Insights into Mobile Government Adoption Factors: A Comprehensive Analysis of Peduli Lindungi Application in Indonesia

Denok Kurniasih[1*], Paulus Israwan Setyoko[2], and Mohammad Nurul Huda[3]
[1,2]Department of Public Administration, Faculty of Social and Political Sciences,
Universitas Jenderal Soedirman
Banyumas, Indonesia 53122
[3]Department of Public Administration, Faculty of Social and Political Sciences,
Universitas Diponegoro
Semarang, Indonesia 50275
Email: [1]denok.kurniasih@unsoed.ac.id, [2]paulus.setyoko@unsoed.ac.id,
[3]mohammadnurulhuda@lecturer.undip.ac.id

***Abstract*—Information and Communication Technology (ICT) progression has notably impacted the shift from traditional public services to digital alternatives. Among the various digital services, m-government services, provided by smartphone technology, have gained widespread popularity. Unfortunately, the broader adoption of digital technology encounters several challenges, including insufficient user interest and acceptance, as well as concerns regarding security and user privacy. The primary goal of the research is to address the existing gap in the literature by examining the factors that contribute to the effective implementation of m-government services. A mix of key components is employed, incorporating the Information Systems (IS) Success model and Technology Acceptance Model (TAM) as research variables. The research applies a quantitative approach in the form of an online survey. Furthermore, a Partial Least Square-Structure Equational Modeling (PLS-SEM) analytic approach is performed to evaluate 230 data points. The research findings support five hypotheses while rejecting three hypotheses. Significantly, the findings suggest that perceived usefulness and ease of use influence behavioral intention considerably. Additionally, constructions related to service quality significantly impact behavioral intention. Meanwhile, both system quality and information quality do not contribute to affecting behavioral intention. Furthermore, information quality exerts a substantial impact on perceived usefulness, but it does not influence perceived ease of use. Finally, it is observed that system quality significantly affects the perceived ease of use.**

***Index Terms*—M-Government Service, Public Health Service, Peduli Lindungi Application, User Acceptance**

Received: Sept. 27, 2022; received in revised form: Feb. 14, 2023; accepted: Feb. 15, 2023; available online: April 29, 2024.
*Corresponding Author

I. Introduction

THE swift advancement of Information and Communication Technology (ICT) has a significant influence on public services, commonly denoted as e-government services [1]. E-government services employ ICT in the form of hardware, including smartphones, computers, tablets, and other devices. These technologies leverage wireless Internet networks to deliver public services with increased effectiveness and efficiency [2]. The utilization of e-government offers numerous benefits, such as the augmentation and dissemination of official information, enhancement of public service quality, and broadening public access [3]. Furthermore, extant literature also shows that incorporating ICT in the public sector can further amplify comprehensive public access to the decision-making process [4–6]. Finally, enhancing the efficiency and effectiveness of the government bureaucratic system is an inevitable end goal.

The COVID-19 pandemic has exerted substantial pressure on the government, necessitating prompt and informed decision-making in delivering public services to the community [7]. The adoption of ICT has played a substantial role in addressing communal issues posed by the Coronavirus. It encompasses the distribution of accurate information and the implementation of contact tracing strategies, effectively mitigating the impact of the distribution of the Coronavirus [8–10]. Amidst the pandemic, as highlighted by previous research [10], ICT plays an important role as the primary means for accessing governmental health services. This transition exemplifies the emergence of innovative approaches

in digital health technology. Notably, digital contact tracing and exposure notification applications represent novel approaches aiming to curb the transmission of COVID-19 through smartphones [6, 11]. Regrettably, in developing countries like Indonesia, policies for handling the COVID-19 pandemic crisis are less effective due to a poor sense of crisis in policy making, negative perceptions of gradual decision making, loss of rationality in decision making, and unclear coordination from the central government [12]. As a consequence, it has led to chaos and confusion within the community, exacerbating the burden of the crisis.

Current research indicates that numerous countries are adopting mobile applications as innovative tools for public health services in managing the COVID-19 pandemic [13]. Public services that leverage smartphone technologies are commonly referred to as mobile government services (m-government) [2, 10, 14–21]. M-government services represent an evolutionary and expansive phase of e-government [14, 22]. They facilitate transactions and services among the public, private sector, employees, and other government organizations, utilizing smartphone technology and Internet access for support [2, 10, 14, 21]. In this context, smartphones serve as ICT devices, enabling the public to access government services during the outbreak. Moreover, the central government of the Republic of Indonesia, in conjunction with the COVID-19 handling committee, has introduced the "Peduli Lindungi" application as a trusted and regularly updated source of information on managing the COVID-19 pandemic crisis. The Peduli Lindungi application, a government public health service utilizing smartphone technology, exemplifies a form of m-government services. Importantly, these services play a pivotal role in the ongoing trends shaping the development of current service delivery [23].

Recently, there has been a burgeoning interest among researchers in investigating the utilization of mobile technology for providing public health services, particularly in the context of the COVID-19 outbreak [10, 13, 24]. It is because m-government services offer distinct advantages over the use of e-government [25]. These benefits encompass improved efficiency and effectiveness, cost-effectiveness, simplified and expedited access to information, along with heightened transparency and accountability [10, 14, 17]. Furthermore, existing research highlights the benefits of m-government services amidst the Coronavirus crisis, demonstrating their effectiveness in significantly reducing the risk of spreading cases [13, 24]. Moreover, these services play an essential role in lowering the ongoing negative impact on the economic and social sectors [24]. On the other hand, m-government services can offer advantages in addressing the challenges and limitations of wireless coverage in certain areas [9, 16].

Although using mobile applications provides many benefits, low user adoption poses a significant obstacle to realizing these benefits [26]. In addition, various technical problems have been raised, such as problems related to user security and privacy concerns [2, 13]. Additionally, there is a lack of citizen interest in electronic-based services due to the negative image of the government as a service provider [2]. These factors contribute to the lack of user acceptance of ICT, resulting in suboptimal use [27–29]. Recognizing the significance of tackling these challenges, it is imperative to empirically examine the aspects that contribute to the effective implementation of m-government services [2, 14–21, 30–38]. This need has prompted previous studies to suggest evaluating system implementation to improve progress and development [39]. Moreover, assessing user acceptance behavior is crucial for effectively utilizing m-government services in a developing context [2, 10].

The research stands apart from previous studies as the existing literature predominantly focuses on e-government adoption, with an emphasis on traditional web-based services. However, the characteristics of smartphones introduce significant differences [10]. For instance, smartphones are designed and equipped with various special features, enabling access to an Internet network from anywhere and anytime [14–17, 20, 32, 34]. This design facilitates direct communication with government service providers, making it more convenient for users to receive messages. Despite the evident shift towards mobile technology, existing literature demonstrates that the exploration of m-government services is a recent focus of research. Previous research has primarily concentrated on the acceptance of e-government systems, overlooking the distinctive features of smartphone systems [10, 14]. This gap in research has led to a deficiency in empirical investigation into the adoption of smartphone services [2] and limited research examining the factors conducive to the viability of m-government services [14]. The research makes a substantial contribution to the current body of knowledge by evaluating the adoption of m-government services, particularly in the context of Indonesia, to bridge the literature gap.

To address a research void caused by a lack of earlier interest in adopting m-government services, the researchers formulate a research question: "What factors influence an individual's behavioral intention to use m-government services?" The research employs the Technology Acceptance Model (TAM) framework to assess the adoption of the m-government service,

Peduli Lindungi. Moreover, external variables from the Information Systems (IS) Success model have been incorporated into the conceptual model to broaden the analytical scope. Within this framework, the IS Success Model serves as a construct measuring the overall impact of the information system. Simultaneously, TAM evaluates technological quality from a technical factor perspective. These two theories collectively offer a comprehensive framework to explain the technological factors that significantly contribute to the successful adoption of the Peduli Lindungi application in Indonesia.

A. Technology Acceptance Model

The Technology Acceptance Model (TAM) is a conceptual framework derived from the Theory of Reasoned Action (TRA), designed to analyze how users accept and use technology. TAM is particularly well-suited for modeling the acceptance of information systems due to its ability to explain determinants of a general nature and user behavior [31]. This model can delve into the causal connection between the introduction of an innovative technological system to users affected by its perceived usefulness and ease of use [2, 40]. These two construct variables signify overarching determinants, encapsulating users' subjective evaluation of the advantages offered by the technology [2]. Expanding upon the TAM, a comprehensive research model is formulated. Previous scholarly inquiries have identified a noteworthy affirmative influence between the core constructs of the TAM and the intention to utilize it within the m-government context [2, 31]. In a previous research on the diffusion of m-government among 365 local communities in the UAE, the results indicate that the core constructs of TAM exert a positive impact on the adoption of m-government [31]. Similarly, the survey of the distribution of m-government among 161 students in Germany finds that the core constructs of TAM significantly predict the use of m-government services [2]. Derived from the preceding results, the researchers suggest the following hypotheses.

H1: Perceived Usefulness (PU) has a significant impact on Behavioral Intention (BI).

H2: Perceived Ease of Use (PEOU) has a significant impact on Behavioral Intention (BI).

B. Information Systems Success Model

The examination of the IS Success model within the literature has experienced substantial advancement. The formulation of the IS Success model comprises elements such as System Quality (SysQual), Information Quality (InfQual), utilization, user satisfaction, individual influence, and organizational impact [41]. However, in its development, the core construction of the IS Success model has received criticism from other researchers, particularly regarding the use of "usefulness" as a measure of information systems [14, 42]. Usefulness is a variable introduced to replace the "use" construct, aiming to measure the social impact of utilizing information systems [43]. In response to this criticism, the IS Success model construction has undergone an update by adding a service quality construct. This addition serves as a measure of the overall impact of using information systems. Unfortunately, the service quality construct in the IS Success model primarily focuses on sustainable use and is not entirely suitable for promoting the use of m-government [43]. To address this shortcoming, the researchers have amalgamated the IS Success model components with the TAM framework to measure the efficacy of m-government holistically.

System Quality (SysQual) encompasses user interface uniformity, ease of use, documentation quality, and, in certain instances, computer code quality and sustainability, which collectively contribute to the overall evaluation of system quality [42]. Transitioning to the importance of SysQual, SysQual is emphasized as a critical technical factor for measuring the system's ability to provide useful information, thereby influencing the success of the technology used by customers [44]. Moreover, SysQual is closely associated with the performance of e-government systems in carrying out functions to ensure user convenience [45], establishing it as a pivotal factor driving the use of information systems [46]. Consequently, SysQual plays an essential role in the spread of e-government system technology as supported by previous research demonstrating its strong impact [46, 47]. Previous research analyzing 348 responses related to customer hospitality demonstrates a substantial correlation between SysQual and customer behavioral intention in the hospitality sector [47]. Building upon those previous results, the researchers posit the following hypothesis.

H3: SysQual has a significant impact on BI.

InfQual is characterized by the effectiveness of e-government outputs in fulfilling user needs [41]. Moreover, InfQual focuses on aspects such as the pertinence, timeliness, and precision of the information produced by information systems. It encompasses the generation of information for decision-making and

serves as a metric applicable to various systems [42]. Recognizing its significance, existing studies have considered InfQual an important element in assessing smartphone-based services [48–50]. This acknowledgment is rooted in the understanding that InfQual is an influential factor driving the use of information systems. Furthermore, previous research conducted has proven that InfQual strongly affects BI in an e-learning context [46]. Likewise, an empirical study provides further support by showing that InfQual strongly affects BI in a mobile-based hospitality service context [47]. Hence, the researchers posit that the efficacy of InfQual plays a major role in its utilization within the m-government context. Based on these considerations, the following hypothesis is proposed.

H4: InfQual has a significant impact on BI.

Service quality (SerQual) represents the support factor received by users of government systems [41]. SerQual is essentially a user's assessment of the product or information, encompassing their perceived SerQual [44]. This construct provides an all-encompassing evaluation of the overall perspective and comprehensive measurement of the general views of the e-government system. It assesses the readiness of the staff to deliver the necessary services, examines system accessibility, and ensures the security of transactions. Therefore, this construct serves as an illustrative gauge of the degree to which e-government services align with user expectations in fulfilling their anticipated service needs [51]. Expanding upon the consistent findings from prior research that affirm the strong impact of SerQual on BI [30, 44, 47]. Hence, the researchers assert that SerQual influences BI in the context of m-government. Based on this idea, the researchers build a hypothesis as follows.

H5: SerQual has a significant impact on BI.

C. Information Quality - Perceived Usefulness

Although InfQual is recognized as an influential factor in information systems, existing literature has shown its significant impact on PU [42, 52]. The InfQual can contribute additional benefits, especially in the presence of a new information system. It is argued that InfQual influences the PU within the context of the Online Public Grievance Redressal System (OPGRS) context [42]. In addition, InfQual positively affects PU in the mobile internet context [50]. Hence, the researchers posit that good InfQual not only influences users' benefits but also enhances the PU of new technology. This belief is grounded in the understanding that high-quality information positively contributes to the PU of a system. Therefore, the following hypothesis is proposed.

H6: InfQual has a strong effect on PU.

D. Information Quality - Perceived Easy to Use

Existing literature incorporates content quality when explaining InfQual and its relation to service convenience [48, 52]. The quality of information content plays a pivotal role in influencing the ease of use steps on a website [42]. Moreover, InfQual has significantly impacted PEOU in e-government settings [42, 53]. Previous research further supports this by showing that InfQual significantly determines PEOU in the context of mobile value-added services [48]. Therefore, the researchers assert that good InfQual not only enhances the overall user experience but also facilitates users' navigation and utilization of m-government services. Based on these considerations, the researchers propose the following hypothesis.

H7: InfQual has a strong effect on PEOU.

E. System Quality-Perceived Easy to Use

SysQual is meticulously developed to meet user needs and eliminate barriers to technology acceptance [42]. A high SysQual has the potential to instill a sense of comfort, security, and responsiveness in operating technology [53]. As a technical factor, SysQual is also concerned with addressing system failures or "bugs" and ensuring ease of use. Previous studies have consistently explored the positive relationship between SysQual and PEOU [42, 53]. For example, previous research surveys 942 respondents in the context of web-based online retailing [53]. Meanwhile, another study uses 419 data points to assess and validate the IS Success model in the context of the e-government system [42]. Given this body of research, the researchers assert that a well-developed SysQual can effectively reduce the perceived difficulty in using mobile services. Grounded in this understanding, the researchers propose the following hypothesis.

H8: SysQual has a strong effect on PEOU.

Figure 1 shows the conceptual model of the research which shows the eight hypothesized paths used. It has six variables. First, PEOU measures the degree of user confidence that the Peduli Lindungi application

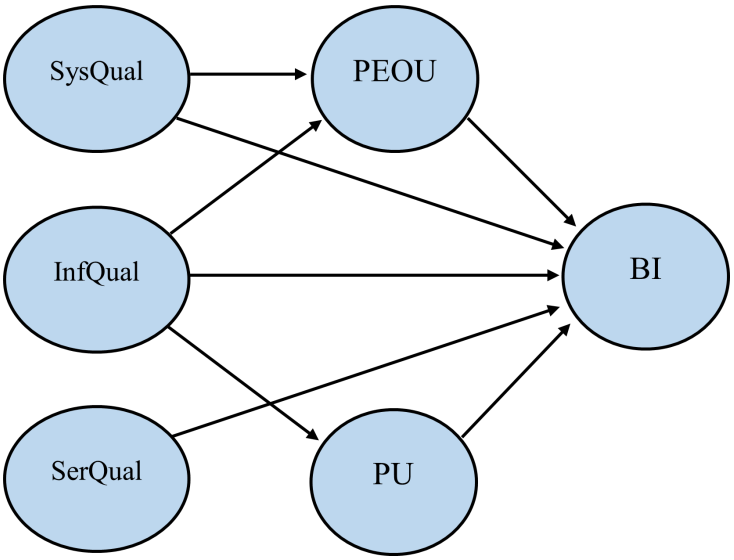

Fig. 1. Conceptual model. It consists of Behavioral Intention (BI), Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Information Quality (InfQual), System Quality (SysQual), and Service Quality (SerQual).

provides benefits in accessing health services. Second, PU shows the degree of trust that the Peduli Lindungi application requires easy efforts to access health services. Third, SysQual measures the performance of technical attributes to carry out the function of the Peduli Lindungi application. Fourth, InfQual analyzes the quality of information availability in the Peduli Lindungi application to help the users to carry out health service transactions. Fifth, SerQual measures users' assessments of the service performance of the Peduli Lindungi application in meeting users' needs. Last, BI examines the extent to which users select and reuse the Peduli Lindungi application in future health service transactions.

II. Research Method

The research applies a quantitative approach through an online survey. This approach is selected based on its appropriateness for scrutinizing the correlations among variables in the adopted model, given the relatively short data collection period and the specific goal of evaluating the adoption of smartphone technology systems. In addition, the researchers employ both primary and secondary data sources to collect research data. Primary data are obtained through online surveys using Google, Inc.'s Google form facility, whereas secondary data are derived from pertinent articles and books. Moreover, the research focuses on a specific demographic, which is citizens of Indonesia utilizing the Peduli Lindungi application to access public health services. Then, convenience and purposive sampling methods are employed, with predefined criteria for recruiting potential respondents, to collect the data. The researchers distributed the online survey using a questionnaire link from March 1st, 2022, to May 31st, 2022.

The disseminated questionnaire link contains 26 question items, with each item assessed using a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). A combination of IS Success model concepts into TAM is employed in constructing research variables. Additionally, each item in the research is adopted from previous work and modified according to the research objectives. In addition, within the TAM construct, the PU latent variable consists of a five-item scale from previous research [54]. The latent variable of PEOU is assessed using a five-item scale from previous research [55]. Moreover, SysQual utilizes a four-item scale from previous research [42, 46]. Similarly, InfQual has a five-item scale from previous research [42, 56, 57], and SerQual consists of a four-item scale from previous research [42, 57]. Meanwhile, the latent variable of BI is a three-item scale from previous research [42]. Furthermore, the guidelines are followed to determine the minimum sample size [58]. A total of 233 responses are collected, and 230 data are analyzed in the research. A minimum sample size to achieve a statistical power of 80% is 174 [58]. Meanwhile, another study suggests a sample size ranging from 160 to 300 for multivariate statistical analysis [59].

The analysis of Partial Least Square-Structure Equational Modeling (PLS-SEM) is used to calculate factor loadings, Average Variance Extracted (AVE), Composite Reliability (CR), and Cronbach's alpha (CA).

TABLE I
SAMPLE CHARACTERISTICS.

Item	Category	Frequency	Percentage (%)
Gender	Male	106	46.09
	Female	124	53.91
Age	$<$ 17 years old	32	13.91
	18–27 years old	130	56.52
	28–37 years old	59	25.65
	38–47 years old	9	3.92
Education	High school or less	26	11.30
	Undergraduate	142	61.74
	Postgraduate	62	26.96
Application Menu Used	COVID-19 vaccine	42	18.26
	COVID-19 test results	14	6.09
	Electronic-Health Alert Card (EHAC)	12	5.22
	travel regulation	4	1.74
	Quick-Response (QR) code	155	67.39
	COVID-19 statistic	3	1.30

Previous studies are referenced to establish certain threshold values, such as the factor loadings' limit of 0.7. It is considered essential to meet the minimal criteria for convergent and discriminant validity tests [47, 60]. Additionally, prior research recommends setting the AVE limit value at 0.50 or above to ensure minimum construct validity [61]. Meanwhile, the minimum threshold for Cronbach's Alpha is established as greater than 0.7 [62]. In the data processing phase, two phases are completed. Initially, data with extreme residual values are eliminated. Subsequently, the PLS algorithm and bootstrapping method are used for data calculation and analysis.

III. RESULTS AND DISCUSSION

A. Overview of Respondents

Table I provides a summary of respondents' information. The gender distribution shows that men constitute the majority, with 46.09%, while women account for 53.91%. Regarding age groups, most respondents fall within the 18–27 age range, comprising 56.52%. It is followed by the 28–37 age group at 25.65%. In addition, the age distribution highlights a prevalence of youngsters, indicating a significant presence of young individuals at the forefront of embracing technology [63]. Youngsters are known for being avid social media users [64] and having higher Internet access [65], which facilitates their adeptness in mastering modern technology. This factor may explain why the youngster group dominates smartphone technology use.

Furthermore, examining the educational background of the respondents reveals that the majority are undergraduates (61.74%), followed by postgraduates (26.96%), while 11.30% have a higher school education or less. In addition, when it comes to the regular use of the Peduli Lindungi application, the majority use it for scanning Quick-Response (QR) codes (67.39%), followed by obtaining COVID-19 vaccine services (18.26%), and checking COVID-19 test results (6.09%).

B. Measurement Model

The SmartPLS software is utilized to analyze the structural model, incorporating established loading factors for each build component. The findings indicate that numerous items fall short of the 0.70 criterion for factor loading values. Notably, items PU5 and PEOU5 exhibit loading factor values of 0.689 and 0.681, respectively. Despite being slightly below the 0.70 threshold, both items are retained in the SEM as values in the range of 0.6–0.7 are still considered acceptable [66].

Moreover, Table II shows the loading factor, AVE, CR, and CA test results. The assessment of convergent validity involves comparing the calculated values of the loading factor and AVE with specified limit values. Meanwhile, the researchers verify reliability by comparing the calculated values of CR and CA with specified limit values. The result of these calculations for all constructs meets the minimum criteria, indicating overall acceptability.

Furthermore, discriminant validity is evaluated using the Fornell-Larker criterion test. As outlined in Table III, the results validate the discriminant validity by indicating that the AVE of each latent construct exceeds the maximum squared correlation with other latent constructs. With reference to both Tables II and III, the researchers confirm that the research model demonstrates reliability, convergent, and discriminant validity.

TABLE II
CONVERGENT VALIDITY AND RELIABILITY RESULTS.

Construct	Code	Indicators	Factor Loadings (> 0.7)	Average Variance Extracted (> 0.5)	Composite Reliability (> 0.7)	Cronbach's Alpha (> 0.7)
BI	BI1	Having Intention to use	0.917	0.727	0.888	0.809
	BI2	Having Prediction to Use	0.860			
	BI3	Having Plan for Future Use	0.774			
PU	PU1	Making Job Easier	0.798	0.649	0.902	0.862
	PU2	Being Useful	0.799			
	PU3	Increasing Productivity	0.898			
	PU4	Enhancing Effectiveness	0.830			
	PU5	Improving Job Performance	0.689			
PEOU	PEOU1	Being Easy to Learn	0.815	0.629	0.894	0.850
	PEOU2	Being Easy to Become Skilful	0.829			
	PEOU3	Being Easy to Use	0.744			
	PEOU4	Being Adaptable	0.880			
	PEOU5	Being Clear and Understable	0.681			
InfQual	InfQual1	Having Sufficient Information	0.860	0.713	0.925	0.899
	InfQual2	Having Up-to-Date Information	0.791			
	InfQual3	Having Reliable Information	0.840			
	InfQual4	Having Timely Information	0.867			
	InfQual5	Having Clear Information	0.860			
SysQual	SysQual1	Being User Friendly	0.845	0.735	0.917	0.880
	SysQual2	Being Available Anytime	0.860			
	SysQual3	Being Highly Reliable	0.869			
	SysQual4	Having Good Response Time	0.854			
SerQual	SerQual1	Having Dependable Services	0.880	0.762	0.928	0.896
	SerQual2	Having Prompt Service	0.841			
	SerQual3	Having Responsive Service	0.905			
	SerQual4	Having Accurate Service Duration	0.865			

Note: Behavioral Intention (BI), Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Information Quality (InfQual), System Quality (SysQual), and Service Quality (SerQual).
Source: The outcomes of data processing using SmartPLS software.

TABLE III
FORNELL-LARKER CRITERION RESULTS.

	BI	InfQual	PEOU	PU	SerQual	SysQual	Discriminant Validity
BI	0.852						Valid
InfQual	0.687	0.844					Valid
PEOU	0.675	0.625	0.793				Valid
PU	0.749	0.740	0.582	0.806			Valid
SerQual	0.781	0.815	0.640	0.779	0.873		Valid
SysQual	0.763	0.819	0.752	0.792	0.856	0.857	Valid

Note: Behavioral Intention (BI), Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Information Quality (InfQual), System Quality (SysQual), and Service Quality (SerQual).
Source: The outcomes of data processing using SmartPLS software.

C. Structural Model

Figure 2 illustrates eight path coefficients in the structural model. The R^2 value serves as an indicator of the extent to which dependent variables affect the independent variable. The R^2 values are categorized into three groups: 0.75 for a significant effect, between 0.33 and 0.50 for a moderate effect, and 0.26 for a weak effect [58]. In Fig. 2, the latent variable of BI has an R^2 value of 0.697. The result indicates that all latent variables (PU, PEOU, SerQual, InfQual, and SysQual) collectively explain 69.7% of the variance in BI. The remaining variance is attributed to other unanalyzed variables. Moreover, the latent variable of PU has an R^2 value of 0.547, signifying that InfQual explains 54.7% of the variance in PU. Furthermore, the latent variable of PEOU has an R^2 value of 0.565, indicating that both InfQual and SysQual collectively explain 56.5% of the variance in PEOU. It is confirmed that all R^2 values demonstrate a moderate effect.

Next, the bootstrapping procedure is employed to calculate the t-statistics. It is essential to evaluate the significance level of the coefficients model and test research hypotheses. As presented in Table IV and Fig. 2, five hypotheses (H1, H2, H3, H6, and H8) are accepted. Meanwhile, three hypotheses are rejected (H4, H5, and H7). The findings indicate that PU, PEOU, and SerQual significantly and positively

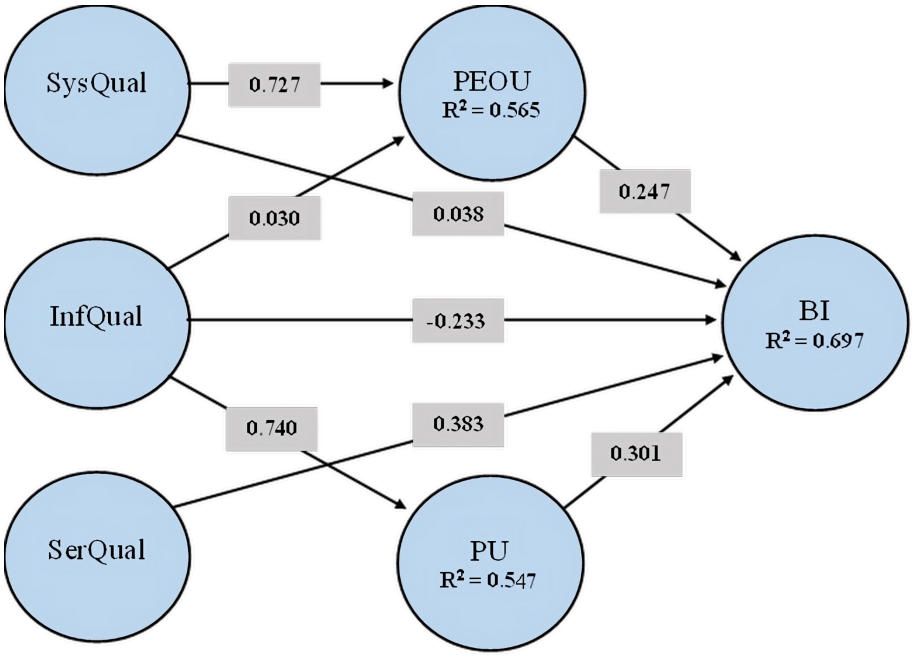

Fig. 2. Visualization of data processing results. Behavioral Intention (BI), Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Information Quality (InfQual), System Quality (SysQual), and Service Quality (SerQual).
Source: The outcomes of data processing using SmartPLS software.

TABLE IV
HYPOTHESES TESTING RESULTS.

Hypothesis	Path	β	T-Value	P-Value	Supported
H1	PU → BI	0.301	3.848	0.000*	Yes
H2	PEOU → BI	0.247	3.521	0.000*	Yes
H3	SerQual → BI	0.383	3.583	0.000*	Yes
H4	InfQual → BI	-0.033	0.360	0.719	No
H5	SysQual → BI	0.038	0.340	0.734	No
H6	InfQual → PU	0.740	21.342	0.000*	Yes
H7	InfQual → PEOU	0.030	0.413	0.680	No
H8	SysQual → PEOU	0.727	10.480	0.000*	Yes

Note: * is standardized beta values used $p < 0.05$. Behavioral Intention (BI), Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Information Quality (InfQual), System Quality (SysQual), and Service Quality (SerQual).
Source: The outcomes of data processing using SmartPLS software.

influence the intention to use the Peduli Lindungi application. However, both InfQual and SysQual are found to have no substantial direct influence on the intention of using the Peduli Lindungi application. Interestingly, the results suggest that SysQual has an indirect influence on the intention to use. Furthermore, the findings indicate that InfQual does not directly impact PEOU. Instead, in the context of mobile services, InfQual can indirectly shape the intention to use through its impact on PU.

The results reveal strong support for five hypotheses, while three are rejected. PU and PEOU emerge as substantial predictors of BI (H1 and H2). The findings complement previous research, highlighting the substantial impact of two major components of TAM on the intention to use technological services. Citizens perceive significant benefits in using the Peduli Lindungi application, finding it a valuable tool for accessing health services during crises. In addition, the application contributes to a sense of comfort and safety, particularly in the context of the COVID-19 virus. As a result, the m-government service effectively meets health service needs, and an increased perception of its usefulness fosters user intent to reuse [67]. In this case, usefulness is one of the main factors that motivates users to use digital services [68]. These factors are important considerations in the adoption of technology, providing ”added values” that encourage the uptake of digital services [69]. Additionally, in the context of m-government, the empirical test results align with

previous research [2, 31], supporting the TAM theory. PU construct measures the system's usability, while the PEOU assesses the ease of mobile device operation in determining the acceptance of the information system. In essence, users consider the Peduli Lindungi application to possess a high level of usefulness and ease of operation.

Next, SerQual has a noteworthy impact on BI (H3). SerQual contributes to a memorable experience, leaving users satisfied and inclined to reuse the service in the future. In this context of the Peduli Lindungi application, SerQual plays an important role in shaping a positive experience, thereby strengthening the intention to use the Peduli Lindungi application. However, InfQual and SysQual do not affect BI (H4 and H5). It shows that individuals are not motivated to use Peduli Lindungi mobile technology frequently or imminently to access health services due to its InfQual and SysQual. Additionally, despite the widespread use of smartphone-based services, users encounter challenges in identifying information within the mobile application systems that support them. Consequently, the findings show a significant impact of SerQual on BI, aligning with previous research [30, 44, 47]. In contrast, there is no influence of InfQual on BI, contradicting previous studies [44, 46, 47]. Additionally, the minimal effect of SysQual on BI contradicts previous studies [46, 47], but aligns with a previous finding [44]. Service systems do not affect the intention to use banking chatbot services, attributing it to the absence of features that increase user intentions [44]. Moreover, challenges like low user literacy and decreased public trust in system security and privacy are prevalent in developing countries such as Indonesia. On top of that, existing research confirms that security and privacy issues influence users' intentions to adopt ICT [2, 13]. This factor may contribute to understanding why high-quality information does not affect BI.

Furthermore, the findings indicate that InfQual significantly affects PU (H6), but InfQual does not have an impact on PEOU (H7). High-quality information exhibits a commendable level of accuracy and is easy to comprehend, enhancing user decision-making in using m-government services. As a result, InfQual plays a pivotal role in augmenting the performance of Peduli Lindungi in providing health services effectively. Despite the commendable InfQual, citizens find it difficult to use the Peduli Lindungi application because its ease of use is not solely dependent on InfQual. Instead, it is closely related to interface design and user experience, potentially influencing ease of use in the Peduli Lindungi application. Moreover, the findings regarding the impact of InfQual on PU align with previous research [42, 52]. InfQual positively affects perceived usefulness in the mobile internet context [52]. The results show β is 0.030, with a t-value of 0.413 and a p-value of 0.680, implying that InfQual has a minimal effect on ease of use. Given that results, these findings contradict previous studies [42, 48, 53].

Finally, the findings also show that SysQual significantly affects PEOU (H8). These findings align with the previous studies that identify SysQual as a significant predictor of PEOU [42, 53]. Moreover, SysQual, facilitated by technology and ICT supporting devices, minimizes operational obstacles and system failures. As a result, the Peduli Lindungi application operates seamlessly and effortlessly. Moreover, SysQual stands out as a critical factor contributing to the success of m-government system technology, serving as a benchmark for the system's ability to provide ease of use for the technology embraced by customers.

IV. Conclusion

The research explores the factors influencing the adoption of m-government services. The availability of mobile services offers many benefits, facilitating easy access to health services during crises. In addition, the presence of mobile services improves SerQual, aligning with citizens' expectations and needs. These factors contribute to increased citizens' satisfaction with cellular services, fostering the intention to reuse these services in the future. However, several factors are believed not to contribute to the increased intention to use cellular services fully. The research findings support five hypotheses while rejecting three hypotheses.

The suggestions should be carefully considered, and actions need to be taken to enhance all factors significantly affecting the adoption of the Peduli Lindungi application. For instance, the Indonesian central government and the COVID-19 handling committee can improve InfQual on the Peduli Lindungi application by using simple language that users easily understand, thereby increasing the ease of understanding information for the public accessing the application. Additionally, evaluating the user interface design of the Peduli Lindungi application is crucial, offering advantages in improving user experience and satisfaction and facilitating application operations. Those factors become essential in influencing a user's behavioral intention to use mobile-based health services sustainably. Furthermore, improving the security system of the Peduli Lindungi application by the Indonesian central government and the COVID-19 handling committee can address users' concerns about security and privacy issues, creating a heightened sense of comfort for users when using the application.

Finally, the research has some limitations that should be acknowledged. First, the sample size may not fully represent the entire population of Peduli Lindungi users, potentially impacting the interpretation and generalization of research findings. Hence, caution is needed to extrapolate and interpret the results. Future research is recommended to use a larger and more diverse sample for improved representativity. Second, the proposed model, integrating the IS Success model and TAM, successfully validates two positive relationships: InfQual and PU and SysQual and PEOU. While this model can be employed in subsequent research, it is essential to note that the research relies on the IS Success model and TAM as theoretical frameworks. In addition, investigation into critical factors influencing m-government services is still needed. Hence, future research is expected to consider another theoretical model that may contribute to a more comprehensive understanding of critical factors affecting m-government service acceptance, providing diverse research findings.

Author Contribution

Writing—original draft, D. K., P. I. S., and M. N. H.; Methodology, D. K., P. I. S., and M. N. H.; Formal analysis, D. K., P. I. S., and M. N. H.; Analysis result review, D. K., and P. I. S. All authors have read and agreed to the published version of the manuscript.

References

[1] M. I. Wibowo, A. J. Santoso, and D. B. Setyohadi, "Factors affecting the successful implementation of e-government on network documentation and legal information website in Riau," *CommIT (Communication and Information Technology) Journal*, vol. 12, no. 1, pp. 51–58, 2018.

[2] B. W. Wirtz, S. Birkmeyer, and P. F. Langer, "Citizens and mobile government: An empirical analysis of the antecedents and consequences of mobile government usage," *International Review of Administrative Sciences*, vol. 87, no. 4, pp. 836–854, 2021.

[3] M. N. Huda, E. N. Kurniasari, and S. M. Ruroh, "A systematic literature review of e-government evaluation," *Journal of Local Government Issues*, vol. 5, no. 1, pp. 32–48, 2022.

[4] Z. M. Aljazzaf, S. A. Al-Ali, and M. Sarfraz, "E-participation model for Kuwait e-government," *International Journal of Advanced Computer Science and Applications*, vol. 11, no. 2, pp. 192–199, 2020.

[5] A. K. Shaikh, N. Ahmad, I. Khan, and S. Ali, "E-participation within e-government: A bibliometric-based systematic literature review," *International Journal of Electronic Government Research (IJEGR)*, vol. 17, no. 4, pp. 15–39, 2021.

[6] T. Qi, T. Wang, Y. Ma, W. Zhang, and Y. Zhu, "A scientometric analysis of e-participation research," *International Journal of Crowd Science*, vol. 2, no. 2, pp. 136–148, 2018.

[7] T. Polzer and G. Goncharenko, "The UK COVID-19 app: The failed co-production of a digital public service," *Financial Accountability & Management*, vol. 38, no. 2, pp. 281–298, 2022.

[8] S. Park, G. J. Choi, and H. Ko, "Information technology–based tracing strategy in response to COVID-19 in South Korea–privacy controversies," *JAMA*, vol. 323, no. 21, pp. 2129–2130, 2020.

[9] V. Jahmunah, V. K. Sudarshan, S. L. Oh, R. Gururajan, R. Gururajan, X. Zhou, X. Tao, O. Faust, E. J. Ciaccio, K. H. Ng, and U. R. Acharya, "Future IoT tools for COVID-19 contact tracing and prediction: A review of the state-of-the-science," *International Journal of Imaging Systems and Technology*, vol. 31, no. 2, pp. 455–471, 2021.

[10] A. F. Alkhwaldi and R. T. Al-Ajaleen, "Toward a conceptual model for citizens' adoption of smart mobile government services during the COVID-19 pandemic in Jordan," *Information Sciences Letters*, vol. 11, no. 2, pp. 573–579, 2022.

[11] X. Cheng, "A commentary of digital contact tracing in MIT Technology Review 2021," *Fundamental Research*, vol. 1, no. 6, pp. 838–839, 2021.

[12] L. Agustino, "Policy learning and handling of COVID-19 in Indonesia," *TRANSFORMASI: Jurnal Manajemen Pemerintahan*, pp. 62–78, 2021.

[13] S. L. Zhou, X. Jia, S. P. Skinner, W. Yang, and I. Claude, "Lessons on mobile apps for COVID-19 from China," *Journal of Safety Science and Resilience*, vol. 2, no. 2, pp. 40–49, 2021.

[14] C. Wang, T. Teo, and L. Liu, "Perceived value and continuance intention in mobile government service in China," *Telematics and Informatics*, vol. 48, 2020.

[15] M. Alonazi, N. Beloff, and M. White, "Exploring determinants of m-government services: A study from the citizens' perspective in Saudi Arabia," in *2019 Federated Conference on Computer Science and Information Systems (FedCSIS)*. Leipzig, Germany: IEEE, Sept. 1–4, 2019, pp. 627–631.

[16] F. Ishengoma, L. Mselle, and H. Mongi, "Critical success factors for m-government adoption in Tanzania: A conceptual framework," *The Elec-*

tronic Journal of Information Systems in Developing Countries, vol. 85, no. 1, pp. 1–10, 2019.

[17] H. S. Al-Hubaishi, S. Z. Ahmad, and M. Hussain, "Assessing m-government application service quality and customer satisfaction," *Journal of Relationship Marketing*, vol. 17, no. 3, pp. 229–255, 2018.

[18] A. M. AlBar and M. A. Hddas, "Exploring Saudi citizens' acceptance of mobile government service," *International Journal of Advanced Computer Science and Applications*, vol. 9, no. 11, pp. 397–400, 2018.

[19] S. Sidek and S. K. A. Alkaabi, "Causative factors for continuous usage of m-government services among users of smart city," *International Journal of Sustainable Construction Engineering and Technology*, vol. 13, no. 2, pp. 213–219, 2022.

[20] H. Mandari and D. Koloseni, "Examining the antecedents of continuance usage of mobile government services in Tanzania," *International Journal of Public Administration*, vol. 45, no. 12, pp. 917–929, 2022.

[21] B. Alqaralleh, A. Al-Omari, and M. Alksasbeh, "An integrated conceptual model for m-government acceptance in developing countries: The case study of jordan," *iJIM*, vol. 14, no. 6, pp. 115–136, 2020.

[22] A. S. Alharbi, G. Halikias, M. Yamin, and A. Basahel, "An overview of m-government services in Saudi Arabia," *International Journal of Information Technology*, vol. 12, no. 4, pp. 1237–1241, 2020.

[23] H. Ali and R. A. Kabbi, "M-government applications: Measurement of users' satisfaction in the Kingdom of Bahrain," *Electronic Government, an International Journal*, vol. 14, no. 4, pp. 375–388, 2018.

[24] R. Abbas and K. Michael, "COVID-19 contact trace app deployments: Learnings from Australia and Singapore," *IEEE Consumer Electronics Magazine*, vol. 9, no. 5, pp. 65–70, 2020.

[25] G. Eibl, T. Lampoltshammer, and L. Temple, "Towards identifying factors influencing mobile government adoption: An exploratory literature review," *JeDEM-eJournal of eDemocracy and Open Government*, vol. 14, no. 1, pp. 1–18, 2022.

[26] T. Alshammari, "Factors affecting continuance intention of m-government: An empirical study," *International Journal of E-Business Research (IJEBR)*, vol. 19, no. 1, pp. 1–23, 2023.

[27] M. H. Muttaqin and T. D. Susanto, "The effect of website components on user trust in increasing the interest to use public administration service on e-government website," in *2019 International Conference on Computer Science, Information Technology, and Electrical Engineering (ICOMITEE)*. Jember, Indonesia: IEEE, Oct. 16–17, 2019, pp. 30–36.

[28] R. Waluyo, F. E. Gunawan, and I. Setiawan, "The measurement of information and communication technology literacy: A case study of the village officials in Purbalingga," *CommIT (Communication and Information Technology) Journal*, vol. 16, no. 1, pp. 19–25, 2022.

[29] M. N. Huda, "Analysis the critical factors of m-government service acceptance: An integrating theoretical model between TAM and ECM," *Policy & Governance Review*, vol. 7, no. 2, pp. 109–124, 2023.

[30] M. Almaiah, A. Al-Khasawneh, A. Althunibat, and S. Khawatreh, "Mobile government adoption model based on combining GAM and UTAUT to explain factors according to adoption of mobile government services," *iJIM*, vol. 14, no. 3, pp. 199–224, 2020.

[31] A. Althunibat, M. Abdallah, M. A. Almaiah, N. Alabwaini, and T. A. Alrawashdeh, "An Acceptance Model of Using Mobile-Government Services (AMGS)," *CMES-Computer Modeling in Engineering & Sciences*, vol. 131, no. 2, pp. 865–880, 2022.

[32] R. Eid, H. Selim, and Y. El-Kassrawy, "Understanding citizen intention to use m-government services: An empirical study in the UAE," *Transforming Government: People, Process and Policy*, vol. 15, no. 4, pp. 463–482, 2021.

[33] N. Hajiheydari and M. Ashkani, "Mobile application user behavior in the developing countries: A survey in Iran," *Information Systems*, vol. 77, pp. 22–33, 2018.

[34] S. Sidek, S. K. A. Alkaabi, and N. A. Mosali, "Mediation model of factors affecting continuous use of m-government services of Abu Dhabi smart city," *International Journal of Sustainable Construction Engineering and Technology*, vol. 13, no. 2, pp. 141–152, 2022.

[35] M. Ltifi, "Determinants of the intention of smartphone usage by mobile Internet users for m-services," *Management Decision*, vol. 56, no. 11, pp. 2291–2307, 2018.

[36] M. Muflih, "Muzakki's adoption of mobile service: Integrating the roles of Technology Acceptance Model (TAM), perceived trust and religiosity," *Journal of Islamic Accounting and Business Research*, vol. 14, no. 1, pp. 21–33, 2023.

[37] F. W. Ntsafack, J. R. K. Kamdjoug, and

S. F. Wamba, "Exploring factors affecting mobile services adoption by young consumers in Cameroon," in *Trends and advances in information systems and technologies: Volume 26*. Springer, 2018, pp. 46–57.

[38] S. K. Sharma, A. Al-Badi, N. P. Rana, and L. Al-Azizi, "Mobile applications in government services (mG-App) from user's perspectives: A predictive modelling approach," *Government Information Quarterly*, vol. 35, no. 4, pp. 557–568, 2018.

[39] D. Stefanovic, A. Milicevic, S. Havzi, T. Lolic, and A. Ivic, "Information systems success models in the e-government: Context: A systematic literature review," in *2021 20th International Symposium INFOTEH-JAHORINA (INFOTEH)*. East Sarajevo, Bosnia and Herzegovina: IEEE, March 17–19, 2021, pp. 1–6.

[40] A. I. Alkraiji, "An examination of citizen satisfaction with mandatory e-government services: Comparison of two information systems success models," *Transforming Government: People, Process and Policy*, vol. 15, no. 1, pp. 36–58, 2021.

[41] W. H. DeLone and E. R. McLean, "Information systems success measurement," *Foundations and Trends® in Information Systems*, vol. 2, no. 1, pp. 1–116, 2016.

[42] N. P. Rana, Y. K. Dwivedi, M. D. Williams, and V. Weerakkody, "Investigating success of an e-government initiative: Validation of an integrated IS success model," *Information Systems Frontiers*, vol. 17, pp. 127–142, 2015.

[43] C. Wang and T. S. Teo, "Online service quality and perceived value in mobile government success: An empirical study of mobile police in China," *International Journal of Information Management*, vol. 52, 2020.

[44] J. A. Mulyono and Sfenrianto, "Evaluation of customer satisfaction on Indonesian banking chatbot services during the COVID-19 pandemic," *CommIT (Communication and Information Technology) Journal*, vol. 16, no. 1, pp. 69–85, 2022.

[45] M. G. Nkanata, "Applying DeLone and McLean information systems success model in the evaluation of e-government initiatives: A literature review," in *Proceedings of 20th Annual IS Conference*, vol. 18, 2019, pp. 300–327.

[46] N. Yakubu and S. Dasuki, "Assessing elearning systems success in Nigeria: An application of the DeLone and McLean information systems success model," *Journal of Information Technology Education: Research*, vol. 17, pp. 183–203, 2018.

[47] P. Rita, T. Oliveira, A. Estorninho, and S. Moro, "Mobile services adoption in a hospitality consumer context," *International Journal of Culture, Tourism and Hospitality Research*, vol. 12, no. 1, pp. 143–158, 2018.

[48] K. Wang and C. L. Lin, "The adoption of mobile value-added services: Investigating the influence of IS quality and perceived playfulness," *Managing Service Quality: An International Journal*, vol. 22, no. 2, pp. 184–208, 2012.

[49] J. Y. Kim and H. S. Lee, "Key factors influencing customer satisfaction in Korea's mobile service sector," *Journal of Internet Banking and Commerce*, vol. 18, no. 3, pp. 1–13, 2013.

[50] M. Suleiman Awwad, "An application of the American Customer Satisfaction Index (ACSI) in the Jordanian mobile phone sector," *The TQM Journal*, vol. 24, no. 6, pp. 529–541, 2012.

[51] Y. Tirana and Sfenrianto, "Factors on mobile application user satisfaction in the largest Indonesian Internet Service Provider (ISP)," *CommIT (Communication and Information Technology) Journal*, vol. 17, no. 2, pp. 199–208, 2023.

[52] J. H. Cheong and M. C. Park, "Mobile Internet acceptance in Korea," *Internet Research*, vol. 15, no. 2, pp. 125–140, 2005.

[53] T. Ahn, S. Ryu, and I. Han, "The impact of web quality and playfulness on user acceptance of online retailing," *Information & Management*, vol. 44, no. 3, pp. 263–275, 2007.

[54] W. W. Chin and P. A. Todd, "On the use, usefulness, and ease of use of structural equation modeling in MIS research: A note of caution," *MIS Quarterly*, vol. 19, no. 2, pp. 237–246, 1995.

[55] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS Quarterly*, vol. 13, no. 3, pp. 319–340, 1989.

[56] E. Sorongan and Q. Hidayati, "Integration of EUCS variables into DeLone and MCLean models for e-government evaluation: Conceptual models," *Register: Jurnal Ilmiah Teknologi Sistem Informasi*, vol. 6, no. 1, pp. 32–42, 2020.

[57] L. Alzahrani, W. Al-Karaghouli, and V. Weerakkody, "Investigating the impact of citizens' trust toward the successful adoption of e-government: A multigroup analysis of gender, age, and Internet experience," *Information Systems Management*, vol. 35, no. 2, pp. 124–146, 2018.

[58] J. F. Hair Jr, G. T. M. Hult, C. M. Ringle, M. Sarstedt, N. P. Danks, and S. Ray, *Partial Least Squares Structural Equation Modeling (PLS-SEM) using R: A workbook*. Springer

Nature, 2021.

[59] M. A. Memon, H. Ting, J. H. Cheah, R. Thurasamy, F. Chuah, and T. H. Cham, "Sample size for survey research: Review and recommendations," *Journal of Applied Structural Equation Modeling*, vol. 4, no. 2, pp. 1–20, 2020.

[60] S. Ahmad, R. Omar, and F. Quoquab, "Corporate sustainable longevity: Scale development and validation," *SAGE Open*, vol. 9, no. 1, pp. 1–19, 2019.

[61] M. G. Khwaja and U. Zaman, "Configuring the evolving role of eWOM on the consumers information adoption," *Journal of Open Innovation: Technology, Market, and Complexity*, vol. 6, no. 4, pp. 1–13, 2020.

[62] U. Zaman, Z. Jabbar, S. Nawaz, and M. Abbas, "Understanding the soft side of software projects: An empirical study on the interactive effects of social skills and political skills on complexity–performance relationship," *International Journal of Project Management*, vol. 37, no. 3, pp. 444–460, 2019.

[63] S. S. Lim and K. R. Tan, "Front liners fighting fake news: Global perspectives on mobilising young people as media literacy advocates," *Journal of Children and Media*, vol. 14, no. 4, pp. 529–535, 2020.

[64] S. Arshad and S. Khurram, "Can government's presence on social media stimulate citizens' online political participation? Investigating the influence of transparency, trust, and responsiveness," *Government Information Quarterly*, vol. 37, no. 3, 2020.

[65] N. Khan, R. L. Ray, H. S. Kassem, and S. Zhang, "Mobile Internet technology adoption for sustainable agriculture: Evidence from wheat farmers," *Applied Sciences*, vol. 12, no. 10, pp. 1–20, 2022.

[66] A. A. G. A. Yana, H. A. Rusdhi, and M. A. Wibowo, "Analysis of factors affecting design changes in construction project with Partial Least Square (PLS),," *Procedia Engineering*, vol. 125, pp. 40–45, 2015.

[67] N. E. Carissa, M. Erlangga, C. S. Evik, and P. W. Handayani, "The influence of perceived usefulness, satisfaction, and personalization on subscription video on demand continuance intentions," *CommIT (Communication and Information Technology) Journal*, vol. 17, no. 2, pp. 169–184, 2023.

[68] V. Kulshrestha, K. Jain, and T. Dhingra, "Dimensions of mobile service adoption—A systematic literature review," *South Asian Journal of Business Studies*, vol. 12, no. 3, pp. 345–373, 2023.

[69] M. N. Huda and K. Amin, "Understanding the intention to use LAPOR application as e-democracy in Indonesia: An integrating ECM and UTAUT perspective," *JeDEM-eJournal of eDemocracy and Open Government*, vol. 15, no. 1, pp. 22–47, 2023.