The Role of Technology Acceptance and Readiness on Intention to Adopt Virtual Tourism Technology during The New Normal Era

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Abstract—**Tourism in the new normal era, after the COVID-19 pandemic, has undergone many changes, especially from the attitudes and habits of tourists who are accustomed to digitalization. Virtual tourism has a huge potential to complement conventional tourism to help tourism sector recover from its loss due to the pandemic. This study aims to investigate the intention to adopt virtual tourism technology in Indonesia by integrating Technology Acceptance Model (TAM) and Technology Readiness Index (TRI). Data were collected through online survey with total 456 users of virtual tourism participated. The structural equation model (SEM) was used to test the hypothetical relationships between variables. Results showed that optimism has a positive relationship to TAM indicators, while discomfort has no significant effect at all. Perceived ease of use was found to positively affect perceived usefulness, and both TAM variables were found to have positive impact on the intention to adopt virtual tourism technology. Developers of virtual tourism technology needs to create a better user experience and more targeted marketing effort are needed to eliminate the discomfort in using the technology.**

Keywords—virtual tourism, technology acceptance model, technology readiness index, COVID-19

I. INTRODUCTION

The COVID-19 pandemic which has occurred all over the world has shifted the way people live, due to many regulations made by global organizations or countries' leaders to prevent the spread of the virus and reduce the transmission rate [1]. The outdoor activities have been restricted, even banned in some countries, social distancing was applied in public spaces, schools and offices were closed, people were required to wear mask whenever they were out of their homes, and travelling were also restricted [1], [2]. Many business sectors are affected by this situation, but one of the most affected is tourism [3]. Considering its important role as an income generator for a country, and its huge impact on labor absorption, many countries are now paying great attention to help this sector recover [3]–[6].

Digitalization is one of the most effective ways that has helped other industries survive, since people are becoming more familiar with anything digital during the pandemic [7],

[8]. In Indonesian tourism sector, the Ministry of Tourism and Creative Economy makes digital tourism as its strategic plan within 2020 to 2024 [9], [10]. Many literatures mentioned the development of virtual tourism technology as one of the innovative steps to create a digital tourism environment [11]–[14]. Virtual tourism is a technology that allows users to feel the sensation of real tourism through a smartphone or PC screen, without really having to be in the tourism destination [15]. The use of virtual tourism continued to rise during the COVID-19 pandemic as it was proven as a safer alternative to conventional travel [13]. However, its use is more popular in developed countries compared to developing ones like Indonesia [2]. The adoption of virtual tourism technology in Indonesia needs further investigation considering how crucial and bad the impact felt by Indonesian tourism sector.

As many as 12.74 billion people are working in tourism sector in Indonesia [6]. In 2020, during the COVID-19 pandemic, approximately 62 million jobs in tourism sector lost [16]. The drastic decrease in the number of tourists' visit also caused significant loss for the country. In 2020, the number of tourists' visit decreased by 75% from 16 million people in 2019 to 4 million, and even lower to 1.5 million in 2021 [17]. This phenomenon shows a serious impact the COVID-19 pandemic has on Indonesian tourism. Immediate action is needed to help this sector recover, but in the future, unpredictable situation could happen, and the impact might or might not be worse. Many believe that virtual tourism would help the tourism sector to not only recover from this pandemic, but also survive in the long run and become more resilient to face any other unfavorable circumstances, or in other word, sustain [1], [18].

Although virtual tourism has been developed for quite some time, in Indonesia, this technology is still relatively new [19]. To understand about the reason behind the acceptance and adoption of a new technology, technology acceptance model (TAM) has been the most frequently used model [20], [21], even some that discussed virtual tourism as its main object [1], [22]. Another concept that could also be used, given the fact that the popularity of virtual tourism is still low in Indonesia, is

the technology readiness index (TRI) [23], [24]. Previous studies have shown that TRI is proven to be a strong predictor related to behavioral intention when it comes to technology, and it takes into account the individual differences where people could have two type of emotions, positive and negative [8], [25][23], [26]. Both TAM and TRI could be used to investigate the motives behind the adoption of virtual tourism, especially in the new normal era.

II. LITERATURE REVIEW

A. Virtual tourism

Virtual tourism is a new way to travel in the form of virtual simulation, where the set-up of the location is made digitally by the compilation of edited images in videos, using technology such as virtual reality, augmented reality, 350-degree video, and holograms [2], [3]. By using virtual tourism technology, people would have the privilege to experience the sensation of desired places without having to be in that place physically [27]. The use of virtual tourism would help tourism business recover, due to its ability to engage with potential consumer (in this case, potential tourist) and affect their intention to do the on-site-visit in the future [28]. Moreover, virtual tourism also contributes to sustainable tourism [1]. People who choose virtual tourism over the conventional tourism would eliminate the number of travels, making less people transporting from one place to the other. Transportation, shopping place and items, and restaurants are among the global greenhouse gas emissions' contributors [29]. This makes virtual tourism an interesting and important topic to be studied further.

B. Technology Readiness Index (TRI)

TRI was originally developed by [23] in 2000, and later updated into the TRI 2.0 in 2015 [24]. This concept was commonly used to understand the readiness of people to adopt cutting-edge technology, by taking into account individual differences, and also relevant to the marketing context [23], [30]. Most studies used the four dimensions of TRI: optimism, innovativeness, discomfort, and insecurity [8], [24]. However, some scholars believed that when the four dimensions are used together, their total score might not be optimal to predict the behavior of people [1]. Considering the aim of this study, only two dimensions will be used, each will represent the two individual emotions highlighted in TRI, optimism will represent positive emotion, and discomfort will represent positive emotion towards a technology.

In TRI context, optimism refers to a positive attitude towards a certain technology, where optimist think that technology can improve their flexibility and efficiency [31]. Previous studies have found that optimism has a positive and significant impact on perceived ease-of-use and perceived usefulness [8]. When a person is more optimist about a technology, he/she will find that technology to be useful and easy to be used.

H1: Optimism positively affects perceived usefulness.

H2: Optimism positively affects perceived ease-of-use.

On the other hand, discomfort is a negative feeling, when a person feels of being pressured by a technology and think they have lack of control over that certain technology [23], [24]. Inconsistent results are found relating the impact of discomfort on both perceived usefulness and perceived ease-of-use. While some found that there was a negative influence of dicomfort on perceived usefulness and perceived ease-of-use [32], [33], other found there was no impact at all [1]. However, we believe that when one feels more discomfort towards using a technology, they will perceive that technology to be useless and hard-to use. Hence, the hypotheses are developed as follows:

H3: Discomfort negatively affects perceived usefulness.

H4: Discomfort negatively affects perceived ease-of-use.

C. Technology acceptance model (TAM)

TAM was developed in 1989 by [21] to explain the factors affecting people's acceptance of a new technology or system. Almost all studies that tries to understand the intention to adopt a technology or system used TAM, such as for social media, mobile games, electronic payment, electronic transportation system, online tourism booking, and even virtual tourism [1], [8], [34]–[36]. In TAM, it is believed that the behavioral intention of people to accept or adopt a technology or system is influenced by people internal beliefs, which are their perceived usefulness and perceived ease-of-use [21]. When a person perceives a technology or system as easy the use, the more they will think that technology or system is useful, then the more they will have the intention to adopt the technology or system [18], [37]. Therefore, the hypotheses are developed as follows:

H5: Perceived ease-of-use positively affects perceived usefulness.

H6: Perceived usefulness positively affects intention to adopt.

H7: Perceived ease-of-use positively affects intention to adopt.

The conceptual model of current study shown in Figure 1 is the summary of literature review and hypotheses development.
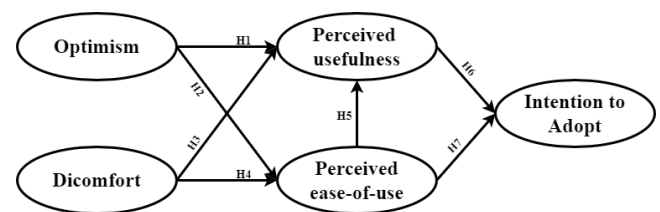

Fig. 1. Conceptual Model

III. RESEARCH METHOD

Data collection was done by distributing online questionnaires. The questions were adapted and modified based on previous research that had analyzed the constructs used in current study. In measuring the TRI variable, two out of four technology readiness index instruments were used: optimism was represented by five indicators, and discomfort uses four indicators [1], [24], [30]. Then, TAM is represented by two

variables, namely perceived usefulness using three indicators, and perceived ease-of-use using five indicators [21], [38]. Finally, the measurement of usage intention used three indicators [1], [38]. The first part of the questionnaire is a statement that respondents are willing to take this survey. The second part covers the socio-demographic characteristics of the respondents. The following sections include statements regarding the research variables. All statement items were measured on a Likert scale of 1 to 5, where 1 means strongly disagree and 5 strongly agree. The pilot test was carried out by conducting a trial of 30 respondents to ensure that the questionnaire questions were not ambiguous and that there were no technical errors that might hinder data collection. No significant changes were made to the questionnaire. Samples were taken from users of virtual tourism technology in Indonesia during the new normal era with a total of 456 respondents. After obtaining survey data, the influence between variables was analyzed using the data analysis technique of partial least squares-structural equation modeling (PLS-SEM) [39]. A two-steps approach was conducted by testing the measurement and structural model. Measurement model was analyzed to examine the validity and reliability of the model constructs, while to test the hypotheses developed, the structural model testing was done [40].

IV. RESULT

A. Respondent Charachteristic

The respondent of this study is dominated by young and educated people, as shown in Table I. This is in line with previous study that also discusses the adoption of technology such as virtual reality [37] and virtual tourism [18].

TABLE I. CHARACTERISTIC OF THE RESPONDENT

Sociodemographic Variable	Frequency	Percentage
Gender:		
Male	185	41%
Female	271	59%
Age group:		
17-24 years old	215	47%
25-34 years old	218	48%
35-44 years old	19	4%
Above 44 years old	4	1%
Education:		
Highschool or less	201	44%
Undergraduate or diploma	247	54%
Postgraduate	8	2%
Income per month (on IDR):		
< 2.000.000	202	44%
2.000.000 – 3.999.999	155	34%
4.000.000 – 5.999.999	90	20%
6.000.000 – 7.999.999	2	0%
>= 8.000.000	7	2%

B. Measurement Model Test

The assessment of measurement model was the first step of analysis that has to be conducted to ensure that the constructs used in current study's model is valid and reliable [39]. To check the convergent validity and reliability, the value of loading factor must meet the minimum requirement of 0.6,

Cronbach'Alpha (CRA) of 0.7, and composite reliability (CR) and average variance extracted (AVE) of 0.7 and 0.5 respectively [40]. Table II shows that the requirements for convergent validity and reliability are met. Furthermore, HTMT was used to assess discriminant validity. As shown in Table III, the discriminant validity requirements between constructs were met because there was no HTMT value higher than 0.9 [41]. To conclude, all constructs used in this study is considered as valid and reliable, therefore the next step could be conducted.

TABLE II. RESULT OF THE MEASUREMENT MODEL

Construct/Item	Loading	CRA	CR	AVE
Optimism		0.862	0.900	0.642
VT technology provides freedom to be mobile	0.808			
VT technology provides greater control of life	0.799			
VT technology increases productivity in personal life	0.779			
VT technology makes it more efficient in getting work done	0.812			
VT that uses the latest technology is more comfortable to use	0.808			
Discomfort		0.757	0.828	0.550
Call centres for virtual tourism are generally not helpful because they don't explain in language or terms that I understand	0.634			
There are no manuals/instructions for using high-tech virtual tourism technology written in simple language	0.658			
I feel ashamed when I face a problem in using VT technology and people notice	0.773			
My friends know more about the newer VT technology than I do	0.875			
Perceived usefulness		0.872	0.921	0.795
Using VT technology makes it easier for me to travel in the new normal era	0.897			
I feel that VT technology is useful to travel	0.893			
VT technology saves my time	0.886			
Perceived ease of use		0.919	0.939	0.755
I can easily learn how to use VT technology	0.877			
I can easily become a pro in using VT technology	0.867			
I feel that virtual tourism technology is easy to use	0.889			
I feel that VT technology is flexible to use	0.878			
My interactions with VT technology are clear and can be easily understood	0.832			
Intention to Adopt		0.779	0.865	0.681
I assumed I was to have the access to use VT technology, then I will use it compared to do a real physical visitation	0.751			
I will continue to use VT technology in the new normal era and after	0.862			
I intend to use VT technology services when there is an opportunity	0.859			

TABLE III.   RESULT OF DISCRIMINANT VALIDITY

HTMT Ratio	OPT	DIS	PUS	PEU	INT
OPT					
DIS	0.240				
PUS	0.631	0.142			
PEU	0.541	0.101	0.664		
INT	0.534	0.299	0.431	0.467	

C. Structural Model Test

To test the structural model and hypotheses, this study uses SmartPLS 3.0. In testing the structural model, this study uses a bootstrap procedure with 5,000 iterations to assess the statistical significance of the weights of construct indicators and path coefficients [42]. Before testing the hypothesis, an assessment of the quality of the model is carried out. R^2 measures the proportion of variation in the dependent variable that is explained by the independent variable [40]. The R^2 value for perceived usefulness is 0.447 (44.7%), perceived ease of use is 0.237 (23.7%), and for intention to adopt is 0.205 (20.5%). According to [39], this shows that all of these variables are influenced by their own independent variables with small to moderate power. In addition to R^2, Q^2 also plays a role as another important indicator to assess the goodness of the proposed model. Q^2 for all dependent variables has a value greater than zero (perceived usefulness = 0.332, perceived ease of use = 0.166, and intention to adopt = 0.121), which means it has an acceptable predictive power [39], [40]. In conclusion, both R^2 and Q^2 shows that the quality of the model taken from this study is good.

The last step is to evaluate the result of hypotheses testing, as shown in Table IV. In general, almost all hypotheses are accepted, except for H3 and H4. Optimism positively affects perceived usefulness (β: 0.338, $p<0.001$) and perceived ease of use (β: 0.488, $p<0.001$), showing H1 and H2 are accepted. Discomfort does not have any impact on perceived usefulness ($p>0.05$) and perceived ease of use ($p>0.05$), or in other words H3 and H4 are rejected. Perceived ease of use shows a positive relationship with perceived usefulness (β: 0.205, $p<0.01$), H5 is accepted. And last, both perceived usefulness (β: 0.430, $p<0.001$) and perceived ease of use (β: 0.299, $p<0.001$) have a significant and positive effect on intention to adopt the virtual tourism technology. H6 and H7 are accepted.

TABLE IV.   RESULT OF HYPOTHESES TESTING

Hypotheses/Relationship	β	T value	Conclusion
H1: OPT -> PUS	0.338	7.077***	Accepted
H2: OPT -> PEU	0.488	9.073***	Accepted
H3: DIS -> PUS	0.024	0.592	Rejected
H4: DIS -> PEU	-0.004	0.081	Rejected
H5: PEU -> PUS	0.205	2.926**	Accepted
H6: PUS -> INT	0.430	9.116***	Accepted
H7: PEU -> INT	0.299	4.387***	Accepted

Table note: ***p value<0.001, **p value<0.01 (one-tailed test)

V. DISCUSSION

This study shows that the combination of TAM and TRI is able to predict the adoption interest of virtual tourism technology during the new normal. This is in line with previous research conducted by (yang et al, lin et al 2007), where they used TAM and TRI because both complement each other's shortcomings. TAM is used to predict the acceptance of a technology so that it is general and system-specific, while TRI is more personal because it describes the acceptance of a technology by involving the emotional tendencies of the individual.

The technology readiness indicators used in this study represent positive (optimism) and negative (discomfort) tendencies. The results of a series of tests conducted in this study show that optimism has an effect on two TAM indicators, while discomfort has no effect at all. This is in line with previous research conducted by [1], [8], [32]. Optimists will feel that virtual tourism technology makes their lives easier, they see this as a new way to do tourism activities after the covid pandemic, so it will encourage them to have the perception that virtual tourism technology is easy to use and useful. Meanwhile, the discomfort of using virtual tourism technology may occur because this technology is new for the majority of Indonesians, so it does not affect their desire to use it. Only until they reach a certain point of comfort, they will use this new technology. Perceived ease of use is proven to have a positive effect on perceived usefulness. This is in line with research [1] states that when someone feels that virtual tousim technology is easy to use, they will start to see how useful the technology is. Furthermore, this affects the interest in adopting virtual tourism technology. Both perceived usefulness and perceived ease of use have a positive effect on interest in using technology, in line with research [1], [33], [43]. The more people perceive that virtual tourism technology is easy to use and useful for them, their interest in using this technology will also increase. The perceived ease of use of virtual tourism technology reduces the cost of participating in travelling and directly contributes to the formation of intentions to adopt virtual tourism technology. Moreover, consumers who finally feel more comfortable with the ease of access of virtual tourism technology will feel higher usability thus strengthening their intention to adopt virtual tourism technology [1].

VI. CONCLUSION

Although in the new normal era, the restriction to travel is already loosened, people are used to the situations during the pandemic, so the options to travel virtually are still in great demand. Many scholars also believe that in the long run, both virtual and conventional tourism will complement each other since virtual tourism tends to stimulate in-person visit. Based on the result it is suggested that the improvement on features and accessibility to the virtual tourism platform has to be made to stimulate the perceived usefulness and perceived ease of use, in order to increase the intention to adopt the technology. Developers of virtual tourism technology should pay more attention to users' experience so it will stimulate the

use of their products. More marketing efforts also has to be done to eliminate the discomfort in using virtual tourism. The thought of something unknown creates discomfort for people, so the more they know, the more they will feel comfortable in using virtual tourism technology. Social media could be the options in promoting this technology due to its high impact, wide and fast coverage.

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