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Factors influencing intention to purchase through VR platforms

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ABSTRACT

With technological advancement, Virtual Reality (VR) significantly impacts various industrial sectors, including education, medicine, gaming, and tourism. In particular, the idea of VR has been extensively applied in e-commerce to create realistic online shopping experiences. The purpose of this study is to investigate factors influencing purchase intention through VR platforms by applying the concept of the IS success model and flow theory. The data were collected from 300 respondents with experience in online shopping via e-commerce websites. Confirmatory factor analysis and structural equation modeling were used to test the proposed research model. Results indicate that factors influencing purchase intention through virtual reality platforms are attitude, satisfaction, concentration, information quality, service quality, system quality, enjoyment, and time distortion. The findings could guide entrepreneurs and platform developers to develop a virtual reality platform suitable for e-commerce to enhance the consumer experience.

Keywords: Virtual reality, e-commerce, purchase intention, IS success model, flow theory.

INTRODUCTION

The rapid development of information technology has led to a change in customer behavior. Due to COVID-19, customers are forced to shop via e-commerce instead of physical stores. Customers' adoption of online purchasing is thus accelerated. This change in customer behavior may persist even after the pandemic pass (Kim, 2020). However, some limitations discourage online shopping, such as a lack of in-store shopping experience and distrust of products they have not seen in person, including the inconsistency between product display and actual products (Wang, Ko, & Wang, 2021). Additionally, most online stores only show images and product descriptions, which are insufficient for decision-making (Kim, 2020; Tamer, 2021). Hence, the biggest challenge for online shopping is to improve customer satisfaction and enhance purchase intention. In recent years, Virtual Reality (VR) has dramatically enhanced the online shopping experience. Major global retailers such as Amazon, Alibaba, and eBay have tried to apply VR to their e-commerce platforms to develop an online retail model as close to reality as possible (Xi & Hamari, 2021). VR refers to interactive display technologies that provide users with an immersive experience to explore computer-generated environments that are similar to the real world (An, Choi, & Lee, 2021; Jayaram, Connacher, & Lyons, 1997). VR could provide the most realistic experience of a product, service, or place for customers by using 3D computer graphics or VR. Thus, customers can experience the virtual environment as if they are there (Lee, Lee, Jeong, & Oh, 2020). However, only a few studies have explored the components that contribute to positive VR experiences and increase purchase intention (Dehghani, Acikgoz, Mashatan, & Lee, 2021; Jang, Hur, & Choo, 2019). Hence, this study raises an important question: 'what are the key factors that induce experience in the virtual world and influence customers' purchase intention?'. Responding to the research question, this study adopts the IS success model and flow theory to examine the technical and psychological mechanisms of VR experiences.

As new technology emerges, several studies have proposed the IS success model to explain the success of Information Systems (IS) and user adoption. Although the IS success model has been widely adopted in previous research (Kim & Hyun, 2016; Poushneh, 2018; Yoo, 2020), its application has been underexplored in the context of VR in e-commerce. Understanding the impact of VR using flow is a crucial component of user experience since the flow theory has been applied to several studies on VR in gaming and tourism contexts. (Hudson, Matson-Barkat, Pallamin, & Jegou, 2019; Kang, Shin, & Ponto, 2020; Zhao, Ham, & Vlist, 2018) Besides, flow is verified to have multiple dimensions, which are distinctively related to various psychological and behavioral effects (An et al., 2021). Kim and Hyun (2016) suggested that digital technologies, such as Augmented reality (AR), could affect telepresence. Thus, telepresence may be another applicable variable in this context. Mallam, Ernstsens, and Nazir (2020) propose time distortion as a part of the flow experience. However, telepresence and time distortion have both positive (Gao & Li, 2019; McLean & Wilson, 2016; Skadberg & Kimmel, 2004) and negative (An et al., 2021; Prashar, Sai Vijay, & Parsad, 2017) effects on attitudes depending on the usage context. Hence, a study on the impact of time distortion and telepresence in e-commerce must identify their roles using an empirical examination. In sum, this study's objectives are divided into two parts: 1) To study the factors affecting intention to purchase through VR platforms by applying the IS success model, including information quality, service quality, system quality, and satisfaction, and 2) To study the influence of flow theory affecting attitudes towards VR platform.

LITERATURE REVIEW

Theoretical Background

DeLone and McLean (1992) propose an IS success model to provide a comprehensive framework for measuring the performance of information systems and identify factors that attribute to IS success, including system quality, information quality, intention to use/ use, user satisfaction, and individual and organizational impacts. They later update the model to support a successful e-commerce system by including service quality as a new dimension of IS success and changing individual and organizational impact to net benefits (DeLone & McLean, 2003). This model enhances the understanding of user adoption behavior in various information systems. Its measures have been widely used in the literature, such as the study by Kim and Hyun (2016) investigated the effects of smartphone-based AR by including personalized service quality, system quality, and content quality in their research model. In addition, flow theory is applied to explain the impact of VR in the context of online shopping as a crucial component of facilitating user-computer interactions. Flow theory is presented by Csikszentmihalyi (1975). It refers to a psychological state or condition that occurs when a person is fully engaged or focused on an activity for an extended period and is unaware of the changes in time or environment (Mahfouz, Joonas, & Opara, 2020). Csikszentmihalyi (2014) explains that flow has primary components: a balance between skill and challenge, clear goals, and immediate responses. Many studies have used flow theory for understanding user behavior in various IS contexts (Bölen, Calisir, & Özen, 2021). In contrast, some studies state that concentration and enjoyment are the main components of flow because flow experience frequently leads to increase enjoyment and continuous involvement in a specific activity (Bölen et al., 2021; Hsu, Chang, & Chen, 2012). The element of flow may not be considered in all contexts since it yields positive or negative emotions and behaviors depending on an activity or situation. For example, people may regret the loss of time or money upon the flow state of gambling or playing a video game (An et al., 2021; Chen, Hsu, & Lu, 2018). However, this study will explore the flow experience using time distortion, concentration, telepresence, and enjoyment.

Hypothesis Development

Information quality is a critical factor in the success of an information system. It is defined as the characteristics of the information system's output or the information shown on a system. DeLone and McLean (2003) suggest that information should be personalized, complete, relevant, easy to understand, and secure. In the context of VR, information quality focuses on the virtual content generated by VR (Lee et al., 2020), which should be presented with a high degree of realism (David, Senn, Peak, Prybutok, & Blankson, 2021) and not too much information and images, which possibly overwhelm users (Poushneh, 2018). If the perceived quality of virtual content is high, users will more easily understand the content and focus on the VR experience (Gao & Li, 2019). Information quality has proven to be strongly associated with user satisfaction (Chen, Rungruengsamrit, Rajkumar, & Yen, 2013). High information quality implies that information systems provide the user with relevant information, which is critical for satisfying users' expectations (Kim, Hwang, Zo, & Lee, 2014). Moreover, the relationship between information quality and attitude is significant, especially in online shopping (Ingham & Cadieux, 2016). It is predicted that when customers perceive the high quality of virtual content, they will develop favorable attitudes toward VR (Lee et al., 2020). Therefore, the following hypothesis is proposed:

H1: Information quality has a positive influence on satisfaction with the VR platform.

H2: Information quality has a positive influence on attitude toward the VR platform.

Service quality refers to the quality of the support users receive from the system. In the context of VR, service quality enables users to choose what they want to see or explore based on their preferences, wants, or needs (Jung, Chung, & Leue, 2015). In this regard, online customization is a crucial feature of service settings in the online shopping experience that allows users to choose information or interactivity. Such variables are strongly associated with user evaluations of websites (Harris & Goode, 2010). High-quality service is required to achieve high levels of user satisfaction, which frequently results in positive behavioral intention (Brady & Robertson, 2001). Good services help consumers finish their online transactions and create good experiences (Gao & Li, 2019). Furthermore, the quality of the online service is an essential predictor of the consumer's attitude towards e-shopping. Inadequate services can negatively influence consumers' future behavior (Ingham & Cadieux, 2016). Therefore, the following hypothesis is proposed:

H3: Service quality has a positive influence on satisfaction with the VR platform.

H4: Service quality has a positive influence on attitude toward the VR platform.

The importance of system quality has been investigated in previous research (Jung et al., 2015; Kumar & Lata, 2021; Tsao, Hsieh, & Lin, 2016). System quality measures the technical capacities of an information system. For example, it can be measured through its ease of use, functionality, reliability, and accessibility (DeLone & McLean, 2003; Kim & Hyun, 2016). In the virtual environment, system quality reflects the degree to which a user can control the VR content in the system using actions such as flipping, zooming in/ out, and photo rotating (Kim & Hyun, 2016). Lee et al. (2020) found that system quality positively affects the psychological perception of users, which is the primary motivation affecting the use of virtual reality traveling sites and increasing a user's intention to visit the destination. Higher system quality is expected to lead to higher user satisfaction (DeLone & McLean, 2003). On the other hand, poor system quality indicates that VR functionality is difficult to use, unstable, or slow to show content. Thus, poor system quality could negatively affect the shopping experience (Yoo, 2020). In addition, system quality directly affects customers' attitudes toward online shopping (Ingham & Cadieux, 2016; Rana, Dwivedi, Williams, & Lal, 2015). Therefore, the following hypothesis is proposed:

H5: System quality has a positive influence on satisfaction with the VR platform.

H6: System quality has a positive influence on attitude toward the VR platform.

In the state of flow, people may lose the sense of time and perceive time faster than usual (An et al., 2021; Mallam et al., 2020) while engaged in a particular task and activity without being unaware of the passing time (Dehghani et al., 2021). Furthermore, time distortion occurs when users have intense or deep engagement in virtual reality environments (Chen, 2006). A person with a high level of time distortion will concentrate more on the flow than a person with a low level of time distortion (Han, An, Han, & Lee, 2020). Consumers tend to use websites to search for information and make purchases with the expectation of minimal effort and immediate information. They may not be aware of the passage of time (Prashar et al., 2017). Therefore, time distortion can have both a positive and a negative influence (McLean & Wilson, 2016). If users do not want to take longer than necessary, time distortion can cause a negative user experience when realizing that time was wasted in a state of flow (e.g., addiction or feeling guilty) (An et al., 2021). However, if VR establishes a positive experiential context with a managerial time requirement, then time distortion is expected to generate a positive evaluation of the experience (McLean & Wilson, 2016; Tan, Lee, & Hsu, 2015). This formed the basis of the following hypothesis:

H7: Time distortion has a positive influence on attitude toward the VR platform.

Concentration means that a person's level of attention is limited to one activity. It occurs when an individual engages in a task or an activity continuously for a while without recognizing distractions (An et al., 2021; Dehghani et al., 2021) and ignores other needs (Agarwal & Karahanna, 2000). Concentration is one of the critical experiential components of flow (An et al., 2021). Consumers who experience flow produce positive emotions that gradually influence attitudes (Lee & Chen, 2010). Consumers who engage in online purchases may better understand product descriptions and feel more confident in purchasing decisions (Ozkara, Ozmen, & Kim, 2017). This could help consumers to achieve their online shopping goals (Lee & Chen, 2010). Thus, they tend to return to the website to purchase more in the future (Chen et al., 2018). The effect of concentration on attitude is expected to be positive and significant, thus forming the basis of the following hypothesis:

H8: Concentration has a positive influence on attitude toward the VR platform.

VR aims to create a virtual environment around users (Han et al., 2020). Hence, telepresence is an essential component of VR (An et al., 2021; Dehghani et al., 2021) since it enables the feeling of being in a real-world location that is temporally and spatially distant from the user's physical location together with the feeling of leaving, which is the feeling of separation from the physical environment (Lee et al., 2020; Tussyadiah, Wang, Jung, & tom Dieck, 2018; Van Kerrebroeck, Brengman, & Willems, 2017). Skadberg and Kimmel (2004) point out that the level of telepresence is related to interaction and attractiveness. Therefore, increasing the level of telepresence could have a positive effect on the flow experience. A website with a high level of telepresence could lead consumers to believe that they are getting good information about the product, thus creating higher purchase intention (Gao & Li, 2019). Thus, telepresence is likely to have a positive effect on attitudes toward the website, which leads to the following hypothesis:

H9: Telepresence has a positive influence on attitude toward the VR platform.

Enjoyment refers to happiness while doing an activity and staying with that activity for an extended period without getting bored. (Furlong, Gilman, & Huebner, 2014). Enjoyment is one of flow's most frequently studied dimensions (Ozkara et al., 2017). Consumers' enjoyment during online purchases is strongly associated with their purchase attitudes and intention (Chen et al., 2018). Additionally, a study in the context of AR found that travelers' perception of enjoyment while using VR applications affects their attitudes towards choosing destinations (Tussyadiah et al., 2018). Wang et al. (2021) studied the role of flow experience in the context of AR. The results show that AR adds enjoyment to the simulated shopping experience and further encourages consumers' exploratory behavior, which directly affects consumers' purchase intentions. As previous research discovered, enjoyment directly impacts attitudes toward the website (Priyadarshini, Sreejesh, & Anusree, 2017; Selfia, Idris, & Abror, 2019). Therefore, the following hypothesis is proposed:

H10: Enjoyment has a positive influence on attitude toward the VR platform.

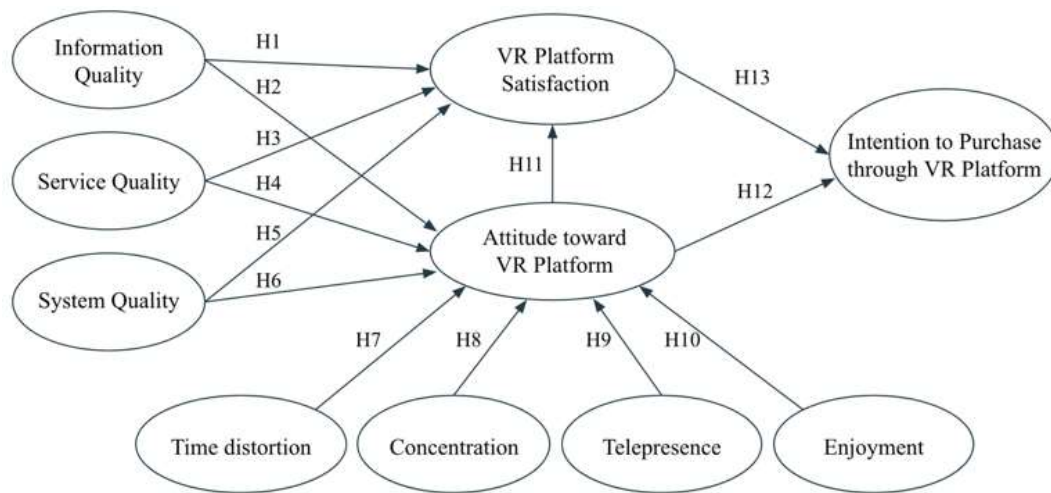
Attitude refers to an individual's positive or negative evaluative reaction to something specific. It can change as the person gains experience or knowledge about it (Hasan, 2010). Consumers' positive attitudes greatly influence purchase intention, which refers to the willingness to purchase goods or services through the website in the future (Harris & Goode, 2010). Another important factor that affects purchase intention is satisfaction. Satisfaction is critical to information system success and effectiveness (Jung et al., 2015). Consumers perceive satisfaction according to their personal experiences of the system. Improving user satisfaction in online environments is critical for increasing purchase intention (An et al., 2021). Several researchers have found that attitude (De Gauquier, Brengman, Willems, & Van Kerrebroeck, 2019; Van Kerrebroeck et al., 2017) and satisfaction (Dash, Kiefer, & Paul, 2021; Prashar et al., 2017; Rana et al., 2015) influence purchase intention. Therefore, the following hypothesis is proposed:

H11: Attitude has a positive influence on satisfaction with the VR platform.

H12: Attitude has a positive influence on purchase intention through the VR platform.

H13: Satisfaction has a positive influence on purchase intention through the VR platform.

Based on the above theoretical hypotheses, a research model showing the relationships between factors relating to IS success model and flow theory and purchase intention is established, as shown in Figure 1.



Source: This study.

Figure 1: Conceptual framework.

RESEARCH METHOD

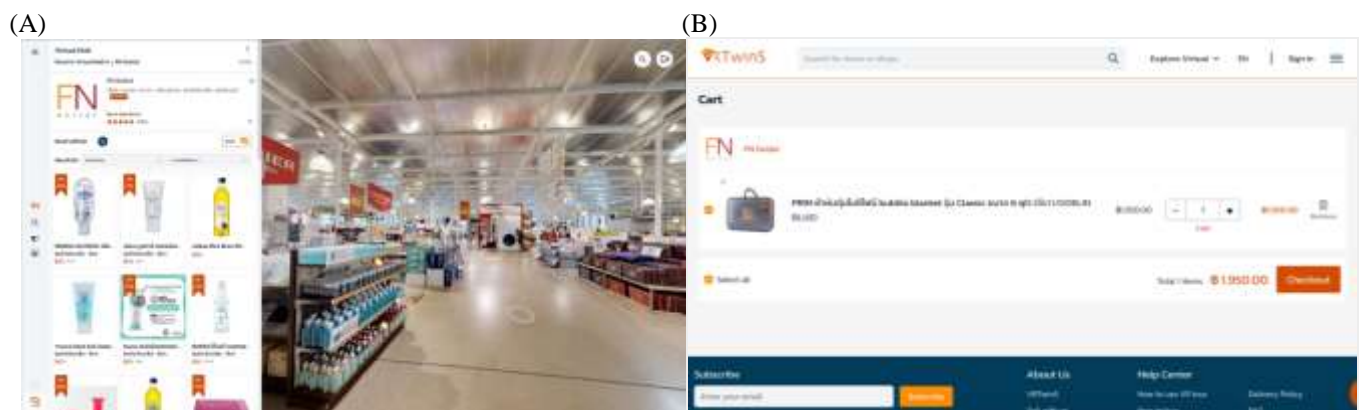
Sample and Data Collection

This study examined the effects of VR and other factors on customers’ intention to purchase. We chose ‘VR Twin Shop’ as the platform for our study, as shown in Figure 2. It was one of the few e-commerce VR-based platforms active in Thailand. The data was collected through online questionnaires (Google forms) from customers who have previously conducted online shopping through e-commerce websites. To ensure that the respondents had experience using the VR platform, they were asked to access the VR platform via a computer or laptop and search for a specific store. Then select the specified product and proceed to the pre-checkout step, as shown in Figure 3. The valid respondents must pass 2 out of 3 manipulation check questions about the platform elements. A total of 300 samples equally balanced between females and males were retained for analysis.



Source: Captured from VRTwinS (2022)

Figure 2: VR Twin Shop



Source: Captured from VRTwinS (2022)

Figure 3: (A) the respondents had to search for a specific store and product
(B) proceed to the pre-checkout step

Measurement Development

The questionnaires consist of 4 sections. The first section is an introduction to the VR platform also instructions on how to use the platform. The following sections are the demographic section and the manipulation check section that the respondents were required to answer three screening questions: “After pressing the ‘SHOP’ button in the ‘VR Twin shop’, how will the system be displayed?”, “When you enter the shop you will see a red promotion sign. What does that sign say?” and “In the checkout page, will the system display the price as the full price or the price after discount?”

The section about hypothetical factors consist of ten constructs measured using scales from previous research. These scales were modified and pretested to fit the context of the present study. The questionnaire included items about information quality (Delone & McLean, 2003; Kim & Hyun, 2016), service quality (Jung et al., 2015; Kim & Hyun, 2016), system quality (Delone & McLean, 2003; Kim & Hyun, 2016; Yoo, 2020), time distortion (Agarwal & Karahanna, 2000), concentration (Agarwal & Karahanna, 2000), telepresence (Han et al., 2020), enjoyment (Han et al., 2020), satisfaction (David et al., 2021), attitude (Ahn, Ryu, & Han, 2004; Porter & Donthu, 2006), and purchase intention (Ahn et al., 2004). All items used a five-point Likert scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). The constructs were validated using Confirmatory Factor Analysis (CFA) before testing the hypotheses using Structural Equation Modeling (SEM).

DATA ANALYSIS

Demographics

By using the quota sampling method, the respondents were similarly distributed between males (50%) and females (50%). The most significant percentage of respondents (49%) was aged 21 to 30, followed by those under 21 (33%). Most respondents received a bachelor's degree (67%). Further, we collected data about online shopping behavior and found that 62% of the respondents spent less than 500 Thai baht per transaction. While the categories of products that respondents purchased online the most were home accessories and lifestyle (30%), health and beauty (24%), and fashion (22%), respectively.

Measurement Model Evaluation

The assessment of reliability was assessed using Cronbach's alpha (CA) and Composite Reliability (CR) values. Convergent validity assessment was based on Average Variance Extracted (AVE) values. The Fornell–Larcker criterion was the approach used in this study to assess discriminant validity. This was done by comparing the square root of the AVE values with the latent variable correlations (Fornell & Larcker, 1981; Hair, Hult, Ringle, & Sarstedt, 2014). By considering the values, All Cronbach's alphas and AVE values were above the threshold of 0.5. CR values were higher than 0.7, and the AVE's square roots on each variable's diagonal were more significant than the correlation coefficients with other variables (Hair et al., 2014), as shown in Tables 1 and 2. This means all constructs were suitable parameters with appropriate reliability and validity.

Table 1. Indicator Reliability, Internal Consistency, and Convergent Validity

Constructs	CA	CR	AVE
Information Quality (INQ)	0.883	0.868	0.689
Service Quality (SEQ)	0.836	0.820	0.534
System Quality (SYQ)	0.844	0.868	0.621
Time Distortion (TD)	0.809	0.839	0.567
Concentration (CON)	0.883	0.874	0.636
Telepresence (TEL)	0.840	0.840	0.636
Enjoyment (ENJ)	0.876	0.860	0.619
Satisfaction (SAT)	0.888	0.876	0.638
Attitude (ATT)	0.850	0.841	0.570
Purchase Intention (PUR)	0.831	0.829	0.550

Table 2. Discriminant Validity (square root of AVE on diagonal).

	ATT	INQ	SEQ	SYQ	TD	CON	TEL	ENJ	SAT	PUR
ATT	0.755									
INQ	0.524	0.830								
SEQ	0.487	0.590	0.731							
SYQ	0.569	0.454	0.654	0.788						
TD	0.440	0.397	0.369	0.342	0.753					
CON	0.626	0.432	0.632	0.659	0.400	0.797				
TEL	0.362	0.239	0.342	0.439	0.364	0.381	0.797			
ENJ	0.443	0.369	0.400	0.442	0.274	0.543	0.330	0.787		

SAT	0.407	0.545	0.560	0.557	0.207	0.444	0.389	0.372	0.799	
PUR	0.604	0.497	0.482	0.485	0.295	0.548	0.407	0.398	0.594	0.742

Structural Equation Analysis

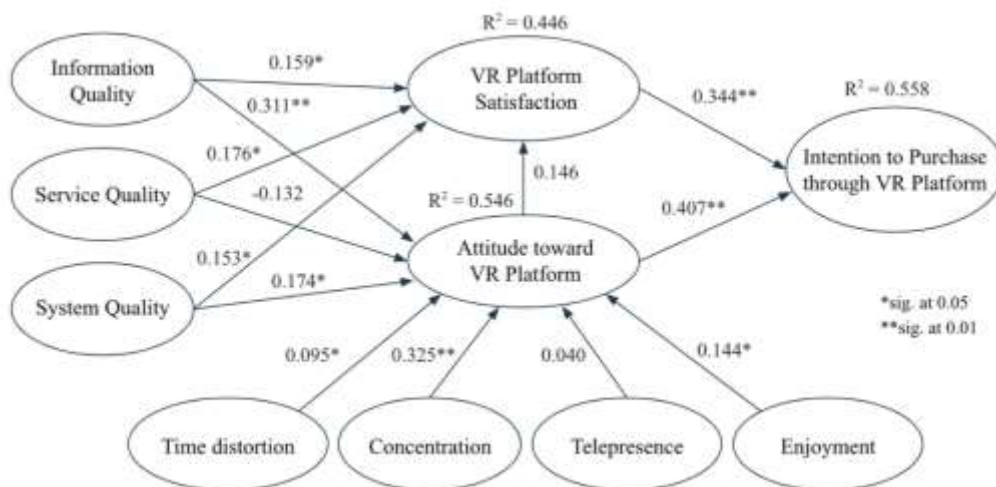
In confirmatory factor analysis, the fitting degree of the model was tested to determine how consistent the relationships in the model were with the collected data. The following fit indicators were explored: the Chi-Square (χ^2 / Degree of Freedom (df) Ratio, the Goodness-of-Fit Index (GFI), and the Root-Mean-Square Error of Approximation (RMSEA). In addition, the indices such as the Root Mean Square Residual (RMR), the Comparative Fit Index (CFI), and the Normed Fit Index (NFI) were used as well. The corrected fitting test results were shown in Table 3, which demonstrated that most indicators reached the recommended value of model fitting (Hooper, Coughlan, & Mullen, 2007; Tabachnick & Fidell, 2007), both for CFA and SEM, so the overall modified models were good.

Table 3. CFA and SEM: Model fit index

Fit Measure	Good Criteria	Fit Indicators	Indicators Confirmatory factor analysis	Indicators Structural equation modeling
χ^2/df	< 2.00		0.963	1.011
GFI	> 0.90		0.914	0.906
NFI	> 0.90		0.926	0.921
CFI	> 0.90		1.000	0.999
RMSEA	< 0.08		0.007	0.006
RMR	< 0.05		0.023	0.024
P-value for a test of close fit	> 0.05		1.000	1.000

Source: This study.

The hypotheses were tested by examining the structural equation modeling and the impact of each factor. The results were largely positive effects of predictors, as shown in Figure 4 and Table 4.



Source: This study.

Figure 4. Standardized estimates for SEM

Table 4. Hypotheses Testing

Hypotheses	Relationship	Estimate	S.E.	C.R.	Test result
H1	INQ à SAT	0.159*	0.096	3.577	Supported
H2	INQ à ATT	0.311**	0.087	3.588	Supported
H3	SEQ à SAT	0.176*	0.103	1.846	Supported
H4	SEQ à ATT	-0.132	0.101	-1.305	Not Supported
H5	SYQ à SAT	0.153*	0.089	3.156	Supported
H6	SYQ à ATT	0.174*	0.081	2.145	Supported
H7	TD à ATT	0.095*	0.046	2.06	Supported
H8	CON à ATT	0.325**	0.078	4.16	Supported
H9	TEL à ATT	0.040	0.047	0.862	Not Supported
H10	ENJ à ATT	0.144*	0.080	1.001	Supported
H11	ATT à SAT	0.146	0.079	-0.399	Not Supported
H12	ATT à PUR	0.407**	0.064	6.323	Supported

H13	SAT à PUR	0.344**	0.061	5.682	Supported
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Source: This study.

Notes: **: P < 0.01; *: P < 0.05

DISCUSSION AND IMPLICATION

Discussion

This study aims to identify the influence of VR on customers' intention to purchase. Findings reveal that all dimensions of the IS success model (information quality, service quality, and system quality) significantly positively influence users' satisfaction and attitude, except for the relationship between service quality and attitude. Hence, it could be summarized that users may understand the platform's interface easily, or they do not use the platform long enough to encounter issues requiring support. The findings have similar insignificant results to the previous studies (Chen et al., 2013; Elsharnouby & Mahrous, 2015; Muljono & Setiyawati, 2019), which indicate that consumers develop attitudes only after purchasing products. Regarding the flow experience, the results show that time distortion, concentration, and enjoyment are the main components of flow in the context of VR e-commerce. All of them positively influence customers' attitudes. However, although telepresence in VR could affect users' excitement, a non-significant relationship is found between telepresence and attitude. Jang et al. (2019) report the same outcome, showing that telepresence with VR technology could not attract consumers to online shopping. Telepresence creates a positive attitude towards the platform only when consumers perceive the sensation of being transported to the virtual world (Lee, 2018). Surprisingly, the findings reveal that the relationship between attitude and satisfaction is not supported. That could explain it because many respondents have never used a VR platform before; they have no expectations before trying the platform, according to the instruction of this research. There is also no comparison between expectations and the results obtained after trying the platform. Therefore, it cannot be assessed whether satisfaction is achieved or not. Finally, this study found a positive effect of attitude and satisfaction on purchase intentions, which confirms previous research findings indicating that VR encourages a positive psychological stage that leads to the behavioral intention of users (Jang et al., 2019; Kang et al., 2020; Xi & Hamari, 2021).

Implications

For theoretical implications, this study contributes to the existing knowledge by applying the IS success model (Delone & McLean, 2003) and flow theory (Csikszentmihalyi, 1975) to the VR e-commerce context, which has been rarely investigated in the literature. The findings confirm all dimensions of quality in the IS Success model toward VR platform satisfaction and show that consumer satisfaction is a significant predictor of purchase intention in VR e-commerce. Moreover, a significant contribution of this study is that it reflected the main components according to flow theory in the context of the VR shopping experience, including time distortion, concentration, and enjoyment. This study can induce future researchers to apply the research framework to investigate other outcomes such as repurchase and word-of-mouth, in addition, to purchase intention, in the context of e-commerce with VR technology. This study also provides valuable practical implications for VR developers and entrepreneurs. First, given that the quality of IS (Information Quality, Service Quality, and System Quality) affects purchase intention, this study shows that customers are more likely to purchase through VR platforms that satisfy them the most. Once customers have a satisfying experience or a favorable evaluative reaction toward the VR platform, they may choose to purchase goods and services in the future. Second, the study findings suggest developing users' perception of VR platform performance by enhancing system design and functionalities. Virtual content that accurately displays images and colors is easy to understand, straightforward and realistic and will enhance the quality of information delivered through the VR platform. In terms of service and system quality, the design of the VR platform should allow customers to easily access it from various devices such as smartphones, tablets, etc. The control of VR functions must be easy; the system can process virtual contents properly and immediate interactions between the user and media. Finally, this study shows that flow experience (Time Distortion, Concentration, Enjoyment) positively influences customers' attitudes. Developers should design features that strongly support customers' enjoyment and engage them to entirely focus on the platform without realizing how much time has passed. Retail businesses should consider those aspects of the platform as one of the selling channels.

LIMITATIONS AND FUTURE RESEARCH

Customer behavior is continually changing in online shopping. Especially during the COVID-19 pandemic, VR can be used to increase customers' experience and lead to purchase intention. This study explores the factors affecting the intention to purchase through VR platforms. This research has shown a significant positive relationship between the factors of these models. Nevertheless, the factor of telepresence should be further studied in the context of online shopping through VR platforms. A few limitations were encountered in this study. The age of this study's sample was disproportionate as most respondents were under 30. This may cause bias in the data results because they can quickly adopt new technologies. Therefore, verifying whether the results are still valid in other age groups is necessary. This study could be replicated in the future with larger and broader sample size. The findings may also be limited because the VR characteristics and flow measurements were only applied to web-based virtual environments. It would be interesting to determine if there is a difference between non-immersive, semi-immersive, and fully-immersive VR in terms of how the technology affects purchase intention. Future studies should investigate how devices or gadgets influence VR experiences.

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