Technology Acceptance Model for Virtual Reality in Hotel Industry

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Abstract

Technology is developing at a faster pace than ever before. Thus, it becomes very important for hotels and the hospitality industry to combine the latest technological innovations to expand their business base and customers. Today's tourists are more interested in experiencing virtual technology while they are on travel. Tourist need an online information about accommodation that they can easily find wherever they go to. A hotel with its virtual images on their website or other booking applications would interest tourists. However, it was confirmed that a virtual hotel tour is also an option that most travelers choose to observed before booking a room. Unlike the previous photos and digital imagery, with the help of a virtual hotel tour, viewers can fully immerse themselves into the hotel facilities and can judge the state of the hotel. This study aims to prove customer acceptance of the performance of Virtual Reality technology in the hotel industry so as to increase tourist intention to come and stay at hotels. This research will be carried out by collecting primary data derived from the dissemination of surveys with purposive sampling techniques. This research will be analyzed with structure equation modeling analysis techniques.

Keywords
TAM, Hotel Industry, Intention to stay, Virtual Reality.

1. Introduction
Virtual Reality (VR) is a technology that can make users 'close to reality'. Virtual Reality can be found in various ways, for example in the activity of a training simulation along with training materials, online *games*, displaying a location or activity at the *event* (Chiao et al. 2018). All views can be seen by the audience as if they are real and close

to the audience. The display of locations in VR that seems to be alive can help the hospitality industry to develop in terms of modern promotion by utilizing technology (Huang et. al. 2016).

The hospitality industry is one of the industries that benefits from the presence of technological innovation. The Internet of things (IoT), artificial intelligence, machine learning, and automation are some of the technological innovations that not only revolutionize in terms of consumer experience, but are also able to provide convenience from the business side (Sari 2019). For example, safes or cash registers are slowly being replaced with barcodes, mobile payments, and now cloud computing-based technology. This innovation has completely replaced the need for a physical payment system at the reception or cashier counter, while improving security, efficiency, and transparency.

For hotel owners, it is important to connect with the latest technological innovations in order to still be able to compete in a dynamic industry. Ensuring a quality customer experience requires a holistic approach, involving many operational and professional aspects that a hotel can provide to its customers. Technology plays an important role in making this happen while enabling hotel owners to manage challenges and day-to-day operations through a platform powered by technology. From the customer side, the maximum use of technology has been carried out. Customers who become tourists to various tourist destinations and become guests in hotels, have used many forms of technology to facilitate the search for tourist locations, plan their trips independently or through travel agents, and even make payments with the help of the latest payment technology (Israel et al. 2018). When searching for the location of the tourist destination they want as well as looking for suitable accommodation, customers need to explore the appropriate location or hotel. This is where the role of VR technology is needed. VR makes the location of the hotel, atmosphere, facilities, facilities, environment, even the staff who will serve clearly and visibly visible. So, potential customers can look around and make their choices (Pantano & Corvello 2014).

Most of previous study discussed about VR in Tourism perspective (Kilic et al. 2021; Pantano & Corvello 2014). This study examines the level of customer acceptance of hotel promotions through virtual reality. It is very important for hotels to understand how the VR created has been received by their customers, thus forming an attitude and increasing the customer's intention to use VR to find preferred hotel. The use of Technology Acceptance Model for this study will explain the impact of VR to technology acceptance by hotel's customer.

2. Literature Review

Technology Acceptance Model (TAM)

Technology acceptance model (TAM) explained that system users tend to use the system if the system is perceived to be easy to use and beneficial to the user. The TAM concept is based on the Theory of Reasoned Action developed by Fishbein and Ajzen (Ajzen 2015). In TAM, the acceptance of users of information systems is determined by two key factors, namely perceived usefulness and perceived ease of use. This model has been used to explain both short-term behavior (acceptance and adoption) and long-term (usage) behavior (Venkatesh et al. 2003). Perceived usefulness (PU) and perceived ease of use (PEOU) determine an individual's attitude towards the use of the system. PU is the extent to which users believe that using information systems will improve their learning performance. PEOU is a measure of the user's perception of the ease of implementation of the system. Furthermore, TAM shows that PEOU is a predictor of PU. The attitude of an individual is seen as influencing his behavior when using information systems, and will ultimately affect his actual performance. PU is the main determinant of behavioral intention to use information systems (Davis 1989).

2.1. Virtual Reality (VR) and Perceived of Usefulness (PU)

Virtual Reality (VR) is a technology that allows users to interact with an environment simulated by a computer-simulated environment, where an environment is actually imitated or actually an environment that only exists in imagination (Israel et al. 2018). This technology allows a person to simulate a real object using a computer that is able to evoke a three-dimensional atmosphere so as to make the user seem to be physically involved. Virtual reality technology provides a completely new form of product visualization that has the potential to significantly alter hotel presentation in the future (Lam et al. 2007). This technology can be used for marketing needs at hotels. Virtual tours are generally prepared through the hotel's website. Usually, virtual tours are divided into 360-degree images that are planned to be simple and match the basis of social media (Guttentag 2010). With this technology, potential consumers can watch the hotels to be booked. VR technology is also used to polish the interface of a hotel service *platform* so that it replaces the interface support of mobile devices or others. The goal of hotel service customers is of course to 'buy' the experience, not the product. However, conventional hotel services do not allow this until the customer actually makes a purchase transaction. VR technology can help make it possible by providing seemingly real virtual tours so

customers can try before buying. What supports VR services to be reliable as a promotional tool is (a) Virtual Tours, and (b) Virtual experiences (Lintasarta, 2020). VR allows customers to try before buying. In the hospitality industry, hotels provide the opportunity for potential customers to have a virtual experience and try to be in an attractive hotel atmosphere (Kourouthanassis et al. 2015). The new experience felt by the customer increases the customer's acceptance of the state of the hotel displayed in VR. Customer could accept the usefulness of the VR.

VR is an interactivity performance of hotel's offerings to customer. When using VR, hotel must provide application that easy to use. The ease of using information systems in hotel's VR leads to higher user acceptance (Davis et al., 1989). A system that is easy for users to use, the higher the probability of the user receiving the system next. For VR use in hotels, the interaction that occurs between the customer and the VR application to assess the hotel's offerings should be easy, and the customer must be able to operate the VR system intuitively. For example, the study of the use of technology in social media, system operation and simple interactions are important criteria for system design in order to lead to maximum use of the system by increasing the usability felt by customers (Rauniar et al. 2013).
Thus the hypothesis that can be put forward is as follows;
H1. Customer who is using VR realized that VR has a positive impact to perceived usefulness to customer.
H2. Customer who is using VR realized that VR has a positive impact to perceived ease of use

2.2 Perceived of Usefulness (PU), Attitude (ATT), and Behavioral Intention of using Hotel's VR (BI)
The hotel as a place of accommodation, promotes itself on the basis of the 'experience' of others who are already using it, which means potential guests who have never stayed in a particular hotel, have difficulty in evaluating the offer (Guttentag 2010**).** Therefore, it takes effort to search and plan by potential customers to ensure that the purchase decision to be made is sufficiently satisfactory (Xiang et al. 2015). The risks felt in the order process can be minimized by the product information provided if this information is communicated in a credible and easily accessible manner (Sharifpour et al. 2014). A suitable instrument to minimized missed information related to hotel product is VR, which supports potential guests during their individual search and planning phases by displaying the product in a vivid visual form. In particular, through realistic hotel presentations and intuitive interactions, guests have a feeling of being there (Buhalis & Law 2008**).**

Hotels can offer accommodation, food, facilities and other products virtually and potential customers find this very useful in gathering information and improving their attitude in the use of technology (Lee et al. 2006). Davis (1989) on his research states that perceived usefulness also has a direct influence on the intention to use technology. Because, the advantage in terms of user efficiency when using technology will cause users to return to using the same technology (Davis et al. 1989). On the use of VR, physical presence can be simulated virtually to provide valuable information to tourists prior to their arrival. Previous studies in the context of VR revealed that virtual reconstruction of travel destinations supports users in trip planning (Chiao et al. 2018). Thus, VR will be able to support the process of prospective travelers' intention to choose the hotel of interest when planning their trip. Based on this, the hypothesis proposed is as follows;
H3. Customer who is using VR realized that perceived usefulness of VR has a positive impact to attitude towards using hotel's VR
H6. Customer who is using VR realized that perceived usefulness of VR has a positive impact to behavioral intention to stay at the hotel

2.3 Perceived Ease of Use (PEOU) and Attitude towards using Hotel's VR
In the case of internet applications, Perceived Ease of Use (PEOU) is an important feature that leads to a positive attitude towards the use of technology. This positive attitude will then trigger the intention of using the internet at a higher frequency (King & He 2006). PEOU on VR that is specifically perceived will make users feel positive towards information systems and minimize barriers to intrinsic use (Venkatesh et. al. 2003). More to say that if users feel the ease of using VR, users will have a positive attitude. PEOU is also considered very important for one of the internet applications that are relied on (Ayeh et al. 2013)**.** This is in accordance with the results of research in the online field, that there is a positive influence of the attitude of technology users when PEOU is achieved (Chung et al. 2015). Thus, it can be assumed that users are more open-minded and positivity towards virtual reality applications if they are easy to use. Based on this, the hypothesis proposed is as follows;
H4. Customer who is using VR realized that perceived ease of use of VR has a positive impact to attitude towards using hotel's VR

2.4 Attitude toward Using Hotel's VR and Behavioral Intention to use Hotel's VR

A person's attitude towards the use of technology is the main determinant of that person's intention to use a technology. The attitude of users to the use of technology is based on their beliefs about the technology itself. This theory was originally put forward in the Theory of Planned Behavior (Hill et al. 1977). When this theory is applied to VR, it can be interpreted that, if the user believes that the use of VR can cause a positive attitude of this application, then the user's willingness to continue using this application will increase (Bertrand & Bouchard 2008). Thus, the attitude of the individual when using technology will affect the intention to use it. In this regard, Cheng & Cho research (2011) identifies attitudes towards the use of technology as the main influence factor that must be taken into account when introducing information and communication technologies in companies. If employees develop a positive attitude towards the use of VR, then the hotel will use it in the future (Cheng & Cho 2011). The process of planning a place to stay during the trip also experiences similar behaviors, when searching for accommodation places both online and offline. In terms of trip planning and accommodation, users will use technologies that they believe will be most useful for information search (Ayeh et al. 2013)**.** The explanation above leads to the following research hypothesis, namely:
H5. Customer Attitude toward Using Hotel's VR has a positive impact to Behavioral Intention to use Hotel's VR

3. Research Method

The data obtained is in the form of survey data and analyzed using SEM-PLS. Model structural equations (SEM) are selected to analyze structural models and measurement models. PLS-SEM was chosen because it has a sample size and minimum size scale for construct validation (Joseph F. Hair et al., 2019). Operational data taken from Israeli & Zerres (2019) for variable constructs of PE (5 items), PEOU (4 items), ATT (3 items) and BI (3 items) (Israel et al., 2018). As for the VR variables through experiential quality measurements taken from Wei & Zhang's research (2019) as many as 6 items (Wei et al. 2019). The population used came from all VR users who were tourists who were looking for hotels through the VR application, with the number of samples taken from the total items multiplied by ten (Joseph F Hair et al. 2018), which is 16 items x 10 which is 160 respondents. The data were collected using purposive sampling techniques.

4. Result and Discussion

Characteristics of Respondents

Table 1. Characteristic of Respondents

	Characteristics	Frequency	Percentage (%)
Gender	Female	89	55,62%
	Male	71	44,38%
Age (years old)	20 – 29	45	28,12%
	30 – 39	55	34,37%
	40 – 49	32	20%
	50 – 59	20	12,5%
	Over 60	8	5,01%
Employment status	Student	66	41,25%
	Employees	42	26,25%
	Private Business	34	21,25%
	Other	18	11,25%
Know the term VR	Yes	121	75,62%
	No	39	24,38%
VR used for first time?	Yes	91	56,88%
	No	69	43,12%

The profile of the respondents (n = 160) is presented in table 1. More than half of the respondents in this study were women (55.62%). With the most age is 30 – 39 years (34.37%). Sixty-six respondents or 41.25% of the respondents to this study were students. The number of respondents who knew the term 'VR' was 75.62% and overall, 56.88% of respondents used VR for the first time when this study was held.

Measurement Model

Measurement model testing is necessary to measure the condition of the construct used in this study. The measurement model consists of validity and reliability tests. The test used outer loading, average extracted variant (AVE), composite reliability (CR) as a measuring instrument. Table 2 shows that all constructions are above the outer loading threshold of 0.6, CR values above 0.7, and AVE values above 0.5. The results showed that the data used were reliable and valid (Hult et al. 2016). Even though there is a contour with a value below 0.6, it is still acceptable because it is still in the vulnerable 0.4-0.7.

Table 2. Loading, Composite Reliability, AVE

Construct Item	Outer Loading	CR	AVE
VR1	0.820	0.942	0.731
VR2	0.893		
VR3	0.860		
VR4	0.857		
VR5	0.865		
VR6	0.834		
PE1	0.920	0.933	0.735
PE2	0.832		
PE3	0.825		
PE4	0.861		
PE5	0.846		
PEOU1	0.873	0.938	0.791
PEOU2	0.859		
PEOU3	0.900		
PEOU4	0.925		
ATT1	0.909	0.916	0.784
ATT2	0.891		
ATT3	0.855		
BI1	0.876	0.908	0.766
BI2	0.883		
BI3	0.867		

Finally, another indicator used to measure validity, namely Fornell-Lacker in Table 3, shows that the Square AVE of each variable is higher than the value of other variables. Therefore, the reliability and validity of the construct is met and can be used for further analysis (Nunan et al. 2020).

Table 3. Fornell-Lacker

	Attitude	Behavioral Intention	Perceived Ease of Use	Perceived Usefulness	Virtual Reality
Attitude	0.886				
Behavioral Intention	0.807	0.875			
Perceived Ease of Use	0.853	0.740	0.889		
Perceived Usefulness	0.853	0.766	0.911	0.857	
Virtual Reality	0.827	0.832	0.816	0.852	0.855

Structural Model

Goodness-of-Fit (GoF) is used to demonstrate the quality of the model used in measuring the behavioral intent of VR hotel users. Formulations used to measure GoF using R^2 and AVE (Henseler & Sarstedt 2013). The GoF result in this study was 0.569. With this value, it can be said that the data used is appropriate to describe the model used (Joe F. Hair et al. 2014). Researchers conduct model conformity tests to measure the suitability of the model being tested. The fit model uses two indicators, namely Standardized Root Mean Square Residual (SRMR) and Normal Fit Index (NFI) (Joe F. Hair et al. 2014). Models can be declared suitable if they have an SRMR value below 0.08 and an NFI

value close to 1 or more than 0.9 (Nunan et al., 2020). The SRMR value obtained in the data analysis was 0.090, and the NFI value was 0.788. Thus the SRMR value is acceptable, and the NFI is rejected. However, the model can still be declared appropriate, even if only one criterion is met (Nunan et al. 2020).

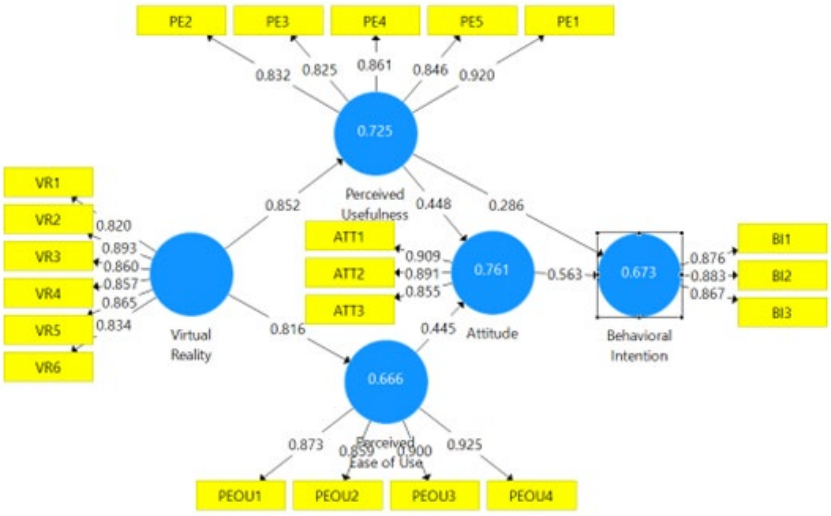

Fig1. Measurement Model

The results of the R^2 data analysis showed that directly PE and ATT affected BI by 67.3%, Hotel's VR also directly affected PE by 72.5%, and affected PEOU by 66.6%. Then, PE and PEOU directly and together affect the ATT by 76.1%. It can be said that the level of accuracy of predictions that occur in behavioral intentions to use VR in choosing hotels of interest when traveling is strong.The path coefficient analysis in this study uses the bootstrap method. Based on the recommendations of Henseler, et al. (Henseler et al. 2009), path coefficient analysis can use bootstrap. Table 4 shows the relationship between independent variables and dependent variables.

Table 4. Hyphoteses Testing

	T Statistics (|O/STDEV|)	P Values	Result
H1: Virtual Reality -> Perceived Usefulness	22.111	0.000	Accepted
H2: Virtual Reality -> Perceived Ease of Use	29.278	0.000	Accepted
H3: Perceived Usefulness -> Attitude	4.482	0.000	Accepted
H4: Perceived Ease of Use -> Attitude	4.547	0.000	Accepted
H5: Attitude -> Behavioral Intention	6.099	0.000	Accepted
H6: Perceived Usefulness -> Behavioral Intention	2.840	0.005	Accepted

The path coefficient indicates that there is a direct influence of VR on PE and VR on PEOU is positive with p=0.000 so it can be stated that H1 and H2 are accepted. The coefficient of the path on PE against ATT and PEOU against ATT also showed positive things with a p value of 0.000. So H3 and H4 are accepted. The path coefficient on ATT against BI with a p value of 0.000 and PE against BI with a P value of 0.005, shows positive and significant values, so that H5 and H6 are accepted.

5. Conclusion

This study aims to test the level of customer acceptance of the use of Hotel's VR to increase the desire to use the Virtual Tour before deciding to book a room at the destination Hotel. In this study, there are three variables of customer

acceptance of the use of virtual reality technology, namely perceived Usefulness, Perceived ease of use and Attitude regarding virtual reality technology used by potential customers. All three show the results that all variables have a positive influence on the intention to behave in the future. Perceived of Usefulness is the most important factor in creating behavioral intentions and optimally influencing users for future hotel visits. With this research, it provides recommendations to take advantage of virtual tour hotels as an effort to provide additional information about products, facilities, infrastructure and facilities at the intended hotel. Another suggestion is for VR travel service providers to start considering the use of various technologies that support the best quality results of content.

Research Limitation

Researchers suggested testing the models used against various forms of Virtual reality Hotel activities specifically based on the category of tourist destinations. It is necessary to know the perspective of VR users specifically because this study only measures in outline of Hotel's Virtual Reality. Additional variables needed for subsequent research are the degree of authenticity of the content displayed, and the on-site experience of the user. In addition, it is necessary to conduct in-depth interviews to find out personally and in detail related to the behavior of Hotel VR users. If the addition is made, it will provide a very deep knowledge related to VR Hotels.

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