Based on the above discussion, the following hypothesis is developed:

H8a: System quality may have a positive effect on the performance expectancy

High quality of e-government system would also ease and improve citizens' experience in using e-government (Almukhlifi, Deng & Kam 2019b; Chomchalao & Naenna 2013). Citizens would spend less effort requesting public services through e-government if public organisations improved the quality of e-government system and services. This is because the delivery of quality e-government system can overcome difficulties in requesting online public services. Previous studies show that quality of e-government system and services has a positive influence on perceived ease of use of TAM (Almukhlifi, Deng & Kam 2019b; Mustapha & Obid 2015), which is the root of effort expectancy. Based on the above discussion, the following hypothesis is developed:

H8b: System quality may have a positive effect on the effort expectancy

5.2.9 ICT Literacy

ICT literacy can be defined to the extent to which citizens believe in their ability to request public services through the adoption of e-government (Maslihatin 2016; Puspitasari & Ishii 2016; van Deursen & van Dijk 2011). It can be assessed by measuring ICT self-efficacy, internet self-efficacy, ICT exposure and internet exposure (Sabani, Deng & Thai 2018; Saxena 2017; Urbina & Abe 2017). ICT self-efficacy is about the degree of citizens' beliefs about their abilities to use ICT devices. Internet self-efficacy relates to the degree of citizens' beliefs about their abilities to use internet. ICT exposure refers to the level of experience of citizens in using ICT devices. Internet exposure is about the level of experience of citizens in using internet.

The perception of citizens of the expected benefit of using e-government very much depends on their familiarity and skills with different functions of computers and other ICT devices (Rana & Dwivedi 2015). This means that citizens with a high level of ICT literacy are more likely to perceive to the adoption of e-government to be useful and beneficial for them.

However, citizens with a lower level of ICT literacy are more likely to face difficulties to adopt e-Government services and realise the benefits from the adoption. An interviewee believes that e-Government services in Indonesia are not user-friendly enough for older citizens. This is elaborated by an interviewee as follows: *"It was not easy but I managed to learn how to use e-Government services, once you have learned, it is not that difficult. However, I feel this learning curve can be quite steep for people who are not skilled in using computers and internet such as my parents".* Based on the above discussion, the following hypothesis is developed:

H9a: ICT literacy may have a positive effect on the performance expectancy

ICT literacy can also potentially influence the perception of citizens of the easiness of using e-Government. High level of ICT literacy would help citizens to learn and use e-government. If a citizen is confident in his or her capability regarding computers, she or he is more likely to request public services through the use of e-government (Susanto & Goodwin 2013). Such confidence can lead to overcoming specific difficulties in using e-Government. This is elaborated by an interviewee as follows: *"For me, e-Government services are not too difficult to use, because I am used to online services such as e-commerce systems. When I am facing a problem with online services, I usually search online for solutions and troubleshoot myself".* Based on the above discussion, the following hypothesis is developed:

H9b: ICT literacy may have a positive effect on the effort expectancy

The confidence of citizens of the security and potential risks of using e-government very much depends on their familiarity and skills with different functions of computers and other ICT devices (Alharbi, Papadaki & Dowland 2017; AlKalbani et al. 2017; Joo & Hovav 2016). This means that citizens with a high level of ICT literacy are more likely to perceive to the adoption of e-government to be secured. This notion is also supported by an interviewee: *"I have no problem with submitting my sensitive information online, as sometimes you have to live with your personal data at risk. For example, if we are talking about the manual submission directly to the office, the file can be misplaced, misused and other problems"*. Based on the above discussion, the following hypothesis is developed:

H9c: ICT literacy may have a positive effect on the perceived security

5.2.10 Government Encouragement

Government encouragement in the revised model refers to the actions taken by the government to support the adoption of e-Government (Section 4.5). It can be assessed by measuring the level of effort taken and incentives provided by governments to encourage the citizens to adopt e-Government such as availability of support centres, e-Government training and financial incentives (Al-Hujran et al. 2015; Maruping et al. 2017; Meghan, Theresa & Teresa 2012; Rallis et al. 2018; Sabani, Deng & Thai 2018). Availability of support centres refers to the variety of assistance from the government to help citizens in using e-Government such as phone and web support centre. Availability of e-Government training is about the extent of education and training provided by the government to help citizens adopting e-Government. Financial incentive refers to the monetary benefits being offered to citizens for adopting e-Government.

The thematic analysis suggests that government encouragement may influence effort expectancy, social influence, facilitating conditions and perceived security (Section 4.4.9). High level of government encouragement such as availability of support centres, awareness support and e-Government training would encourage citizens in learning e-Government, enhance the ability to access e-government. This is elaborated by an interviewee stating, *"I found it quite difficult to use e-filling system and there was lack of support system".* Based on the above discussion, the following hypothesis is developed:

H10a: Government encouragement may have a positive effect on effort expectancy.

Government encouragement can also potentially affect the social influence factor. For example, promoting the availability of e-Government services using mainstream and social media would raise the awareness of citizens toward the benefits of adopting the system. This is elaborated by an interviewee asserting, *"the government might have provided several e-Government services, but the awareness is very low due to the lack of publicity.".* Such promotions would influence citizens to adopt a socially acceptable system and in turn encourage the adoption of e-Government to their family, friends and peers. In addition, this relationship might be even stronger in the collectivism societies such as Indonesia compared to the individualism society in different countries (Hofstede 2009; Hofstede 2011; Sabani, Deng & Thai 2019b). Based on the above discussion, the following hypothesis is developed:

H10b: Government encouragement may have a positive effect on social influence.

The thematic analysis findings highlight the fact that citizens are reluctant to adopt e-Government services due to the lack of necessary supports. This is elaborated by an interviewee stating, *"the government should provide training, or at least helpline such as a call centre where I can get necessary helps and supports".* Further encouragements from the government by providing necessary supports such as service kioks, phone helplines, online chat systems and support centres would potentially affect the perception of citizens toward facilitating conditions of e-Government. Based on the above discussion, the following hypothesis is developed:

H10c: Government encouragement may have a positive effect on facilitating conditions.

Findings from the thematic analysis show that citizens are hesitant to adopt and use e-Government services due to security concerns. This is elaborated by an interviewee stating, *"I am very concerned on how my sensitive information will be handled by e-Government system, the data handling and privacy policies are a bit unclear".* Encouragements from the government by raising the awareness and educating citizens about the implementation of security policies and measures in e-Government systems would reassure and boost the confidence of citizens to adopt and use e-Government. In this regard, the higher to government encouragement the more likely to perceive to the adoption of e-government to be secured and suppress the hesitation of adopting e-Government due to security concerns. Based on the above discussion, the following hypothesis is developed:

H10d: Government encouragement may have a positive effect on perceived security.

5.2.11 Adoption and Use

Consistent with Venkatesh et al. (2003), this research predicts that intentions to adopt e-Government system will positively influence the actual use of e-government services. In theorising this relationship, Venkatesh et al. (2008, p. 486) stated the "temporal sequencing of events leading up to the execution of a target behaviour." It is suggested that individuals shape the perception of intention as an "internal determination to perform a behaviour." This reflects the combination of all of the internal factors that shape behaviour (Maruping et al. 2017). Subsequently, individuals' perceptions incorporate various external factors that can potentially hinder the successful execution of behaviour, that is the actual use of technology. This suggests that unless individuals develop the intention to adopt a certain technology, it is unlikely that

they will use the technology (Venkatesh et al. 2008; Venkatesh et al. 2003; Venkatesh, Thong & Xu 2012).

The thematic analysis further suggests the effect of intention to adopt on the actual use may be moderated by perceived security. As noted by an interview *"I am interested to use e-Government services but I am a bit reluctant due to security and privacy concerns*" and further discussed in Section 4.4.5, citizens with the intention to adopt e-government might be hesitant to use e-government services due to security concerns. Such relationship might fulfill the potential missing link between the intention to adopt and the use of technologies (Venkatesh, Thong & Xu 2016) such as e-Government. Based on the above discussion, the final hypothesis is developed:

H11: Intention to adopt may have a positive effect on e-government use and this relationship will be moderated by perceived security.

5.3 Summary of Developed Hypotheses

Based on the thematic data analysis, a revised model as seen in Figure 4.15 is developed. The model has eleven major hypotheses, with twenty-one relationships identified. The relationships are derived based on the thematic analysis while being grounded in the existing literature. Figure 5.1 illustrates the revised model with the hypotheses, while Table 5.1 gives a summary of the hypotheses developed and the relationship between the constructs.

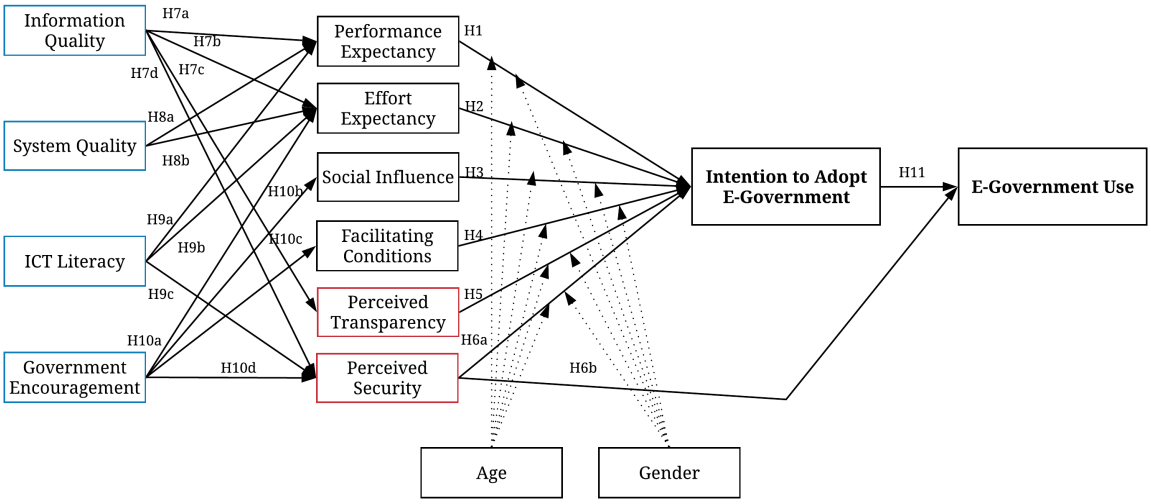

Figure 5.1 The Hypothesised Research Model

Note: Black box indicates core UTAUT variables, red box indicates endogenous variables, and blue box indicates exogenous variables.

Table 5.1 Summary of Relationships among Constructs and their Respective Hypotheses

Construct	**Link**	**H#**	**Hypothesis Statement**
Performance Expectancy (PE)	PE → IA	H1	Performance expectancy may have a positive effect on the intention to adopt e-government and this relationship will be moderated by age and gender.
Effort Expectancy (EE)	EE → IA	H2	Effort expectancy may have a positive effect on the intention to adopt e-government and this relationship will be moderated by age and gender.
Social Influence (SI)	SI → IA	H3	Social influence may have a positive effect on the intention to adopt e-government and this relationship will be moderated by age and gender.
Facilitating Conditions (FC)	FC → IA	H4	Facilitating conditions may have a positive effect on the intention to adopt e-government and this relationship will be moderated by age and gender.
Perceived Transparency (PT)	PT → IA	H5	Perceived security may have a positive effect on the intention to adopt e-government and this relationship will be moderated by age and gender.

Perceived Security (PS)	PS → IA	H6a	Perceived security may have a positive effect on the intention to adopt e-government and this relationship will be moderated by age and gender.
	PS → EU	H6b	Perceived security may have a positive effect on e-government use.
Information Quality (IQ)	IQ → PE	H7a	Information quality may have a positive effect on performance expectancy.
	IQ → EE	H7b	Information quality may have a positive effect on effort expectancy.
	IQ → PT	H7c	Information quality may have a positive effect on perceived transparency.
	IQ → PS	H7d	Information quality may have a positive effect on perceived security.
System Quality (SQ)	SQ → PE	H8a	System quality may have a positive effect on performance expectancy.
	SQ → EE	H8b	System quality may have a positive effect on effort expectancy.
ICT Literacy (IL)	IL → PE	H9a	ICT literacy may have a positive effect on performance expectancy.
	IL → EE	H9b	ICT literacy may have a positive effect on effort expectancy.
	IL → PS	H9c	ICT literacy may have a positive effect on perceived security.
Government Encouragement (GE)	GE → EE	H10a	Government encouragement may have a positive effect on effort expectancy.
	GE → SI	H10b	Government encouragement may have a positive effect on social influence.
	GE → FC	H10c	Government encouragement may have a positive effect on facilitating conditions.
	GE → PS	H10d	Government encouragement may have a positive effect on perceived security.

Intention to Adopt (IA)	IA → EA	H11	Intention to adopt may have a positive effect on e-government use and this relationship will be moderated by perceived security.

5.4 Measurement Items

To test the hypotheses developed in the preceding section, an online survey was deployed. The survey was developed from the findings of the field study as well as the existing literature so that the relationships between the constructs shown in Figure 5.1 could be validated.

The survey instrument includes three parts. The first part describes the terms included in the survey instrument. The second part is designed to gather the demographic information of the participants such as gender, age, education level and occupation. The items are depicted in Table 5.2. In this section, DE1 and DE3 are represented with ordinal scales. DE2 uses of the ordinal scale, while DE4 is a multiple choice question where the respondents can choose from the list or type their own occupation.

Table 5.2 Demographic Items

Item	Measurement
DE1	Age of the respondent
DE2	Gender of the respondent
DE3	Education of the respondent
DE4	Occupation of the respondent

The third part is used to explore the perception and opinion of individual citizens on the factors that influence the adoption and the use of e-Government in Indonesia. The survey instrument employs a seven-point Likert scale in this research. This is due to its accuracy and capability in providing consistent results to be used in data analysis (Hair et al. 2018; Hair Jr et al. 2016). A seven-point Likert scale is used in the survey to evaluate agreement regarding the specific measurement items under various constructs in the survey instrument. The value '1' indicates 'strongly disagree' and the value '7' indicates 'strongly agree'. The seven-point Likert scale is also applied for evaluating the importance of some specific constructs in the survey instrument describing that the value '1' indicates 'not important at all' and value '7' indicates 'extremely important'. Table 5.2 summarises indicators and definitions of the measurement items in the revised model.

5.4.1 Core UTAUT Variables

The core variables are the core factors that are believed to influence the adoption and the use of a given technology (Venkatesh, Thong & Xu 2012). With the use of UTAUT, four core factors including the performance expectancy, the effort expectancy, the social influence, and the facilitating condition are identified in the research model for explaining the adoption and the use of e-government services. Several formative items are developed from the field study and literature review as outlined in Table 5.2

Table 5.2 A Summary of the UTAUT Measurements in the Revised Model

Construct	Item	Description	References
Performance Expectancy	Productivity Enhancement	The extent of which citizens believe the use of e-Government systems would increase work efficiency.	Dwivedi et al. (2017), Venkatesh et al. (2003), Venkatesh, Thong & Xu (2012), and Qualitative study
	Time Efficiency	The extent of which citizens believe obtaining public services from e-Government is done faster than the traditional approach.	
	Cost Efficiency	The extent of which citizens believe obtaining public services from e-Government is less expensive than the traditional approach.	
	Process Clarity	The extent of which citizens obtaining public services from e-Government is easily understood.	
Effort Expectancy	User Intuitiveness	The extent to which citizens believe e-Government systems is self-explanatory.	Puspitasari and Ishii (2016), Susanto and Goodwin (2013), Venkatesh et al. (2003),
	System Navigation	The extent to which citizens believe e-Government systems is easy to direct.	

	Learnability	The extent to which citizens become quickly familiar with e-Government.	Venkatesh, Thong & Xu (2012), and Qualitative study
	Understandability	The extent to which citizens believe e-Government systems is easy to comprehend.	
Social Influence	Community Adoption	The level of e-Government uptake from citizens' community.	Rana et al. (2017), Kurfalı et al. (2017), Shareef et al. (2011), Venkatesh et al. (2003), Venkatesh, Thong & Xu (2012), and Qualitative study
	Community Motivation	The level of encouragement from citizens' community to adopt e-Government.	
	Community Opinion	The feedback from citizens' community about the adoption of e-Government	
	Community Support	The level of assistance from the community to help citizens adopting of e-Government.	
Facilitating Conditions	Availability of ICT Infrastructure	The extent to which citizens believe adequate infrastructure exists to support the adoption of e-Government.	Dwivedi et al. (2017), Puspitasari and Ishii (2016), and Venkatesh et al. (2003), and Qualitative study
	Availability of Multiple Platforms Access	The ability to use e-Government from multiple devices (e.g. personal computers and mobile phones).	
	Availability of Community Access Points	The ability to use e-Government from public places.	
	Availability of ICT Devices	The level of effort that the individual must take to access ICT devices.	

5.4.2 Endogenous Extensions

Endogenous constructs refer to factors that may directly impact the intention to adopt and the use of e-government services. Two factors including perceived security and transparency, are included in the research model. Perceived security is adapted from existing literature. Perceived security is considered to be one of the most prominent factors in e-government adoption field (AlKalbani et al. 2017; Munyoka & Maharaj 2019; Shahzad et al. 2019). Perceived transparency identified through the qualitative phase of this research and it is found to be one of the strongest factors that influence interviewees to adopt and use e-government services. These two factors are both formative in nature. The constructs are made up of several items as shown in Table 5.3.

Table 5.3 A Summary of the Endogenous Extensions in the Revised Model

Construct	Item	Description	References
Perceived Security	Perceived Risk	The degree of uncertainty citizens has when adopting e-Government.	Dwivedi et al. (2017), Kurfalı et al. (2017) Shareef et al. (2011), Posthumus and Von Solms (2004), and Qualitative study
	Trust in the E-Government System	The degree of confidence of citizens regarding security of e-Government.	
	Willingness in Submitting Credentials	The degree of readiness of citizens to submit sensitive information to e-Government.	
	Visibility of Information Security	The clarity of information with respect to the implementation of security policies in e-Government.	
Perceived Transparency	Perceived Corruption Eradication	The degree to which citizens perceive the adoption of e-Government would suppress corruptions.	Almukhlifi, Deng & Kam (2019b) and Qualitative study
	Information Restrictions	The extent to which public organisations provide citizens with public information online with no restrictions.	

	Process Openness	The extent to which public organisations provide citizens with clear procedures to use e-Government.	
	Public Participation	The capability of citizens to be involved in public decision-making through the use of e-Government.	

5.4.3 Exogenous Extensions

Exogenous constructs refer to external predictors that may impact endogenous variables in the model (i.e., performance expectancy, effort expectancy, social influence, facilitating conditions, perceived security, and perceived transparency). There are four exogenous constructs in the revised model, including information quality, system quality, ICT literacy, and government encouragement. Information quality and system quality are adapted from IS Success Model (DeLone & McLean 2003). ICT literacy is also adapted from existing literature, and it is deemed to be essential to e-Government adoption research from the perspective of citizens in developing countries (Puspitasari & Ishii 2016). Government encouragement has emerged as a new factor from the thematic analysis that can be defined as the actions taken by the government to support the adoption and the use of e-Government. These four factors are also formative in nature. In all, the exogenous extensions comprised four items, as shown in Table 5.4

Table 5.4 A Summary of the Exogenous Extensions in the Revised Model

Construct	**Item**	**Description**	**References**
Information Quality	Information Accuracy	The degree of errors within the information.	DeLone and McLean (2003), Papadomichelaki and Mentzas (2012),
	Information Relevancy	The degree of match between the information requested and the information retrieved.	

	Information Timeliness	The extent to which the information provided is up to date.	Wangpipatwong, Chutimaskul and Papasratorn (2009), and Qualitative study
	Information Understandability	The extent to which the information provided is comprehensible.	
	Information Variety	The variability of e-Government information.	
	Information Accessibility	The obtainability of e-Government information.	
System Quality	System Reliability	The quality of e-Government system being able to perform consistently well.	DeLone and McLean (2003), Papadomichelaki and Mentzas (2012), and Wangpipatwong, Chutimaskul and Papasratorn (2009), and Qualitative study
	Service Usefulness	The extent of e-Government services in fulfilling the citizens' requirements.	
	Service Functionality	The extent of e-Government systems works as expected.	
	System Accessibility	The obtainability of e-Government system.	
	Service Variety	The variability of e-Government services.	
ICT Literacy	ICT self-efficacy	The degree of citizens' beliefs about their abilities to use ICT devices.	Compeau and Higgins (1995), and Qualitative study
	Internet self-efficacy	The degree of citizens' beliefs about their abilities to use internet.	
	ICT exposure	The level of citizens' experience in using ICT devices	
	Internet exposure	The level of citizens' experience in using internet	

Government Encouragement	Publicity of E-Government Services	The level of support from the government to maintain timely information to the presence of e-Government.	Qualitative study
	Availability of Support Centres	The level of support from the government to assist citizens in using e-Government (e.g. phone and web support centres)	
	Availability of Financial Incentive.	The availability of financial benefits provided by the government to citizens for adopting e-Government systems	
	Availability of E-Government Training	The availability of e-Government training provided by the government to citizens.	

5.4.4 Outcomes Variables

There are two outcomes variables in the research model including the intention to adopt e-Government and the use of e-Government as discussed in section 5.2.11. Specifically, there are three formative items for the adoption of e-Government and there is one item for the use of e-Government as shown in Table 5.5.

Construct	Item	Description	References

Adoption	Retrieve information	The intention to adopt e-Government to retrieve public information	Maruping et al. (2017), Venkatesh et al. (2003), and Qualitative study
	Retrieve service	The intention to adopt e-Government to retrieve public services.	
	Social reason	The intention to adopt e-Government due to social influence/reason.	
Use	Frequency	The frequency of using e-Government.	Nam (2014), Venkatesh, Thong & Xu (2012), and Venkatesh, Thong & Xu (2016)

The above measurement items are adopted from existing literature in Chapter 2 and thematic analysis in Chapter 4. Discussion about these measurement items can be found in Section 5.2.1 to Section 5.2.11. Apart from the frequency of using e-Government that is utilised to measure the use of e-Government as a single item construct, the rest of the measurement items are formative in nature. Formative constructs indicates that items define the constructs, thus a change in the items changes the construct (Hair et al. 2018). This leads to the items not being interchangeable as they measure distinct dimension, hence covariation is not necessary amongst the items (Hair Jr et al. 2016).

5.5 Conclusion

This chapter presented the hypotheses developed that were derived from the revised research model, developed in Chapter 4. Based on the revised model, a total of twenty-one hypotheses were developed. The rationale and justification of the hypotheses were also observed. Finally, it presented the measurement items for the questionnaire for this research. To test the developed hypotheses, the questionnaire was developed based on the findings from the qualitative data analysis and the existing literature. The final questionnaire was distributed for a survey, which is discussed in the next chapter.

Chapter 6. Analysis of Quantitative Data

6.1 Introduction

This chapter presents the results of the quantitative phase, which aimed to test and validate the identified hypotheses presented in the last chapter. This data collection process was completed through an online survey distributed to Indonesian citizens in regard to e-government adoption and use behaviour. This chapter outlines the results of the survey. It initially presents a discussion of the response rate and demographics of the respondents. Then, using the partial least squares structural equation (PLS-SEM) approach, the chapter discusses the validity of the measurement model, evaluates the structural model, tests the hypotheses, calculates the coefficient of determination, effect size and predictive relevance of each construct, mediation effect and moderation effect. The result identifies the critical factors that influence the adoption and the use of e-Government services in Indonesia from the perspective of citizens. In addition, Fuzzy Set Qualitative Comparative Analysis (fsQCA) is utilised in this study to complement the results of PLS-SEM analysis. The fsQCA combines the determinants of e-Government adoption and use while developing alternative necessary and sufficient configurations. Furthermore, configurations of antecedents for non-adoption or non-use to e-Government are also analysed which make a unique contribution to the extant literature.

6.2 An Overview of Survey Data

For the purpose of this research, approximately one thousand and five hundred (1500) online survey questionnaires were distributed through social media platforms. From this, 314 people have responded to the survey. The response rate of the survey is, therefore, at 20.9%. The response rate of the survey is in line with the suggestion of previous studies (Karunasena & Deng 2012; Kurfalı et al. 2017; Mirchandani, Johnson Jr & Joshi 2008) that the response rate for e-government research is normally less than 50%. The reasons for non-response are usually varied from respondents' lack of interest in the research topic, low uptake of e-government, respondents' level of education, or some other social and economic factors (Deng, Karunasena & Xu 2018; Mensah 2019).

The questionnaire consists of three parts, this includes the demographic questions of respondents, questions about the current patterns of the adoption of e-Government in Indonesia,

and questions for assessing the critical factors for the adoption of e-Government in Indonesia. The results were analysed using IBM SPSS 26 (IBM Corp. 2019), SmartPLS 3 (Ringle, Wende & Becker 2015) and fsQCA 3.1 (Ragin & Davey 2016).

6.3 Profile of Respondents

The demographic distribution is analysed across the participants' age group, gender, educational level, occupation type and the frequency of using e-Government. Table 6.1 presents a summary of the demographic data. In relation to the age group, the majority of respondents are young adults in the range of 21 to 45 years old. In terms of gender distribution, 64.2% are male, 34.4% are female. Regarding the frequency of using e-government, the majority of respondents are non-frequent e-Governmenr users with only using e-Government services once in six months or less, and 3.5% of the respondents have not used e-Government services at all.

Table 6.1 Demographic of the Survey Participants

Categories	Items	Distribution	Categories	Items	Distribution
Age Group	18-20	6.00%	Education	No Formal School	0.35%
	21-30	60.00%		Primary School	0.00%
	31-45	27.00%		Junior High School	1.40%
	46-60	6.30%		Senior High School	11.93%
	60 and older	0.70%		Diploma	9.12%
	Total	100.00%		Bachelor Degree	61.40%
Gender	Male	64.20%		Master Degree	13.33%
	Female	34.40%		Doctorate Degree	2.46%
	Prefer not to be included	1.40%		Total	100.00%
	Total	100.00%	Occupation	Student	14.40%
Frequency of Using E-Government	Very often (once in a month)	14.00%		Government employee	12.60%
	Often (once in 3 months)	20.00%		Private sector employee	46.30%
	Sometimes (once in 6 months)	27.40%		Self-employed	17.20%
	Rarely (once in a year)	26.30%		Unemployed	4.90%
	Very rarely (less than once in a year)	8.80%		Retired	1.10%

The level of education of respondents is also examined. Three-quarters of respondents have a university degree, including 61.4% hold undergraduate degrees, 13.33% have master qualifications, and 2.46% hold a doctorate. In addition, 9.12% of the respondents have diploma certificates, 11.93% finish high school, and 1.4% finish junior high school. There is only 0.35% have no formal education. In relation to the occupation of the respondents, a majority of the

respondents that is at 46.3% comes from the private sector, 17.2% are self-employed, and 12.6% work in the public sector. Additionally, 14.4% are students, 4.9% are unemployed, and 1.1% is retired. As shown in Table 6.1, similar to other studies (Almukhlifi, Deng & Kam 2019b; Kurfalı et al. 2017; Mensah & Mi 2019), the respondents are diverse from multiple age groups, genders, education and occupation. In addition, there is also a variety in the frequency of using e-Government services, which leads to diversity in the level of knowledge and experience in the adoption of e-government. The sample for this research is, therefore, adequately representative of the whole population.

6.4 Data Screening for SEM Analysis

SEM is a statistical approach for testing hypothesised theoretical models that contain certain relationships between and among observed variables (variables that can be directly measured) and latent variables (variables that cannot be directly measured) in a confirmatory manner with the sample data collected through surveys (Byrne 2010; Kline 2010). It examines the extent to which the hypothesised model is supported by the sample data (Byrne 2010). A model can be rejected as inappropriate if the sample data does not conform to the hypothesised model (Hair 2018). This research, therefore, conducts several assessments, including missing data assessment, outlier assessment, non-response bias assessment, reliability assessment, and multicollinearity assessment to normalise the data set.

Missing data is any values of the measurement items in the survey instrument that are not completed by a respondent (Hair et al. 2010). The existence of the missing data affects the data analysis by reducing the sample size (Byrne 2013; Hair et al. 2010). Further, the missing data influence the accuracy of the estimated parameters of the SEM model (Kaplan 2009). This compromises the research findings in a given situation. It is, therefore, important to effectively handle the missing data in a given study to improve the accuracy of the research findings. To effectively handle the missing data, preventive action is taken to ensure that the data is free from any missing values. For the online survey, participants are reminded if any measurement items are not answered. This helps in the absence of the missing values for the online survey.

Outliers are data values that are significantly different from the rest of the data values (Byrne 2013; Hair et al. 2010). Outliers often are existent in the dataset due to several causes including observation errors, data entry errors, and instrument errors (Schumacker & Lomax 2004). The identification of outliers is important since they can influence fitting the model estimation,

standard errors, and parameter estimation in the data analysis process (Byrne 2013). This means that outliers must be managed using available statistical procedures (Byrne 2013).

To effectively detect outliers, the Mahalanobis distance (D_2) for each measurement item is computed (Hadi 1992; Hair et al. 2010). D_2 is used to measure the distance between a single observation and the mean of all the observations in a given study (Kline 2015). This study assesses D_2 of each data case using the chi-square ($\chi 2$) distribution with a *P*-value (<0.001) and degrees of freedom equal to the independent constructs number (Chowdhury 2019; Tabachnick & Fidell 2007). A particular case is considered an outlier if the D2 of this case is higher than the $\chi 2$ value (Tabachnick & Fidell 2007). As a result, four cases are detected as data outliers in this study, and they are deleted from further analysis. As a result, 48 cases are deleted in the missing data assessment, 4 cases are removed in the assessment of univariate outlier, and 18 cases are deleted in the assessment of multivariate outlier, leading to a total of 244 valid cases to be further analysed using the SEM technique.

Non-response bias concerns the partiality that exists when a group of respondents differs from another group (Hair et al. 2010). The assessment of non-response bias is important to ensure that the collected data remains representative of the study population (Okoli & Pawlowski 2004). The presence of non-response bias is a concern for researchers when they collect data via a survey instrument. This is due to the fact that the existence of non-response bias influences the generalisability of the study findings (Hair et al. 2010). Non-response-bias tests check whether there is any difference in opinion of the respondents with the non-respondents who could have participated in the survey. Thus, the rationale for this test is that late respondents were likely to have a similar characteristic to non-respondents Non-response bias is usually assessed by examining the differences in demographics information between two groups of respondents (Hair et al. 2010). A non-response bias is assessed by using the Mann-Whitney U test using SPSS to compare the main demographic information including age, gender, education and occupation of the 200 first responses from the last 44 responses as presented in Table 6.2.

Table 6.2 Mann-Whitney U test for early and late samples

	Age	**Gender**	**Education**	**Occupation**
Z	0.187	0.533	0.386	0.318

The results shown as in Table 6.2 indicate that no significant differences can be detected in the main demographic information between the early group of respondents and the later group of respondents, provided that in each instance, z-values are not significant at 0.05 level. Thus, it would be reasonable to conclude that the nonresponse bias did not arise a problem in this study.

6.5 Assessment of the Measurement Model

Measurement model analysis examines the relationships between an observed variable (measurement item) and a latent variable (construct) in a specific study (Hair et al. 2010). An observed variable is usually measured directly through a numerical value obtained from the research participants in response to a certain question in the research survey instrument (Hair et al. 2010). A latent variable cannot directly be measured. It is often measured using multiple observed items (Hair et al. 2010). In the measurement model, each measurement item should be linked properly to an individual construct for ensuring the validity of the measurement model (Byrne 2013; Hair et al. 2010).

The latent variables including performance expectancy (PEXPE), effort expectancy (EEXPE), social influence (SINFL), facilitating conditions (FCOND), perceived security (SECUR), information quality (IQUAL), system quality (SQUAL), perceived transparency (TRANS), ICT literacy (ICTLI), government encouragement (GOVEN), and the adoption of e-Government (ADOPT), are depicted in the full measurement model with the total of 46 items. The constructs are formative, which were evaluated based on their outer weights, outer loadings and multicollinearity.

In examining the formative indicators, the criteria for measuring the validity and reliability of reflective constructs do not apply (Hair Jr et al. 2016). In evaluating formative constructs, the guide given by Hair Jr et al. (2016) was followed. This initiates by measuring the significance of the outer weights of the items of the constructs. If the outer weight is significant, then the item is kept. If the outer weight is not significant, then the outer loading is considered. If the outer loading is greater than 0.5, the item is retained. If the outer loading is less than 0.5 but is significant, the item is kept, otherwise, it is removed (Hair Jr et al. 2016). However, this rule has not always been universal. Rai, Patnayakuni and Seth (2006) argued that there is no established weight for accepting items in formative constructs. It is suggested that if the item inclusion is validated based on the theory and also satisfies the content and face validity, the item should be retained regardless of the calculation result. The items included in this study

were derived from its qualitative phase and were validated by experts and academics, thus satisfying the content and face validity criteria. Nevertheless, Table 6.3 indicates that the formative assessment criteria were met for all items.

Table 6.3 Construct Measures

Constructs	**Items**	**Descriptions**	***t*-statistics (One Tail)**	**Outer Weights**	**Outer Loadings**	**VIF**
Performance Expectancy	PEXPE1	Productivity Enhancement	4.362	0.353	0.802	1.581
	PEXPE2	Time Efficiency	3.892	0.245	0.713	1.476
	PEXPE3	Cost Efficiency	5.434	0.341	0.825	1.749
	PEXPE4	Process Clarity	5.191	0.329	0.793	1.582
Effort Expectancy	EEXPE1	User Intuitiveness	5.885	0.300	0.865	2.422
	EEXPE2	System Navigation	5.396	0.289	0.844	2.104
	EEXPE3	Learnability	4.194	0.212	0.856	2.598
	EEXPE4	Understandability	7.685	0.363	0.869	2.149
Social Influence	SINFL1	Community Adoption	4.222	0.325	0.817	1.827
	SINFL2	Community Motivation	2.759	0.232	0.790	1.877
	SINFL3	Community Opinion	5.802	0.423	0.862	1.774
	SINFL4	Community Support	3.029	0.256	0.728	1.476
Facilitating Conditions	FCOND1	Availability of ICT Infrastructure	2.412	0.208	0.842	2.512
	FCOND2	Availability of Multiple Platforms Access	4.476	0.387	0.872	2.014
	FCOND3	Availability of Community Access Points	3.476	0.287	0.862	2.514
	FCOND4	Availability of ICT Devices	3.633	0.293	s	1.858
Perceived Security	SECUR1	Perceived Risk	4.577	0.356	0.876	2.339
	SECUR2	Trust in the E-Government System	5.201	0.321	0.789	1.602

	SECUR3	Willingness in Submitting Credentials	2.483	0.174	0.774	1.993
	SECUR4	Visibility of Information Security	5.33	0.364	0.826	1.696
Perceived	TRANS1	Perceived Corruption Eradication	6.921	0.442	0.895	2.161
Transparency	TRANS2	Information Restrictions	5.88	0.326	0.826	1.871
	TRANS3	Process Openness	2.046	0.135	0.737	1.836
	TRANS4	Public Participation	4.248	0.288	0.817	1.843
Information	IQUAL1	Information Accuracy	3.948	0.228	0.840	2.385
Quality	IQUAL2	Information Relevancy	4.338	0.233	0.836	2.286
	IQUAL3	Information Timeliness	4.564	0.247	0.818	2.046
	IQUAL4	Information Understandability	3.424	0.163	0.709	1.628
	IQUAL5	Information Variety	3.562	0.189	0.825	2.645
	IQUAL6	Information Accessibility	3.633	0.182	0.775	2.206
System Quality	SQUAL1	System Reliability	3.703	0.222	0.842	2.511
	SQUAL2	Service Usefulness	4.817	0.241	0.808	1.999
	SQUAL3	Service Functionality	2.635	0.165	0.799	2.238
	SQUAL4	System Accessibility	4.305	0.243	0.846	2.366
	SQUAL5	Service Variety	4.951	0.316	0.886	2.678
ICT Literacy	ICTLI1	ICT self-efficacy	2.24	0.186	0.823	2.651
	ICTLI2	Internet self-efficacy	2.308	0.192	0.835	2.913
	ICTLI3	ICT exposure	7.109	0.573	0.949	2.498
	ICTLI4	Internet exposure	2.402	0.173	0.823	2.379

Government Encouragement	GOVEN1	Publicity of E-Government Services	1.931	0.229	0.786	2.182
	GOVEN2	Availability of Support Centres	2.138	0.263	0.871	2.839
	GOVEN3	Availability of Financial Incentive.	5.151	0.546	0.920	1.999
	GOVEN4	Availability of E-Government Training	0.924	0.113	0.792	2.437
Adoption	ADOPT1	Adopting e-government to retrieve information	9.096	0.412	0.841	1.635
	ADOPT2	Adopting e-government to retrieve services	8.233	0.423	0.854	1.689
	ADOPT3	Adopting e-government due to social influences/reasons	7.047	0.365	0.800	1.529

In assessing the multicollinearity of the items in the construct, previous research has specified different values for variance inflation factor (VIF), from 10 as suggested by Diamantopoulos, Riefler and Roth (2008), 5 as recommended by Hair Jr et al. (2016) and a more strict value of 3 as specified by Petter, Straub and Rai (2007). As shown in Table 6.3, it is observed that all the items have a VIF that is lower than 3, with the highest being 2.913 for ICTLI1. Therefore, the result suggests that there is no multicollinearity problem. The common method bias could potentially influence relationships between the constructs (Roy et al. 2018). Harman's single-factor test was performed, and none of the factors exceeded the threshold of more than 50% of the total variance (Harman 1976). (Hair Jr et al. 2016). In addition, inner multicollinearity assessment can also be used to detect CMB. The results in Table 6.3 shows that VIF values of every item are lower than the 3.3 thresholds (Kock 2015). This is indicative that the model is free from common method bias. The use of Harman's single factor and VIF analysis suggests that common method bias is not a concern in this study. These finding show that all the results are satisfactory.

6.6 Assessment of the Structural Model

The structural model illustrates the path between the theoretical constructs in a given state (Hair et al. 2010). It analyses how each single construct is related to another. The structural model is examined after the validity of the full measurement model is confirmed (Hair et al. 2010). The path coefficient shows the strength, nature, and significance of each relationship between constructs (Hair et al. 2010; Schumacker & Lomax 2004). Furthermore, it also shows the significance of the relationship shows whether the hypotheses of the research are accepted or rejected (Byrne 2013; Schumacker & Lomax 2004).

Recent research by Henseler and Sarstedt (2013) has proposed new measures in estimating model fit for PLS-SEM models, including standardized root mean square residual (SRMR) and root mean square residual covariance (RMS_{theta}). While it is acknowledged that they are still at their early stage, they are often discouraged so as not to sacrifice the model's predictive power in a bid to have better model fit (Hair Jr et al. 2016). In evaluating SRMR, a model is said to be of good fit if its value is less than 0.08 (Hair et al. 2018). Henseler and Sarstedt (2013) suggested RMS_{theta} values below 0.12 or 0.14, indicates a well-fitting model. The SRMR and RMS_{theta} for this research model are 0.42 and 0.117, respectively indicate the model is a good fit based on the evaluated guidelines.

In assessing the path significance, a bootstrap analysis was executed using 5000 samples, which is the minimum suggested by Hair Jr et al. (2016). The revised research model and proposed hypotheses is depicted in Figure 6.1 with all relationships are positive influence. The frequency of using e-Government is utilised to measure the use of e-Government (USE) as a single item construct.

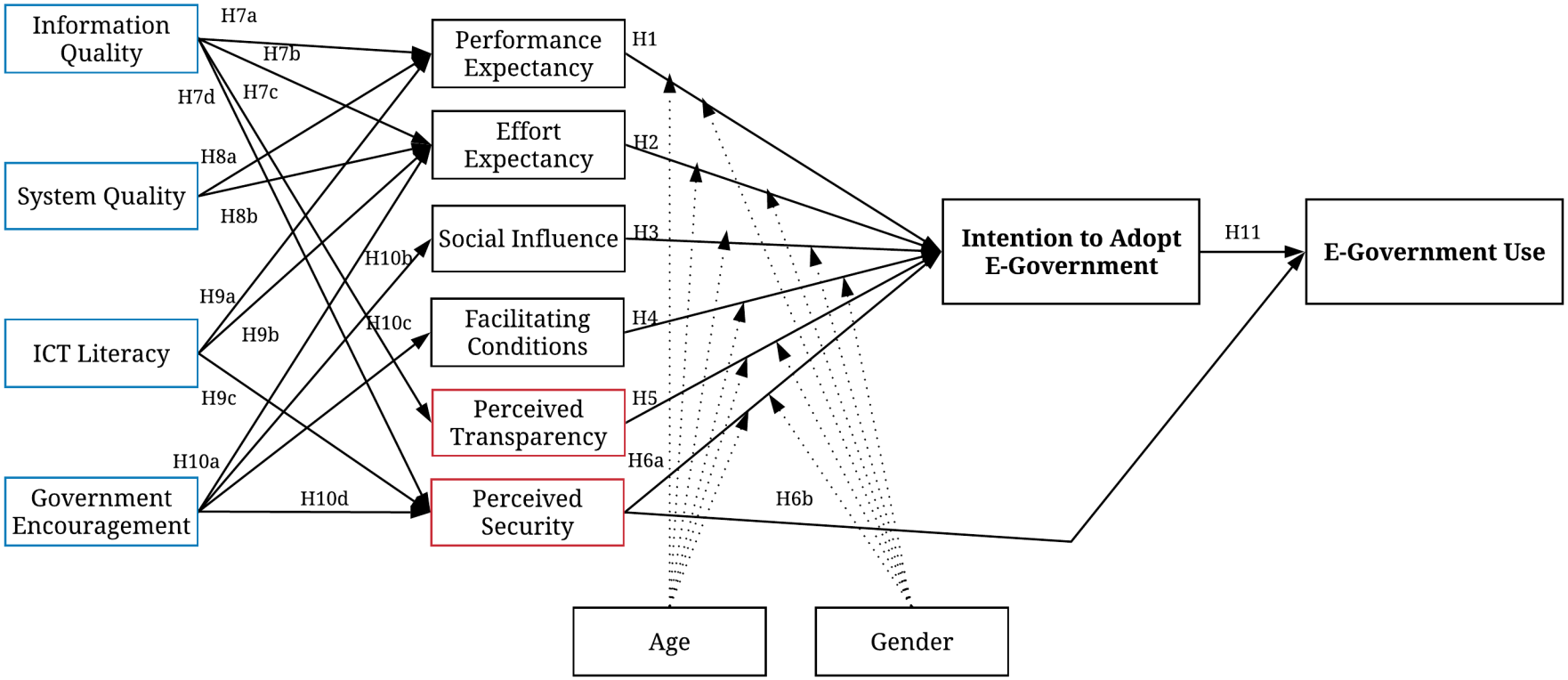

Figure 6.1 Hypothesised Research Model

Note: Black box indicates core UTAUT constructs, red box indicates endogenous extensions, and blue box indicates exogenous extensions.

Upon analysing the result of the hypotheses testing as shown in Table 6.4, twenty hypotheses out of twenty-one were accepted. The path-coefficient value (β) is shown near to each link among the constructs, while the t-value is shown next to the β value in bracket.

Table 6.4 Evaluation of Research Hypotheses

	Link	**Path Coefficient (β)**	***t*-statistics (One Tail)**	***p* -values**	**Result**
H1	PEXPE -> ADOPT (+)	0.216	3.046	0.001***	**Supported**
H2	EEXPE -> ADOPT (+)	0.163	2.453	0.007***	**Supported**
H3	SINFL -> ADOPT (+)	0.089	2.061	0.020**	**Supported**
H4	FCOND -> ADOPT (+)	0.093	1.386	0.083*	**Not Supported**
H5	TRANS -> ADOPT (+)	0.270	3.613	0.000***	**Supported**
H6a	SECUR -> ADOPT (+)	0.160	2.440	0.007***	**Supported**
H6b	SECUR -> USE (+)	0.284	3.158	0.001***	**Supported**
H7a	IQUAL -> PEXPE (+)	0.325	4.587	0.000***	**Supported**
H7b	IQUAL -> EEXPE (+)	0.245	3.572	0.000***	**Supported**
H7c	IQUAL -> SECUR (+)	0.656	10.106	0.000***	**Supported**
H7d	IQUAL -> TRANS (+)	0.807	27.677	0.000***	**Supported**
H8a	SQUAL -> PEXPE (+)	0.459	5.942	0.000***	**Supported**
H8b	SQUAL -> EEXPE (+)	0.273	3.859	0.000***	**Supported**
H9a	ICTLI -> PEXPE (+)	0.114	2.239	0.013**	**Supported**
H9b	ICTLI -> EEXPE (+)	0.377	7.965	0.000***	**Supported**
H9c	ICTLI -> SECUR (+)	0.170	2.841	0.002***	**Supported**
H10a	GOVEN -> EEXPE (+)	0.139	3.747	0.000***	**Supported**
H10b	GOVEN -> SINFL (+)	0.707	18.486	0.000***	**Supported**
H10c	GOVEN -> FCOND (+)	0.473	7.502	0.000***	**Supported**
H10d	GOVEN -> SECUR (+)	0.092	2.217	0.013**	**Supported**
H11	ADOPT -> USE (+)	0.149	1.661	0.048**	**Supported**

Significant at *** $p<0.01$, Significant at ** $p<0.05$, Significant at * $p<0.1$

The path analysis with respect to the influence of endogenous constructs including PEXPE, EEXPE, SINFL, FCOND, TRANS and SECURE were assessed. The result indicates that H1, H2, H3, H5, H6a and H6b are supported but not H4. PEXPE has a significant positive influence on ADOPT (β=0.216; t=3.046), supporting H1. EEXPE has a significant effect on ADOPT (β=0.163; t=2.453), supporting H2. SINFL has a significant positive influence on ADOPT

(β=0.089; t=2.061), supporting H3. TRANS has a significant positive influence on ADOPT (β=0.27; t=3.613), supporting H5. SECUR has significant positive influences on both ADOPT (β=0.16; t=2.440) and USE (β=0.284; t=3.158), supporting H6a and H6b.The result, however, reveals that FCOND has an insignificant positive influence on ADOPT (β=0.093; t=1.386), rejecting H4 at $p<0.05$ as it is only significant at $p<0.1$.

In relation to exogenous constructs, the path analysis with respect to the influence of IQUAL, SQUAL, ICTLI and GOVEN were also tested. The results indicate that all hypotheses including H7a, H7b, H7c, H7d, H8a, H8b, H9a, H9b, H9c, H10a, H10b, h10c and H10d are supported. IQUAL has significant positive influences on PEXPE (β=0.325; t=4.587), EEXPE (β=0.245; t=3.572), SECUR (β=0.656; t=10.106) and TRANS (β=0.807; t=27.677), supporting H7a, H7b, H7c and H7d. SQUAL has significant positive influences on both PEXPE (β=0.459; t=5.942) and EEXPE (β=0.273; t=3.859), supporting H8a and H8b. ICTLI has significant positive influences on PEXPE (β=0.114; t=2.239), EEXPE (β=0.377; t=7.965), and SECUR (β=0.17; t=2.841), supporting H9a, H9b and H9c. GOVEN has significant positive influences on EEXPE (β=0.139; t=3.747), SINFL (β=0.707; t=18.486), FCOND (β=0.473; t=7.502) and SECUR (β=0.092; t=2.217), supporting H10a, H10b, H10c and H10d.

The path analysis with respect to the influence of ADOPT to the use e-government is examined. The results indicate that H11 is supported. ADOPT has a significant positive influence on USE (β=0.149; t=1.661), supporting H11 as the final hypothesis. Figure 6.2 presents the results of the structural model analysis

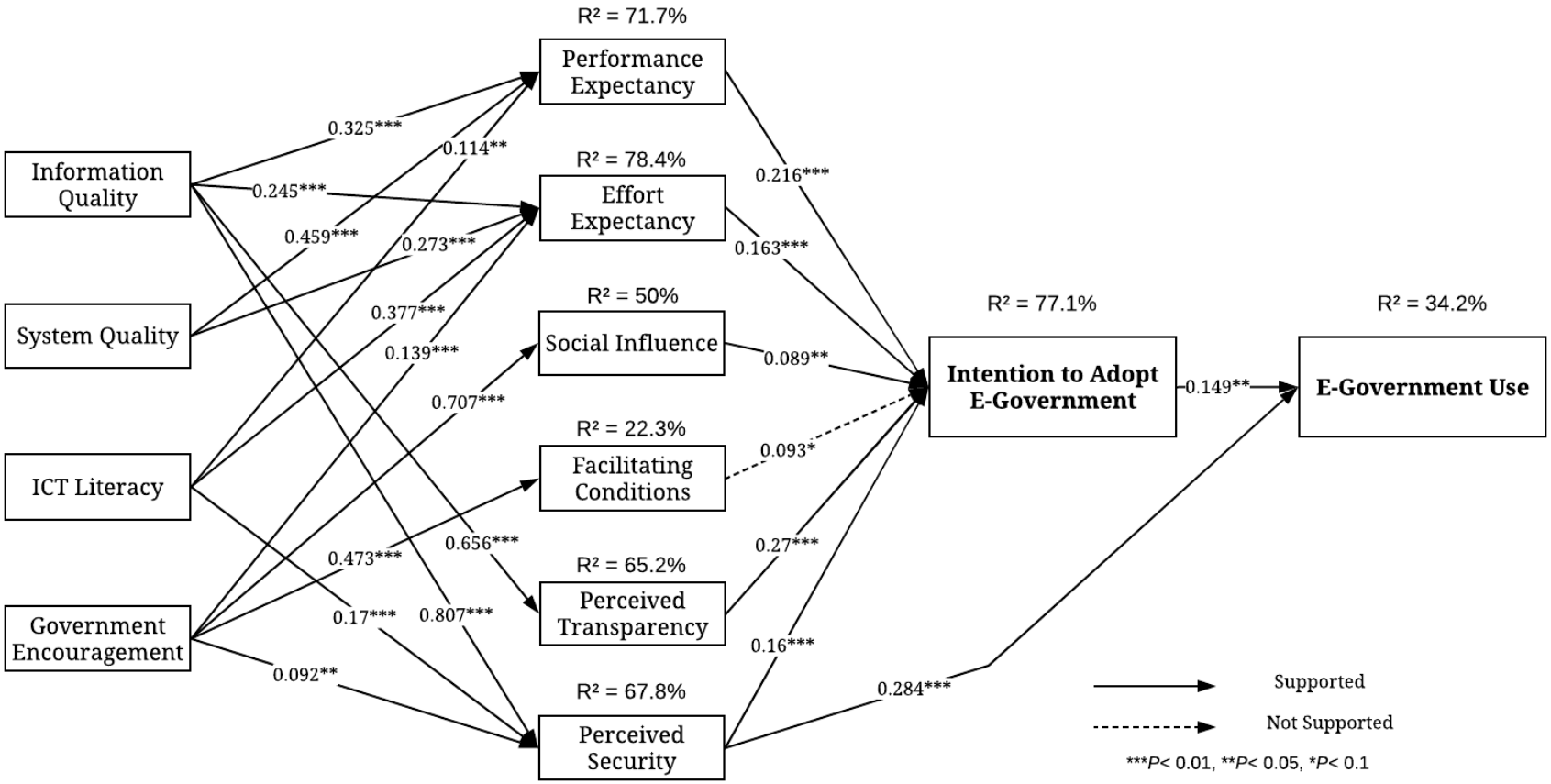

Figure 6.2 Final Structural Model

As shown in Figure 6.2, all the hypotheses are supported except for FCOND to ADOPT (H4). This implies that performance expectancy, effort expectancy, social influence, perceived security, and perceived transparency are critical to evaluate the adoption and the use of e-government in Indonesia. In addition, information quality, system quality, ICT literacy and government encouragement are relevant exogenous constructs to evaluate the adoption and the use of e-government in Indonesia.

6.7 The Coefficient of Determination

The Coefficient of Determination (R^2) explains the combined power of the exogenous variables on the endogenous variable (Hair Jr et al. 2016). Using the guidelines written by Chin (2010), the values 0.67, 0.33 and 0.19 represent strong, moderate and weak effects respectively. As presented in Table 6.2, data accounted for 71.7% in variance for the performance expectancy, 78.4% in variance for effort expectancy, 50% in variance for social influence, and 22.3% for facilitating conditions based on their exogenous factors, while explaining 65.2% on perceived transparency and 67.8% on perceived security. Table 6.5 summarises the result.

Table 6.5 R^2 Values for the Endogenous Constructs

	R^2	**Effect**
Performance Expectancy Factors	0.717	Strong
Effort Expectancy Factors	0.784	Strong
Social Influence Factors	0.500	Moderate
Facilitating Conditions Factors	0.223	Weak
Perceived Transparency Factors	0.652	Moderate
Perceived Security Factors	0.678	Strong

R^2 is also assessed in the structural model analysis. It was conducted to identify the level of strength of the structural model by using R^2 value (Hair et al. 2010). R^2 value shows how much variance in endogenous variables is explained by the model (Chin 2010). This research model has successfully explained 34.2% on the use of e-Government and 77.1% of the variance in the intention to adopt e-government that is higher than the baseline UTAUT model.

6.8 **Effect Size**

Effect size (f^2) is a concept that measures the strength of the relationship between two variables on a numeric scale. Table 6.6 shows the result of individual constructs on their endogenous variable.

Table 6.6 Effect Size for Each Construct

	Link	**f^2 Value**	**f^2 Interpretation**
H1	PEXPE -> ADOPT	0.068	Weak
H2	EEXPE -> ADOPT	0.028	Weak
H3	SINFL -> ADOPT	0.018	None
H4	FCOND -> ADOPT	0.008	None
H5	TRANS -> ADOPT	0.065	Weak
H6a	SECUR -> ADOPT	0.034	Weak
H6b	SECUR -> USE	0.033	Weak
H7a	IQUAL -> PEXPE	0.070	Weak
H7b	IQUAL -> EEXPE	0.052	Weak
H7c	IQUAL -> SECUR	0.734	Strong
H7d	IQUAL -> TRANS	1.870	Strong
H8a	SQUAL -> PEXPE	0.131	Weak
H8b	SQUAL -> EEXPE	0.060	Weak
H9a	ICTLI -> PEXPE	0.024	Weak
H9b	ICTLI -> EEXPE	0.342	Strong
H9c	ICTLI -> SECUR	0.050	Weak
H10a	GOVEN -> EEXPE	0.068	Weak
H10b	GOVEN -> SINFL	0.999	Strong
H10c	GOVEN -> FCOND	0.288	Moderate
H10d	GOVEN -> SECUR	0.020	Weak
H11	ADOPT -> USE	0.009	None

According to Cohen (1992), the values 0.02, 0.15, and 0.35 respectively indicate a weak, medium, and strong effect size of the individual construct, respectively. As shown in Table 6.6, performance expectancy, effort expectancy, perceived transparency and perceived security have weak individual effects on the adoption of e-government. Information quality and system

quality are also observed to have weak individual effects on performance expectancy and effort expectancy. Information quality, however, has strong individual effects on perceived transparency and perceived security. ICT literacy has weak individual effects on performance expectance and perceived security but has a strong individual effect on effort expectancy. Government encouragement has weak individual effects on effort expectancy and perceived security, but it has a moderate individual effect on facilitating conditions and a strong individual effect on social influence. In relation to the use of e-government, perceived security has a weak individual effect on the construct.

6.9 Predictive Relevance

Predictive relevance (q^2) aims to evaluate the predictive validity of a complex model in PLS-SEM (Akter, D'Ambra & Ray 2011). To evaluate the predictive relevance of an endogenous construct, a blindfolding procedure was conducted. This allows calculating Stone-Geisser's Q^2 value (Geisser 1974; Stone 1974), which represents an evaluation criterion for the cross-validated predictive relevance of the PLS path model.

The systematic pattern of data point elimination and prediction in the blindfolding procedure depends on the omission distance (D) with suggested values of D are between 5 and 12. An omission distance with a value of 6 was used in this research. This was because the value of d divided by the number of valid observations in the data sample must not be an integer (Hair Jr et al. 2016). In evaluating the effect size of individual constructs on the predictive relevance of an endogenous variable, the formula below was used:

$$q^2 = \frac{Q^2_{included} - Q^2_{excluded}}{1 - Q^2_{included}}$$

A value greater than zero indicates that the model has predictive relevance for the endogenous variable (Hair Jr et al. 2016). As outlined in Table 6.7, values of predictive relevance for all endogenous constructs have met the requirement. Thus, predictive relevance is established for constructs in the research model.

Table 6.7 Predictive Relevance Results

Predictor	Construct	Q^2 Included	Q^2 Excluded	Predictive relevance (q^2)	q^2 Interpretation
IQUAL	PEXPE	0.429	0.417	0.021	Weak
SQUAL	PEXPE	0.429	0.41	0.033	Weak
ICTLI	PEXPE	0.429	0.426	0.005	None
IQUAL	EEXPE	0.565	0.556	0.021	Weak
SQUAL	EEXPE	0.565	0.558	0.016	None
ICTLI	EEXPE	0.565	0.512	0.122	Weak
GOVEN	EEXPE	0.565	0.555	0.023	None
IQUAL	SECUR	0.444	0.285	0.286	Moderate
ICTLI	SECUR	0.444	0.437	0.013	None
GOVEN	SECUR	0.444	0.44	0.007	None
PEXPE	ADOPT	0.515	0.505	0.021	Weak
EEXPE	ADOPT	0.515	0.511	0.008	None
SINFL	ADOPT	0.515	0.512	0.006	None
FCOND	ADOPT	0.515	0.514	0.002	None
TRANS	ADOPT	0.515	0.505	0.021	Weak
SECUR	ADOPT	0.515	0.513	0.004	None

In establishing the individual effect size of the exogenous variable on the predictive relevance of the endogenous variables, the values 0.02, 0.15, and 0.35 denote a weak, medium, and strong effect size respectively (Cohen 1992). As stated in Table 6.7, information quality and service quality have weak predictive effects on the performance expectancy. Information quality and ICT literacy have weak predictive effects on the effort expectancy. Information quality, however, has a moderate predictive effect on perceived transparency. In relation to the adoption, both performance expectancy and perceived transparency have weak predictive effects on the construct.

6.10 **Mediation Effect**

This study evaluates the mediating effect on the role of exogenous constructs on the relationships between endogenous constructs and the adoption of e-government and the exogenous constructs on the relationships between perceived security and e-government use.

The mediation analysis followed the guidelines of Zhao, Lynch Jr and Chen (2010) and Hair Jr et al. (2016). In establishing mediation, as shown in Figure 6.2, the indirect effect ‘a x b’ significance is a prerequisite (Zhao, Lynch Jr & Chen 2010). Hair Jr et al. (2016) further suggested that there is a need for a significant direct effect ‘c’ between the independent and dependent variable for ease of understanding. However, it was not a requirement and was thus ignored in this research. This approach challenged the classical full mediation that only occurs when there exists a significant indirect effect ‘a x b’ without a significant effect ‘c’ from the independent on the dependent variable (Baron & Kenny 1986).

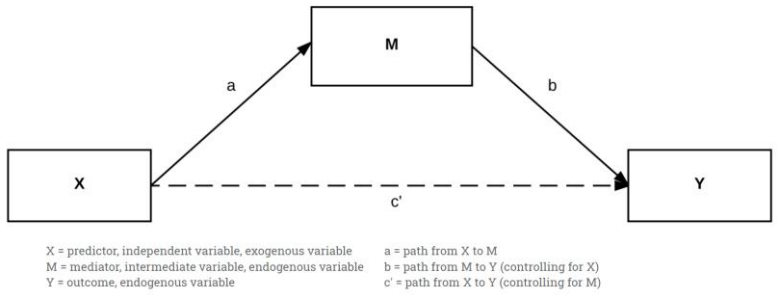

Figure 6.3 A Three-variable Non-recursive Causal Model. Adapted from Zhao, Lynch Jr & Chen (2010)

In testing for mediation, steps suggested by Zhao, Lynch Jr and Chen (2010) as illustrated in Figure 6.4 were followed to categorise the type of mediation.

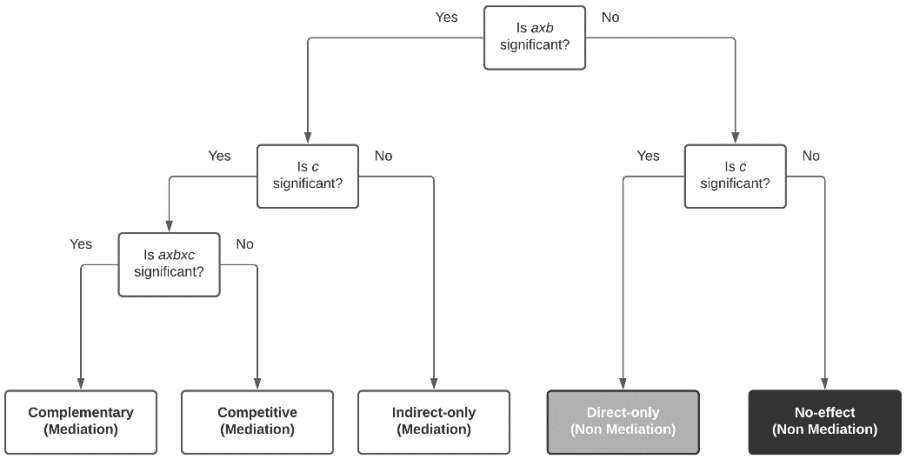

Figure 6.4 Establishing and classifying mediator type. Adapted from Zhao, Lynch Jr & Chen (2010)

In addition to establishing the type of mediation, the size of mediation effect is also calculated by using Variance Accounted For (VAF) based on Hair Jr et al. (2016), following the formula below:

$$VAF = \frac{a\ x\ b}{(a\ x\ b + c)}$$

According to Hair Jr et al. (2016), A VAF greater than 80% indicates a full mediation; between 20%-80% denotes a partial mediation, while less than 20% shows no mediation.

Table 6.8 indicates that performance expectancy is a full indirect-only mediator for information quality and the adoption of e-government, a partial complementary mediator for system quality and the adoption of e-government, and a partial-indirect only mediator for ICT literacy and the adoption of e-government. Effort expectancy is a partial indirect-only mediator from information quality and ICT literacy to the adoption of e-government. In addition, effort expectancy is a partial complementary mediator for system quality and the adoption of e-government. Furthermore, social influence is a full indirect-only for government encouragement and the adoption of e-government.

Perceived transparency has a full indirect-only mediation role to the relationship between information quality and the adoption of e-government. Perceived security has full and partial indirect-only mediation roles to the relationships between information quality, ICT literacy and

the adoption of e-government, respectively. In addition, perceived security is also a partial indirect-only mediator from information quality, ICT literacy and government encouragement to the use of e-government as presented in Table 6.8

Table 6.8 Mediation Table

Link	Path a	Path b	Path c	*t*-statistics (One Tail)	*t*-statistics of direct effect (Significance of c)	Mediation Type	VAF	Effect Size
IQUAL -> PEXPE -> ADOPT	0.325	0.216	0.014	2.597	0.154	Indirect-only mediation	83%	Full
SQUAL -> PEXPE -> ADOPT	0.459	0.216	0.169	2.478	1.765	Complementary mediation	37%	Partial
ICTLI -> PEXPE -> ADOPT	0.114	0.216	0.051	1.914	0.957	Indirect-only mediation	33%	Partial
IQUAL -> EEXPE -> ADOPT	0.245	0.163	0.014	1.995	0.154	Indirect-only mediation	74%	Partial
SQUAL -> EEXPE -> ADOPT	0.273	0.163	0.169	2.033	1.765	Complementary mediation	21%	Partial
ICTLI -> EEXPE -> ADOPT	0.377	0.163	0.051	2.410	0.957	Indirect-only mediation	55%	Partial
GOVEN -> EEXPE -> ADOPT	0.139	0.163	0.011	1.912	0.252	Indirect-only mediation	67%	Partial

GOVEN -> SINFL -> ADOPT	0.707	0.089	0.011	2.010	0.252	Indirect-only mediation	85%	Full
GOVEN -> FCOND -> ADOPT	0.473	0.093	0.011	1.307	0.252	Non mediation		None
IQUAL -> TRANS -> ADOPT	0.807	0.270	0.014	3.481	0.154	Indirect-only mediation	94%	Full
IQUAL -> SECUR -> ADOPT	0.656	0.160	0.014	2.329	0.154	Indirect-only mediation	88%	Full
ICTLI -> SECUR -> ADOPT	0.170	0.160	0.051	1.799	0.957	Indirect-only mediation	35%	Partial
GOVEN -> SECUR -> ADOPT	0.092	0.160	0.011	1.588	0.252	Non mediation		None
IQUAL -> SECUR -> USE	0.656	0.284	0.142	3.032	1.169	Indirect-only mediation	57%	Partial
ICTLI -> SECUR -> USE	0.170	0.284	0.092	2.115	1.064	Indirect-only mediation	34%	Partial
GOVEN -> SECUR -> USE	0.092	0.284	0.104	1.664	1.397	Indirect-only mediation	20%	Partial

6.11 **Moderation Effect**

Moderation refers to a change in the relationship between an independent variable and a dependent variable, depending on the level of a third variable, termed the moderator variable (Hair et al. 2018). There are two types of moderator in this research including continuous and categorical. For continuous variables, moderation means that the slope of the relationship between the independent and dependent variable varies according to the level of the moderator (Hair et al. 2018). For categorical variables, moderation means that the slope of the relationship between the independent and dependent variable differs across the groups represented by the categorical moderator (Hair et al. 2018).

Thirteen moderation effects were tested in this study, including one continuous variable on the moderation effect of perceived security on the relationship between the adoption of e-government and the actual use of e-government services, and twelve categorical moderation effects of age and gender on relationships between six endogenous constructs (performance expectancy, effort expectancy, social influence, facilitating conditions, perceived transparency and perceived security) and the adoption of e-government.

To test the moderating effect, the two-stages approach was employed. This approach uses the latent variable scores of the latent predictor and latent moderator variable from the main effects model without the interaction term (Chin 2010; Hair et al. 2018). These latent variable scores are saved and used to calculate the product indicator for the second stage analysis that involves the interaction term in addition to the predictor and moderator variable (Hair Jr et al. 2016). Table 6.9 summarises the result of the moderation effect.

Table 6.9 Moderation Table

Moderation	***t*-Statistics**	**Result**
AGE X EEXPE -> ADOPT	0.216	Non-Significant
AGE X FCOND -> ADOPT	0.368	Non-Significant
AGE X PEXPE -> ADOPT	1.373	Non-Significant
AGE X SECUR -> ADOPT	0.469	Non-Significant
AGE X SINFL -> ADOPT	0.710	Non-Significant
AGE X TRANS -> ADOPT	0.821	Non-Significant
GENDER X EEXPE -> ADOPT	1.718	Significant

GENDER X FCOND -> ADOPT	0.665	Non-Significant
GENDER X PEXPE -> ADOPT	1.394	Non-Significant
GENDER X SECUR -> ADOPT	0.642	Non-Significant
GENDER X SINFL -> ADOPT	1.235	Non-Significant
GENDER X TRANS -> ADOPT	0.872	Non-Significant
SECUR X ADOPT -> USE	0.368	Non-Significant

As shown in Table 6.9, by calculating the T-Statistics analysis through bootstrapping of 5000 samples, it is indicated that out of thirteen moderation effects, only one that is significant. Gender is found to significantly moderates the relationship between effort expectancy and the adoption of e-government. The slope analysis is presented in Figure 6.5 below.

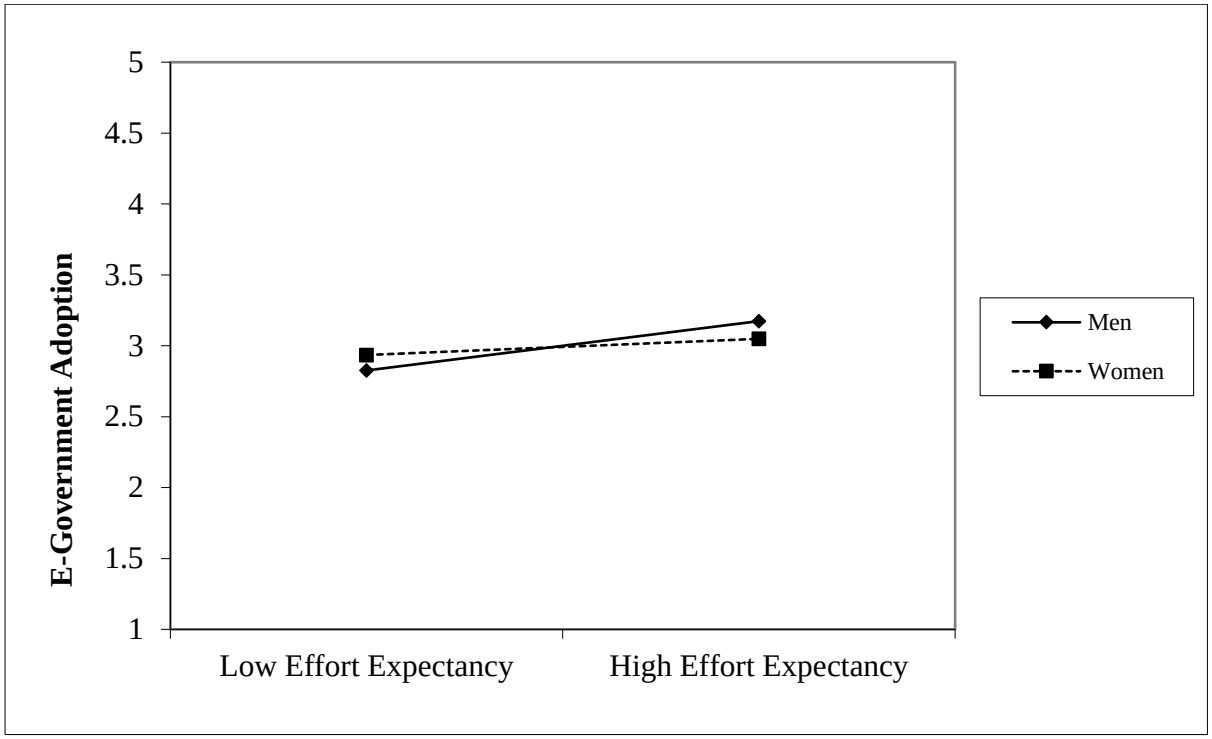

Figure 6.5 The Interaction of GENDER between EEXPE and ADOPT

This study reveals that gender significantly moderates the relationship between effort expectancy and the adoption of e-government in Indonesia. It suggests that gender strengthens the positive relationship between effort expectancy and e-government adoption for male and the opposite for female.

Provided the research model and its critical factors have been validated and tested using PLS-SEM for the confirmatory aspect of this research, the fuzzy-set qualitative comparative analysis fsQCA will be applied to investigate the collective effects of identified critical factors that would ultimately lead to the adoption and use of e Government services. Further, fsQCA will also be utilised to investigate the configurations of factors for low adoption or use of e Government services, making a unique contribution to e Government adoption research.

6.12 **Fuzzy-set Qualitative Comparative Analysis**

As previously discussed in section 2.5 and section 3.5.5, this study utilises fsQCA to complement and supplement the results of PLS-SEM analysis. The fsQCA combines the factors of e-Government adoption and use while developing necessary and sufficient configurations. Furthermore, configurations of factors for non-adoption or non-use to e-Government are also analysed, which make a unique contribution to the extant literature. This study uses the fsQCA 3.1 software (www.fsqca.com) to analyse the data. Two different analyses are conducted. The first analysis explores the conditions that lead to the outcome of citizens' adoption and use of e-Government. The second analysis investigates the conditions leading to resistance/rejection towards e-Government adoption and use. Three fundamental steps of fsQCA are fuzzy set calibration, development of a truth table and analysis of the truth table solutions.

The fuzzy set calibration process transforms a ratio or interval scale into a fuzzy set with membership scores between 0 and 1. To decide on the degree of membership in a fuzzy set, the procedure from Ragin (2008) are adopted as follows: threshold for full membership (fuzzy score = 0.95), the threshold for full non-membership (fuzzy score = 0.05), and the cross-over point (fuzzy score = 0.05). Since this study uses a 7-point Likert scale, the values of 6 (agree), 4 (neither agree nor disagree) and 2 (disagree) are adopted to represent full membership, cross-over point, and full non-membership, respectively (Ordanini, Parasuraman & Rubera 2014; Pappas & Woodside 2021).

The next step in fsQCA is the development of a configurational model (see Figure 6.6) based on a truth table that shows possible combinations of conditions and the number of cases with a fuzzy set membership score greater than 0.5 (Ragin 2008). Each row in the truth table represents a possible configuration or recipe for the outcome (Ragin 2008). The primary goal of the truth table is "to explicitly identify the connections between combinations of causal

conditions and outcome" (Ragin 2008, p. 38) and for this reason, a truth table is a vital tool of fsQCA. Four truth tables were developed as follows: (A) outcome variable 'behavioural intentions towards the adoption of e-Government (ADOPT)' as presented in Figure 6.7, (B) outcome variable 'negation of behavioural intentions towards the adoption of e-Government (~ADOPT)' as presented in Figure 6.8, (C) outcome variable 'use of e-Government (USE)' as presented in Figure 6.9, and (D) outcome variable 'negation of use of e-Government (~USE)' as presented in Figure 6.10.

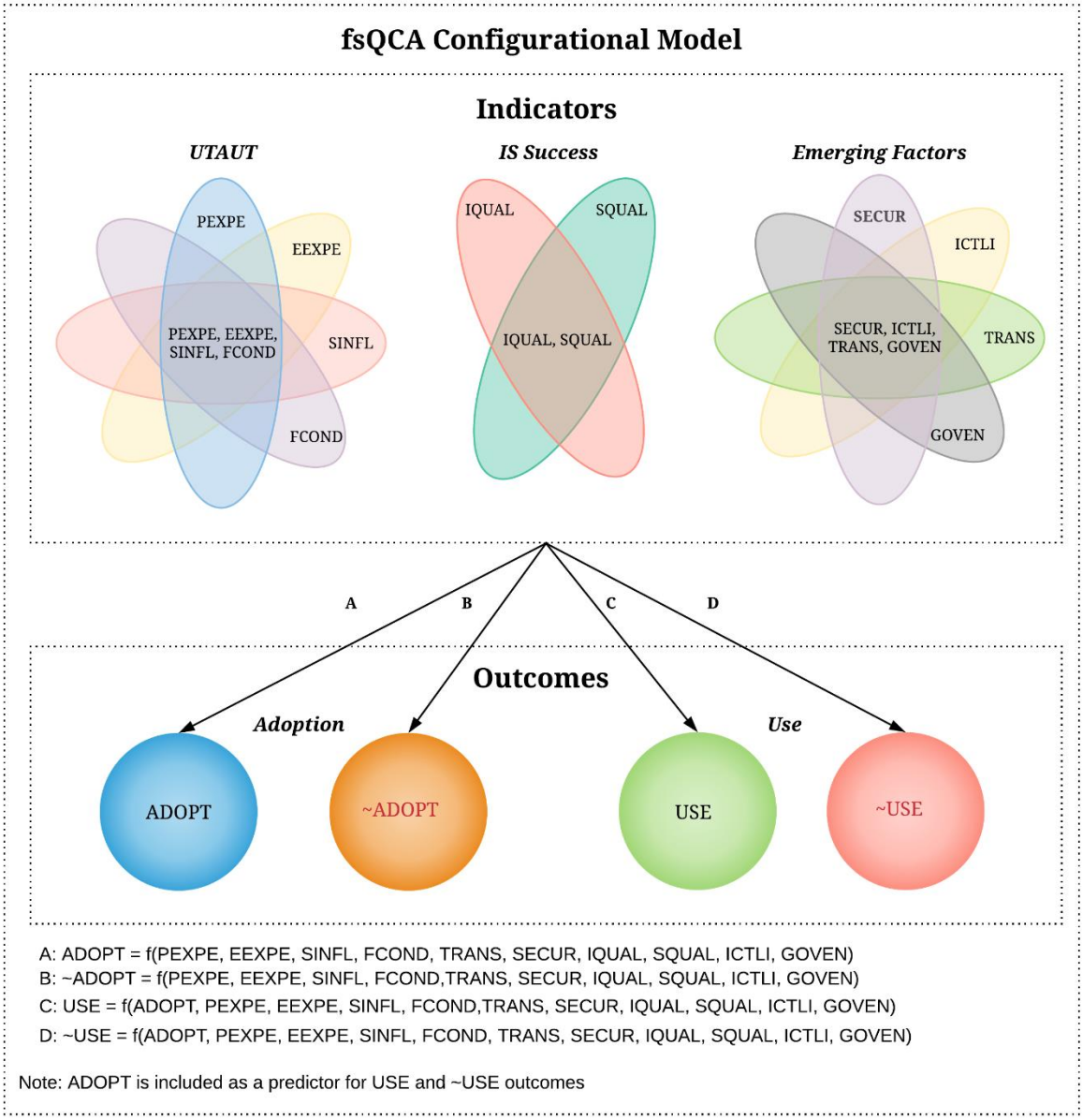

Figure 6.6 The Configurational Model Developed for the Current Research

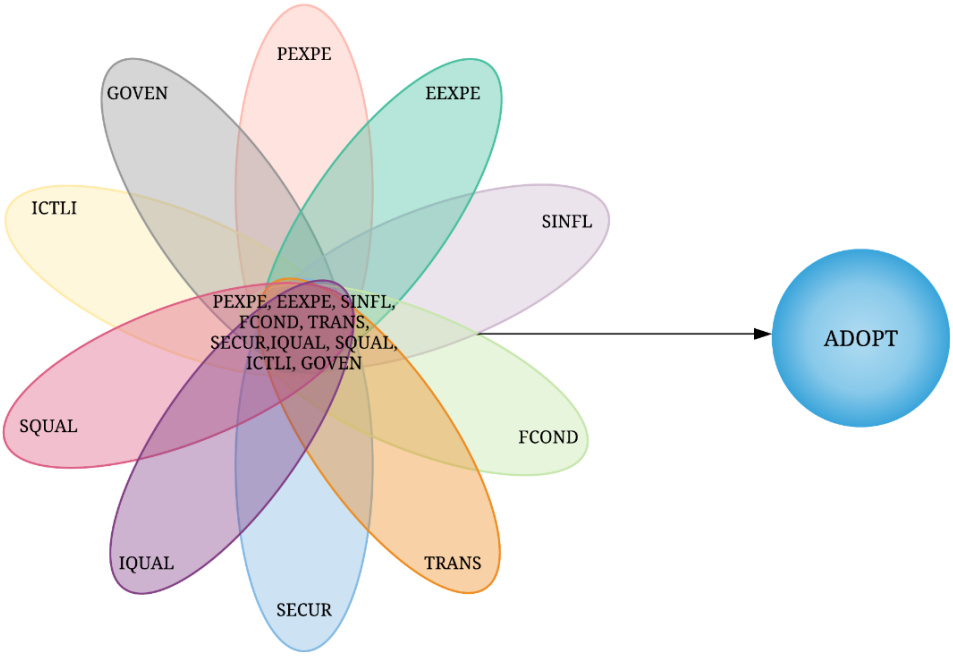

Figure 6.7 fsQCA Model for e-Government Adoption (A)

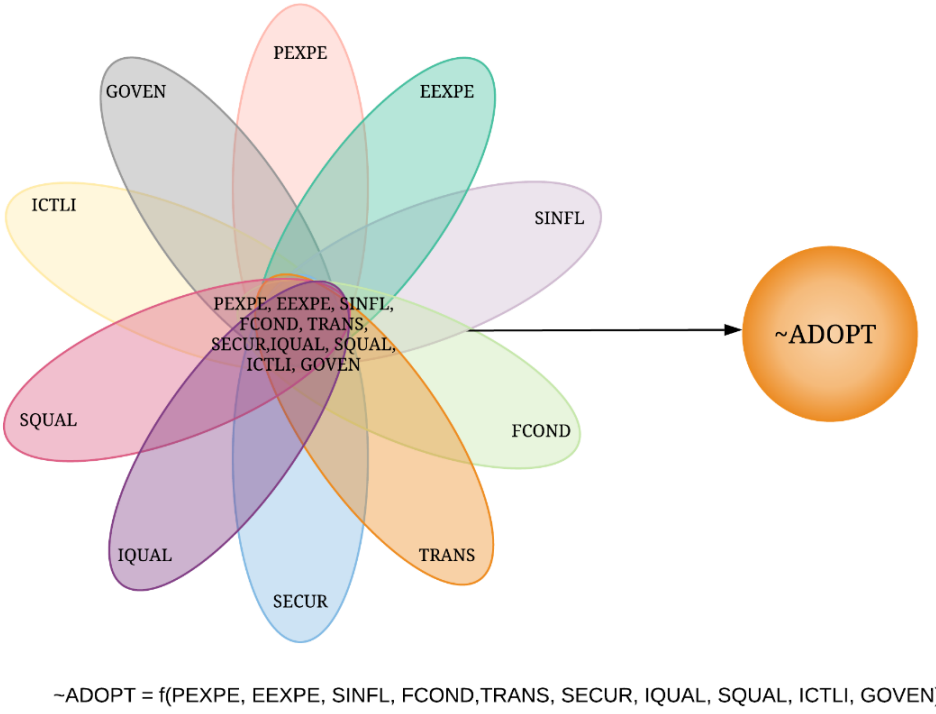

Figure 6.8 fsQCA Model for the Negation of e-Government Adoption (B)

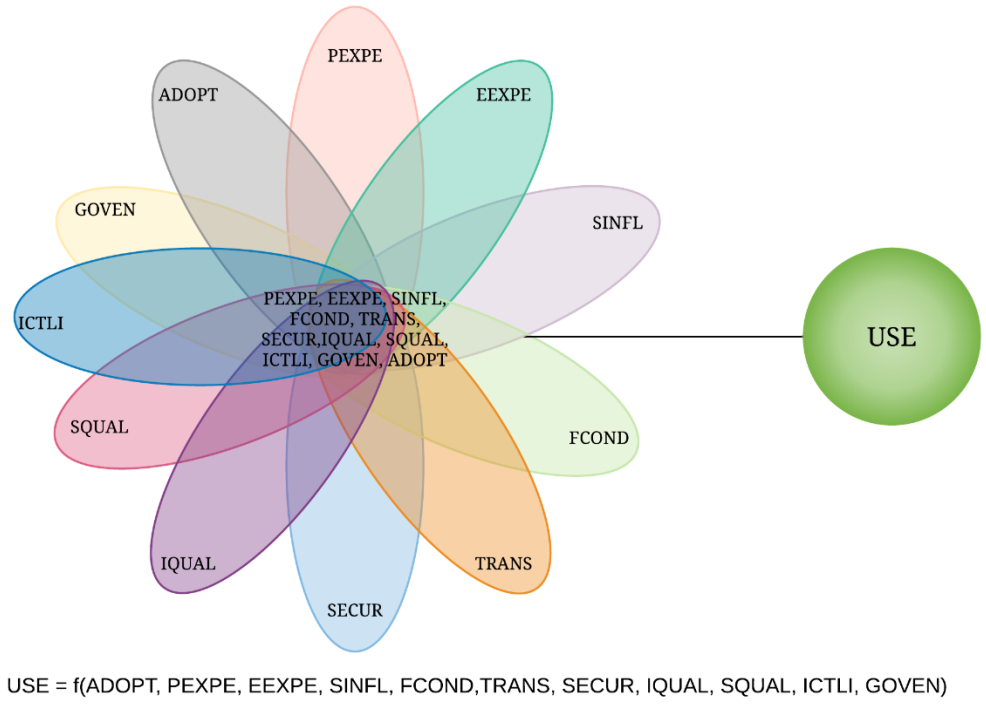

Figure 6.9 fsQCA Model for e-Government Use (C)

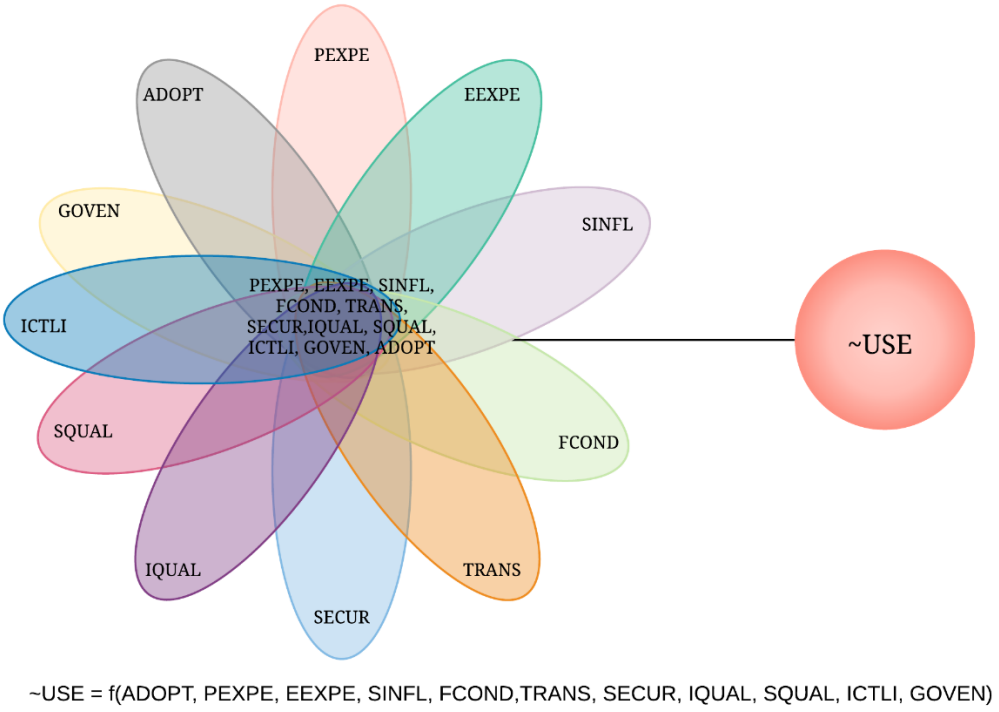

Figure 6.10 fsQCA Model for the Negation of e-Government Use (D)

Outcomes of the fuzzy set analysis for the adoption of e-government and the use of e-Government are presented in Table 6.10 and Table 6.11. The black circles (●) denote the presence of a condition, while the crossed-out circles (⊗) indicate the absence of it (Fiss 2011). Core elements of a configuration are marked with large circles, peripheral elements with small ones, and blank spaces are an indication of a do not care situation in which the causal condition may be either present or absent. The solution table includes values of set-theoretic consistency for each configuration as well as for the overall solution, with all values being above threshold (> 0.70). Consistency measures the degree to which a subset relation has been approximated, whereas coverage assesses the empirical relevance of a consistent subset (Ragin & Davey 2016). The overall solution coverage provides an indication as to what extent e-government adoption and use can be determined based on the set of configurations and is comparable to the R-square value reported in correlational methods (Woodside 2014).

The results in Table 6.10 indicate an overall solution consistency of 99.4% that is well above the recommended threshold of 80% (Pappas & Woodside 2021), with solution coverage of 84.5% for the adoption of e-Government which suggests that a substantial proportion of the outcome is consistently covered by the identified solutions. Such results suggest for the adoption of e-Government to occur, solutions 1–3 reflect combinations of the presence and absence of factors. Information quality and perceived security are core conditions while other factors are peripheral conditions. In detail, the combination of performance expectancy, effort expectancy, social influence, facilitating conditions, information quality, system quality, perceived security, ICT literacy, perceived transparency, with the absence of government encouragement and regardless the presence of social influence, would lead to the adoption of e-Government (solution 1). To this end, when government encouragement is present, the absence of perceived security would also lead to the adoption of e-Government (solution 2) regardless the presence of perceived transparency. With the presence of both perceived security and government encouragement, information quality is no longer a core condition (solution 3).

Table 6.10 Solutions for e-Government Adoption (High Adoption)

	Solutions for e-Government Adoption		
Configuration	1	2	3
UTAUT Factors			
Performance Expectancy	●	●	●
Effort Expectancy	●	●	●

Social Influence		●	●
Facilitating Conditions	●	●	●
IS Success Factors			
Information Quality	⬤	⬤	
System Quality	●	●	●
Emerging Factors			
Perceived Security	⬤	⊗	⬤
ICT Literacy	●	●	●
Perceived Transparency	●		●
Government Encouragement	⊗	●	●
Consistency	0.996	0.995	0.997
Raw Coverage	0.190	0.128	0.815
Unique Coverage	0.022	0.003	0.622

Overall solution consistency	**0.994**
Overall solution coverage	**0.845**

Note:

Black circles (●) indicate the presence of a condition, circles with "x" (⊗) indicate its absence, and blank space indicates the "don't care" condition.

Large circles indicate core conditions, and small circles indicate peripheral conditions.

In relation to the use of e-Government, the results in Table 6.11 indicate an overall solution consistency of 76.3% that is above the minimum threshold of 75% but not the recommended threshold of 80% (Pappas & Woodside 2021) with solution coverage of 82.5% for the use of e-Government which suggests that a substantial proportion of the outcome is consistently covered by the identified solutions.

Table 6.11 Solutions for e-Government Use (High Use)

	Solutions for e-Government Use	
Configuration	1	2
UTAUT Factors		
Performance Expectancy	●	●

Effort Expectancy	●	●
Social Influence	●	●
Facilitating Conditions	●	●
IS Success Factors		
Information Quality	⬤	
System Quality	●	●
Emerging Factors		
Perceived Security	⬤	⬤
ICT Literacy	●	●
Perceived Transparency	●	●
Government Encouragement		●
Intention to Adopt	●	●
Consistency	0.852	0.768
Raw Coverage	0.161	0.852
Unique Coverage	0.328	0.623

Overall solution consistency	**0.763**
Overall solution coverage	**0.825**

Note:

Black circles (●) indicate the presence of a condition, circles with "x" (⊗) indicate its absence, and blank space indicates the "don't care" condition.

Large circles indicate core conditions, and small circles indicate peripheral conditions.

Table 6.11 highlights two successful configurations (solutions) for the use of e-Government to occur by reflecting combinations of the presence and absence of factors. Information quality and perceived security are core conditions, while other factors are peripheral conditions. The first solution shows a combination of performance expectancy, effort expectancy, social influence, facilitating conditions, information quality, system quality, perceived security, ICT literacy, perceived transparency, would lead to the use of e-Government, regardless the presence of government encouragement, provided there is a presence of the intention to the adoption of e-Government. To this end, with the presence of government encouragement, information quality is no longer a core condition (solution 2). It is worth noting that intention

to adopt and perceived security are necessary conditions for the use of e-Government to occur. Such conditions are presented in the XY plot analysis in Figure 6.11 below.

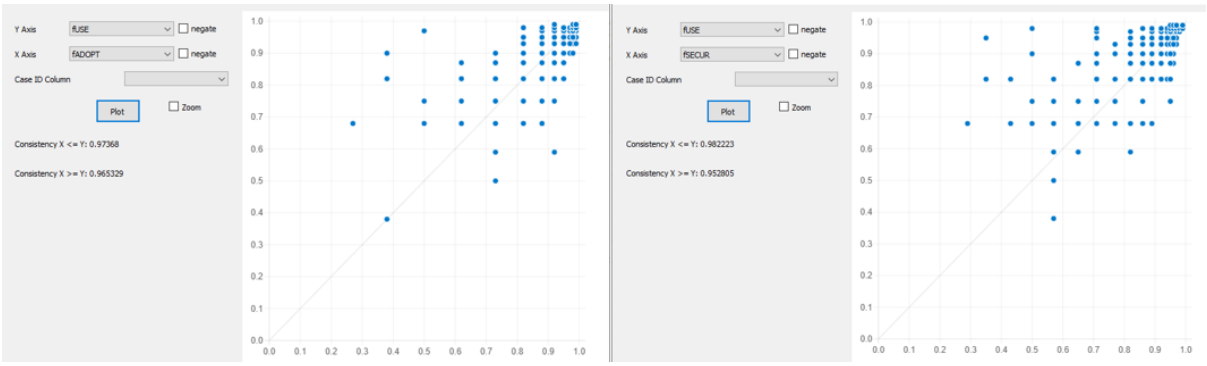

Figure 6.11 Necessary Conditions for the Use of e-Government

This research also investigates configurations for non-adoption and non-use to e-Government which make a unique contribution to the body literature. Such investigation is conducted by negating the outcome variables of adoption and use. The results in Table 6.12 indicate an overall solution consistency of 97% with solution coverage of 13.3% for the resistance of e-Government adoption which suggests that a small proportion of the outcome is covered consistently by the identified solutions. The absence of effort expectancy, social influence, facilitating conditions, information quality, system quality, perceived security, and perceived transparency with the presence of performance expectancy and ICT literacy would lead to the resistance of e-Government adoption (solution 1) regardless the existence of government encouragement. Furthermore, the absence of performance expectancy, social influence, facilitating conditions, information quality and system quality would also lead to the resistance of e-Government adoption (solution 2) despite the presence of all other factors.

Table 6.12 Solutions for non e-Government Adoption (Low Adoption)

	Solutions for Non e-Government Adoption	
Configuration	1	2
UTAUT Factors		
Performance Expectancy	●	⊗
Effort Expectancy	⊗	●
Social Influence	⊗	⊗
Facilitating Conditions	⊗	⊗

IS Success Factors		
Information Quality	⊗	⊗
System Quality	⊗	⊗
Emerging Factors		
Perceived Security	⊗	●
ICT Literacy	●	●
Perceived Transparency	⊗	●
Government Encouragement		●
Consistency	0.907	0.908
Raw Coverage	0.023	0.549
Unique Coverage	0.569	0.007

Overall solution consistency	**0.970**
Overall solution coverage	**0.133**

Note:

Black circles (●) indicate the presence of a condition, circles with "x" (⊗) indicate its absence, and blank space indicates the "don't care" condition.

Large circles indicate core conditions, and small circles indicate peripheral conditions.

In relation to non e-Government use, the results in Table 6.13 indicate an overall solution consistency of 91% with solution coverage of 61.8% for the resistance of e-Government use which suggests that a substantial proportion of the outcome is consistently covered by the identified solutions. The absence of effort expectancy, social influence, facilitating conditions, information quality, system quality, perceived security, perceived transparency, government encouragement, and the intention to adopt e-Government with the presence of performance expectancy and ICT literacy would lead to the resistance of e-Government use (solution 1). In addition, the absence of performance expectancy, social influence, facilitating conditions, information quality, system quality and the intention to adopt would also lead to the resistance of e-Government use (solution 2) despite the presence of all other factors.

Table 6.13 Solutions for non e-Government Use (Low Use)

	Solutions for Non e-Government Use	
Configuration	1	2
UTAUT Factors		

Performance Expectancy	●	⊗
Effort Expectancy	⊗	●
Social Influence	⊗	⊗
Facilitating Conditions	⊗	⊗
IS Success Factors		
Information Quality	⊗	⊗
System Quality	⊗	⊗
Emerging Factors		
Perceived Security	⊗	●
ICT Literacy	●	●
Perceived Transparency	⊗	●
Government Encouragement	⊗	●
Intention to Adopt	⊗	⊗
Consistency	0.831	0.093
Raw Coverage	0.811	0.101
Unique Coverage	0.863	0.097

Overall solution consistency	**0.910**
Overall solution coverage	**0.618**

Note:

Black circles (●) indicate the presence of a condition, circles with "x" (⊗) indicate its absence, and blank space indicates the "don't care" condition.

Large circles indicate core conditions, and small circles indicate peripheral conditions.

6.13 **Testing for specific models with fsQCA**

After obtaining all the possible solutions that can explain the outcome of interest with fsQCA, specific propositions are analysed to examine the consistency and the coverage of underlying theories. This is performed by computing the specific configuration in fsQCA, thus creating a model, and plotting it against the outcome of interest (Pappas & Woodside 2021). The configuration is computed as described by the theory and transform into a model in fsQCA software. For UTAUT, a proposition is developed based on the following recipe: the presence

of performance expectancy, effort expectancy, social influence and facilitating conditions would lead to the adoption of e-Government. The function 'fuzzyand' is used to all the UTAUT variables as inputs. This research develops two models to compare the results from UTAUT model with the final model of this research (performance expectancy, effort expectancy, social influence, facilitating conditions, information quality, system quality, perceived security, ICT literacy, perceived transparency, and government encouragement) to evaluate the adoption of e-Government as presented in Figure 6.12.

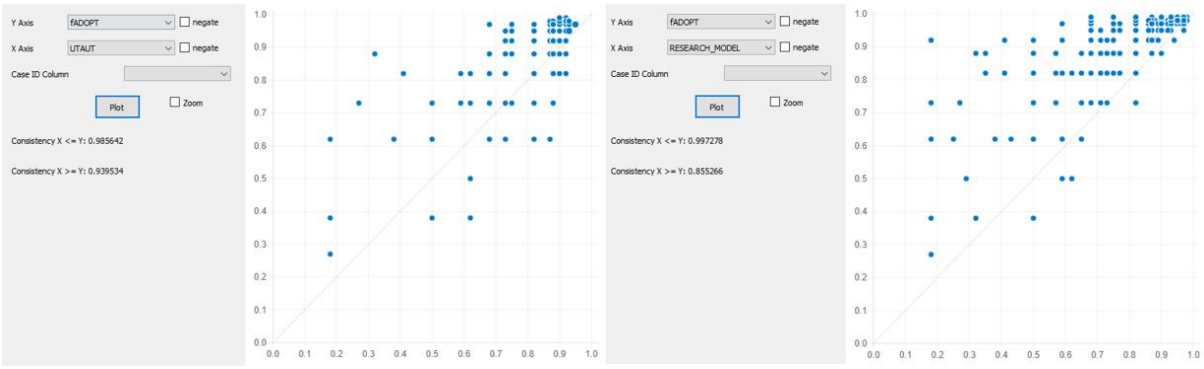

Figure 6.12 Plotting Specific Propositions for UTAUT and Research Model to the Adoption of e-Government

Figure 6.12 shows the consistency and coverage values of each model. The findings show that both propositions are supported. Furthermore, the research model shows a slightly higher consistency of 99.7% compared to the UTAUT with 98.5%. Models with consistency above 80% are useful and can serve theory advancement (Pappas & Woodside 2021), which the research model has satisfied this requirement.

In terms of the use of e-Government as presented in Figure 6.13, the research model also outperformed the UTAUT model with 71.7% consistency compared to 67.2%. However, the research model does not meet the minimum threshold of 80% to be considered as theory advancement in this scenario.

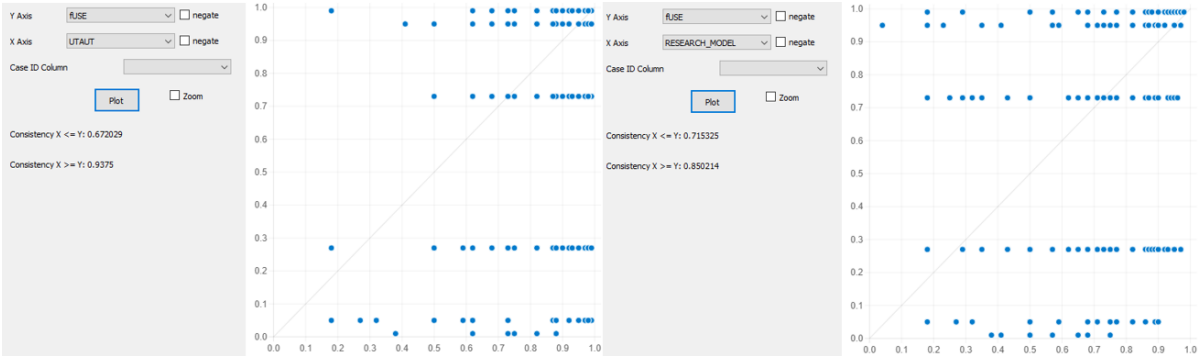

Figure 6.13 Plotting Specific Propositions for UTAUT and Research Model to the Use of e-Government

6.14 **Summary of PLS-SEM and fsQCA Findings**

The objective of this study was to investigate the factors that influence the adoption of e-government services from the perspective of citizens in Indonesia. Emerging factors from the qualitative phase of the research were validated via an online survey to see how generalisable the revised model is. Table 6.14 summarises the findings from the quantitative analyses from PLS-SEM and fsQCA with respect to hypotheses developed in the previous chapter (Table 5.1).

Table 6.14 Summary of Hypotheses Results

H#	Hypothesis Statements	Results from PLS-SEM	Results from fsQCA
H1	Performance expectancy may have a positive effect on the intention to adopt e-government and this relationship will be moderated by age and gender.	Performance expectancy **has a positive effect** on the intention to adopt e-government, but this relationship is **not moderated by age and gender**.	• Performance expectancy **is present in all solutions** that explain intention to adopt and the use of e-Government services. • Performance expectancy is found to be a peripheral condition.
H2	Effort expectancy may have a positive effect on the intention to adopt e-government and this relationship will be moderated by age and gender.	Effort expectancy **has a positive effect** on the intention to adopt e-government, but this relationship is **only moderated by gender**.	• Effort expectancy **is present in all solutions** that explain intention to adopt and the use of e-Government services. • Effort expectancy is found to be a peripheral condition.
H3	Social influence may have a positive effect on the intention to adopt e-government and this relationship will be moderated by age and gender.	Social influence **has a positive effect** on the intention to adopt e-government, but this relationship is **not moderated by age and gender**.	• Social influence **is present in 2 out of 3 solutions** that explain intention to adopt e-Government services. • Social influence **is present in all solutions** that explain e-Government use. • Social influence can be either present or absent in explaining intention to adopt e-Government depending on its combination with the other factors in **1 out of 3 solutions**. • Social influence is found to be a peripheral condition.

H4	Facilitating conditions may have a positive effect on the intention to adopt e-government and this relationship will be moderated by age and gender.	Facilitating conditions **do not significantly influence** the intention to adopt e-government.	• Facilitating conditions **are present in all solutions** that explain intention to adopt and the use of e-Government. • Facilitating conditions are found to be peripheral condition.
H5	Perceived transparency may have a positive effect on the intention to adopt e-government and this relationship will be moderated by age and gender.	Perceived transparency **has a positive effect** on the intention to adopt e-government, but this relationship is **not moderated by age and gender**.	• Perceived transparency **is present in 2 out of 3 solutions** that explain intention to adopt e-Government, while perceived transparency can be either present or absent in explaining intention to adopt depending on its combination with the other factors in **1 out of 3 solutions**. • Perceived transparency **is present in all solutions** that explain e-Government use. • Perceived transparency is found to be a peripheral condition.
H6a	Perceived security may have a positive effect on the intention to adopt e-government and this relationship will be moderated by age and gender.	Perceived security **has a positive effect** on the intention to adopt e-government, but this relationship is **not moderated by age and gender**.	• Perceived security **is present in 2 out of 3 solutions** that explain intention to adopt e-Government. Interestingly, perceived security is absent in **1 out of 3 solutions** that explain intention to adopt e-Government. • Perceived security is found to be a **core condition**.

H6b	Perceived security may have a positive effect on e-government use.	Perceived security **has a positive effect** on e-government use.	• Perceived security **is present in all solutions** that explain e-Government use. • Perceived security is found to be a core and necessary condition for the use of e-Government.
H7a	Information quality may have a positive effect on performance expectancy.	Information quality **has a positive effect** on performance expectancy.	• Information quality **is present in 2 out of 3 solutions as a core factor** that explain intention to adopt e-Government. • Information quality **is present in 1 out of 2 solutions as a core factor** that explain e-Government use. • Information quality can be either present or absent in explaining intention to adopt and use e-Government depending on its combination with the other factors.
H7b	Information quality may have a positive effect on effort expectancy.	Information quality **has a positive effect** on effort expectancy.	
H7c	Information quality may have a positive effect on perceived transparency.	Information quality **has a positive effect** on perceived transparency.	
H7d	Information quality may have a positive effect on perceived security.	Information quality **has a positive effect** on perceived security.	
H8a	System quality may have a positive effect on performance expectancy.	System quality **has a positive effect** on performance expectancy.	• System quality **is present in all solutions** that explain the intention to adopt e-Government. • System quality **is present in all solutions** that explain e-Government use. • System quality is found to be a peripheral condition.
H8b	System quality may have a positive effect on effort expectancy.	System quality **has a positive effect** on effort expectancy.	

H9a	ICT literacy may have a positive effect on performance expectancy.	ICT literacy **has a positive effect** on performance expectancy.	• ICT literacy **is present in all solutions** that explain intention to adopt and the use of e-Government • ICT literacy found to be a peripheral condition.
H9b	ICT literacy may have a positive effect on effort expectancy.	ICT literacy **has a positive effect** on effort expectancy.	
H9c	ICT literacy may have a positive effect on perceived security.	ICT literacy **has a positive effect** on perceived security.	
H10a	Government encouragement may have a positive effect on effort expectancy.	Government encouragement **has a positive effect** on effort expectancy.	• Government encouragement **is present in 2 out of 3 solutions** that explain intention to adopt e-Government while **absent in 1 out of 3 solutions**. • Government encouragement **is also present in 1 out of 2 solutions** that explain e-Government use while government encouragement can be either present or absent in explaining intention to use e-Government depending on its combination with the other factors in **1 out of 2 solutions**. • Government encouragement are found to be a peripheral condition.
H10b	Government encouragement may have a positive effect on social influence.	Government encouragement **has a positive effect** on social influence.	
H10c	Government encouragement may have a positive effect on facilitating conditions.	Government encouragement **has a positive effect** on facilitating conditions.	
H10d	Government encouragement may have a positive effect on perceived security.	Government encouragement **has a positive effect** on perceived security.	

H11	Intention to adopt may have a positive effect on e-government use and this relationship will be moderated by perceived security.	Intention to adopt **has a positive effect** on e-government use, but this relationship is **not moderated by perceived security**.	• Intention to adopt **is present in all solutions** that explain e-Government use. • Intention to adopt is a necessary condition for the use of e-Government to occur.
The Coefficient of Determination (R^2)		The results indicate an R2 of 0.771 for the adoption and 0.342 for the use of e-Government services, which means that 77% of the variance of intention to adopt e-government and 34.2% of the variance of use are explained by the model.	The results indicate an overall solution coverage of 0.845, which suggests that a substantial proportion (84.5%) of intention to adopt is consistently covered by the three solutions. The results also indicate an overall solution coverage of 0.825, which suggests that a substantial proportion (82.5%) of e-Government use is almost consistently covered by the three solutions

6.15 **Conclusion**

This chapter presented the result of the quantitative analysis of the data collected from Indonesia. The research model was analysed using PLS-SEM to investigate the effects of the hypothesised relationships on the revised research model. The assessment of the constructs and model fit were assessed in the light of existing literature. The structural model was then evaluated by analysing the path coefficients, the coefficient of determination, effect size, predictive relevance. The mediation and moderation effects are also tested with respect to the research model. Furthermore, the fsQCA was conducted to determine necessary and sufficient configurations for the adoption and the use of e-Government to occur. In the following chapter, the implications of the result will be discussed, as well as a reflective connection of this analysis back to the research objective.

Chapter 7. Discussion and Conclusion

7.1 Introduction

This chapter discusses the findings from the qualitative and quantitative studies with reference to the existing literature on e-Government adoption. This allows for a complementary discussion of the findings. This chapter begins by reviewing the purpose of the study and its methodological approach, which is then followed by highlighting the important findings and how the findings are associated with critical factors that influence e-Government adoption and use. The research contributions and implications for practice are deliberated later in the chapter. The chapter concludes by identifying the limitations of the study and areas for future research.

7.2 The Purpose of the Study

The objective of this research was to propose an e-Government adoption model for better understanding the adoption of e-Government at the transaction stage from the perspective of citizens in developing countries such as Indonesia. Specifically, this research aimed to (a) identify the critical factors for the adoption of transactional e-Government services from the perspective of citizens in Indonesia, (b) evaluate the configurations of the critical factors that lead citizens to adopt and use e-Government services and (c) analyse the configurations of the sufficient and necessary factors that lead citizens to reject e-Government services in the context of developing countries such as Indonesia. To fulfil these aims, the primary research question for this study was formulated as follows:

> ***RQ:*** *What are the critical factors for evaluating the adoption of transactional e-Government services from the perspective of citizens in Indonesia?*

The following secondary questions were formulated to answer the primary research question:

> ***SRQ1:*** *What factors influence the adoption of transactional e-Government services in Indonesia?*
>
> ***SRQ2:*** *What are the relationships among identified factors for evaluating the adoption of transactional e-Government services in Indonesia?*

SRQ3: *What are the configurations of factors that would lead citizens to accept and resist the adoption and the use of transactional e-Government services in Indonesia?*

7.3 Methodology Reviewed

To adequately answer the research questions, a mixed-methods research methodology was adopted. Specifically, a sequential, exploratory mixed-methods approach was conducted, consisting of two phases. The first phase involved a qualitative approach by conducting interviews with 15 e-Government users in Indonesia. The interviews were analysed using deductive thematic analysis, detailed in Chapter 3, and the findings were presented in Chapter 4. The findings from the thematic analysis were used to obtain citizens' perceptions of the adoption of e-Government in Indonesia. The findings of the thematic analysis also led to the development of hypotheses in Chapter 5, which helped answer the research questions.

The second phase took the quantitative approach, where an online survey was distributed to Indonesian citizens. The questionnaire was constructed based on the literature review and findings of the qualitative study. The measurement items were developed from the literature, and new items were also created when information could not be found in the literature. In total, 314 responses were received. IBM SPSS (version 26) was used for descriptive statistics. PLS-SEM was applied to test the measurements and structural model using SmartPLS 3 (Ringle, Wende & Becker 2015). After evaluating the structural model, developed hypotheses were tested, which helped to answer research questions. Further, fsQCA (Ragin & Davey 2016) was applied to determine the necessary and sufficient configurations for the adoption and use of e-Government. The quantitative findings were presented in Chapter 6. The results from the PLS-SEM analysis, fsQCA and findings from the thematic analysis were then complimented to confirm and validate the overall research findings.

7.4 Critical Factors for the Adoption of E-Government in Indonesia

This section focuses on investigating the role of individual factors for the adoption of e-Government to answer the following research questions:

SRQ1: *What factors influence the adoption of transactional e-Government services in Indonesia?*

SRQ2: *What are the relationships among identified factors for evaluating the adoption of transactional e-Government services in Indonesia?*

Significant statistical evidence supports a positive relationship between the majority of the UTAUT factors, including performance expectancy, effort expectancy, social influence and e-Government adoption. This result is also supported by the literature (Berlilana, Hariguna & Nurfaizah 2017; Jacob & Darmawan 2019; Mensah 2019; Mutaqin & Sutoyo 2020; Rabaa'i 2017). Performance expectancy was the strongest predictor of e-Government adoption from the data analysis ($\beta = 0.216$; $t = 3.046$), and these findings were echoed in the qualitative analysis. Further explanation from the qualitative study suggests e-Government streamlines public services to become simpler, faster and more cost-effective. Citizens can reduce the number of physical visits to government offices by using e-Government services. Interviewees explained that *'with e-Government, I do not have to take a day off to report my annual tax, as the online service is available 24/7 whereas taxation offices only open on standard working hours'.* In addition, fsQCA further highlights the importance of performance expectancy in the adoption and use of e-Government services. Performance expectancy is present in all solutions that explain the intention to adopt and use e-Government services.

Effort expectancy also positively influenced e-Government adoption ($\beta = 0.163$; $t = 2.453$). The positive influence of effort expectancy on e-Government adoption implies that further improving user-friendliness is critical if extensive use of e-Government is the objective. The qualitative study indicates many citizens often '*face difficulties in accessing e-Government websites due to poor navigation design*', which may lead to a low uptake of e-Government. Further, fsQCA shows that effort expectancy is present in all solutions that explain the intention to adopt and use e-Government services.

Apart from performance expectancy and effort expectancy, which have been widely discussed in the literature (Deden et al. 2017; Hermana & Silfianti 2011; Mirchandani, Johnson Jr & Joshi 2008), findings from the qualitative and quantitative studies of this research also established that social influence significantly affects the adoption of e-Government ($\beta = 0.089$; $t = 2.061$). These findings suggest that the influence of family, friends and co-workers affects an individual's intention to adopt and use a socially acceptable system such as e-Government. This has not been adequately explored in the Indonesian e-Government research. Therefore, it is essential for public organisations in Indonesia to pay attention to the social influence factors.

Previous experience and feedback from individuals' close proximity may trigger the intention to adopt e-Government. An interviewee explained that *'the main reason that I am using e-Government is because a colleague keeps recommending me to'*. This also leads to a reciprocal effect as another interviewee suggested that he is '*actively encouraging the use of e-Government to my friends and families*'. The qualitative study also shows that under social pressures, citizens are encouraged to recognise the advantage of innovation and embrace the need to adopt e-Government to satisfy their needs for public services. The cultural aspect of collectivism, which features in Indonesian society (Hofstede 2009), may play a significant role in this factor. Thus, further research on a different context is required. In relation to fsQCA, social influence was present in two out of three solutions that explained the intention to adopt e-Government and all the solutions for the use of e-Government. Further, social influence can be either present or absent in explaining the intention to adopt and use e-Government, depending on its combination with the other factors.

Findings from SEM analysis suggest that facilitating conditions do not significantly affect the adoption and use of e-Government in Indonesia (β = 0.093; t = 1.386). This result differs from the literature, including the research findings of Mansoori, Sarabdeen and Tchantchane (2018) and Kurfalı et al. (2017). This finding might be attributed to the 58.9% of participants in this study who were working for an organisation (12.6% in the public sector and 46.3% in the private sector). These participants were likely to have adequate access to public services through e-Government from their workplace. However, fsQCA showed that facilitating conditions under specific circumstances would be essential for adopting and using e-Government, depending on its combination with the other factors. The qualitative study suggested that when citizens required services involving *'a significant amount of data entry such as online tax lodgement'*, facilitating conditions such as the availability of public access points, including kiosks and front office counters, is essential and valued by citizens. Moreover, fsQCA showed that facilitating conditions were present in all solutions that explain the intention to adopt and use e-Government services.

Perceived security had a positive effect on the intention to adopt e-Government (β = 0.16; t = 2.440). This result is supported by Shareef et al. (2011) and Alharbi, Papadaki and Dowland (2017). There is even stronger statistical evidence to support a positive relationship between perceived security and the actual use of e-Government (β = 0.284; t = 3.158). It is envisaged that issues relating to information security may negatively influence citizens' trust in adopting

e-Government services since personal and sensitive information may be leaked and used for malicious purposes if it is not protected securely. From the qualitative study, many interviewees claimed that they are '*afraid to disclose their sensitive information such as bank and credit card details to public organisations*'. Taking necessary measures to prevent unauthorised access to citizens' sensitive information in e-Government systems is important. The interview findings highlight the importance of having an official account for information security confidence in using e-Government services. One interviewee suggested that establishing an official developer account for e-Government applications can increase citizens' confidence and eliminate confusion from third-party applications. They argued that *'the government should have an official account at App Store, so we know the application is secured'*.

The fsQCA further highlights the importance of perceived security. The findings showed that perceived security was a core condition present in two out of three solutions that explain the intention to adopt e-Government, and it was also present in all solutions that explain e-Government use. In addition, perceived security was also a necessary condition for the use of e-Government to occur. Interestingly, perceived security was absent in one out of three solutions that explain the intention to adopt e-Government. This might explain the missing link between the intention to adopt and use technologies (Venkatesh, Thong & Xu 2016) such as e-Government services. This is further supported by the thematic analysis, which suggests citizens intending to adopt e-Government might be hesitant to use e-Government services due to security concerns. As noted by one interview participant, *'I am interested to use e-Government services but I am a bit reluctant due to security and privacy concerns'*.

Perceived transparency emerged from the qualitative study as one of the most significant factors that influence the adoption and use of e-Government services from the perspective of citizens in Indonesia. It relates to the availability of relevant decision-making information and procedures to citizens through e-Government. Public organisations in Indonesia are often criticised for a lack of transparency and are associated with a high level of corruption (Kristiansen et al. 2009; Prahono & Elidjen 2015). The Indonesian Government has focused on promoting the transparency of public decision-making through e-Government to fight corruption (Obi & Naoko 2016). The transparency of public decision-making and its effectiveness for encouraging citizens to adopt e-Government in developing countries such as Indonesia was unclear. The quantitative data analysis confirmed that the perceived transparency of public decision-making significantly influenced the adoption of e-Government

(β = 0.27; t = 3.613). The qualitative analysis further explains that there is a strong demand for public organisations to disclose their decision-making processes online. Facilitating online inquiries for various public services is also valued by citizens. For example, this could include making online inquiries about the status of an application or inquiring about why an application has been rejected. One interviewee explained, '*Before the introduction of e-Government, it was very difficult to find a clear procedure on how to upgrade my land and building development permits. Now, with this mobile application, I can track the progress of my application and contact the responsible personnel for my query easily'*. In relation to fsQCA, perceived transparency was present in two out of three solutions that explain the intention to adopt e-Government, while perceived transparency can be either present or absent in explaining intention to adopt e-Government, depending on its combination with the other factors, in one out of three solutions. As for the use of e-Government services, perceived transparency was present in all solutions. These results confirm the importance of perceived transparency in the adoption and use of e-Government services.

The study shows that ICT literacy has a positive effect on performance expectancy (β = 0.114; t = 2.239), effort expectancy (β = 0.377; t = 7.965) and perceived security (β = 0.17; t = 2.841) with respect to the adoption of e-Government in Indonesia. Performance expectancy, effort expectancy and perceived security are partial indirect-only mediators for ICT literacy and the adoption of e-Government. This suggests that citizens who have higher levels of ICT literacy would find e-Government more useful than those citizens who have lower levels of ICT literacy. The qualitative study further shows that citizens who are confident in their '*ability to deal with the different functions of computers would find e-Government easy to use*'. In other words, citizens who are more anxious about dealing with computers are less likely to find e-Government useful and easy to use. This is because the apprehension about using computers causes a loss of time and creates challenges when requesting public services through e-Government. This apprehension limits the benefits of using e-Government. As a result, the adoption and use of e-Government are affected. In addition, the study found that citizens who are more experienced with online services have higher trust in the security of the e-Government system. Enhanced confidence in using computers would help Indonesian citizens improve their perception of the usefulness, ease of use and security of e-Government. These findings suggest that enhancing ICT literacy would improve the adoption and use of e-Government in Indonesia. These findings are also echoed in the fsQCA, which shows that ICT literacy is present in all solutions that explain the intention to adopt and use e-Government services.

Government encouragement emerged from the thematic analysis as a new factor that has also been validated to influence effort expectancy ($\beta = 0.139$; $t = 3.747$), social influence ($\beta = 0.707$; $t = 18.486$), facilitating conditions ($\beta = 0.473$; $t = 7.502$) and perceived security ($\beta = 0.092$; $t = 2.217$). Effort expectancy is a partial indirect-only mediator for government encouragement and the adoption of e-Government, while social influence is a full mediator for government encouragement and the adoption of e-Government. In addition, perceived security is a partial indirect-only mediator for government encouragement and the actual use of e-Government. Further explanation from the thematic analysis suggests that government encouragement is critical to support the poor publicity of e-Government services in Indonesia. The qualitative research also highlights the need for '*a frequently updated official portal to integrate and showcase all e-Government services and the use of social media and mass media channels such as YouTube and TV to raise awareness of the available e-Government services*'. This implies a high level of government encouragement, such as the availability of support centres and e-Government training, would encourage citizens to learn more about e-Government services, enhance the ability to access e-Government, promote e-Government to their peers and clear the hesitation of adopting e-Government due to security concerns. Further, as a peripheral condition in fsQCA configurations, government encouragement was present in two out of three solutions that explain the intention to adopt e-Government, while it was absent in one out of three solutions. Concerning e-Government use, government encouragement was also present in one out of two solutions. It can be either present or absent in explaining the intention to use e-Government, depending on its combination with the other factors in the other solution.

This study found that information quality has a significant positive relationship with performance expectancy ($\beta = 0.325$; $t = 4.587$), effort expectancy ($\beta = 0.245$; $t = 3.572$), perceived security ($\beta = 0.656$; $t = 10.106$) and has the strongest influence on perceived transparency ($\beta = 0.807$; $t = 27.677$). The positive influence of information quality on performance expectancy and effort expectancy is supported by the literature (Almukhlifi, Deng & Kam 2019a; Berlilana, Hariguna & Nurfaizah 2017). This research further indicates that performance expectancy is a full indirect-only mediator for information quality and the adoption of e-Government. In contrast, effort expectancy is a partial indirect-only mediator for information quality and the adoption of e-Government. The qualitative study suggests that '*the availability of quality information*' would encourage citizens to adopt e-Government as they would find e-Government services easy to use and useful.

This research also establishes the positive influence of information quality on perceived transparency and security. Perceived transparency and security are full indirect-only mediators for information quality and the adoption of e-Government. This infers that the availability of quality information would help citizens to learn about the transparency and security aspects of e-Government. In relation to fsQCA findings, information quality was present in two out of three solutions for the intention to adopt and in one out of two solutions for the use of e-Government services. Information quality can be either present or absent in explaining the intention to adopt and use e-Government, depending on its combination with the other factors, in one out of the three solutions. Further, fsQCA shows that information quality is a core factor in both configuration settings. These findings emphasise the importance of information quality in the adoption and use of e-Government services.

The study reveals that system quality significantly affects performance expectancy (β = 0.459; t = 5.942) and effort expectancy (β = 0.273; t = 3.859). The positive influence of system quality on performance expectancy and effort expectancy is echoed in other studies (Almukhlifi, Deng & Kam 2019a; Berlilana, Hariguna & Nurfaizah 2017; Hariguna 2017). This research further shows that performance expectancy and effort expectancy are partial indirect-only mediators for system quality and the adoption of e-Government. This means that the delivery of high-quality e-Government systems can help citizens to obtain the benefits of e-Government and overcome the difficulties in requesting online public services. The qualitative study further shows that a bad experience with e-Government services can significantly demotivate citizens to adopt e-Government. One interviewee said, *'I have a horrible experience with using e-Government. For me, to use e-Government again, the system has to be proven working properly; otherwise, I will not touch the system*'. To further demonstrate the importance of system quality, fsQCA shows that system quality is present in all solutions that explain the intention to adopt and use e-Government services.

This study found that intention to adopt has a positive influence on the actual use of e-Government in Indonesia (β = 0.149; t = 1.661). This suggests that unless individuals develop the intention to adopt a certain technology, it is unlikely that they will use the technology. This finding is in line with the literature (Venkatesh et al. 2008; Venkatesh et al. 2003; Venkatesh, Thong & Xu 2012). These results were confirmed by fsQCA, which showed the intention to adopt is present in all solutions that explain e-Government use. Moreover, the intention to adopt is also a necessary condition for the use of e-Government to occur. The

thematic analysis further indicated that Indonesian citizens who enjoy using innovations are often more open to using e-Government. Citizens who stay updated with new technologies would perceive the simplicity and benefits of e-Government more than citizens who do not pay attention to innovations. This research also suggests that the relationships between performance expectancy, social influence, perceived security, perceived transparency and e-Government adoption are not moderated by age and gender. These results may be due to the asymmetrical distribution of age and gender, which has also been acknowledged in the literature (Kurfalı et al. 2017; Tan, Chan & Auchus 2001; Van Schaik 2011). This study reveals that gender significantly moderates the relationship between effort expectancy and the adoption of e-Government in Indonesia (t = 1.718), but not age. The influence of effort expectancy was more pronounced with males than females.

7.5 The Collective Influence of the Critical Factors for the Adoption and Use of E-Government Services

Studies have reported inconsistent effects on the factors for the adoption of many technologies, including e-Government (Dwivedi et al. 2017; Venkatesh et al. 2003; Verkijika & De Wet 2018; Williams, Rana & Dwivedi 2015). A plausible explanation is that the adoption of e-Government has thus far been studied using models that do not fully capture the complexity of e-Government services with respect to the adoption from the perspective of citizens. This research develops a holistic model that posits that adoption does not depend on individual factors, but rather on specific configurations of such factors. This section focuses on investigating the collective role of critical factors for the adoption of e-Government to answer the following research question:

> ***SRQ3:*** *What are the configurations of factors that would lead citizens to accept and resist the adoption and the use of transactional e-Government services in Indonesia?*

7.5.1 Configurations of Critical Factors for High and Low Adoption of E-Government

In the investigation of the collective influence of the critical factors for the adoption of e-Government, the findings from fsQCA show three configurations for the acceptance or high adoption of e-Government services and two configurations for the rejection, resistance or low adoption of e-Government services. These findings make a unique contribution to the literature. The overview of these configurations is presented in Table 7.1.

Table 7.1 An Overview of Configurations for High and Low Adoption of E-Government

	Solutions for High E-Government Adoption			Solutions for Low E-Government Adoption	
Configuration	1	2	3	1	2
Performance Expectancy	●	●	●	●	⊗
Effort Expectancy	●	●	●	⊗	●
Social Influence		●	●	⊗	⊗
Facilitating Conditions	●	●	●	⊗	⊗
Information Quality	●	●		⊗	⊗
System Quality	●	●	●	⊗	⊗
Perceived Security	●	⊗	●	⊗	●
ICT Literacy	●	●	●	●	●
Perceived Transparency	●		●	⊗	●
Government Encouragement	⊗	●	●		●

Note: Black circles (●) indicate the presence of a condition, circles with 'x' (⊗) indicate its absence, and blank spaces indicate the 'don't care' condition. Large circles indicate core conditions, and small circles indicate peripheral conditions.

The results from Table 7.1 highlight the overview of configurations for high and low adoption of e-Government, reflecting combinations of the presence and absence of factors using fsQCA. Concerning the high adoption of e-Government, information quality and perceived security are core conditions, while other factors are peripheral conditions. According to the fsQCA, there are three successful configurations (solutions) that would lead to the high adoption of transactional e-Government services from the perspective of citizens in Indonesia. The first solution for the high adoption of e-Government requires a combined presence of performance expectancy, effort expectancy, facilitating conditions, information quality, system quality, perceived security, ICT literacy and perceived transparency, with the absence of government encouragement and regardless of the presence of social influence.

The second solution for the high adoption of e-Government requires a combined presence of performance expectancy, effort expectancy, social influence facilitating conditions, information quality, system quality, ICT literacy and government encouragement, with the absence of perceived security and regardless of the presence of perceived transparency. This solution shows that perceived security becomes less important if there is a strong presence of

government encouragement and social influence. This can potentially be explained by the PLS-SEM and thematic analysis findings. The PLS-SEM analysis showed that government encouragement positively affects perceived security (H10d: $\beta = 0.092$; $t = 2.217$). The thematic analysis showed that citizens were hesitant to adopt and use e-Government services due to security concerns. Encouragement from the government, such as raising awareness and educating citizens about implementing security measures in e-Government services, could reassure citizens and increase their confidence in adopting and using e-Government services. This was echoed by one interviewee, who said *'the government should provide training, or at least helpline such as a call centre where I can get necessary helps and supports'*. Increased government encouragement may increase the likelihood of citizens perceiving e-Government as secure and suppress hesitation for adopting e-Government due to security concerns. This might explain why when government encouragement is present, the absence of perceived security would also lead to the adoption of e-Government services. However, this solution has the lowest raw and unique coverage according to fsQCA (see Table 6.10). This indicates such a phenomenon has only occurred in a smaller sample; thus, the generalisability of this configuration might be limited.

The third solution for the high adoption of e-Government requires a combined presence of performance expectancy, effort expectancy, social influence, facilitating conditions, information quality, system quality, perceived security, ICT literacy, perceived transparency and government encouragement, regardless of the presence of social influence. This configuration had the highest raw and unique coverage (see Table 6.10), which means the majority of successful outcomes for the high adoption of e-Government services was covered by the third solution. The fsQCA findings for the high adoption of e-Government show that none of the factors was necessary and sufficient on its own. Therefore, public organisations must focus on improving all the factors identified in this study. Figure 7.1 illustrates the configurations for the high adoption of the transactional e-Government services from the perspective of citizens in Indonesia.

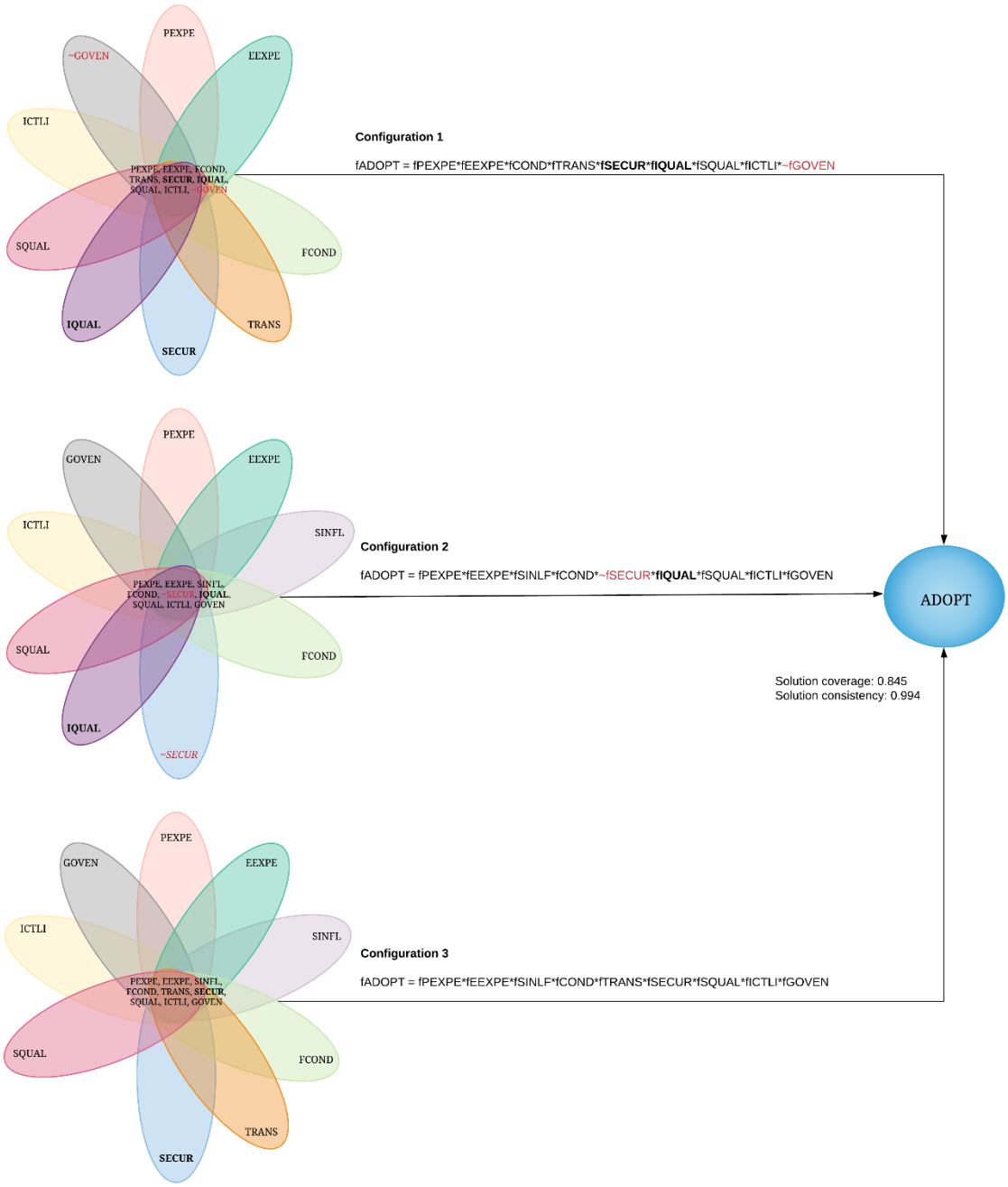

Figure 7.1 Configurations of Critical Factors for the High Adoption of E-Government

This research also analyses the collective influence of factors for the low adoption of e-Government, making a unique contribution to the technology adoption and e-Government literature. This investigation is conducted by negating the outcome variables for the adoption of e-Government. The results show the resistance, rejection or low adoption of technologies (Pappas et al. 2018; Pappas &Woodside 2021; Ragin & Davey 2016; Roy et al. 2018). As presented in Table 7.1, there are two configurations (solutions) for the low adoption of

transactional e-Government services from the perspective of citizens in Indonesia. According to the first solution, the absence of effort expectancy, social influence, facilitating conditions, information quality, system quality, perceived security, and perceived transparency with the presence of performance expectancy and ICT literacy would lead to the resistance or low adoption of e-Government, regardless of the existence of government encouragement. Further, the absence of performance expectancy, social influence, facilitating conditions, information quality and system quality would also lead to the resistance of e-Government adoption despite the presence of all other factors, as shown in the second solution. Figure 7.2 illustrates the configurations for the low adoption of transactional e-Government services from the perspective of citizens in Indonesia.

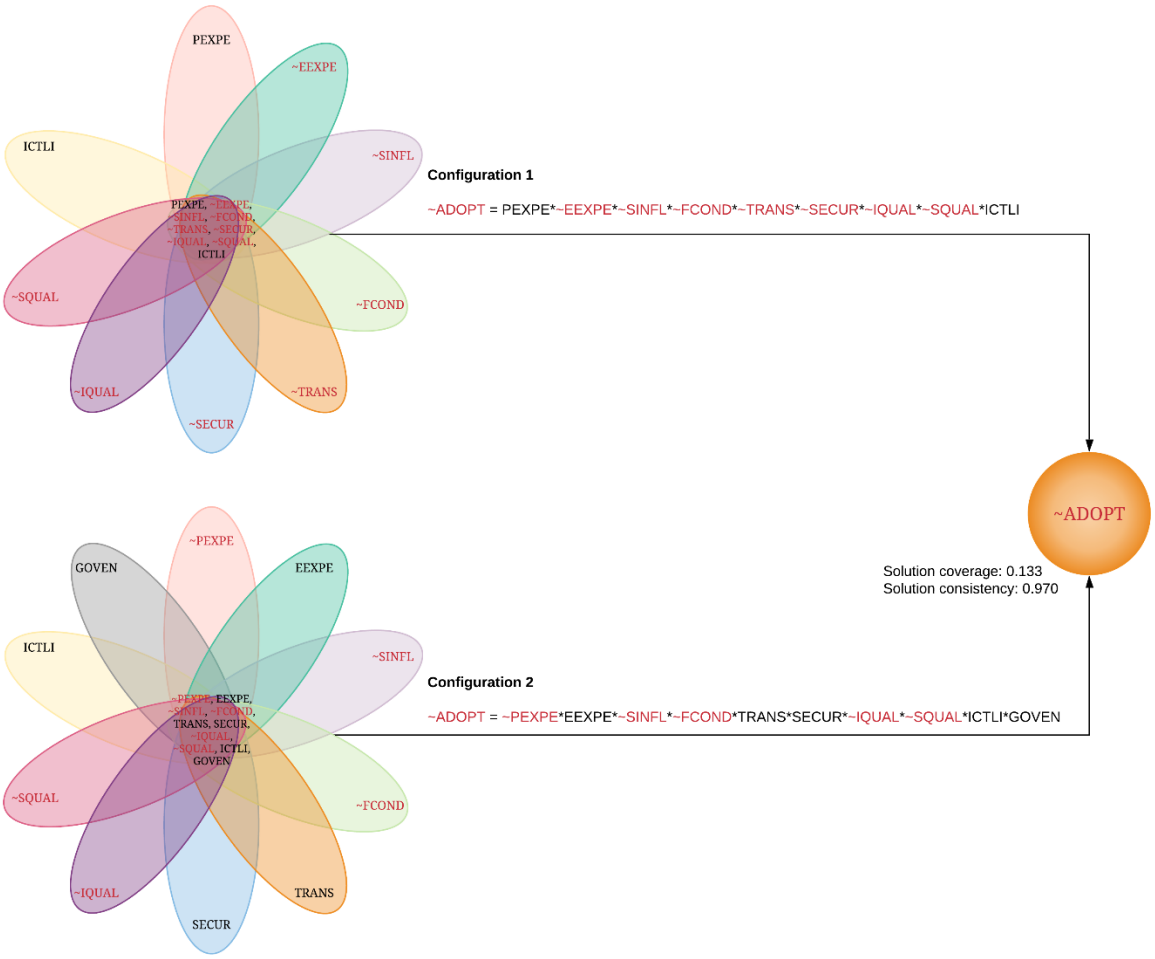

Figure 7.2 Configurations of Critical Factors for the Low Adoption of E-Government

These findings contribute to e-Government and technology adoption studies by asserting that the most influential factors for the adoption of many technologies, including e-Government

services, such as performance expectancy and effort expectancy (Kurfalı et al. 2017; Maruping et al. 2017; Mutaqin & Sutoyo 2020; Sabani 2021; Venkatesh et al. 2003; Venkatesh, Thong & Xu 2016; Venkatesh, Thong & Xu 2012; Verkijika & De Wet 2018; Voutinioti 2013; Williams, Rana & Dwivedi 2015) are not sufficient for the high adoption of e-Government on their own. These two prominent factors must be combined with other factors to successfully achieve high adoption of e-Government. Moreover, with the application of fsQCA, this study also found that performance expectancy is only a peripheral condition for the adoption of transactional e-Government services from the perspective of citizens in Indonesia. This was despite performance expectancy being the strongest factor according to the PLS-SEM analysis and the reason for nine out of fifteen interviewees to adopt e-Government services in Indonesia. These findings further highlight the importance of conducting configuration analysis when investigating the collective influences of critical factors, in addition to examining the individual influences. Figure 7.3 illustrates the overall configurations for the high and low adoption of transactional e-Government services from the perspective of citizens in Indonesia.

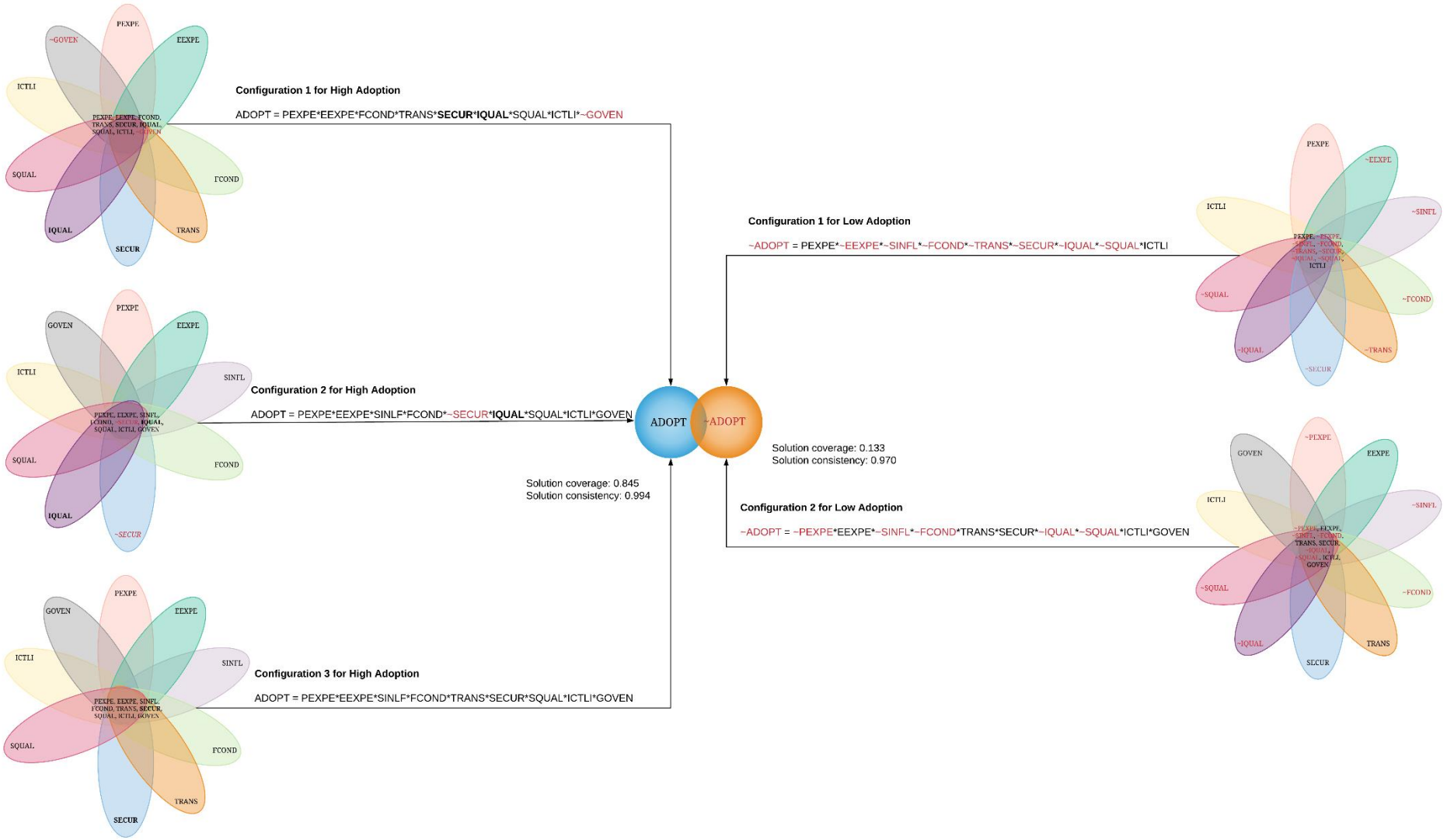

Figure 7.3 The Overall Configurations of Critical Factors for the High and Low Adoption of E-Government

7.5.2 Configurations of Critical Factors for the High and Low Use of E-Government

In addition to investigating e-Government adoption, this research evaluates the collective influence of the critical factors for the use of transactional e-Government services from the perspective of citizens in Indonesia. The findings from fsQCA show two configurations for the high use of e-Government services and two configurations for the rejection, resistance or low use of e-Government services. These findings make another unique contribution to the literature. The overview of these configurations is presented in Table 7.2.

Table 7.2 An Overview of Configurations for High and Low Use of E-Government

	Solutions for High e-Government Use		**Solutions for Low e-Government Use**	
Configuration	1	2	1	2
Performance Expectancy	●	●	●	⊗
Effort Expectancy	●	●	⊗	●
Social Influence	●	●	⊗	⊗
Facilitating Conditions	●	●	⊗	⊗
Information Quality	●		⊗	⊗
System Quality	●	●	⊗	⊗
Perceived Security	●	●	⊗	●
ICT Literacy	●	●	●	●
Perceived Transparency	●	●	⊗	●
Government Encouragement		●	⊗	●
Intention to Adopt	●	●	⊗	⊗

Note: Black circles (●) indicate the presence of a condition, circles with 'x' (⊗) indicate its absence, and blank spaces indicate the 'don't care' condition. Large circles indicate core conditions, and small circles indicate peripheral conditions.

Table 7.2 shows the overview of configurations for high and low use of e-Government, reflecting combinations of the presence and absence of factors determined using fsQCA. Regarding the high use of e-Government, information quality and perceived security were core conditions, while other factors were peripheral. According to the fsQCA, there were two successful configurations (solutions) that would lead to the high use of transactional e-Government services from the perspective of citizens in Indonesia. The first solution requires

a combined presence of the intention to adopt, performance expectancy, effort expectancy, social influence, facilitating conditions, information quality, system quality, perceived security, ICT literacy and perceived transparency, regardless of government encouragement. The second solution requires a combined presence of the intention to adopt, performance expectancy, effort expectancy, social influence, facilitating conditions, system quality, perceived security, ICT literacy and perceived transparency, regardless of the presence of information quality. Figure 7.4 illustrates the configurations for the high use of transactional e-Government services from the perspective of citizens in Indonesia.

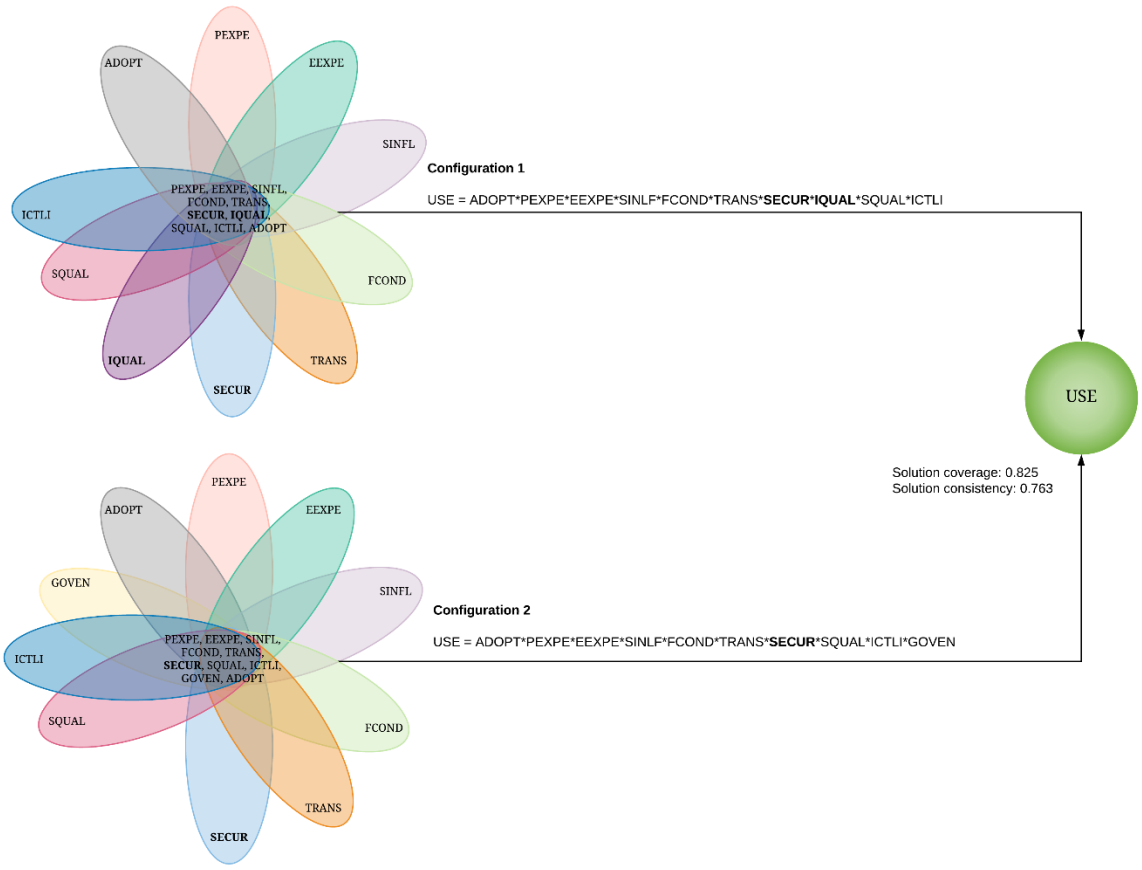

Figure 7.4 Configurations of Critical Factors for the High Use of E-Government

The intention to adopt e-Government services was an important and necessary factor for the actual use as identified through fsQCA and is consistent with Venkatesh et al. (2003). This suggests that unless individuals develop the intention to adopt a certain technology, they are unlikely to use that technology (Venkatesh et al. 2008; Venkatesh et al. 2003; Venkatesh, Thong & Xu 2012). Further, when comparing the configurations for the high adoption of e-Government (see Figure 7.2), it is interesting to see that there is no single absence of factor

for the use of e-Government. These findings further highlight the necessity for public organisations to focus on improving all factors identified in this study. Notably, the intention to adopt and perceived security are necessary conditions for the use of e-Government. These necessary conditions can be further explained by the thematic analysis, which suggests the effect of the intention to adopt on the actual use of e-Government may be moderated by perceived security. As noted by one interview participant, *'I am interested to use e-Government services but I am a bit reluctant due to security and privacy concerns*'. Citizens with the intention to adopt e-Government might be hesitant to use e-Government services due to security concerns, as discussed in Section 4.4.5. These findings would explain the potential missing link between the intention to adopt and the use of technologies (Venkatesh, Thong & Xu 2016) such as e-Government services.

This research also examined the collective influence of factors for the low use of e-Government, making another contribution to the technology adoption and e-Government literature. The investigation was conducted by negating the outcome variables for the use of e-Government. The results show the resistance, rejection or low use of technologies (Pappas et al. 2018; Pappas & Woodside 2021; Ragin & Davey 2016; Roy et al. 2018). As presented in Table 7.2, there are two configurations (solutions) for the low use of transactional e-Government services from the perspective of citizens in Indonesia. According to the first solution, the absence of effort expectancy, social influence, facilitating conditions, information quality, system quality, perceived security, perceived transparency, government encouragement, and the intention to adopt e-Government with the presence of performance expectancy and ICT literacy would lead to resistance towards e-Government use. In addition, the absence of performance expectancy, social influence, facilitating conditions, information quality, system quality and the intention to adopt would also lead to resistance towards e-Government use, despite the presence of all other factors, as shown in the second solution. Figure 7.5 illustrates the configurations for the low use of transactional e-Government services from the perspective of citizens in Indonesia.

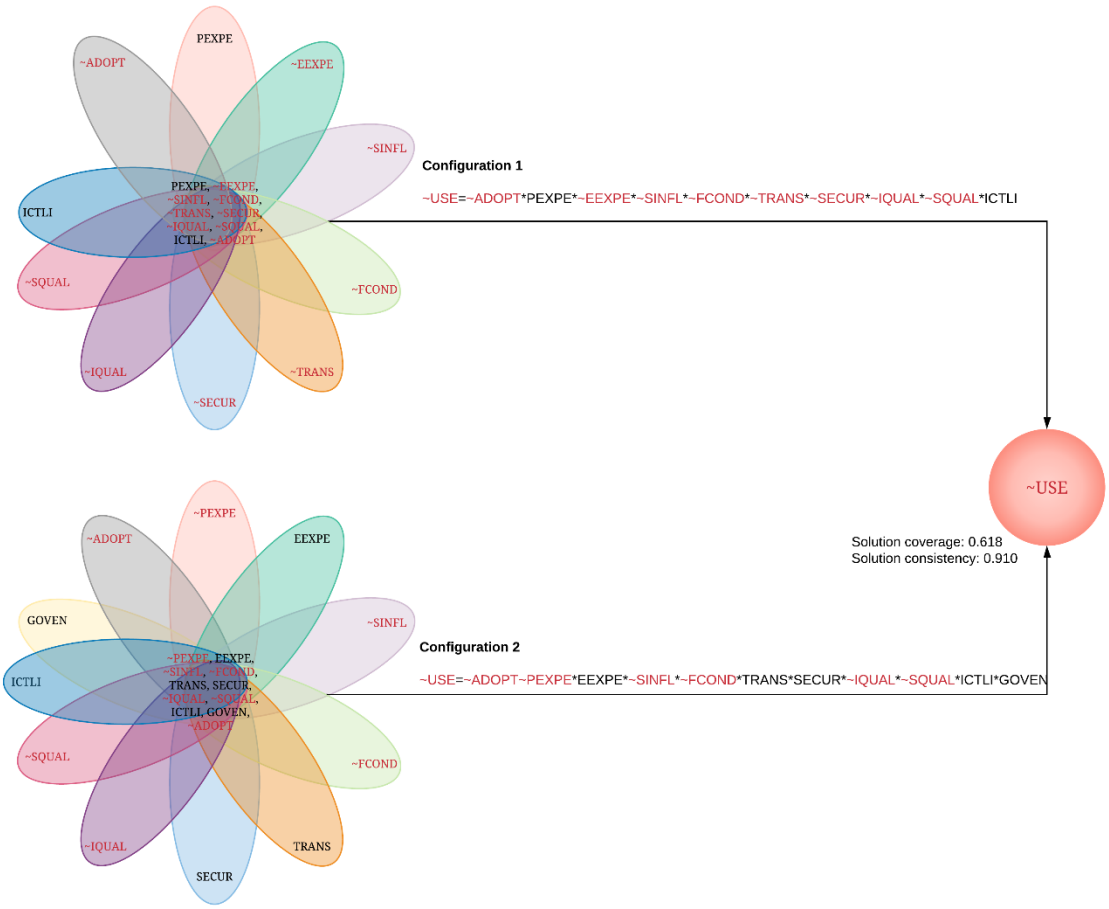

Figure 7.5 Configurations of Critical Factors for the Low Use of E-Government

The combination of fsQCA findings from the low adoption and low use of e-Government services further stresses that factors, including the most significant factors, such as performance expectancy, are not individually sufficient for the high adoption and high use of e-Government. These factors must be combined as configurations to successfully achieve the high adoption and high use of e-Government. These findings explain the inconsistent individual effects of the critical factors evident in prior studies (Almukhlifi, Deng & Kam 2019a; Dwivedi et al. 2017; Masinde & Mkhonto 2019; Venkatesh et al. 2008; Venkatesh et al. 2003; Venkatesh, Thong & Xu 2016; Venkatesh, Thong & Xu 2012; Verkijika & De Wet 2018; Voutinioti 2018). In addition to assessing the individual effects of each critical factor, it is essential for these factors to be treated as configurations and to be tested collectively. The application of fsQCA is useful for testing configurations and complements the findings from SEM analysis. Figure 7.6 illustrates the overall configurations for the high and low adoption of transactional e-Government services from the perspective of citizens in Indonesia. In addition, a summary of the individual and collective influence of the critical factors for the adoption and use of

transactional e-Government services from thematic analysis, PLS-SEM and fsQCA are presented in Table 7.3.

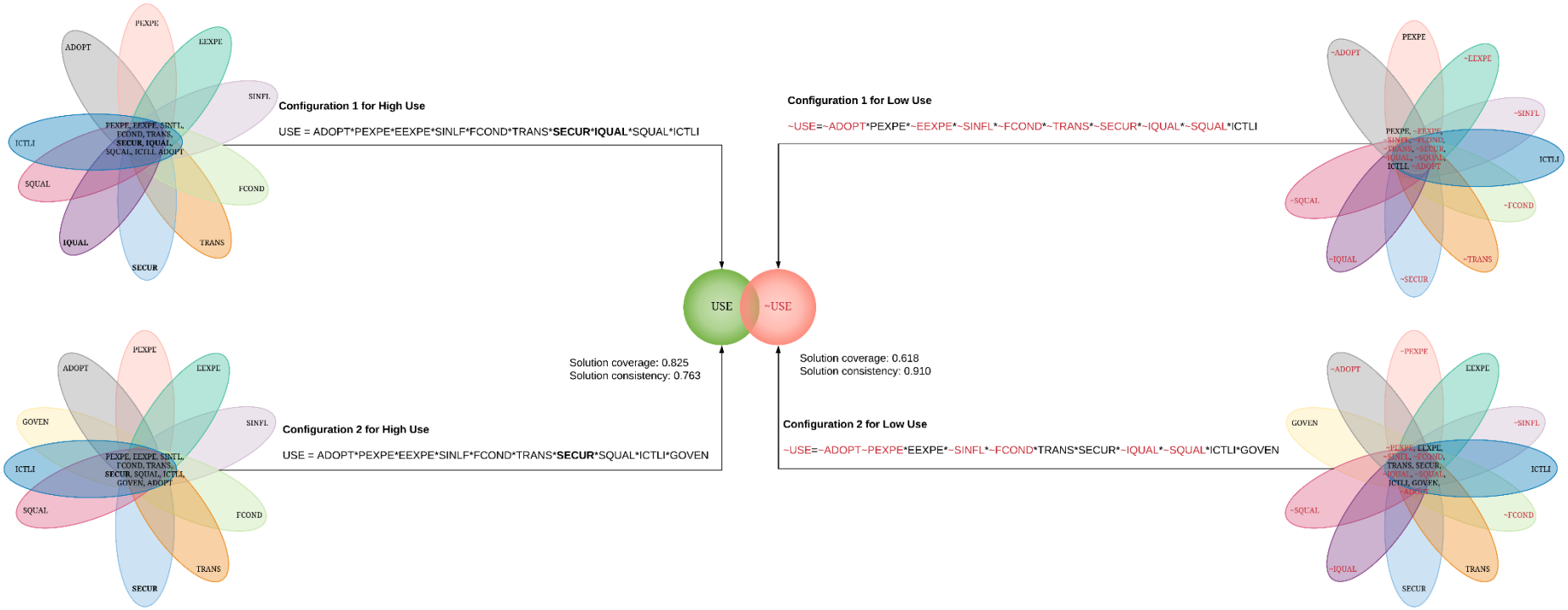

Figure 7.6 The Overall Configurations of Critical Factors for the High and Low Adoption of E-Government

Table 7.3 A Summary of Research Findings from Thematic Analysis, PLS-SEM and fsQCA

Factor	Results from Thematic Analysis	Results from PLS-SEM	Results from fsQCA
Performance Expectancy	• Performance expectancy was the most important factor for nine interviewees in the adoption of e-Government services. Interviewees believed that e-Government enabled them to access public services without time and space constraints. One interviewee explained, '*improving performance and efficiency is the main reason why I am using e-Government*'.	• Performance expectancy has a positive effect on the intention to adopt e-Government ($\beta = 0.216$; $t = 3.046$). • Performance expectancy is a full indirect-only mediator for information quality and the adoption of e-Government, a partial complementary mediator for system quality and the adoption of e-Government and a partial indirect-only mediator for ICT literacy and the adoption of e-Government.	• Performance expectancy is present in all solutions that explain the intention to adopt and the use of e-Government services. • Performance expectancy was found to be a peripheral condition.
Effort Expectancy	• Effort expectancy is important to the adoption of e-Government. Interviewees faced difficulties accessing e-Government services due to poor navigation and design, which may lead to the low uptake of e-Government. This assertion was supported by an interviewee who noted that '*I have been eager to use e-Government to renew my STNK [Vehicle Registration Certificate]. However, the navigation of the system on the Police website, from my experience, were a nightmare, it was very difficult to use*'.	• Effort expectancy positively affects the intention to adopt e-Government ($\beta = 0.163$; $t = 2.453$), and this relationship is moderated by gender ($t = 1.718$). • Gender strengthens the positive relationship between effort expectancy and e-Government adoption for males and the opposite for females. • Effort expectancy is a partial indirect-only mediator from information quality and ICT literacy to the adoption of e-Government. In addition, effort expectancy is a partial complementary mediator for system quality and the adoption of e-Government.	• Effort expectancy is present in all solutions that explain the intention to adopt and use e-Government services. • Effort expectancy was found to be a peripheral condition.

Social Influence	• The influence of family, friends and co-workers influences an individual's intention to adopt a socially acceptable system such as e-Government. This has not been adequately explored in the Indonesian e-Government research. One interviewee explained, '*I use e-Government to report my income tax because co-workers recommend and help me to use the (e-filing) system. Now, I am actively encouraging the use of e-Government to my friends and families*'.	• Social influence positively affects the intention to adopt e-Government ($\beta = 0.089$; $t = 2.061$). • Social influence is a full indirect-only mediator for government encouragement and the adoption of e-Government.	• Social influence is present in 2 out of 3 solutions that explain the intention to adopt e-Government services. • Social influence is also present in all solutions that explain e-Government use. • Social influence can be either present or absent in explaining the intention to adopt e-Government depending on its combination with the other factors in 1 out of 3 solutions. • Social influence was found to be a peripheral condition.
Facilitating Conditions	• Citizens' interest in accessing e-Government services through mobile phones was revealed. One interviewee explained that '*mobile phone is my preferred device to access e-Government, as I spend most of the time away from computers*'.	• Facilitating conditions do not significantly influence the intention to adopt e-Government ($\beta = 0.093$; $t = 1.386$).	• Facilitating conditions are present in all solutions that explain the intention to adopt and use e-Government. • Facilitating conditions were found to be a peripheral condition.
Perceived Transparency	• Perceived transparency emerged as one of the most influencing factors for Indonesian citizens to adopt e-Government. One interviewee explained, '*before the introduction of e-Government, it was very difficult to find a clear procedure on how to upgrade my land and building development permits. Now, with this mobile application, I can track the progress of my application and contact the responsible personnel for my query easily*'.	• Perceived transparency positively affects the intention to adopt e-Government ($\beta = 0.27$; $t = 3.613$). • Perceived transparency has a full indirect-only mediation role in the relationship between information quality and the adoption of e-Government.	• Perceived transparency is present in 2 out of 3 solutions that explain the intention to adopt e-Government, while perceived transparency can be either present or absent in explaining intention to adopt depending on its combination with the other factors in 1 out of 3 solutions. • Perceived transparency is present in all solutions that explain e-Government use. • Perceived transparency was found to be a peripheral condition.

Perceived Security	• The disclosure of identity information, such as names, telephone numbers, email and postal addresses, is an issue for many citizens. One interviewee noted '*I have seen a potential misuse due to mishandling of data … When my child was graduating from elementary school, I searched up by his name and school … The system somehow displayed all his details including home address and landline. It was a concern to me, although the department has now fixed it*'. • Despite security concerns regarding the adoption of e-Government, the thematic analysis showed paper-based services also carry similar or even greater risk compared to the online services. One interviewee noted, '*I have no problem with submitting my sensitive information online, as sometimes you have to live with your personal data at risk. For example, if we are talking about the manual submission directly to the office, the file can be misplaced, misused and other problems*'.	• Perceived security positively affects the intention to adopt e-Government ($\beta = 0.16$; $t = 2.440$). • Perceived security positively affects e-Government use ($\beta = 0.284$; $t = 3.158$). • Perceived security has full and partial indirect-only mediation roles to the relationships between information quality, ICT literacy and the adoption of e-Government, respectively. • Perceived security was also a partial indirect-only mediator from information quality, ICT literacy and government encouragement to the use of e-Government.	• Perceived security is present in 2 out of 3 solutions that explain the intention to adopt e-Government. Interestingly, perceived security was absent in 1 out of 3 solutions that explain the intention to adopt e-Government. • Perceived security was found to be a core condition. • Perceived security was present in all solutions that explain e-Government use. • Perceived security is found to be a core and necessary condition for the use of e-Government.

Information Quality	• Interviews confirmed the importance of information quality and how this factor positively influences the adoption of e-Government. An interviewee remarked, '*for e-Government to be successful, it has to provide up-to-date and accurate information. I have to be able to trust the information I receive from e-Government before I want to use the system*'. • Having access to the latest and accurate information, provided in an understandable manner, increases citizens' confidence in adopting e-Government. This could affect the level of trust, which is crucial to e-Government adoption. An interviewee explained, '*when I browse a government website, the first thing I check is whether they have a new post or announcement. If there is no recent update, I am very sceptical of using the service*'.	• Information quality positively affects performance expectancy ($\beta = 0.325$; $t = 4.587$). • Information quality positively affects effort expectancy ($\beta = 0.245$; $t = 3.572$). • Information quality has a positive effect on perceived transparency ($\beta = 0.807$; $t = 27.677$). • Information quality positively affects perceived security ($\beta = 0.656$; $t = 10.106$).	• Information quality is present in 2 out of 3 solutions as a core factor that explain the intention to adopt e-Government. • Information quality is present in 1 out of 2 solutions as a core factor that explain e-Government use. • Information quality can be either present or absent in explaining the intention to adopt and use e-Government depending on its combination with the other factors.

System Quality	• The thematic analysis showed that a bad experience can significantly demotivate citizens to adopt e-Government. An interviewee explained, '*I have a horrible experience with using e-Government. For me, to use e-Government again, the system has to be proven working properly; otherwise, I will not touch the system*'. • Thematic analysis findings showed that there is a need for an integrated one-stop portal for e-Government services, as suggested by an interviewee: '*I am not quite sure what e-Government services are available due to low publicity … the government should create a one-stop portal for citizens to check and find all kind of e-Government services available*'.	• System quality positively affects performance expectancy (β = 0.459; t = 5.942). • System quality positively affects effort expectancy (β = 0.273; t = 3.859).	• System quality is present in all solutions that explain the intention to adopt e-Government. • System quality is present in all solutions that explain e-Government use. • System quality was found to be a peripheral condition.
ICT Literacy	• ICT literacy is one of the influencing factors for citizens to adopt e-Government. In Indonesia, there are still many citizens, particularly older generations, with low levels of ICT literacy, who may not be able to fully utilise e-Government services. One participant explained, '*I believe the current e-Government is designed for intermediate ICT users, whereas it should be designed to cater all kind of people including those who are not literate with ICT*'.	• ICT literacy positively affects performance expectancy (β = 0.114; t = 2.239). • ICT literacy positively affects effort expectancy (β = 0.377; t = 7.965). • ICT literacy positively affects perceived security (β = 0.17; t = 2.841).	• ICT literacy is present in all solutions that explain the intention to adopt and the use of e-Government • ICT literacy was found to be a peripheral condition.

Government Encouragement	• Government encouragement may influence effort expectancy, social influence and perceived security. One interviewee shared his opinion about the limited government effort to raise awareness of e-Government services in Indonesia: '*The socialisation of e-Government services aside from e-filing for the tax is very poor, how are we supposed to adopt the service if we do not know the existence of them in the first place*'.	• Government encouragement positively affects effort expectancy (β = 0.139; t = 3.747). • Government encouragement positively affects social influence (β = 0.707; t = 18.486). • Government encouragement positively affects facilitating conditions (β = 0.473; t = 7.502). • Government encouragement positively affects perceived security.	• Government encouragement is present in 2 out of 3 solutions that explain the intention to adopt e-Government while absent in 1 out of 3 solutions. • Government encouragement is present in 1 out of 3 solutions that explain e-Government use while absent in 1 out 3 of solutions. FsQCA suggests government encouragement can be either present or absent in explaining the intention to use e-Government depending on its combination with the other factors in 1 out of 3 solutions. • Government encouragement was found to be a peripheral condition.
Adoption and Use	• The effect of the intention to adopt on the actual use may be affected by perceived security. As noted by an interviewee, '*I am interested to use e-Government services, but I am a bit reluctant due to security and privacy concerns*'.	• The intention to adopt positively influences the actual use of e-Government in Indonesia (β = 0.149; t = 1.661).	• Intention to adopt is present in all solutions that explain e-Government use. • Intention to adopt is a necessary factor for the use of e-Government but not sufficient. • Perceived security is a necessary factor for the use of e-Government but not sufficient.

7.6 Recommendations for Improving the Adoption and Use of E-Government in Indonesia

Developing countries, including Indonesia, attempt to continuously review and revise their innovation priorities to best address the needs of their citizens. Embracing e-Government adoption and digital transformation is increasingly perceived as a key driver of sustainable development (United Nations 2020). Since governments have been searching for ways to effectively contain the COVID-19 pandemic and relieve the stress on public services, this trend has intensified. Further, COVID-19 has exposed the need for increased government leadership to improve e-Government services to ensure an effective provision of public services.

This research confirms that the success of e-Government adoption depends upon citizens' willingness to use e-Government services. Governments and public organisations must review and prioritise factors that citizens perceive as having a strong influence on their decision to adopt and use e-Government services (see Sections 7.4 and 7.5) while considering the feasibility of such improvements. Figure 7.7 summarises suggestions for public organisations in Indonesia and developing countries with similar characteristics to improve citizens' uptake of e-Government services. Figure 7.7 is based on the action priority matrix.

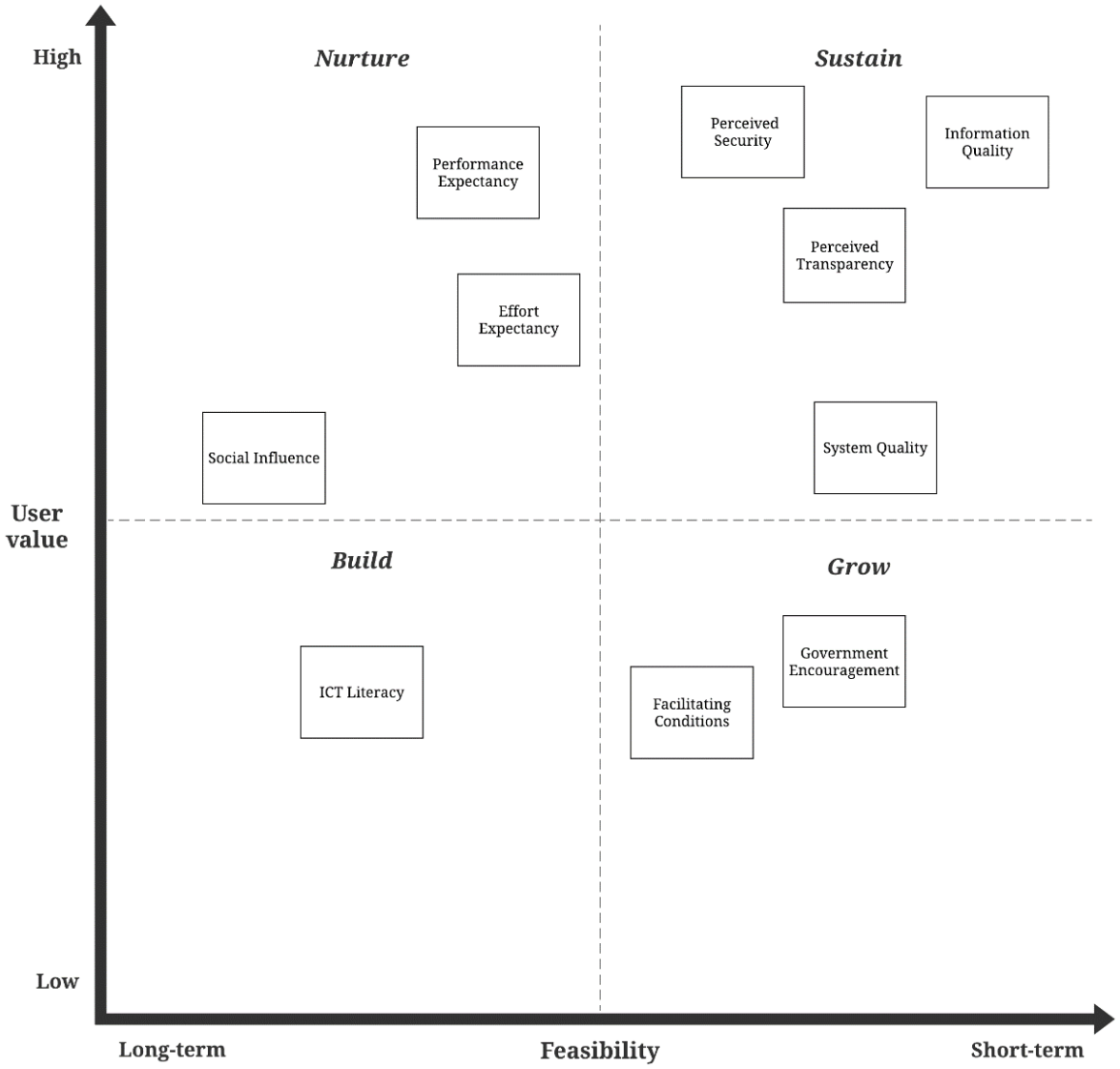

Figure 7.7 Action Priority Matrix

The action priority matrix is assessed based on user value and feasibility. The user value is determined by considering and interpreting the thematic analysis and PLS-SEM findings regarding how significantly the factors influence citizens' decisions to adopt and use e-Government services. It also involves assessing the necessity and sufficiency of the factors for adopting and using e-Government services from fsQCA. The findings suggest that perceived security, performance expectancy, perceived transparency, effort expectancy and information quality are appreciated by Indonesian citizens. System quality, social influence and government encouragement are moderately valued. Meanwhile, ICT literacy and facilitating conditions are the least significant factor in terms of user value.

Feasibility can be classified as short-term or long-term depending on the effort required by public organisations to enhance and sustain the factors. Improving transparency, system quality, security, information quality, and government encouragement is highly feasible because these factors are within the direct control of public administrations to action within a short time. Improving ICT literacy and social influence is a long and challenging process for many developing countries, especially those with many citizens (Puspitasari & Ishii 2016; Urbina & Abe 2017). Enhancing performance expectancy and effort expectancy may require improvement in system and information quality. These factors are less feasible as they are not within the direct control of public organisations.

Based on the feasibility and user value, the action priority matrix entails four quadrants, namely *sustain, nurture, grow* and *build*. *Sustain* refers to high user value and short-term feasibility. Public organisations should prioritise sustaining their implementation of these factors. *Sustain* factors, including perceived transparency, system quality, perceived security and information quality, are the most attractive because they are highly valued by citizens for relatively less effort to sustain. From the fsQCA findings, information quality and perceived security were found to be a core condition for the adoption and use of e-Government. In addition, perceived security was a necessary condition for the use of e-Government. Top priority should be given to these factors. Perceived transparency and information quality can be sustained by frequently updating e-Government services with relevant and up-to-date information, particularly in terms of public service delivery, public procurement and budget expenditure. System quality and perceived security can be sustained by frequently updating e-Government system.

The research findings suggest a need for an integrated one-stop portal for all e-Government services for ease of access and standardisation. This is also an opportunity for the Government to consolidate and integrate e-Government databases across public organisations. This would improve the security of e-Government services from unauthorised access to citizens' sensitive information, which was a major factor discouraging citizens from adopting and continuously using e-Government services.

Nurture refers to high user value and long-term feasibility. *Nurture* factors, including performance expectancy, effort expectancy and social influence, are the second-most attractive because they are highly appreciated by citizens. However, they might not be as feasible in the short term, as they require considerable effort and are potentially time-consuming. Public

organisations should aim to nurture the implementation of these factors so that they can become *sustain* factors in the long term. Performance expectancy can be nurtured by constantly enhancing the quality and expanding the range of e-Government services. Effort expectancy can be nurtured by developing a more user-friendly system and providing education on using e-Government services. Positive feedback from the improved performance expectancy and effort expectancy would potentially pull social influence to the *sustain* quadrant.

Grow refers to low user value and short-term feasibility. Government encouragement and facilitating conditions are feasible but less influential at the moment. Public organisations should aim to grow their implementation of these factors to become more effective and transform into *sustain* factors in the long term. Government encouragement and facilitating conditions are within the direct control of public organisations. Several strategies can be used to strengthen these two factors, including investing in ICT infrastructure, such as 5G network, and adding financial incentives, such as less expensive passport processing fees for online applications. These initiatives would support the adoption of e-Government and motivate more citizens to use e-Government services.

Build relates to low user value and long-term feasibility. Public organisations should aim to build these factors so that they can become either *grow* and then *sustain* factors or directly become *sustain* factors in the long term. Improving ICT literacy requires significant effort. The large number of citizens distributed in an archipelagic country like Indonesia leaves many people, particularly older generations and those in remote areas, with limited ICT literacy. These people may not be able to fully utilise e-Government services. Investments in ICT infrastructure and education need to be made to improve ICT literacy. Closing this digital divide might take several years to be effective and decades to complete. The priority for improving the citizens' adoption and use of e-Government should be, first, the *sustain* factors (perceived transparency, system quality and perceived security), followed by *nurture* factors (performance expectancy, effort expectancy and social influence), *grow* factors (facilitating conditions and government encouragement) and, finally, the *build* factor (ICT literacy).

These recommendations can help public organisations and relevant stakeholders to better understand the importance of critical factors for the adoption and use of e-Government services in Indonesia. Implementing such recommendations would not only improve the adoption, but also the continuance of e-Government programs in the country.

7.7 Theoretical Contribution

This research focuses on the configurations of critical factors for citizens to adopt and use transactional e-Government services from the perspective of developing countries such as Indonesia that have not been adequately addressed in previous studies (Alzahrani, Al-Karaghouli & Weerakkody 2017; Deng, Karunasena & Xu 2018; Gupta, Bhaskar & Singh 2016; Idris 2016; Nam 2014). As previously discussed, studies have reported inconsistent effects for the critical factors for the adoption of many technologies, including e-Government services (Dwivedi et al. 2017; Venkatesh et al. 2003; Verkijika & De Wet 2018; Williams, Rana & Dwivedi 2015). A reasonable explanation is that the adoption of e-Government has thus far been studied using models that do not fully capture the complexity of e-Government services concerning the adoption from the perspective of citizens. This research developed a holistic model for specific configurations rather than individual factors. Findings from this research enhance the understanding on the collective effects of the critical factors that would lead to the successful adoption of e-Government, leading to significant theoretical implications and unique contributions to e-Government and technology adoption research.

This research contributes to e-Government literature by investigating the factors influencing citizens to adopt and use e-Government services. Importantly, it also investigated the configurations of factors that would lead to high and low adoption and use of transactional e-Government services from the perspective of citizens in Indonesia. This study uncovered valuable insights for academics and practitioners regarding how to improve the adoption and use of e-Government in Indonesia and other developing countries with similar characteristics.

This study extends the UTAUT with the IS Success model to for investigating the citizen adoption and use of e-Government at the transaction stage in developing countries. This research contributes to the theory by confirming the appropriateness of combining theories such as the UTAUT and the IS Success model for investigating the adoption and use of technological innovations in society (Dwivedi et al. 2017; Maruping et al. 2017; Venkatesh, Thong & Xu 2016). This provides a more holistic view of the citizen perspective on e-Government adoption. Integrating the constructs of UTAUT and IS Success into a single research model offers a richer theoretical basis for explaining the adoption and use of e-Government from the perspective of citizens. The findings empirically support the UTAUT by suggesting performance expectancy, effort expectancy and social influence as the critical

factors of the adoption and use of e-Government while expanding the UTAUT to include information quality and system quality, which were also tested and proven to be valid and reliable.

This study further integrated the emerging factors from the literature review and the qualitative study as additional constructs of the research model for better examining the adoption and use of e-Government in Indonesia. The refinement and creation of new constructs are significant theoretical contributions (Reay & Whetten 2011; Webster & Watson 2002; Whetten 1989). This is an important contribution to the existing literature about e-Government adoption because such factors have often been ignored in prior research. This study confirmed that the adoption and use of e-Government are directly influenced by perceived transparency and perceived security and indirectly affected by ICT literacy and government encouragement. As a result, this study contributes to the existing body of knowledge by filling the literature gap regarding the role of such factors in the adoption and use of e-Government from the perspective of citizens in developing countries.

The research model has successfully explained 76.5% of the variance in the intention to adopt e-Government. This result is substantial, compared to the baseline UTAUT that only explains 70% of its intended use (Venkatesh et al. 2003). This result is also marginally higher than UTAUT2, which explains 74% of the variance (Venkatesh, Thong & Xu 2012). Further, the results from fsQCA indicate an overall solution coverage of 84.5% of the intention to adopt and 82.5% on the use of e-Government services. These results show that a substantial proportion (Olya et al. 2021; Pappas & Woodside 2021) of e-Government adoption and use are covered by the proposed solutions. From the model proposition analysis, the research model for the adoption of e-Government shows a consistency value of 99.7%. Models with a consistency value above 80% are useful and can serve theory advancement (Pappas & Woodside 2021), and the research model has satisfied this requirement.

This study also contributes to the existing IS adoption literature, specifically in the context of e-Government adoption from the perspective of citizens. This extension enhances the understanding of e-Government adoption, particularly from the citizens' perspective in developing countries such as Indonesia. The combination of PLS-SEM analysis and fsQCA enabled this research to evaluate the individual and collective influence of the critical factors on the citizen adoption and use of e-Government that had not been addressed previously

(Almukhlifi, Deng & Kam 2019a; Chen & Aklikokou 2020; Deng, Karunasena & Xu 2018; Khan et al. 2021; Kumar et al. 2018; Mensah 2019; Mutaqin & Sutoyo 2020; Rallis et al. 2018; Van Thanh, Yoon & Hwang 2018). Further, configurations of factors for non-adoption or non-use of e-Government were analysed, making another unique contribution to the literature.

The PLS-SEM and fsQCA results also presented interesting findings. The PLS-SEM results revealed that facilitating conditions do not influence the adoption of e-Government. However, further investigation using fsQCA revealed that the absence of facilitating conditions combined with the absence of other factors results in non-acceptance or resistance to e-Government services. Collectively, these findings suggest that under certain conditions and for certain citizens, facilitating conditions influence the adoption and use of e-Government. Nevertheless, future research should further explore the conditions under which facilitating conditions would influence citizens' acceptance of new technology.

The findings in Section 7.5 provide new insights into citizen rejection of e-Government services. The fsQCA results showed that individual factors, with the exception of core conditions such as perceived security and information quality, may not play a significant role in the absence of a condition concerning e-Government adoption and use. However, configurations of negations of peripheral factors such as performance expectancy, social influence, facilitating conditions, system quality and perceived transparency result in citizens resistance to e-Government adoption and use. This suggests that citizens might show resistance to e-Government services despite high effort expectancy and high ICT literacy. This offers public organisations insights for improving the development process by uncovering what does and does not make e-Government services attractive. These findings extend our understanding of factors that hinder the adoption and use of e-Government from the perspective of citizens in developing countries.

Finally, the combination of fsQCA findings from the low adoption and use of e-Government services further stresses that all individual factors, including the most significant factors, such as performance expectancy, are not sufficient by themselves for the high adoption and use of e-Government. These factors need to be combined as configurations to successfully achieve the high adoption and use of e-Government. These findings explain the inconsistent individual effects of the critical factors, which are evident in prior studies. In addition, the fsQCA findings for the high adoption of e-Government also show that none of the factors is necessary and

sufficient on its own. Therefore, public organisations must focus on improving all the factors identified in this study.

7.8 Methodological Reference

Another contribution of this research lies in the method that has been adopted. As opposed to most studies in the e-Government adoption area, which commonly use a mono-method approach, this research applied a mixed-methods approach that combines qualitative and quantitative methods in the data collection process. Using thematic analysis for qualitative data from interviews and PLS-SEM and fsQCA to analyse quantitative data from the survey in this study contributes to the literature on the mixed-methods approach and its role in e-Government research. Specifically, this research establishes how a mixed-methods approach can be utilised in e-Government research to fulfil the exploratory and confirmatory research objectives by complementing qualitative and quantitative data. It provides insights into how procedures and strategies followed in the mixed-methods approach, used to formulate research questions, collect and analyse qualitative and quantitative data and complement findings, can fulfil the research objectives. This research, therefore, provides an example of the applicability of the mixed-methods approach in e-Government domain for obtaining a comprehensive understanding of the research phenomenon. Further, this research provides a holistic perspective for examining the adoption and use of e-Government using mixed methods. This technique facilitates addressing the literature gap in technology adoption in general and e-Government adoption in particular.

This research suggests that the mixed-methods approach should be applied to studies lacking substantial prior investigation or for assessing the collective influence of critical factors. This combination of methods helps to specify the functional relationships between constructs, offering a comprehensive understanding. Further, this method provides the necessary information for explanatory arguments to confirm or review existing theories, especially when the literature on the research topic is still growing.

7.9 Practical Implications

The findings of this study have important implications for central government, public organisations and technology vendors in facilitating the adoption of e-Government in developing countries, specifically in Indonesia.

7.9.1 Implications for Public Organisations

This study attempts to help public organisations recognise that adopting e-Government from the citizens' perspective is more of an adaptive challenge than a technical one. The findings can help organisations understand the importance of critical factors for the adoption and use of e-Government.

Based on a comprehensive literature review, it was determined that Indonesia's current e-Government development plan is not effective due to various obstacles, including poor ICT infrastructure, inadequate human resources, lack of readiness among citizens to use e-Government, and an unsupportive environment. This study recommends that the Indonesian Government develop a citizen-oriented plan that addresses these technological, organisational, citizen-based and environmental challenges. These challenges must be addressed to improve the transition of public services from conventional paper-based systems to a digital, online platform. Further, e-Government in Indonesia cannot be successfully implemented without the Indonesian government's support and full participation from its citizens. Findings from the literature review have shown that several e-Government services in Indonesia are not working as expected, which leads to the low uptake of e-Government (see Section 2.3). Interview data regarding performance expectancy further confirm that citizens value quality services over variety. Therefore, the future Indonesian e-Government development plan should focus on improving the quality of the current e-Government services before introducing new services.

This research provides a comprehensive investigation into the adoption of e-Government in Indonesia, which would help improve e-Government stakeholders' understanding of the situation. Further, findings from this research offer the government and public organisations in Indonesia with relevant suggestions for improving e-Government adoption. The fsQCA findings for the high adoption of e-Government show that none of the factors are necessary and sufficient on their own. Therefore, public organisations must focus on improving all factors identified in this study. Prioritising critical factors perceived by citizens as having a substantial influence on their adoption of e-Government, based on the action priority matrix, is essential. These suggestions can lead to the formulation of better strategies and policies for the continuous development of e-Government in Indonesia.

The findings imply that public organisations need to communicate the potential benefits of using e-Government to citizens. Specifically, the findings suggest that citizens who intend to

adopt e-Government need adequate ICT literacy and technological resources. As a result, public organisations must develop strategies for evaluating the availability of existing and required resources for e-Government adoption. Moreover, educative programs and trainings need to be developed to foster e-Government adoption.

The findings also propose that increasing the external pressures from citizens and support from the central government tend to stimulate the adoption of e-Government. This implies that public organisations should be aware of what their citizens want through e-Government adoption. The findings finally suggest that it is important for public organisations to recognise central government support for e-Government adoption.

7.9.2 Implications for Central Government

The central government plays a significant role in the successful uptake of e-Government. As a result, government support becomes critical in overcoming the challenges faced by public organisations associated with the adoption and use of e-Government from the perspective of citizens. This study further highlights the importance of government encouragement in e-Government adoption. Therefore, central governments should support public organisations in creating better awareness of the benefits of e-Government services to encourage citizen adoption. This implies that more seminars and workshops for public organisation staff and citizens should be conducted to show how e-Government adoption helps with the strategic delivery of public services. The government needs to support public organisations to build and maintain their resources, structures and governance for compatibility with e-Government technologies. Further, governments should focus their support activities on lowering perceived security and consistency issues of e-Government services across public organisations by providing more secure and standardised systems.

The significance of government encouragement implies that central governments should provide public organisations with financial and technological support and other forms of assistance to facilitate the improvement of e-Government services. This can be done by executing the proposed strategy outlined in the action priority matrix. Further, the study highlights the importance of citizens' knowledge of ICT and e-Government for adopting and using e-Government systems. As a result, the central government can play a significant role in promoting e-Government by providing training programs and workshops specifically designed to educate citizens about ICT and e-Government.

7.9.3 Implications for Technology Vendors

Technology vendors are mediating agents in facilitating the development of e-Government systems. They must understand the critical factors for e-Government adoption to design strategies for addressing the technological glitches hindering the adoption of e-Government. Technology vendors are advised to participate in implementing the action priority matrix by programming e-Government services with innovative environments and positive attitudes towards e-Government adoption.

Technology vendors should focus on improving the quality of e-Government systems by developing friendly, reliable and resourceful e-Government services for citizens. This involves improving key aspects like server uptime and system navigation design to allow citizens to access online public services effectively. Several interviewees referenced this as one of the major reasons for reluctance and frustration with e-Government services in Indonesia. An improved system would help citizens to see the benefits of adopting e-Government.

Interconnecting e-Government services from multiple public organisations under one system would further benefit citizens and strengthen e-Government adoption. The fact that individual e-Government systems of different public organisations are not connected wastes citizens' time visiting multiple offices to obtain public services. With approval from the central government, technology vendors in Indonesia should consolidate databases from public organisations and develop a one-stop portal for all e-Government services.

7.10 Limitations and Future Research

Despite significant contributions to e-Government research, this study has several limitations. This research investigates the critical factors that influence the adoption and use of e-Government in Indonesia. Further, the qualitative study and literature review suggest the adoption of technologies is dependent on culture and personal traits. The same study could be extended to other developing countries for comparison.

This study utilises cross-sectional data collected primarily at one point in time. Thus, it provides a snapshot of the adoption issues at the time of the study. Given the dynamic environments in which society is transforming due to COVID-19, a longitudinal study could be undertaken to monitor changes in adoption behaviour over time.

This research investigates the critical factors for the adoption and the of e-Government from the perspective of citizens. There are other stakeholders with different perceptions of the adoption of e-Government, such as businesses and public organisations. These stakeholders may have various thoughts, needs and expectations regarding the adoption of e-Government. Future research should consider the perceptions of these stakeholders to broaden the scope of the study to obtain a better understanding of the issues that affect the adoption and use of e-Government.

This study investigates the indirect and direct effects of ICT literacy, government encouragement and perceived transparency on the adoption and use of e-Government in Indonesia. Investigating the moderating influences of these factors on the adoption of e-Government could provide valuable insight into how a low level of ICT literacy, absence of Government encouragement and lack of transparency in a specific society can discourage citizens from adopting e-Government. A further investigation on these antecedents to the problem of e-Government adoption and use could help public organisations to better understand the role that public policies and cultural differences play in e-Government adoption.

IS scholars suggest that adoption does not guarantee the eventual use and, thus, the success of an innovation. The quantitative data analyses from PLS-SEM and fsQCA show gaps in the performance of the research model from evaluating the adoption to the use of e-Government services, despite outperforming the baseline UTAUT. It is also worth noting that the use of the UTAUT is equally as constraining as it is developmental. The structural model analysis using R^2 through PLS-SEM showed that the research model explained 77.1% of the variance in the intention to adopt e-Government. However, only 34.2% explained the use of e-Government services. Further, from the model proposition analysis using fsQCA, despite having a consistency of 99.4% for the adoption of e-Government, the research model on the use of e-Government services only shows a consistency of 76.3%. This is below the minimum threshold of 80% to be considered theory advancement. These results suggest further studies into the specific factors for the use of e-Government that differ from the adoption factors would result in a better understanding of the issues that specifically affect the use of e-Government services.

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Appendices

Appendix A: Ethics Approval

RMIT UNIVERSITY

Deputy Pro Vice-Chancellor
(Research & Innovation)
College of Business

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Notice of Approval

Date:	9 March 2018
Project number:	21337
Project title:	*An Empirical Examination of E-Government Adoption in Indonesia*
Risk classification:	Low Risk
Chief Investigator:	Prof Hepu Deng
Student Investigator:	Mr Alvedi Chandra Chandra Sabani
Other Investigator:	Dr Vinh Thai
Project Approved:	**From: 2 March 2018 To: 28 February 2021**

Terms of approval:

Responsibilities of the principal investigator

It is the responsibility of the principal investigator to ensure that all other investigators and staff on a project are aware of the terms of approval and to ensure that the project is conducted as approved by BCHEAN. Approval is only valid while the investigator holds a position at RMIT University.

1. *Amendments*
   Approval must be sought from BCHEAN to amend any aspect of a project including approved documents. To apply for an amendment submit a request for amendment form to the BCHEAN secretary. This form is available on the Human Research Ethics Committee (HREC) website. Amendments must not be implemented without first gaining approval from BCHEAN.
2. *Adverse events*
   You should notify BCHEAN immediately of any serious or unexpected adverse effects on participants or unforeseen events affecting the ethical acceptability of the project.
3. *Participant Information and Consent Form (PICF)*
   The PICF must be distributed to all research participants, where relevant, and the consent form is to be retained and stored by the investigator. The PICF must contain the RMIT University logo and a complaints clause including the above project number.
4. *Annual reports*
   Continued approval of this project is dependent on the submission of an annual report.
5. *Final report*
   A final report must be provided at the conclusion of the project. BCHEAN must be notified if the project is discontinued before the expected date of completion.
6. *Monitoring*
   Projects may be subject to an audit or any other form of monitoring by BCHEAN at any time.
7. *Retention and storage of data*
   The investigator is responsible for the storage and retention of original data pertaining to a project for a minimum period of five years.

Regards,

Associate Professor Penny Weller
Chairperson
RMIT BCHEAN

Appendix B: PICF for Interview in Indonesian

Lembar Informasi Peserta / Formulir Persetujuan

Interview

Judul	An Empirical Examination of E-Government in Indonesia
Kepala Penyidik / Pengawas Senior	Professor Hepu Deng
Rekan Penyidik / Rekan Pengawas	Dr Vinh Thai
Pelajar Penelitian Utama	Mr Alvedi Sabani

Apa partisipasi saya?

Jika Anda memutuskan untuk mengambil bagian dalam proyek penelitian, Anda akan diundang untuk melengkapi wawancara semi-terstruktur. Bagian pertama meminta informasi demografis. Bagian ini seharusnya tidak lebih dari 10 menit untuk menyelesaikannya. Bagian kedua terdiri dari pertanyaan spesifik terkait identifikasi faktor kritis untuk adopsi e-government terkait persepsi dan pandangan peserta. Bagian ini harus memakan waktu sekitar 50 menit untuk menyelesaikannya. Wawancara akan menjadi rekaman audio dengan persetujuan Anda dan catatan akan diambil untuk melengkapi rekaman. Tidak ada biaya yang terkait dengan partisipasi dalam proyek penelitian ini dan Anda juga tidak akan dibayar.

1 Pengantar

Anda diundang untuk ambil bagian dalam proyek penelitian ini, yang disebut An Empirical Examination of E-Government di Indonesia. Anda diundang karena Anda telah mengindikasikan bahwa Anda telah menggunakan layanan e-government.

Lembar Informasi / Formulir Persetujuan Peserta ini bercerita tentang proyek penelitian. Ini menjelaskan proses yang terlibat dengan mengambil bagian. Mengetahui apa yang terlibat

akan membantu Anda memutuskan apakah Anda ingin mengambil bagian dalam penelitian ini.

Silahkan baca informasi ini dengan saksama. Ajukan pertanyaan tentang apapun yang Anda tidak mengerti atau ingin tahu lebih banyak tentang. Sebelum memutuskan apakah akan ikut ambil bagian, Anda mungkin ingin membicarakannya dengan saudara atau teman.

Partisipasi dalam penelitian ini bersifat sukarela. Jika Anda tidak ingin ambil bagian, Anda tidak perlu melakukannya.

Jika Anda memutuskan ingin mengambil bagian dalam proyek penelitian, Anda akan diminta untuk menandatangani bagian persetujuan. Dengan menandatanganinya, Anda memberi tahu kami bahwa Anda:

• Pahami apa yang telah Anda baca

• Persetujuan untuk ambil bagian dalam proyek penelitian

Anda akan diberi salinan Formulir Informasi dan Lembar Informasi Peserta ini untuk disimpan.

2 Apa tujuan dari penelitian ini??

Penelitian ini bertujuan untuk mengetahui faktor-faktor kritis untuk adopsi e-government dari perspektif warga negara Indonesia.

Studi ini berkontribusi pada domain penelitian e-government baik dari sudut pandang teoretis maupun praktis. Dari perspektif teoritis, penelitian ini memberikan pemahaman yang lebih baik mengenai faktor kritis untuk adopsi e-government di Indonesia. Dari perspektif praktis, penelitian ini memberi saran kepada pemerintah Indonesia dan organisasi publik mengenai bagaimana penerapan e-government dapat ditingkatkan. Saran tersebut dapat mengarah pada pengembangan strategi dan kebijakan yang lebih baik untuk pengembangan e-government yang berkelanjutan di Indonesia.

Hasil penelitian ini akan digunakan oleh peneliti Alvedi Sabani untuk mendapatkan gelar Doctor of Philosophy. Penelitian ini didanai oleh RMIT University.

3 Apa partisipasi dalam penelitian ini?

Jika Anda memutuskan untuk mengambil bagian dalam proyek penelitian, Anda akan diundang untuk melengkapi wawancara semi-terstruktur. Bagian pertama meminta informasi demografis. Bagian ini seharusnya tidak lebih dari lima menit untuk menyelesaikannya. Bagian kedua terdiri dari pertanyaan spesifik terkait identifikasi faktor kritis untuk adopsi e-government terkait persepsi dan pandangan peserta. Bagian ini harus memakan waktu sekitar 25 menit untuk menyelesaikannya. Wawancara akan menjadi rekaman audio dengan persetujuan Anda dan catatan akan diambil untuk melengkapi rekaman. Anda berhak meminta untuk rekaman audio diberhentikan kapan saja selama proses interview.

Tidak ada biaya yang terkait dengan partisipasi dalam proyek penelitian ini dan Anda juga tidak akan dibayar.

4 Informasi lain yang relevan tentang proyek penelitian

Pengambilan data penelitian ini membutuhkan 250 tanggapan survei yang valid dan 10 sampai 16 wawancara tatap muka pengguna e-government di Indonesia untuk menilai secara memadai masalah penelitian.

5 Apakah saya harus ambil bagian dalam proyek penelitian ini?

Partisipasi dalam wawancara bersifat sukarela. Jika Anda tidak ingin ambil bagian, Anda tidak perlu melakukannya. Jika Anda memutuskan untuk mengambil bagian dan kemudian berubah pikiran, Anda bebas untuk menarik diri dari wawancara kapan saja. Kecuali Anda mengatakan bahwa Anda ingin kami menyimpannya, rekaman apapun akan terhapus dan informasi yang Anda berikan tidak akan disertakan dalam hasil penelitian. Anda mungkin juga menolak menjawab pertanyaan yang tidak ingin Anda jawab selama wawancara berlangsung.

Jika Anda memutuskan untuk ambil bagian, Anda akan diberikan Formulir Informasi dan Persetujuan Peserta ini untuk ditandatangani dan Anda akan diberi salinan untuk disimpan.

Keputusan Anda apakah akan ambil bagian atau tidak ambil bagian, atau ambil bagian dan kemudian mundur, tidak akan mempengaruhi hubungan Anda dengan para peneliti, dengan Universitas RMIT.

6 Apa manfaat yang mungkin diambil?

Temuan dari penelitian ini akan digunakan untuk mengembangkan dan memvalidasi model penelitian untuk adopsi e-government di Indonesia. Berpartisipasi dalam wawancara merupakan kesempatan berharga bagi Anda untuk mengungkapkan bagaimana e-

government dapat ditingkatkan untuk melayani masyarakat dengan lebih baik. Hasil penelitian ini akan memberikan informasi yang berguna bagi pemerintah Indonesia untuk pengembangan e-government di masa depan.

7 Apa risikonya dan kerugiannya?

Tidak ada risiko langsung dan tersembunyi dalam berpartisipasi dalam penelitian ini. Jika ada pertanyaan yang membuat Anda khawatir, Anda bebas untuk tidak menjawabnya. Anda tidak akan diminta memberikan informasi sensitif apapun. Jika Anda tidak nyaman dengan tanggapan Anda terhadap pertanyaan-pertanyaan atau jika Anda merasa berpartisipasi dalam wawancara, Anda harus memberi tahu peneliti bahwa Anda ingin mengakhiri wawancara. Para periset akan mendiskusikan kekhawatiran Anda dengan Anda secara rahasia dan menyarankan tindakan tindak lanjut yang tepat jika perlu.

8 Bagaimana jika saya menarik diri dari proyek penelitian ini?

Jika Anda setuju untuk berpartisipasi, Anda dapat menarik diri kapan saja. Jika Anda memutuskan untuk menarik diri dari proyek ini, mohon beritahu anggota tim peneliti. Keputusan Anda untuk menarik tidak akan mempengaruhi hubungan Anda dengan para peneliti, dengan Universitas RMIT.

Anda memiliki hak untuk memiliki data yang tidak diproses yang ditarik dan dimusnahkan, sehingga dapat diidentifikasi dengan andal.

9 Apa yang terjadi ketika proyek riset berakhir?

Diharapkan hasil penelitian ini akan dipublikasikan dan / atau didisukusikan dalam berbagai forum. Dalam publikasi dan / atau presentasi, informasi akan diberikan sedemikian rupa sehingga Anda tidak dapat diidentifikasi. Temuan penelitian ini akan ditulis dalam tesis PhD dan di makalah akademis yang relevan tanpa ada rincian peserta yang diungkapkan. Peserta akan dapat memperoleh hasil penelitian dan data pribadi mereka yang dikumpulkan selama penelitian dengan menghubungi Mr Alvedi Sabani.

Bagaimana proyek penelitian dilakukan?

10 Apa yang akan terjadi dengan informasi tentang saya?

Dengan menandatangani formulir persetujuan, Anda menyetujui tim peneliti mengumpulkan dan menggunakan informasi dari Anda untuk proyek penelitian. Setiap informasi yang

diperoleh sehubungan dengan proyek penelitian ini yang dapat mengidentifikasi Anda akan tetap dirahasiakan.

Kecuali Anda mengatakan bahwa Anda ingin kami menyimpannya, rekaman apapun akan terhapus dan informasi yang Anda berikan tidak akan disertakan dalam hasil penelitian. Anda mungkin juga menolak menjawab pertanyaan yang tidak ingin Anda jawab selama wawancara berlangsung.

Setelah selesai, data yang dikumpulkan akan disimpan dengan aman selama lima tahun di Sekolah Bisnis IT and Logistics, RMIT University. Data di server RMIT University kemudian akan dihapus dan dihapus. Semua informasi yang dikumpulkan akan diperlakukan dengan penuh keyakinan dan hanya dapat diakses oleh penyidik.

Diharapkan hasil penelitian ini akan dipublikasikan dan / atau disajikan dalam berbagai forum. Dalam publikasi dan / atau presentasi, informasi akan diberikan sedemikian rupa sehingga Anda tidak dapat diidentifikasi. Temuan penelitian ini akan ditulis dalam tesis PhD dan di makalah akademis yang relevan tanpa ada rincian peserta yang diungkapkan.

Sesuai dengan privasi Australia dan / atau Victoria yang relevan dan undang-undang terkait lainnya, Anda berhak meminta akses ke informasi tentang Anda yang dikumpulkan dan disimpan oleh tim peneliti. Anda juga memiliki hak untuk meminta agar setiap informasi yang Anda tidak setuju dikoreksi. Informasikan kepada anggota tim peneliti yang disebutkan di bagian akhir dokumen ini jika Anda ingin mengakses informasi Anda.

Setiap informasi yang Anda berikan dapat diungkapkan hanya jika (1) melindungi Anda atau orang lain dari bahaya, (2) jika secara khusus diizinkan oleh undang-undang, (3) Anda memberi periset izin tertulis dari mereka. Setiap informasi yang diperoleh untuk tujuan proyek penelitian ini dan untuk publikasi masa depan yang dapat mengidentifikasi Anda akan diperlakukan sebagai rahasia dan disimpan dengan aman.

11 Siapa yang mengatur dan mendanai penelitian?

Peneliti utama, Alvedi Sabani adalah seorang mahasiswa PhD di School of Business Information Technology and Logistics, RMIT University. Pengawasnya untuk penelitian PhD adalah Professor Hepu Deng dan Doktor Vinh Thai. Penelitian ini didanai oleh RMIT University.

12 Siapa yang telah meninjau proyek penelitian?

Semua penelitian di Australia yang melibatkan manusia ditinjau oleh kelompok independen orang yang disebut Human Research Ethics Committee (HREC). Proyek penelitian ini telah disetujui oleh RMIT University HREC.

Proyek ini akan dilaksanakan sesuai dengan Pernyataan Nasional Perilaku Etis dalam Penelitian Manusia (2007). Pernyataan ini telah dikembangkan untuk melindungi kepentingan orang-orang yang setuju untuk berpartisipasi dalam penelitian penelitian manusia.

13 Informasi lebih lanjut dan siapa yang harus dihubungi

Jika Anda menginginkan informasi lebih lanjut mengenai proyek ini, Anda dapat menghubungi orang-orang berikut ini:

Kontak peneliti

Nama	Professor Hepu Deng
Posisi	Penyidik Utama / Pengawas Senior
Telepon	+61 3 9925 5823
Email	hepu.deng@rmit.edu.au

14 Keluhan

Jika Anda memiliki masalah atau pertanyaan tentang proyek penelitian ini, yang tidak ingin Anda diskusikan dengan para peneliti yang tercantum dalam dokumen ini, Anda dapat menghubungi:

Nama peninjau HREC	RMIT University
Sekretaris HREC	Peter Burke
Telepon	+61 3 9925 2251
Email	human.ethics@rmit.edu.au
Alamat	Research Ethics Co-ordinator Research Integrity Governance and Systems RMIT University GPO Box 2476 MELBOURNE VIC 3001

Formulir Persetujuan

Judul	An Empirical Examination of E-Government in Indonesia
Kepala Penyidik / Pengawas Senior	Professor Hepu Deng
Rekan Penyidik / Rekan Pengawas	Dr Vinh Thai
Pelajar Penelitian Utama	Mr Alvedi Sabani

Pernyataan Peserta

Saya telah membaca dan memahami Lembar Informasi Peserta.

Saya memahami tujuan, prosedur dan risiko penelitian yang dijelaskan dalam proyek ini.

Saya memiliki kesempatan untuk mengajukan pertanyaan dan saya puas dengan jawaban yang saya terima.

Saya dengan bebas setuju untuk berpartisipasi dalam proyek penelitian ini seperti yang dijelaskan dan mengerti bahwa saya bebas untuk menarik diri kapan saja selama proyek tanpa mempengaruhi hubungan saya dengan RMIT University.

Saya mengerti bahwa saya akan diberi salinan dokumen yang ditandatangani ini untuk disimpan.

Nama Peserta (huruf cetak) _____

Tanda Tangan _____ Tgl _____

Pernyataan Peneliti†

Saya telah memberikan penjelasan lisan tentang proyek penelitian, prosedur dan risikonya dan saya percaya bahwa peserta memahami penjelasan tersebut.

Nama Peneliti (huruf cetak) _____

Tanda Tangan _____ Tgl _____

† Anggota tim riset yang tepat harus memberikan penjelasan dan informasi tentang proyek penelitian.

Catatan: Semua pihak yang menandatangani bagian persetujuan harus menanggalkan tanda tangan mereka sendiri.

Appendix C: PICF for Interview in English

Participant Information Sheet/Consent Form

Interview

Title	An Empirical Examination of E-Government in Indonesia
Chief Investigator/Senior Supervisor	Professor Hepu Deng
Associate Investigator(s)/Associate Supervisor(s)	Dr Vinh Thai
Principal Research Student(s)	Mr Alvedi Sabani

What does my participation involve?

If you decide to take part in the research project, you will be invited to participate in a semi-structured interview. The first part asks for demographic information. This part should take no more than 10 minutes to complete. The second part consists of specific questions related to the identification of critical factors for the adoption of e-government with respect to the participant's perception and view. This part should take approximately 50 minutes to complete. The interview will be audio recorded with your consent and notes will be taken to complement the recordings. There are no costs associated with participating in this research project, nor will you be paid.

1 Introduction

You are invited to take part in this research project, which is called *An Empirical Examination of E-Government in Indonesia*. You are invited because you have indicated that you have used e-government services.

This Participant Information Sheet/Consent Form tells you about the research project. It explains the processes involved with taking part. Knowing what is involved will help you decide if you want to take part in the research.

Please read this information carefully. Ask questions about anything that you don't understand or want to know more about. Before deciding whether or not to take part, you might want to talk about it with a relative or friend.

Participation in this research is completely voluntary. If you don't wish to take part, you don't have to.

If you decide you want to take part in the research project, you will be asked to sign the consent section. By signing it you are telling us that you:

• Understand what you have read

• Consent to take part in the research project

You will be given a copy of this Participant Information Sheet and Consent Form to keep.

2 What is the purpose of this research?

This study aims to investigate the critical factors for the adoption of e-government from the perspective of citizens in Indonesia.

This study contributes to the e-government research domain from both theoretical and practical perspectives. From a theoretical perspective, this research provides a better understanding of the critical factors for the adoption of e-government in Indonesia. From a practical perspective, this research aims to provide the Indonesian government and public organisations with relevant suggestions on how the adoption of e-government can be improved. Such suggestions can lead to the development of better strategies and policies for the continuous development of e-government in Indonesia.

The results of this research will be used by the researcher Alvedi Sabani to obtain a Doctor of Philosophy degree. This research has been funded by RMIT University.

3 What does participation in this research involve?

If you decide to take part in the research project, you will be invited to participate in a semi-structured interview. The first part asks for demographic information. This part should take no more than 10 minutes to complete. The second part consists of specific questions related to the identification of critical factors for the adoption of e-government with respect to the participant's perception and view. This part should take approximately 50 minutes to complete. The interview will be audio recorded with your consent and notes will be taken to complement the recordings. You may request that audio recording ceases at any stage during the interview.

There are no costs associated with participating in this research project, nor will you be paid.

4 Other relevant information about the research project

The data collection of this research requires 250 valid survey responses and 10 to 16 face-face interviews with e-government users in Indonesia.

5 Do I have to take part in this research project?

Participation in the interview is completely voluntary. If you do not wish to take part, you do not have to. If you decide to take part and later change your mind, you are free to withdraw from the interview at any time. Unless you say that you want us to keep them, any recordings will be erased, and information you have provided will not be included in the study results. You may also refuse to answer any questions that you do not wish to answer during the interview.

If you do decide to take part, you will be given this Participant Information and Consent Form to sign, and you will be given a copy to keep

Your decision whether to take part or not to take part, or to take part and then withdraw, will not affect your relationship with the researchers, with RMIT University.

6 What are the possible benefits of taking part?

Findings from this study will be used to develop and validate a research model for the adoption of e-government in Indonesia. Participating in the interview is a valuable opportunity for you to express how e-government can be improved to serve the public better. The outcome of the research will provide useful information for Indonesian government for future e-government developments.

7 What are the risks and disadvantages of taking part?

There are no apparent or hidden risks in participating in this research. If any questions may cause you concern, you are free not to answer them. You will not be asked to provide any sensitive information. If you are unduly concerned about your responses to any of the questions or if you find participation in the interview distressing, you should advise the researcher that you want to terminate the interview. The researchers will discuss your concerns with you confidentially and suggest appropriate follow-up actions if necessary.

8 What if I withdraw from this research project?

If you do consent to participate, you may withdraw at any time. If you decide to withdraw from the project, please notify a member of the research team. Your decision to withdraw will not affect your relationship with the researchers, with RMIT University.

You have the right to have any unprocessed data withdrawn and destroyed, providing it can be reliably identified.

9 What happens when the research project ends?

It is anticipated that the results of this research project will be published and/or presented in a variety of forums. In any publication and/or presentation, information will be provided in such a way that you cannot be identified. The research findings will be written up in a PhD thesis and in relevant academics papers without any details of participants disclosed. The participant will be able to obtain the results of the study and their personal data collected in the course of the research by contacting Mr Alvedi Sabani.

How is the research project being conducted?

10 What will happen to information about me?

By signing the consent form, you consent to the research team collecting and using information from you for the research project. Any information obtained in connection with this research project that can identify you will remain confidential.

Unless you say that you want us to keep them, any recordings will be erased, and information you have provided will not be included in the study results. You may also refuse to answer any questions that you do not wish to answer during the interview.

Following completion of the project, the data collected will be securely stored for a period of five years in the School of Business IT and Logistics, RMIT University. The data in the RMIT

University server would then be deleted and expunged. All information collected would be treated in complete confidence and can only be accessed by the investigator.

It is anticipated that the results of this research project will be published and/or presented in a variety of forums. In any publication and/or presentation, information will be provided in such a way that you cannot be identified. The research findings will be written up in a PhD thesis and in relevant academics papers without any details of participants disclosed.

In accordance with relevant Australian and/or Victorian privacy and other relevant laws, you have the right to request access to the information about you that is collected and stored by the research team. You also have the right to request that any information with which you disagree be corrected. Please inform the research team member named at the end of this document if you would like to access your information.

Any information that you provide can be disclosed only if (1) it protects you or others from harm, (2) if specifically allowed by law, (3) you provide the researchers with written permission. Any information obtained for the purpose of this research project and for future publications that can identify you will be treated as confidential and securely stored.

11 Who is organising and funding the research?

The principal researcher, Alvedi Sabani is a PhD student at the School of Business Information Technology and Logistics, RMIT University. His supervisors for the PhD research are Professor Hepu Deng and Doctor Vinh Thai. This research is funded by RMIT University.

12 Who has reviewed the research project?

All research in Australia involving humans is reviewed by an independent group of people called a Human Research Ethics Committee (HREC). This research project has been approved by the RMIT University HREC.

This project will be carried out according to the *National Statement on Ethical Conduct in Human Research* (2007). This statement has been developed to protect the interests of people who agree to participate in human research studies.

13 Further information and who to contact

If you want any further information concerning this project, you can contact the following people:

Research contact person

Name	Professor Hepu Deng
Position	Chief investigator / Senior supervisor
Telephone	+61 3 9925 5823
Email	hepu.deng@rmit.edu.au

14 Complaints

Should you have any concerns or questions about this research project, which you do not wish to discuss with the researchers listed in this document, then you may contact:

Reviewing HREC name	RMIT University
HREC Secretary	Peter Burke
Telephone	+61 3 9925 2251
Email	human.ethics@rmit.edu.au
Mailing address	Research Ethics Co-ordinator Research Integrity Governance and Systems RMIT University GPO Box 2476 MELBOURNE VIC 3001

Consent Form

Title	An Empirical Examination of E-Government in Indonesia
Chief Investigator/Senior Supervisor	Professor Hepu Deng
Associate Investigator(s)/Associate	Dr Vinh Thai
Principal Research Student(s)	Mr Alvedi Sabani

Acknowledgement by Participant

I have read and understood the Participant Information Sheet.

I understand the purposes, procedures and risks of the research described in the project.

I have had an opportunity to ask questions and I am satisfied with the answers I have received.

I freely agree to participate in this research project as described and understand that I am free to withdraw at any time during the project without affecting my relationship with RMIT.

I understand that I will be given a signed copy of this document to keep.

Name of Participant (please print) _____

Signature _____ Date _____

Declaration by Researcher†

I have given a verbal explanation of the research project, its procedures and risks and I believe that the participant has understood that explanation.

Name of Researcher† (please print) _____

Signature _____ Date _____

† An appropriately qualified member of the research team must provide the explanation of, and information concerning, the research project.

Note: All parties signing the consent section must date their own signature.

Appendix D: Interview Schedule in Indonesian

Penelitian ini bertujuan untuk menguji faktor-faktor penting untuk adopsi e-government dari perspektif warga di Indonesia

E-government

Pemerintahan elektronik (e-government) adalah tentang penggunaan teknologi informasi dan komunikasi (TIK) untuk meningkatkan penyampaian layanan publik kepada warga dan bisnis.

Interview ini berisi bagian berikut

Bagian I: identifikasi informasi demografis responden

Bagian II: investigasi faktor kritis untuk adopsi e-government di Indonesia.

Bantuan Anda diminta secara anonim menjawab pertanyaan dalam wawancara. Tanggapan Anda akan sangat rahasia.

Pertanyaan Skrining untuk Memilih Peserta Wawancara

a) Pernahkah Anda menggunakan layanan e-government?
b) Seberapa sering Anda menggunakan layanan e-government?

Bagian I- Demografis

1. Umur peserta?
   - ☐ 18-20
   - ☐ 21-30
   - ☐ 31-45
   - ☐ 46-60
   - ☐ Diatas 60 tahun

2. Jenis kelamin?
   - ☐ Pria
   - ☐ Wanita
   - ☐ Tidak ingin menjawab

3. Apa pendidikan terakhir Anda?
   - ☐ Tidak sekolah
   - ☐ Sekolah Dasar
   - ☐ Sekolah Menengah
   - ☐ Diploma
   - ☐ Sarjana 1
   - ☐ Sarjana 2
   - ☐ Sarjana 3

4. Apa pekerjaan Anda?
   - ☐ Pelajar
   - ☐ Pegawai pemerintah
   - ☐ Pegawai swasta
   - ☐ Wirausaha
   - ☐ Tidak bekerja
   - ☐ Pensiun
   - ☐ Lainnya

Bagian II

Tujuan dari bagian ini adalah untuk menguji faktor kritis untuk penerapan e-government di Indonesia.

Pertanyaan utama

1. Jenis layanan e-Government yang Anda gunakan atau ingin Anda gunakan?
2. Apa yang memotivasi penggunaan layanan e-government?
3. Apa faktor penting untuk menggunakan layanan e-government?
4. Bagaimana penyampaian layanan e-government dapat ditingkatkan?

Pertanyaan potensial lanjutan dengan probe

1 Menurut Anda, apakah ketersediaan dari informasi dan layanan di dalam e-government system penting bagi Anda?

a. Kenapa Anda berpikir begitu?

b. Apakah menurut Anda e-government telah memberikan informasi yang lengkap?

c. Apakah ada informasi yang Anda ingin e-government berikan?

d. Apakah Anda menemukan kesulitan dalam menemukan yang informasi tentang e-government?

e. Bagaimana ketersediaan informasi mempengaruhi keputusan Anda untuk menggunakan e-government?

f. Apakah menurut Anda e-government telah menyediakan berbagai layanan?

g. Apakah ada layanan tertentu yang Anda ingin e-government sediakan?

h. Apakah mudah untuk mengakses layanan tersebut dari e-government?

i. Bagaimana ketersediaan layanan memengaruhi keputusan Anda untuk menggunakan e-government?

j. Apakah Anda memiliki komentar lebih lanjut ?

2 Menurut Anda, apakah kualitas informasi e-government penting bagi Anda?

a. Kenapa Anda berpikir begitu?

b. Apa harapan Anda atas informasi yang diberikan oleh e-government?

c. Bagaimana kualitas informasi mempengaruhi keputusan Anda untuk menggunakan e-government?

d. Menurut Anda bagaimana pemerintah bisa memperbaiki kualitas informasi e-government?

e. Ada komentar lain?

3 Apakah menurut Anda fungsi layanan e-government penting bagi Anda?

a. Kenapa Anda berpikir begitu?

b. Apakah menurut Anda layanan e-government dapat diandalkan dan sesuai dengan tujuan?

b. Apa harapan Anda terhadap layanan yang diberikan oleh e-government?

c. Bagaimana fungsi layanan mempengaruhi keputusan Anda untuk menggunakan e-government?

d. Menurut Anda bagaimana pemerintah bisa memperbaiki fungsionalitas layanan e-government?

e. Ada komentar lain?

4 Apakah menurut Anda efisiensi dari layanan e-government penting bagi Anda?

a. Kenapa Anda berpikir begitu?

b. Apa pendapat Anda tentang proses yang terlibat dalam penggunaan layanan e-government dibandingkan dengan pendekatan tradisional dalam hal kesederhanaan, ketepatan waktu , dan biaya?

c. Bagaimana efisiensi mempengaruhi keputusan Anda untuk menggunakan e-government?

d. Menurut Anda, bagaimana pemerintah dapat meningkatkan efisiensi penggunaan e-government ?

e. Ada komentar lain?

5 Apakah menurut Anda keamanan informasi mempengaruhi keputusan Anda untuk menggunakan e-government?

a. Kenapa Anda berpikir begitu?

b. Apa pendapat Anda tentang keamanan informasi e-government?

c. Apakah Anda mempercayai informasi dan layanan dari e-government?

d. Apakah Anda akan mengirimkan informasi senstif Anda ke e-government?

e. Apakah Anda merasa aman tentang itu?

f. Apa pendapat Anda tentang risiko menggunakan e-government?

g. Menurut Anda, bagaimana pemerintah dapat memperbaiki ini?

h. Ada komentar lain?

6 Menurut Anda, apakah aksesibilitas dari e-government yang penting bagi Anda?

a. Kenapa Anda berpikir begitu?

b. Bagaimana Anda mengakses sistem e-government?

c. Apakah Anda mengalami kesulitan dalam mengakses sistem e-government?

d. Apakah perangkat TIK dan internet sudah tersedia untuk Anda?

e. Apa perangkat pilihan Anda untuk mengakses e-government?

f. Apakah menurut Anda penting untuk memiliki akses ponsel?

g. Apakah menurut Anda pemerintah telah menyediakan akses sistem yang memadai ke e-government?

h. Apa harapan Anda tentang aksesibilitas e-government?

Saya. Bagaimana aksesibilitas memengaruhi keputusan Anda untuk menggunakan e-government?

j. Menurut Anda, bagaimana pemerintah dapat meningkatkan aksesibilitas e-government?

k. Ada komentar lain?

7 Apa pendapat Anda tentang literasi TIKAnda?

a. Apakah komputer dan internet mudah tersedia untuk Anda?

b. Bagaimana Anda mengaksesnya?

c. Seberapa sering Anda menggunakan komputer dan internet?

d. Seberapa baik Anda menggunakannya?

e. Ada komentar lain?

8 Apakah menurut Anda kegunaan e-government itu penting bagi Anda?

a. Kenapa Anda berpikir begitu?

b. Apakah Anda senang menggunakan e-government?

c. Bagaimana Anda menemukan kemudahan menggunakan e-government?

d. Apakah menurut Anda layanan e-government mudah dinavigasi?

e. Seberapa sulit mempelajari layanan e-government?

f. Apa harapan Anda akan kegunaan e-government?

g. Bagaimana kegunaan mempengaruhi keputusan Anda untuk menggunakan e-government?

h. Menurut Anda bagaimana pemerintah dapat memperbaiki kegunaan e-government?

i. Ada komentar lain?

9 Apakah menurut Anda kesadaran pengguna akan e-government penting bagi Anda?

a. Kenapa Anda berpikir begitu?

b. Seberapa baik Anda mengerti e-government?

c. Apakah Anda menemukan kesulitan dalam menemukan informasi tentang e-government?

d. Bagaimana kesadaran mempengaruhi keputusan Anda untuk menggunakan e-government?

e. Menurut Anda bagaimana pemerintah dapat meningkatkan kesadaran pengguna tentang e-government?

f. Ada komentar lain?

10 Apakah menurut Anda ekspektasi masyarakat mempengaruhi keputusan Anda untuk mengadopsi e-government?

a. Kenapa Anda berpikir begitu?

b. Apakah menurut Anda layanan e-government diadopsi secara luas oleh masyarakat?

c. Menurut Anda, apakah penggunaan e-government didorong oleh komunitas?

d. Apa pendapat Anda tentang opini masyarakat tentang penggunaan e-government?

e. Apa pendapat Anda tentang pendapat teman dan keluarga Anda tentang penggunaan e-government?

f. Apakah pendapat mereka memengaruhi keputusan Anda untuk menggunakan e-government?

g. Ada komentar lain?

Appendix E: Interview Schedule in English

This study aims to examine the critical factors for the adoption of e-government from the perspective of citizens in Indonesia.

E-government

Electronic government (e-government) is about the use of information and communication technologies for improving the delivery of public services to citizens and businesses.

This interview contains following sections

Part I: identification of the demographic information of the respondent

Part II: investigation of the critical factors for the adoption of e-government in Indonesia.

Your assistance is requested in answering the questions in the interview. Your responses will be strictly confidential.

Thank you.

The Screening Questions for Selecting Participants for Interviews

a. Have you ever used e-government services?
b. How often do you use e-government services?

Part I- Demographic data

1. Which of these age groups are you in?

☐ 18-20
☐ 21-30
☐ 31-45
☐ 46-60
☐ Older than 60

2. What is your gender?

☐ Male
☐ Female
☐ Prefer not to say

3. What is your level of education?

- ☐ No formal school
- ☐ Primary school
- ☐ Junior high school
- ☐ Senior high school
- ☐ Diploma
- ☐ Bachelor degree
- ☐ Master degree
- ☐ Doctoral degree

4. What is your occupation?

- ☐ Student
- ☐ Government employee
- ☐ Private sector employee
- ☐ Self-employed
- ☐ Unemployed
- ☐ Retired
- ☐ Others

Part II

The purpose of this section is to examine the critical factors for the adoption of e-government in Indonesia.

Main Questions

1. What kinds of e-government services do you use or wish to use?
2. What motivates you to use e-government services?
3. What are the critical factors for using e-government services?
4. How the delivery of e-government service can be improved?

Potential follow up questions with probes

1 Do you think the availability of information and services in the e-government system are important to you?

   a. Why do you think so?
   b. Do you think e-government has provided comprehensive information?
   c. Is there any information do you wish e-government to provide?
   d. Do you find any difficulties in finding the information about e-government?
   e. How does the availability of information affect your decision to use e-government?
   f. Do you think e-government has provided a wide range of services?
   g. Is there any particular service do you wish e-government to provide?
   h. Is it relatively easy to access those services from e-government?
   i. How does the availability of services affect your decision to use e-government?
   j. Do you have any further comments?

2 Do you think the information quality of e-government is important to you?

   a. Why do you think so?
   b. What is your expectation on the information provided by e-government?
   c. Do you think e-government has provided accurate information in timely manner?
   d. Do you think the information is relevant and easy to understand?
   e. How does information quality affect your decision to use e-government?
   f. How do you think the government could improve the information quality of e-government?
   g. Do you have any further comments about the information quality?

3 Do you think the service functionality of e-government is important to you?

a. Why do you think so?
b. Do you think e-government services are reliable and fit for purpose?
c. What is your expectation on the services provided by e-government?
d. How does service functionality affect your decision to use e-government?
e. How do you think the government could improve the service functionality of e-government?
f. Do you have any further comments about the service functionality?

4 Do you think the efficiency of e-government is important to you?

a. Why do you think so?
b. What do you think about the process involved in using e-government services compared to traditional approaches in terms of simplicity, timeliness and cost?
c. How does efficiency affect your decision to use e-government?
d. How do you think the government could enhance the efficiency of using e-government?
e. Do you have any further comments about the efficiency?

5 Do you think information security affect your decision to use e-government?

a. Why do you think so?
b. What do you think about the information security of e-government?
c. Do you trust the information and services from e-government?
d. Would you submit your sensitive information to e-government?
e. Do you feel secure about it?
f. What do you think of the risk of using e-government?
g. How do you think the government could improve this?
h. Do you have any further comments about the information security?

6 Do you think the accessibility of e-government is important to you?

a. Why do you think so?
b. How do you access e-government system?
c. Do you find any difficulties in accessing e-government system?
d. Are ICT devices and internet readily available for you?
e. What is your preferred device to access e-government?
f. Do you think it is important to have mobile phone access?

g. Do you think the government has provided sufficient public access to e-government?
h. What is your expectation on the accessibility of e-government?
i. How does accessibility affect your decision to use e-government?
j. How do you think the government could improve the accessibility of e-government?
k. Do you have any further comments about the accessibility?

7 What do you think about your ICT literacy?

a. Are computer and internet readily available for you?
b. How do you access them?
c. How often do you use computer and internet?
d. How well do you use them?
e. Do you have any further about the computer literacy?

8 Do you think the usability of e-government is important to you?

a. Why do you think so?
b. Do you enjoy using e-government?
c. How do you find the ease of using e-government?
d. Do you find e-government system is easy to navigate?
e. How difficult is it to learn e-government system?
f. What is your expectation on the usability of e-government?
g. How does usability affect your decision to use e-government?
h. How do you think the government could improve the usability of e-government?
i. Do you have any further comments about the usability?

9 Do you think the user awareness of e-government is important to you?

a. Why do you think so?
b. How well do you understand e-government?
c. Do you find any difficulties in finding the information about e-government?
d. How does awareness affect your decision to use e-government?
e. How do you think the government could improve the user awareness of e-government?
f. Do you have any further comments about the user awareness?

10 Do you think community expectation affect your decision to adopt e-government?

a. Why do you think so?

b. Do you find e-government system is widely adopted by the community?
c. Do you think the use of e-government is encouraged by the community?
d. What do you think about community opinion on the use of e-government?
e. What do you think about your friends and family opinion on the use of e-government?
f. Do their opinions affect your decision to use e-government?
g. Do you have any further comments about peer pressures?

Appendix F: PICF for Survey in Indonesian

Lembar Informasi Peserta

Survei

Judul	An Empirical Examination of E-Government in Indonesia
Kepala Penyidik / Pengawas Senior	Professor Hepu Deng
Rekan Penyidik / Rekan Pengawas	Dr Vinh Thai
Pelajar Penelitian Utama	Mr Alvedi Sabani

Apa partisipasi saya?

Jika Anda setuju untuk menjadi bagian dari proyek ini, Anda akan diundang untuk mengisi kuesioner. Kuesioner terdiri dari dua bagian. Bagian pertama meminta informasi demografis. Bagian ini seharusnya tidak lebih dari tiga menit untuk menyelesaikannya. Bagian kedua terdiri dari pertanyaan spesifik terkait identifikasi faktor kritis untuk adopsi e-government sehubungan dengan persepsi dan pandangan Anda. Bagian ini harus memakan waktu sekitar sepuluh menit untuk menyelesaikannya. Tidak ada biaya yang terkait dengan partisipasi dalam proyek penelitian ini dan Anda juga tidak akan dibayar.

1 Pengantar

Anda diundang untuk ambil bagian dalam proyek penelitian ini, yang disebut An Empirical Examination of E-Government di Indonesia. Anda telah diundang karena Anda telah menggunakan layanan e-government dan menanggapi undangan di media sosial.

Lembar Informasi Peserta ini bercerita tentang proyek penelitian. Ini menjelaskan proses yang terlibat dengan mengambil bagian. Mengetahui apa yang terlibat akan membantu Anda memutuskan apakah Anda ingin mengambil bagian dalam penelitian ini.

Silahkan baca informasi ini dengan saksama. Ajukan pertanyaan tentang apapun yang Anda tidak mengerti atau ingin tahu lebih banyak tentang. Sebelum memutuskan apakah akan ikut ambil bagian, Anda mungkin ingin membicarakannya dengan saudara atau teman.

Partisipasi dalam penelitian ini bersifat sepenuhnya sukarela. Jika Anda tidak ingin ambil bagian, Anda tidak perlu melakukannya.

Mengirim kuesioner lengkap Anda merupakan indikasi persetujuan Anda untuk berpartisipasi dalam penelitian ini. Setelah Anda menyelesaikan kuesioner, tanggapan Anda tidak dapat ditarik karena tidak dapat dikenali dan oleh karena itu kami tidak dapat membedakan mana yang menjadi milik Anda.

2 Apa tujuan dari penelitian ini?

Penelitian ini bertujuan untuk mengetahui faktor-faktor kritis untuk adopsi e-government dari perspektif warga di Indonesia.

Studi ini berkontribusi pada domain penelitian e-government baik dari sudut pandang teoretis maupun praktis. Dari perspektif teoritis, penelitian ini memberikan pemahaman yang lebih baik mengenai faktor kritis untuk adopsi e-government di Indonesia. Dari perspektif praktis, penelitian ini memberi saran kepada pemerintah Indonesia dan organisasi publik mengenai bagaimana penerapan e-government dapat ditingkatkan. Saran tersebut dapat mengarah pada pengembangan strategi dan kebijakan yang lebih baik untuk pengembangan e-government yang berkelanjutan di Indonesia.

Hasil penelitian ini akan digunakan oleh peneliti Alvedi Sabani untuk mendapatkan gelar Doctor of Philosophy. Penelitian ini didanai oleh RMIT University.

3 Apa partisipasi saya dalam penelitian ini?

Jika Anda setuju untuk menjadi bagian dari proyek ini, Anda akan diundang untuk mengisi kuesioner. Kuesioner terdiri dari dua bagian. Bagian pertama meminta informasi demografis. Bagian ini seharusnya tidak lebih dari tiga menit untuk menyelesaikannya. Bagian kedua terdiri dari pertanyaan spesifik terkait identifikasi faktor kritis untuk adopsi e-government sehubungan dengan persepsi dan pandangan Anda. Bagian ini harus memakan waktu sekitar

sepuluh menit untuk menyelesaikannya. Tidak ada biaya yang terkait dengan partisipasi dalam proyek penelitian ini dan Anda juga tidak akan dibayar.

4 Informasi lain yang relevan tentang proyek penelitian

Pengumpulan data penelitian ini memerlukan 250 tanggapan survei yang valid dan 10 sampai 16 wawancara tatap muka pengguna e-government di Indonesia untuk menilai secara memadai masalah penelitian.

5 Apakah saya harus ambil bagian dalam proyek penelitian ini?

Partisipasi dalam penelitian bersifat sepenuhnya sukarela. Jika Anda tidak ingin berpartisipasi, Anda tidak perlu melakukannya. Jika Anda memutuskan untuk berpartisipasi dan kemudian berubah pikiran, Anda bebas untuk menarik diri dari survei pada tahap apapun.

Keputusan Anda untuk tidak berpartisipasi tidak akan mempengaruhi hubungan Anda dengan para peneliti, dan Universitas RMIT.

Mengirim kuesioner lengkap Anda merupakan indikasi persetujuan Anda untuk berpartisipasi dalam penelitian ini. Setelah Anda menyelesaikan kuesioner, tanggapan Anda tidak dapat ditarik, karena respon tidak dapat dikenali dan oleh karena itu kami tidak dapat membedakan mana yang menjadi milik Anda.

6 Apa manfaat yang mungkin diambil?

Temuan dari penelitian ini akan digunakan untuk mengembangkan dan memvalidasi model penelitian untuk adopsi e-government di Indonesia. Berpartisipasi dalam wawancara merupakan kesempatan berharga bagi Anda untuk mengungkapkan bagaimana e-government dapat ditingkatkan untuk melayani masyarakat dengan lebih baik. Hasil penelitian ini akan memberikan informasi yang berguna bagi pemerintah Indonesia untuk pengembangan e-government di masa depan.

7 Apa risikonya dan kerugiannya?

Tidak ada risiko langsung dan tersembunyi dalam berpartisipasi dalam penelitian ini. Jika ada pertanyaan yang membuat Anda khawatir, Anda bebas untuk tidak menjawabnya. Anda tidak akan diminta memberikan informasi sensitif apapun. Jika Anda terlalu khawatir dengan jawaban Anda atas pertanyaan-pertanyaan Anda atau jika Anda menemukan partisipasi dalam survei ini, Anda harus memberi tahu peneliti bahwa Anda ingin menyelesaikan survei.

Para periset akan mendiskusikan kekhawatiran Anda dengan Anda secara rahasia dan menyarankan tindakan tindak lanjut yang tepat jika perlu.

Proyek ini akan menggunakan situs eksternal untuk membuat, mengumpulkan dan menganalisis data yang dikumpulkan dalam format survei. Situs yang kami gunakan adalah *Qualtrics*. Jika Anda setuju untuk berpartisipasi dalam survei ini, tanggapan yang Anda berikan akan disimpan di server host mereka. Tidak ada informasi pribadi yang akan dikumpulkan dalam survei sehingga tidak ada yang akan disimpan sebagai data. Setelah kami menyelesaikan pengumpulan dan analisis data kami, kami akan mengimpor data ke server RMIT yang akan disimpan dengan aman selama lima tahun. Data pada host server kemudian akan dihapus dan dihapus.

8 Bagaimana jika saya menarik diri dari proyek penelitian ini?

Setelah Anda menyelesaikan kuesioner, tanggapan Anda tidak dapat ditarik karena tidak dapat dikenali dan oleh karena itu kami tidak dapat membedakan mana yang menjadi milik Anda.

9 Apa yang terjadi ketika proyek riset berakhir?

Diharapkan hasil penelitian ini akan dipublikasikan dan / atau disajikan dalam berbagai forum. Dalam publikasi dan / atau presentasi, informasi akan diberikan sedemikian rupa sehingga Anda tidak dapat diidentifikasi. Temuan penelitian ini akan ditulis dalam tesis PhD dan di makalah akademis yang relevan tanpa ada rincian peserta yang diungkapkan. Peserta akan dapat memperoleh hasil penelitian dan data pribadi mereka yang dikumpulkan selama penelitian dengan menghubungi Mr Alvedi Sabani.

Bagaimana proyek penelitian dilakukan?

10 Apa yang akan terjadi dengan informasi tentang saya?

Setelah selesai, data yang dikumpulkan akan disimpan dengan aman selama lima tahun di Sekolah Bisnis IT and Logistics, RMIT University. Data di server RMIT University kemudian akan dihapus dan dihilangkan. Semua informasi yang dikumpulkan akan diperlakukan dengan sangat hati-hati dan hanya dapat diakses oleh penyidik.

Diharapkan hasil penelitian ini akan dipublikasikan dan / atau dipresentasikan dalam berbagai forum. Dalam publikasi dan / atau presentasi, informasi akan diolah sedemikian rupa sehingga

Anda tidak dapat diidentifikasi. Temuan penelitian ini akan ditulis dalam tesis PhD dan di makalah akademis yang relevan tanpa ada rincian peserta yang diungkapkan.

Setiap informasi yang diperoleh untuk tujuan proyek penelitian ini dan untuk publikasi masa depan yang dapat mengidentifikasi Anda akan diperlakukan dengan rahasia dan disimpan dengan aman.

11 Siapa yang mengatur dan mendanai penelitian?

Peneliti utama, Alvedi Sabani adalah seorang mahasiswa PhD di School of Business Information Technology and Logistics, RMIT University. Pengawasnya untuk penelitian PhD adalah Profesor Hepu Deng dan Dokter Vinh Thai. Penelitian ini didanai oleh RMIT University.

12 Siapa yang telah meninjau proyek penelitian?

Semua penelitian di Australia yang melibatkan manusia ditinjau oleh kelompok independen orang yang disebut Human Research Ethics Committee (HREC). Proyek penelitian ini telah disetujui oleh RMIT University HREC.

Proyek ini akan dilaksanakan sesuai dengan Pernyataan Nasional Perilaku Etis dalam Penelitian Manusia (2007). Pernyataan ini telah dikembangkan untuk melindungi kepentingan orang-orang yang setuju untuk berpartisipasi dalam penelitian penelitian manusia.

13 Informasi lebih lanjut dan siapa yang harus dihubungi

Jika Anda menginginkan informasi lebih lanjut mengenai proyek ini, Anda dapat menghubungi orang-orang berikut ini:

Kontak peneliti

Nama	Professor Hepu Deng
Posisi	Penyidik Utama / Pengawas Senior
Telepon	+61 3 9925 5823
Email	hepu.deng@rmit.edu.au

14 Keluhan

Jika Anda memiliki masalah atau pertanyaan tentang proyek penelitian ini, yang tidak ingin Anda diskusikan dengan para peneliti yang tercantum dalam dokumen ini, Anda dapat menghubungi:

Nama peninjau HREC	RMIT University
Sekretaris HREC	Peter Burke
Telepon	+61 3 9925 2251
Email	human.ethics@rmit.edu.au
Alamat	Research Ethics Co-ordinator Research Integrity Governance and Systems RMIT University GPO Box 2476 MELBOURNE VIC 3001

Appendix G: PICF for Survey in English

Participant Information Sheet

Survey

Title	An Empirical Examination of E-Government in Indonesia
Chief Investigator/Senior Supervisor	Professor Hepu Deng
Associate Investigator(s)/Associate Supervisor(s)	Dr Vinh Thai
Principal Research Student(s)	Mr Alvedi Sabani

What does my participation involve?

If you agree to be part of this project you will be invited to complete a questionnaire. The questionnaire consists of two parts. The first part asks for demographic information. This part should take no more than three minutes to complete. The second part consists of specific questions related to the identification of critical factors for the adoption of e-government with respect to your perception and view. This part should take approximately ten minutes to complete. There are no costs associated with participating in this research project, nor will you be paid.

1 Introduction

You are invited to take part in this research project, which is called *An Empirical Examination of E-Government in Indonesia*. You have been invited because you have used e-government services and responded to an invite on social media.

This Participant Information Sheet tells you about the research project. It explains the processes involved with taking part. Knowing what is involved will help you decide if you want to take part in the research.

Please read this information carefully. Ask questions about anything that you don't understand or want to know more about. Before deciding whether or not to take part, you might want to talk about it with a relative or friend.

Participation in this research is voluntary. If you don't wish to take part, you don't have to.

Submitting your completed questionnaire is an indication of your consent to participate in the study. Once you have completed the questionnaire, your responses cannot be withdrawn because they are non-identifiable and therefore we will not be able to tell which one is yours.

2 What is the purpose of this research?

This study aims to investigate the critical factors for the adoption of e-government from the perspective of citizens in Indonesia.

This study contributes to the e-government research domain from both the theoretical and practical perspectives. From a theoretical perspective, this research provides a better understanding of the critical factors for the adoption of e-government in Indonesia. From a practical perspective, this research provides the Indonesian government and public organisations with relevant suggestions on how the adoption of e-government can be improved. Such suggestions can lead to the development of better strategies and policies for the continuous development of e-government in Indonesia.

The results of this research will be used by the researcher Alvedi Sabani to obtain a Doctor of Philosophy degree. This research has been funded by RMIT University.

3 What does participation in this research involve?

If you agree to be part of this project you will be invited to complete a questionnaire. The questionnaire consists of two parts. The first part asks for demographic information. This part should take no more than three minutes to complete. The second part consists of specific questions related to the identification of critical factors for the adoption of e-government with respect to your perception and view. This part should take approximately ten minutes to complete. There are no costs associated with participating in this research project, nor will you be paid.

4 Other relevant information about the research project

The data collection of this research requires 250 valid survey responses and 10 to 16 face-face interviews with e-government users in Indonesia.

5 Do I have to take part in this research project?

Participation in the research is voluntary. If you do not wish to take part, you do not have to.

Your decision not to participate will not affect your relationship with the researchers, with RMIT University.

Submitting your completed questionnaire is an indication of your consent to participate in the study. Once you have completed the questionnaire, your responses cannot be withdrawn because they are non-identifiable and therefore we will not be able to tell which one is yours.

6 What are the possible benefits of taking part?

Findings from this study will be used to develop and validate a research model for the adoption of e-government in Indonesia. Participating in the survey is a valuable opportunity for you to express how e-government can be improved to serve the public better. The outcome of the research will provide useful information for Indonesian government for future e-government developments.

7 What are the risks and disadvantages of taking part?

There are no apparent or hidden risks in participating in this research. If any questions may cause you concern, you are free not to answer them. You will not be asked to provide any sensitive information. If you are unduly concerned about your responses to any of the questions or if you find participation in the survey distressing, you should advise the researcher that you want to terminate the survey. The researchers will discuss your concerns with you confidentially and suggest appropriate follow-up actions if necessary.

This project will use an external site to create, collect and analyse data collected in a survey format. The site we are using is *Qualtrics*. If you agree to participate in this survey, the responses you provide will be stored on their host server. No personal information will be collected in the survey so none will be stored as data. Once we have completed our data collection and analysis, we will import the data to the RMIT server where it will be stored securely for five years. The data on the host server will then be deleted and expunged.

8 What if I withdraw from this research project?

Once you have completed the questionnaire, your responses cannot be withdrawn because they are non-identifiable and therefore we will not be able to tell which one is yours.

9 What happens when the research project ends?

It is anticipated that the results of this research project will be published and/or presented in a variety of forums. In any publication and/or presentation, information will be provided in such a way that you cannot be identified. The research findings will be written up in a PhD thesis and in relevant academics papers without any details of participants disclosed. The participant will be able to obtain the results of the study and their personal data collected in the course of the research by contacting Mr Alvedi Sabani.

How is the research project being conducted?

10 What will happen to information about me?

Following the completion of the project, the data collected will be securely stored for a period of five years in the School of Business IT and Logistics, RMIT University. The data in the RMIT University server will then be deleted and expunged. All information collected will be treated in complete confidence and can only be accessed by the investigator.

It is anticipated that the results of this research project will be published and/or presented in a variety of forums. In any publication and/or presentation, information will be provided in such a way that you cannot be identified. The research findings will be written up in a PhD thesis and in relevant academics papers without any details of participants disclosed.

Any information obtained for the purpose of this research project and for the future publications that can identify you will be treated as confidential and securely stored.

11 Who is organising and funding the research?

The principal researcher, Alvedi Sabani is a PhD student at the School of Business Information Technology and Logistics, RMIT University. His supervisors for the PhD research are Professor Hepu Deng and Doctor Vinh Thai. This research is funded by RMIT University.

12 Who has reviewed the research project?

All research in Australia involving humans is reviewed by an independent group of people called a Human Research Ethics Committee (HREC). This research project has been approved by the RMIT University HREC.

This project will be carried out according to the *National Statement on Ethical Conduct in Human Research* (2007). This statement has been developed to protect the interests of people who agree to participate in human research studies.

13 Further information and who to contact

If you want any further information concerning this project, you can contact the following people:

Research contact person

Name	Professor Hepu Deng
Position	Chief investigator / Senior supervisor
Telephone	+61 3 9925 5823
Email	hepu.deng@rmit.edu.au

14 Complaints

Should you have any concerns or questions about this research project, which you do not wish to discuss with the researchers listed in this document, then you may contact:

Reviewing HREC name	RMIT University
HREC Secretary	Peter Burke
Telephone	+61 3 9925 2251
Email	human.ethics@rmit.edu.au
Mailing address	Research Ethics Co-ordinator Research Integrity Governance and Systems RMIT University GPO Box 2476 MELBOURNE VIC 3001

Appendix H: Survey Questionnaire in Indonesian

Penelitian ini bertujuan untuk menguji faktor-faktor penting untuk adopsi e-government dari perspektif warga di Indonesia

E-government

Pemerintahan elektronik (e-government) adalah tentang penggunaan teknologi informasi dan komunikasi (TIK) untuk meningkatkan penyampaian layanan publik kepada warga dan bisnis.

Survei ini berisi bagian berikut

Bagian I: identifikasi informasi demografis responden

Bagian II: investigasi faktor kritis untuk adopsi e-government di Indonesia.

Bantuan Anda diminta secara anonim menjawab pertanyaan dalam kuesioner. Tanggapan Anda akan sangat rahasia.

Bagian I- Demografis

1. Umur peserta?
   - ☐ 18-20
   - ☐ 21-30
   - ☐ 31-45
   - ☐ 46-60
   - ☐ Diatas 60 tahun

2. Jenis kelamin?
   - ☐ Pria
   - ☐ Wanita
   - ☐ Tidak ingin menjawab

3. Apa pendidikan terakhir Anda?
   - ☐ Tidak ada sekolah formal
   - ☐ Sekolah Dasar
   - ☐ Sekolah Menengah Pertama
   - ☐ Sekolah Menengah Atas
   - ☐ Diploma
   - ☐ Gelar sarjana (S1)
   - ☐ Gelar Master (S2)
   - ☐ Gelar Doktor (S3)

4. Apa pekerjaan Anda?
   - ☐ Pelajar
   - ☐ Pegawai pemerintah
   - ☐ Pegawai swasta
   - ☐ Wirausaha
   - ☐ Tidak bekerja
   - ☐ Pensiun
   - ☐ Lainnya:

5. Seberapa sering Anda menggunakan layanan e-government seperti memeriksa informasi yang terkait dengan pemerintah, melaporkan pajak secara online, menerapkan atau memperbarui paspor ... dll?

☐ Sangat sering (sebulan sekali)
☐ Sering(sekali dalam 3 bulan)
☐ Terkadang (sekali dalam 6 bulan)
☐ Jarang (sekali dalam setahun)
☐ Sangat jarang (kurang dari sekali dalam setahun)
☐ Tidak pernah

Bagian II

Tujuan dari bagian ini adalah untuk menguji faktor-faktor kritis untuk penerapan e-government di Indonesia. Silakan menilai tanggapan Anda sesuai dengan skala berikut.

[Centang (√) pada skala di bawah ini: 7 = Sangat setuju ... 1 = Tidak setuju sama sekali]

Sejauh mana Anda setuju dengan pernyataan berikut tentang ekspektasi kinerja?

	7	6	5	4	3	2	1
Penggunaan sistem e-Government akan meningkatkan efisiensi untuk mendapatkan layanan publik.							
Menggunakan e-Government akan menghemat waktu saya dibandingkan dengan layanan berbasis kertas.							
Menggunakan e-government akan lebih murah dibandingkan dengan layanan berbasis kertas.							
Mendapatkan layanan publik dari e-Government mudah dipahami.							

Sejauh mana Anda setuju dengan pernyataan berikut tentang ekspektasi upaya?

	7	6	5	4	3	2	1
Saya menemukan sistem e-Government sudah cukup jelas.							
Saya menemukan sistem e-Government mudah untuk diarahkan.							

Saya menjadi akrab dengan e-Government dengan cepat.							
Sistem e-Government mudah dipahami.							

Sejauh mana Anda setuju dengan pernyataan berikut tentang pengaruh sosial?

	7	6	5	4	3	2	1
E-Government diadopsi secara luas oleh publik.							
Adopsi e-Government didorong secara sosial.							
Saya telah mendengar tanggapan yang baik tentang e-Government dari komunitas saya.							
Saya bisa mendapatkan bantuan dari komunitas saya untuk menggunakan e-Government.							

Sejauh mana Anda setuju dengan pernyataan berikut tentang fasilitas memadai?

	7	6	5	4	3	2	1
Saya menemukan infrastruktur yang memadai tersedia untuk mendukung penerapan e-Government.							
Saya dapat mengakses e-Government dari berbagai platform (misalnya komputer pribadi, telepon seluler).							
Saya dapat mengakses e-Government dari tempat umum.							
Saya memiliki perangkat TIK dan sumber daya yang diperlukan untuk menggunakan e-Government							

Sejauh mana Anda setuju dengan pernyataan berikut tentang keamanan yang dirasakan?

	7	6	5	4	3	2	1

Saya tahu risiko yang terlibat dengan mengirimkan informasi saya ke e-government.							
Saya yakin informasi yang disimpan di e-government diamankan.							
Saya dapat mengirimkan informasi sensitif saya ke e-government dengan rahasia.							
Saya sadar bahwa kebijakan keamanan yang diterapkan untuk melindungi data saya.							

Sejauh mana Anda setuju dengan pernyataan berikut tentang persepsi transparansi?

	7	6	5	4	3	2	1
Transparansi e-government akan menekan korupsi.							
E-Government menyampaikan informasi seperti informasi kontak pejabat publik, informasi tentang anggaran dan pengeluaran pemerintah.							
Prosedur layanan e-government sudah jelas.							
E-Government memungkinkan warga untuk terlibat dalam pengambilan keputusan publik.							

Sejauh mana Anda setuju dengan pernyataan berikut tentang kualitas informasi?

	7	6	5	4	3	2	1
E-Government memberikan informasi yang akurat.							
E-Government memberikan informasi yang relevan.							
E-Government menyediakan informasi terkini.							

E-Government memberikan informasi yang jelas.							
E-Government memberikan informasi yang lengkap.							
Mendapatkan informasi dari e-government relatif mudah.							

Sejauh mana Anda setuju dengan pernyataan berikut tentang kualitas sistem?

	7	6	5	4	3	2	1
Saya menemukan sistem e-Government dapat diandalkan							
E-Government menyediakan layanan yang bermanfaat.							
Saya menemukan sistem e-Government bekerja seperti yang diharapkan.							
Akses layanan publik dari sistem e-Government relatif mudah.							
E-Government menyediakan berbagai layanan publik.							

Sejauh mana Anda setuju dengan pernyataan berikut tentang dorongan pemerintah?

	7	6	5	4	3	2	1
Layanan E-Government disosialisasikan dengan baik oleh pemerintah.							
Pemerintah menyediakan pusat dukungan yang memuaskan untuk membantu saya dalam menggunakan layanan e-Government.							
Penggunaan e-government didorong oleh pemerintah melalui insentif keuangan dan lainnya.							

Pemerintah memberikan pelatihan yang memadai untuk menggunakan e-government.							

Sejauh mana Anda setuju dengan pernyataan berikut tentang literasi TIK Anda?

	7	6	5	4	3	2	1
Saya sangat mampu melakukan tugas dengan perangkat TIK.							
Saya memiliki pengalaman yang luas dalam menggunakan perangkat TIK.							
Saya sangat yakin dengan kemampuan saya dalam menggunakan internet.							
Saya memiliki pengalaman yang luas dalam menggunakan internet.							

Sejauh mana Anda setuju dengan pernyataan berikut tentang adopsi e-Government?

	7	6	5	4	3	2	1
Saya ingin menggunakan e-government untuk mendapatkan kembali informasi.							
Saya ingin menggunakan e-government untuk mendapatkan kembali layanan publik.							
Saya ingin menggunakan e-government karena keluarga dan teman-teman saya menasihati saya .							

Appendix I: Survey Questionnaire in English

This study aims to examine the critical factors for the adoption of e-government from the perspective of citizens in Indonesia

E-government

Electronic government (e-government) is about the use of information and communication technologies for improving the delivery of public services to citizens and businesses.

This survey contains following sections

Part I: identification of the demographic information of the respondent

Part II: investigation of the critical factors for the adoption of e-government in Indonesia.

Your assistance is requested in anonymously answering the questions in the questionnaire. Your responses will be strictly confidential.

Thank you.

Part I- Demographic data

1. Which of these age groups are you in?
   - ☐ 18-20
   - ☐ 21-30
   - ☐ 31-45
   - ☐ 46-60
   - ☐ Older than 60

2. What is your gender?
   - ☐ Male
   - ☐ Female
   - ☐ Prefer not to be included

3. What is your level of education?

- ☐ No formal school
- ☐ Primary school
- ☐ Junior high school
- ☐ Senior high school
- ☐ Diploma
- ☐ Bachelor degree
- ☐ Master degree
- ☐ Doctoral degree

4. What is your occupation?

- ☐ Student
- ☐ Government employee
- ☐ Private sector employee
- ☐ Self-employed
- ☐ Unemployed
- ☐ Retired
- ☐ Others

5. How often do you use e-government services such as issuance or renewal of a driver's license, issuance or renewal of a passport … etc.?

- ☐ Very often (once in a month)
- ☐ Often (once in 3 months)
- ☐ Sometimes (once in 6 months)
- ☐ Rarely (once in a year)
- ☐ Very rarely (less once in a year)
- ☐ Never

Part II

The purpose of this section is to examine the critical factors for the adoption of e-Government in Indonesia. Please rate your responses according to the following scale.

[Tick (√) on the scale below: 7 = Strongly agree… 1 = Not agree at all]

To what extent do you agree with the following statements about the performance expectancy?

	7	6	5	4	3	2	1
The use of e-Government systems would increase efficiency to obtain public services.							
Using e-Government would save my time compared to paper-based services.							
Using e-government would be less expensive compared to paper-based services.							
Obtaining public services from e-Government is easily understood.							

To what extent do you agree with the following statements about the effort expectancy?

	7	6	5	4	3	2	1
I find e-Government system is self-explanatory.							
I find e-Government systems is easy to direct.							
I become quickly familiar with e-Government.							
I e-Government systems is easy to comprehend.							

To what extent do you agree with the following statements about the social influence?

	7	6	5	4	3	2	1
E-Government is widely adopted by the public.							
The adoption of e-Government is socially encouraged.							
I have heard good feedback about e-Government from my community.							

I can get assistance from my community to use of e-Government.							

To what extent do you agree with the following statements about the facilitating conditions?

	7	6	5	4	3	2	1
I find adequate infrastructure exists to support the adoption of e-Government.							
I can access e-Government from multiple platforms (e.g. personal computers, mobile phones).							
I can access e-Government from public places.							
I have ICT devices and resources necessary to use e-Government							

To what extent do you agree with the following statements about the perceived security?

	7	6	5	4	3	2	1
I know the risk involved with submitting my information to e-government.							
I believe the information stored in e-government is secured.							
I can submit my sensitive information to e-government with confidence.							
I am aware that security policies is implemented to protect my data.							

To what extent do you agree with the following statements about the perceived transparency?

	7	6	5	4	3	2	1
The transparency of e-government would suppress corruptions.							
E-Government delivers information such as contact information of public officials, information on government budgets and expenditures.							

The procedure of e-government services is clear.							
E-Government enables citizens to be involved in public decision making.							

To what extent do you agree with the following statements about the information quality?

	7	6	5	4	3	2	1
E-Government provides accurate information.							
E-Government provides relevant information.							
E-Government provides up to date information.							
E-Government provides clear information.							
E-Government provides comprehensive information.							
It is relatively easy to obtain information from e-government.							

To what extent do you agree with the following statements about the system quality?

	7	6	5	4	3	2	1
I find e-Government system to be reliable							
E-Government provides useful services.							
I find e-Government system to work as expected.							
It is relatively easy to access public services from e-Government system.							
E-Government provides a wide range of public services.							

To what extent do you agree with the following statements about the government encouragement?

	7	6	5	4	3	2	1
E-Government services are well socialised by the government.							
The government provides satisfactory support centres to assist me in using e-Government services.							

The use of e-government is encouraged by the government through financial and other incentives.							
The government provides sufficient training to use e-government.							

To what extent do you agree with the following statements about your ICT literacy?

	7	6	5	4	3	2	1
I am very capable of performing tasks with ICT devices.							
I have extensive of experience in using ICT devices.							
I am very confident about my ability in using internet.							
I have extensive of experience in using internet.							

To what extent do you agree with the following statements about the adoption of e-Government?

	7	6	5	4	3	2	1
I would like to use e-government to retrieve information.							
I would like to use e-government to retrieve public services.							
I would like to use e-government because my family and friends advise me to.							

Appendix J: List of Related Publications

Sabani, A. 2021, Investigating the influence of transparency on the adoption of e-Government in Indonesia, *Journal of Science and Technology Policy Management*, Vol 12 No. 2, pp. 236-255.

Sabani, A. 2019, *Three Minute Thesis: An Empirical Examination of E-Government Adoption in Indonesia*, College of Business Three Minute Thesis Competition 2019, RMIT University (Finalist).

Sabani, A., Deng, H. & Thai, V. 2019, Evaluating the Performance of E-Government in Indonesia: A Thematic Analysis, *Proceedings of the 12th International Conference on Theory and Practice of Electronic Governance (ICEGOV)*, Melbourne, Australia.

Sabani, A., Deng, H. & Thai, V. 2019, Evaluating the Development of E-Government in Indonesia, *Proceedings of the 2nd International Conference on Software Engineering and Information Management (ICSIM)*, Bali, Indonesia.

Sabani, A., Deng, H. & Thai, V. 2018, A Conceptual Framework for the Adoption of E-Government in Indonesia, *Proceedings of the 29th Australasian Conference on Information Systems (ACIS)*, Sydney, Australia.