Analysis of Factor in user Intention to Use the Covid-19 Tracking Application

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Abstract - Science and technology can be collaborated to create an application that can help to track the contacts of COVID-19 patients. Smartphone-based contact tracing applications have been adopted by more than 50 countries. One of which is in Indonesia. In March 2020, Indonesia launched a mobile application to track the contact of COVID-19 patients namely *PeduliLindungi*. During its usage, users find some issues about *PeduliLindungi*, such as potential data leaks, data misuse, and data inaccuracies. This research is aimed to develop a conceptual model to analyze factors that affect user intentions in using the *PeduliLindungi* application. The proposed conceptual model is the integration of EUCS, DeLone and McLean that is equipped by the system security variables. There were 288 respondents. The data is processed using SmartPLS 3.0. According to the results of the analysis, the proposed conceptual model has 83.1 percent for its accuracy. User satisfaction and system security give a positive and significant impact on user intentions. The variables of content, accuracy, format, ease of use, and timeliness give a positive and significant impact on user satisfaction. On the other hand, the system security has no positive and significant impact on user satisfaction. Meanwhile, user satisfaction and system security itself affects the user's intentions in using the *PeduliLindungi* application.

Keywords: Intension to use, *PeduliLindungi*, Covid-19

I. INTRODUCTION

Around December 2019, the coronavirus began to emerge in Wuhan, China [1]. The World Health Organization (WHO) named the virus as 2019-nCoV or COVID-19 [2]. The viruses cause health emergencies and are labeled as pandemic throughout the world [1]. The Covid-19 virus continuously spread. Even in March 2020, it is recorded that it spreads to 160 nations and causes the deaths of more than 8000 people [3]. At the beginning of November 2021, COVID-19 spread to 226 countries with more than 200 million people positively infected with the viruses and more than 5 million people died. In Indonesia, over 4 million people are confirmed positively infected and over 100,000 died [4].

Intensive prevention and treatment are required to hinder the increase of Covid-19 cases [5]. People can help to prevent the spread of the Covid-19 viruses by applying 5M and healthy lifestyle [6]. The Indonesian government also tries to prevent the spread by issuing a regulation that is Large-Scale Social Restrictions (PSBB) and set up a mass screnings through rapid test and swab test [7].

Tracking the contact of COVID-19 patients is necessarily needed to control the spread in certain areas [8]. Science and technology can be utilized to track Covid-19 patient interactions. Research in the field of technology aims to provide comfortability to prevent the spread of Covid-19. Digital health technology becomes an alternative solution to overcome the problems that are handled manually [9-11]. China, Singapore, South Korea, and Taiwan track the patient's contact digitally using smartphone applications Smartphone-based applications for COVID-19 patient contact tracking are used personally in over 50 countries by downloading it in Google Play Store. Indonesia released the *PeduliLindungi* mobile application to track the contact of COVID-19 patients in March 2020 [13]. This application can also be used to help the people in checking the COVID-19 suspects and the COVID-19 high-risk zones [14]. User interest is important to the successful implementation of *PeduliLindungi* application [15]. The application is useful but risky because of the issue of potential data leakage, data misuse and data inaccuracise [16].

In the DeLone and McLean method, *the intention to use* is one of the important variables for measuring the success of a system. If people have no intention to use the system, they are less likely to use the system [17]. In measuring the success of *mobile* applications, the variable of *intention to use* will be affected by *information quality*, *user satisfaction*, *perceived usefulness*, *trust*, and *security* [18-19].

In the implementation of e-Government, user satisfaction becomes a factor that determines the success and failure of e-Government [20]. User satisfaction can

be measured using the End User Computing Satisfaction (EUCS) method. The variables in the EUCS method are the information content, accuracy, format, ease of use and the timeliness given in the input and output processes [21]. This is corroborated in a research [22] that the five variables in the EUCS method influence user satisfaction. However, in another research [23] it is stated that the format variable has no effect on user satisfaction. Thus, the end user computing satisfaction instrument has been validated and tested as a model to measure user satisfaction of various systems such as information systems, learning management and mobile applications. It can be developed by combining it with other measurement models and adding different instruments, like security or others as needed [24].

Security is undeniably seen as an important aspect that is considered by the users in today's digital era [25]. A system or application must ensure its access security to the provided services, including its security from data theft [26]. Security becomes the highest priority for users to use an application. The security includes the personal data information on *the online* system [27]. The security of a system or application may affect their intention to use it. Users tend to avoid the system if it has a high risk, especially in terms of security [28].

In this study, the model was developed by combining several variables such as the EUCS variable, *security*, and *intention to use*. These variables have been tested empirically through previously conducted studies [18], [22], [24], [29], [30], [31].

II. METHOD

This study discusses the user satisfaction of *PeduliLindungi* technology as a Covid-19 patient tracking application and user acceptance of its technology in Indonesia. Acceptance analysis of *PeduliLindungi* will be conducted by adopting EUCS and DeLone &McLean method, and security variables as well. The methods and the variables have been widely used in previous study [22], [25], [29], [30], [31].

Samples are collected by using the accidental sampling technique. The number of populations cannot precisely be determined so that the sample is taken by increasing the number of questions that are delivered to the respondents at least five times [32-33]. This study consists of 28 questions, so that the minimum number of samples to be taken is 140 samples (28 question items x 5). Respondents' responses were collected from October 25, 2021 to November 30, 2021. obtained 288 data, so that it has reached the minimum number of samples required.

This study creates a model to analyze the factors that affect user intentions by adopting several methods, namely the EUCS Method [34], and DeLone & McLean [17], and is combined with security variables [25-28], [30]. The design of the research model is shown in Fig. 1.

Based on the research model in figure 2, so that a research hypothesis can be formulated, namely as follows:

H1: Variable of *content* has a positive and significant impact to *user satisfaction*
H2: Variable of a*ccuracy* has a positive and significant impact to *user satisfaction*
H3: Variable of *format* has a positive and significant impact to *user satisfaction*
H4: Variable *of Ease-of-Use* has a positive and significant impact to *user satisfaction*
H5: Variable of *timeliness* has a positive and significant impact to *user satisfaction*
H6: Variable of *security* has a positive and significant impact to *user satisfaction*
H7: Variable of *security* has a positive and significant impact to *Intention to Use*
H8: User satisfaction has a positive and significant impact to *intention to use*

The analysis of data is processed using SmartPLS 3 with *outer model* and *inner model* testing [35]. The *outer model* focuses on validity and reliability testing, while the *inner model*, focuses on the testing of *R Square* and *Goodness of Fit*. Then, the significance and influence of exogenous variables on endogenous variables using bootstrapping tests [36].

III. RESULTS AND DISCUSSION

The respondents who participated in this study were 288 students. They live in Banyumas and had filled out the questionnaire in Google Form. It can be seen in figure 2 that the respondents consist of 83 men (29%) and 205 women (71%). Meanwhile, figure 3 shows the respondents' class, that is 88 respondents from 2018 (31%), 44 respondents (15%) from 2019, 35 (12%) respondents from 2020 and 121 (42%) respondents from 2021.

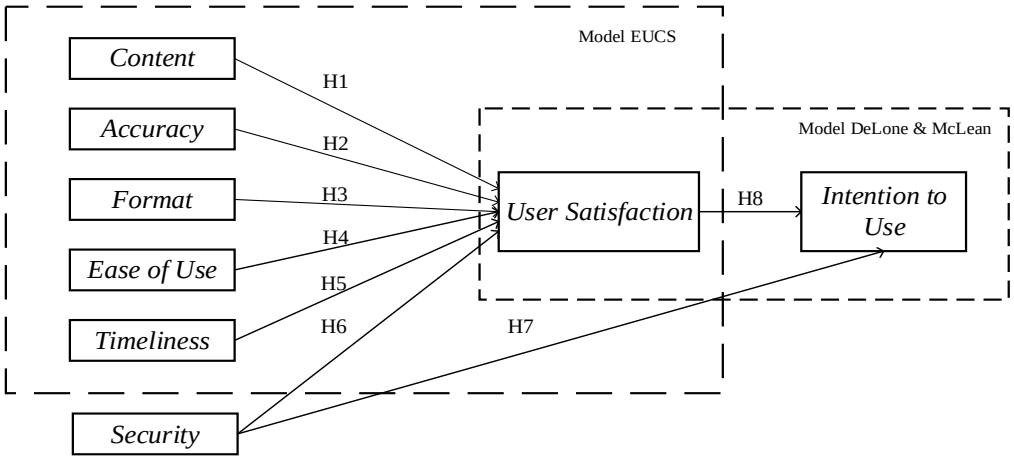

Fig. 1 Research model

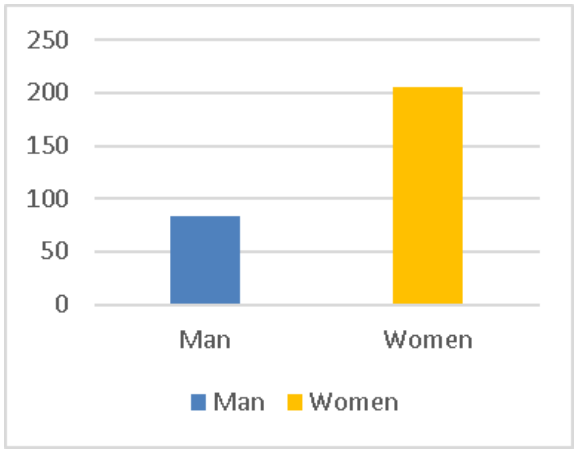

Fig. 2 Gender distribution of respondents

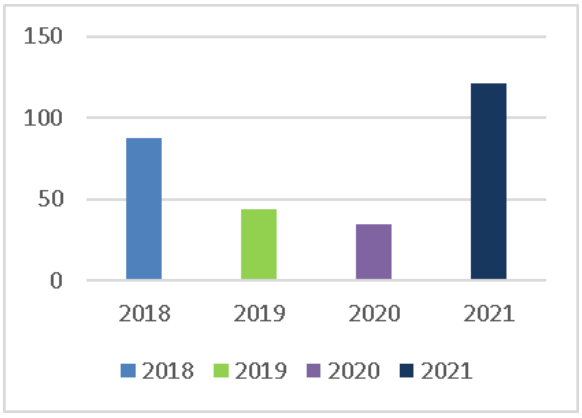

Fig. 3 Year distribution of respondents

A. *Evaluation of the Measurement Model (Outer Model)*

Evaluation of outer models was carried out with validity and reliability tests [37]. A construct has a good convergent validity if the *loading factor* is more than 0.7 and the AVE value is more than 0.05 [38]. Meanwhile, reliability is determined by the value of *composite reliability* and *Cronbach's Alpha* [39]. A construct is consistent if it has *composite reliability* and *Cronbach's Alpha* higher than 0.7 [40]. Table I shows that all indicators have a *loading factor* more than 0.7 and the AVE more than 0.5. It means that all constructs are valid. All constructs produce a *composite reliability value* more than 0.7. *Intention to use* has a *value of Cronbach's Alpha* less than 0.7. It is 0.639. According to [37] 0.6 is still acceptable. Therefore, the internal consistency in the latent variable construct has been fulfilled.

B. *Evaluation of the Structural Model (Inner Model)*

The measurement of relations between exogenous constructs and endogenous constructs that are being evaluated is called *the inner model* [41]. In this study, the evaluation of the inner model includes *R Square* and *Goodness of Fit*.

1) R Square. R Square is a measurement for predicting the accuracy model. R Square shows the combined influence of exogenous constructs to endogenous constructs. The values range from 0 to 1 with criteria 0.75 is strong, 0.50 is moderate, and 0.25 is weak [37]. Table II shows that R Square's intention *to use* is 0.475. It means that the influence of *user satisfaction* is 47% and the rest is influenced by other variables. R Square that constructs *the user satisfaction* is 0.753. It means that the effect of the *accuracy*, *format*, *content*, *ease of use*, *timeliness*, and *security* is 75.3% and the rest are influenced by other factors.

TABLE I
CONVERGENT VALIDITY AND RELIABILITY TEST

Latent Construct	Indikator	*Loading Factor*	Cronbach's Alpha	AVE	Composite Reliability
Accuarcy	ACC1	0,855			
	ACC2	0,863	0,832	0,748	0,899
	ACC3	0,877			
Content	CON1	0,842			
	CON2	0,865	0,873	0,724	0,913
	CON3	0,857			
	CON4	0,838			
Ease of Use	EOU1	0,921			
	EOU2	0,937	0,871	0,796	0,921
	EOU3	0,815			
User	EUS1	0,865			
Satisfaction	EUS2	0,928			
	EUS3	0,895	0,855	0,800	0,912
	EUS4	0,888			
	EUS5	0,894			
Format	FOR1	0,873			
	FOR2	0,903	0,639	0,776	0,847
	FOR3	0,865			
Intention to Use	ITU1	0,867	0,933	0,735	0,949
	ITU2	0,847			
Security	SEC1	0,892			
	SEC2	0,934			
	SEC3	0,937	0,899	0,790	0,937
	SEC4	0,883			
	SEC5	0,791			
Timliness	TIM1	0,920			
	TIM2	0,934	0,937	0,832	0,952
	TIM3	0,882			

TABLE II
TEST RESULTS R SQUARE

Construct	*R Square*	Information
Intention to Use	0,475	Weak
User Satisfaction	0,753	Strong

2) The Goodness of Fit. The accuracy of a model is carried out using the *Goodness of Fit* test by looking at the *Normed Fit Index* (NFI). It has values ranging from 0 to 1. The proposed research model has good accuracy if the value is close to 1 [42]. The score of NFI is 0.831. It means that the proposed model had an accuracy of 83.1%.

C. Hypothesis tests

Bootstrapping is used to determine the significance of exogenous constructs to endogenous constructs [36]. Significance will be fulfilled if it produces a statistical T value > 1.96 at a significant 5% ($\alpha = 0.05$; double-sided test) and P Value is above 0.05 [43]. Table III the path coefficient of the research model. Figure 4 shows the result of *the bootstrapping* testing of the proposed research model.

H1: Variable of content has a positive and significant impact to User Satisfaction

From evaluation testing of the structural model, the influence of *content* variable to *user satisfaction* has a statistical T value 2.061 > 1.95 and P Value 0.040 < 0.05. The estimated value of the original *sample was* positive, that is 0.152. It indicates that *the content* variable has a positive and significant influence on *user satisfaction*. Hence, the first hypothesis (H1) is accepted because the content in the application fits to the user needs. *PeduliLindungi* application provides complete information, including vaccine certificates, Covid-19 test results, Covid-19 patients *contact tracking*, information of high-risk zone, tele doctors, QR Codes for *check-in* and etc. The information has been relevant to the user's needs.

TABLE III
RESULT OF PATH COEFFICIENT

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics	P Values
Content -> User Satisfaction	0,152	0,155	0,074	2,061	0,040
Accuracy -> User Satisfaction	0,179	0,170	0,062	2,871	0,004
Format -> User Satisfaction	0,151	0,158	0,068	2,224	0,027
Ease of Use -> User Satisfaction	0,231	0,230	0,065	3,562	0,000
Timeliness -> User Satisfaction	0,243	0,238	0,074	3,283	0,001
Security -> User Satisfaction	0,046	0,054	0,063	0,729	0,466
Security -> Intention to Use	0,144	0,144	0,062	2,322	0,021
User Satisfaction -> Intention to Use	0,585	0,585	0,056	10,415	0,000

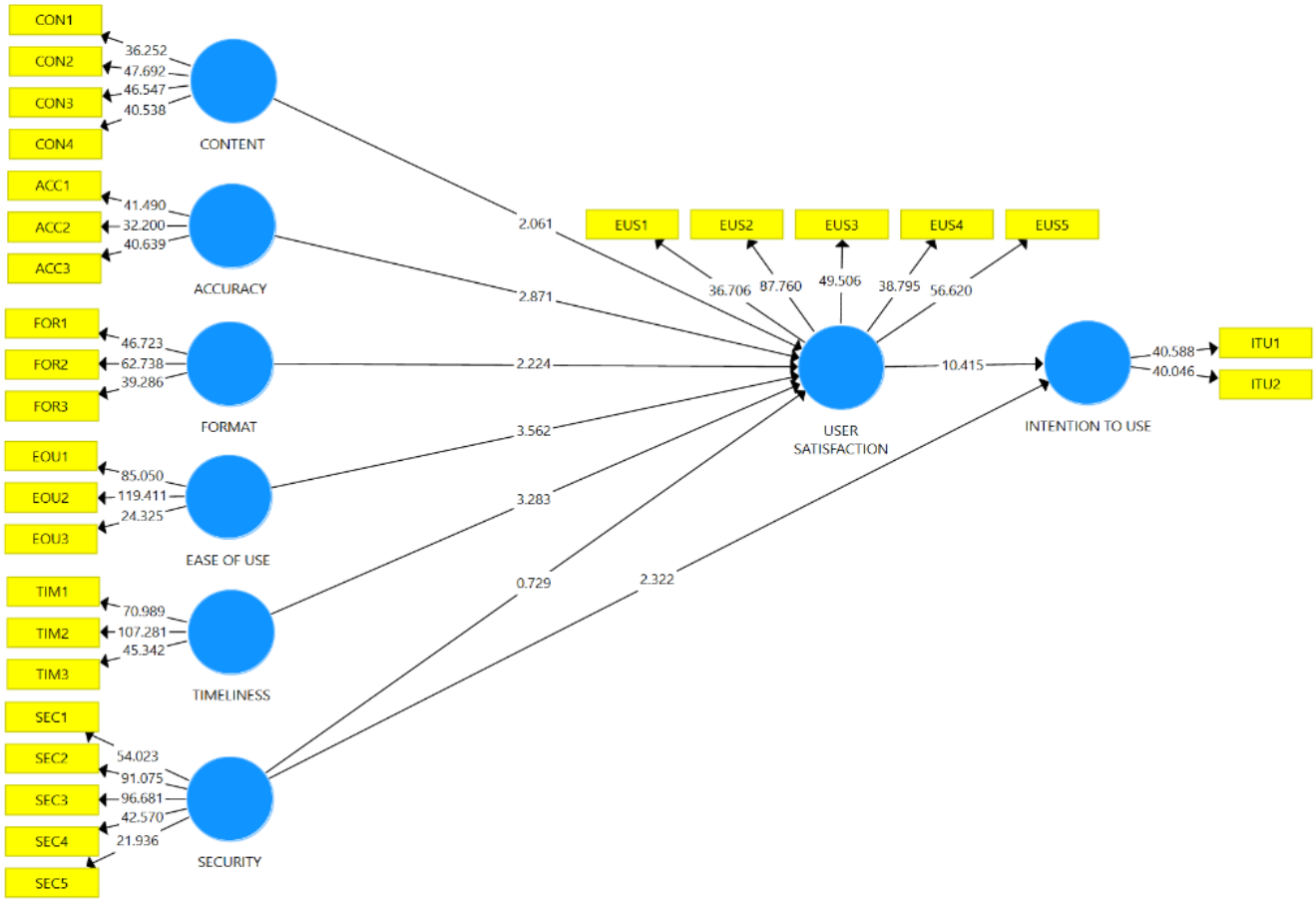

Fig. 4 Bootstrapping outputs

H2: The Variable of accuracy has a positive and significant impact to User Satisfaction

From the evaluation test of the structural model, accuracy has an impact on user satisfaction. Its statistical T value is 2.871 > 1.95 and P Value = 0.004 < 0.05. The estimation value of the original sample is positive. It is 0.179. It indicates that accuracy has a positive and significant impact on user satisfaction. As a result, the second hypothesis (H2) is accepted because the PeduliLindungi application provides accurate information in the process of data input. *PeduliLindungi* application is able to provide accurate information related to the spread of Covid-19 cases in certain regions at one time. It might not be obtained by the users if they search in other sources. This is because the data provided by the apps is directly obtained from the source of the national data center managed by the Ministry of

Communication and Information. Therefore, the information provided is reliable.

H3: Variable of format has a positive and significant impact to User Satisfaction

From the structural model evaluation test, the influence of the format variable on user satisfaction has a statistical T value = 2.224 > 1.95 and P Value = 0.027 < 0.05. The estimated value of the original sample is positive, it is 0.151. It indicates that the format has a positive and significant impact on user satisfaction. Hence, the third hypothesis (H3) is accepted because the design displayed on the page of the application is able to clarify and represent information needed. The users are not confused by it. *PeduliLindungi* application is supported by navigation conformity that is qualified to be a good application standard. When the user clicks the menu of the vaccine certificate, the application will display a page containing the user's vaccine certificate file.

H4: Variable of the Ease-of-Use has a positive and significant impact to User Satisfaction

From the structural model evaluation test, the ease of use has an impact on user satisfaction with a statistical T value = 3.563 > 1.95 and P Value = 0.000 < 0.05. The estimated value of the original sample is 0.231. It indicates that the ease of use variable has a positive and significant impact on user satisfaction. Hence, the fourth hypothesis (H4) is accepted because in daily use, users feel that the application is user friendly. The application can be easily used by users without joining any training first. Thus, users can quickly access information and understand the usefulness of the menu in the application.

H5: Variable of timeliness has a positive and significant impact to user satisfaction

From the structural model evaluation test, the timeliness variable impacts user satisfaction with a statistical T value = 3.283 > 1.95 and P Value = 0.001 < 0.05, while the original sample's estimated value is 0.243. It means that the timeliness variable has a positive and significant impact on user satisfaction. As a result, the fifth hypothesis (H5) is accepted. Acceptance is reached because the use of the *PeduliLindungi* application does not need to take a long time to display information. The *PeduliLindungi* application also always provides the latest information related to Covid-19 so that users can find out the conditions around them, such as statistical mapping of Covid-19 cases, high-risk zones, vaccinations, and other health information easily and quickly.

H6: Variable of security has a positive and significant impact to user satisfaction

From the results of structural model evaluation testing, the influence of security variables on user satisfaction reached a statistical T value = 0.729 > 1.95 and P Value = 0.466 < 0.05, while the original sample estimated value is 0.046. It shows that the security variable has a positive but not significant influence on user satisfaction. As a consequence, the sixth hypothesis (H6) is rejected. The reason for rejection is that users do not really consider the security aspects to get satisfaction in using the *PeduliLindungi* application. It is logically accepted that security does not directly interact with the user when accessing the application. Users tend to use the *PeduliLindungi* application without firstly looking at the security provided by the application.

H7: Variable of security has a positive and significant impact to Intention to Use

From the results of structural model evaluation testing, security influences user satisfaction with a statistical T value = 2.322 > 1.95 and P Value = 0.021 < 0.05, while the estimated value for the original sample is 0.144. It shows that security has a positive and significant influence on intention to use. It means that the seventh hypothesis (H7) is accepted. Acceptance of the hypothesis is because the *PeduliLindungi* application is able to provide good access security. The application has login and logout features to avoid misuse of access by unauthorized users so that the confidentiality of personal data can be guaranteed. To get the user's intention, the *PeduliLindungi* application guarantees information security by asking for users' permissions to access their account for tracing and tracking purposes. It also provides security settings that can be adjusted to the user's needs.

H8: Variable of the user satisfaction has a positive and significant impact to intention to use

From the structural model evaluation test, the influence of the user satisfaction variable on intention to use has a statistical T value = 10.415 > 1.95 and P Value = 0.000 < 0.05. Estimated value of the original sample is 0.585. It indicates that the user satisfaction variable has a positive and significant impact on intention to use. Hence, the seventh hypothesis (H7) is accepted. Acceptance of this hypothesis indicates that users will continue to use the *PeduliLindungi* application because they are satisfied with the services provided. Various conveniences provided by the *PeduliLindungi* application, such as vaccine registration, information on the spread of Covid-19 viruses, tele doctor, Covid-19 statistics and other information, are able to meet the needs of users in recent pandemic situations. All information provided is always updated and reliable.

Users are predicted to often use the application and will access it when they need it again

This research shows that a users' intention to use the *PeduliLindungi* application is influenced by user satisfaction and system security. This result is in line with a research [29] which states that user satisfaction affects the intention to use the system. Another research [30][31] confirmed that system security is able to influence users' intention to use an information system. In the context of influencing the user to use an information system, user satisfaction is influenced by content, accuracy, format display, ease of use and time accuracy, but user satisfaction is not influenced by system security. It has been explained that the variables *of content, accuracy, format, ease of use* and *timeliness* have an influence on user satisfaction. This is in line with other studies [25] which states that the security of information systems does not have an influence on user satisfaction. Based on the results *of the Goodness of Fit* test, this research model has an accuracy of 83.1% so that it can be concluded that the research model has good accuracy.

IV. CONCLUSION

This research was conducted to create a conceptual model by combining the EUCS model, the DeLone and McLean model and equipped with system security in order to measure users' intentions in using the *PeduliLindungi* application. Data from the respondents are tested to confirm its validity and reliability. Then, from the inner model test, it reveals that the model has an accuracy of 83.1%. From the model used in this study, user satisfaction and system security have a positive and significant impact on a user's intention to use the *PeduliLindungi* application. This study also showed that the content, accuracy, format, ease of use and timeliness have a positive and significant impact on the user satisfaction, but the security of the system does not have a significant impact on the users satisfaction while using *PeduliLindungi* application.

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