ISSN 2288-4866 (Print)
ISSN 2288-4882 (Online)
https://www.jiisonline.org
J Intell Inform Syst 2023 June: 29(2): 303~321 http://dx.doi.org/10.13088/jiis.2023.29.2.303

Factors Affecting User Intention towards Metaverse Shopping: An Application of the S-O-R model

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Metaverse shopping has emerged as a new phenomenon in social commerce. This study aims to investigate the user experience of metaverse stores shopping based on the S-O-R model. The results of the study show that telepresence, entertainment, personalized recommendation, and social interaction have significant positive effects on flow experience and satisfaction in metaverse shopping. Additionally, satisfaction and flow experience are shown to have significant positive effects on user intentions. This study provides valuable implications for the design and management of metaverse stores to improve user experience and increase user intention.

Keywords : Metaverse, S-O-R model, Telepresence, Entertainment, Personalized recommendation, Social interaction

Received : May 12, 2023 Revised : June 21, 2023 Accepted : June 25, 2023
Publication Type : 학술대회 Fast Track Corresponding Author : Eunjin Kim

1. Introduction

The metaverse is brought to life by a combination of digital technologies, including Virtual Reality (VR), Augmented Reality (AR), Artificial Intelligence (AI), and the Internet of Things (IoT). These technologies work together to create a sophisticated and interconnected virtual environment that enables users to engage with others and interact with digital content in new and innovative ways. Yoo et al. (2023) considered that the metaverse has the potential to revolutionize the way consumers engage with the digital world and reshape the retail sector by introducing "metaverse retailing", an immersive virtual shopping experience. Given these new opportunities, the global metaverse market was valued at $38.85 billion in 2021 and $47.48 billion in 2022 and is projected to exceed $670 billion by 2030 (Lee et al., 2023).

The extant literature on the metaverse predominantly centers on various themes. The foremost theme is related to the technological aspects of the metaverse, including its architecture and implementation, with a particular focus on integrating and optimizing virtual reality technologies (Khan et al., 2022). Additionally, researchers have devoted considerable attention to investigating the social, cultural, and economic dimensions of the metaverse, including virtual identities, social networks, governance, creator

economy, and the impact of the metaverse on the physical world (Kim, 2022; Yun et al., 2023). Such investigations have been deemed essential to unraveling the complexities associated with the metaverse phenomenon. (Zhang et al., 2022). Despite the significant attention paid to these topics, research on the business applications of the metaverse remains relatively limited. This research aims to fill this gap by focusing on studying the factors affecting the user experience on metaverse shopping. Specifically, the study investigates four key factors that define the characteristics of metaverse shopping: telepresence, entertainment, personalized recommendations, and social interaction. In this study, we employ the S-O-R (Stimulus-Organism-Response) model to scrutinize the metaverse retailing and augment the comprehension of users' requisites and conducts.

The structure of this study consists of six sections. Section 2 provides a theoretical background and reviews previous studies. Section 3 illustrates the conceptual model and hypotheses developed based on the S-O-R model. The research methodology is presented in the subsequent sections, including data collection and analysis. In Section 5, the findings of the analysis are presented and discussed. Section 6 provides a comprehensive discussion of the research, including its implications for metaverse retailing and future research.

2. Literature Review

2.1. The Metaverse Shopping

The metaverse is widely regarded as a substantial opportunity for modern businesses, comparable in significance to the creation of the Internet (Golf-Papez et al., 2022). Bratu (2022) considered that the advent of the metaverse has introduced a novel avenue for digital commerce, enabling the emergence of new business models and opportunities. They posited that in the burgeoning meta-universe shopping model, merchants are required to leverage sophisticated data analytics and artificial intelligence technologies in order to gain an in-depth comprehension of consumer behavior and preferences (Bratu, 2022). By offering tailored services and products, merchants can potentially enhance consumer satisfaction and loyalty, thereby establishing a competitive edge in the marketplace. According to Nica et al. (2022), metaverse stores have the potential to offer a multi-sensory experience that surpasses that of traditional e-commerce, thereby facilitating a more immersive and engaged shopping experience for consumers.

2.2. S-O-R model

The S-O-R model explains how environmental stimuli can influence inner states, which in turn impact external behavior. It also recognizes that environmental stimuli play an important role in shaping human perceptions and emotional responses, which ultimately influence behavior (Mehrabian & Russell, 1974). The S-O-R model has been applied to investigate the impact of digital attributes on consumer behavior, including responses to mobile app design (Liu et al., 2019) and branded digital communications, such as Facebook (Dabbous & Barakat, 2020), which can trigger internal psychological

responses through external stimuli.

Despite the extensive research conducted on the S-O-R model in the context of social media and e-commerce platforms, including m-commerce, its application in the context of metaverse retailing remains relatively limited. Therefore, the present study highlights the importance of using the S-O-R model in investigating metaverse retailing.

2.3. Stimuli in the Metaverse Shopping

Telepresence has been assumed to be one of the most unique stimuli in the metaverse. Metaverse environments let the users reveal themselves as avatars in the virtual world and consider them to be an expression and reflection of themselves (Russell, 2013). It is shown that users attach as much importance to their virtual selves and identity recognition as to physical reality (Park et al., 2023). This leads fashion companies such as Zara, Adidas, and Gucci to deliver products that users can try on their avatars (Gibbons, 2022).

Additionally, the metaverse provides new ways of experiencing entertainment. The infinite digital creation of the metaverse enhances the entertainment of users with various avatar designs, and creative design of NTFs (Yang et al., 2022). It is shown that the metaverse environments create a multi-sensory psycho-physical relationship through entertainment (Jiang & Kim, 2023).

Real-time data on user behavior, preferences, and emotions expressed in the digital field of the metaverse enable hyper-personalized recommendations for metaverse shopping (Rathore, 2023; Lee et al., 2000). After examining studies on behavioral analysis in the metaverse, Mária et al. (2022) found that virtual retail with personalized recommendations is more likely to increase user satisfaction.

In addition, the metaverse paves the way for real-time social interaction between avatars involving multiple senses (Hennig-Thurau et al., 2022). It has been expected that the new forms of retailing in the metaverse promise to fundamentally change the way users interact with the digital world and reshape the retail landscape (Yoo et al., 2023).

In this study, we explore the influence of the above key factors in the metaverse, which are telepresence, entertainment, personalized recommendation, and social interaction on the intention of metaverse shopping users.

2.4. Flow experience

Csikszentmihalyi (1975) proposed the concept of “flow” as a state in which individuals are fully engaged in their activities, emphasizing the overall experience of the activity. In the state of “flow”, individuals become absorbed in the activity itself and lose their sense of self, experiencing a sense of control over their environment (Lu et al., 2009). When individuals experience a high level of enjoyment from an activity, they are more likely to enter into a state of flow (Lu et al., 2009).

The concept of flow experience has provided valuable insights into creating an attractively engaging online environment that can extend users’ browsing time (Chen et al., 2018). It has been widely applied in various fields, particularly in online shopping

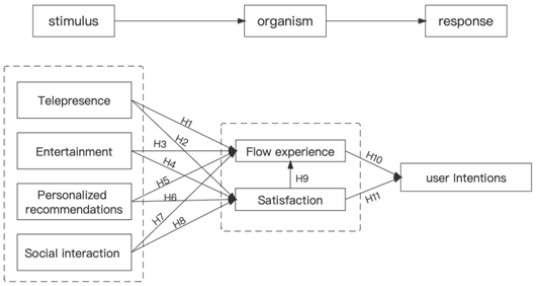
(Michaud Trevinal and Stenger, 2014), mobile shopping (Chen et al., 2018), social media (Song et al., 2017) and social network sites games (Chang, 2013).

2.5. Satisfaction

Satisfaction can be defined as a subjective evaluation of a product's specific performance, which is based on the user's prior expectations and ultimately leads to their intentions (Konuk, 2019). Pham and Ahammad (2017) assert that satisfaction comprises overall and positive comments from users regarding their e-commerce purchases. According to Yi et al. (2021), satisfaction refers to "a consumer's feeling, attitude, or eagerness toward a service/product after it has been used," highlighting the central role of consumer satisfaction in retailing (Thirumalai & Sinha, 2011). Yen and Lu (2008) recommend that online retailers engage more with online users to improve their shopping experience and satisfaction to attract more users. Therefore, consumer satisfaction acts as the primary stimulus for further online purchase intentions (Yang et al., 2019).

3. Conceptual model and hypothesis

This study examines the relationships between the characteristics of metaverse retailing and user flow and satisfaction by using the S-O-R model. Additionally, the study explores whether satisfaction can trigger a user's flow experience when shopping in metaverse retailing. Finally, the study examines the extent to which user intentions are influenced by the dimensions of the metaverse retailing characteristics. Our conceptual model is depicted in Fig. 1.



〈Figure 1〉 Research Model

3.1. Relationships between the telepresence and flow/satisfaction

Telepresence refers to the mediated perception of an environment, where users are capable of experiencing a sense of transportation to an alternate world (Steuer, 1992). Telepresence, according to numerous scholars, is a critical factor in the flow experience (Shin, 2006). Shin and Shin (2011) remarked that immersive interaction with entertainment objects fosters a strong sense of telepresence, which can lead to exploratory behavior.

Dholakia and Zhao (2009) argued that telepresence enhances user satisfaction by creating a more realistic and advantageous virtual environment, leading to greater satisfaction with the experience. Telepresence not only provides a sense of presence and immediacy but also makes it easier for users to become emotionally involved, promoting enjoyment and engagement and reducing psychological strain (Yang et al., 2021). Consequently, based on this premise, the following hypotheses have been formulated.

H1. The use of telepresence technology in metaverse store shopping has a positive (+) effect on flow.

H2. The use of telepresence technology in metaverse store shopping has a positive (+) effect on satisfaction.

3.2. Relationships between entertainment and flow/satisfaction

The term "entertainment" refers to a psychological state of pleasure that involves physical, cognitive, and affective components (Vorderer et al., 2004). Carlson and O'Cass (2011) highlighted the role of entertainment in immersing consumers in the website, leading to the loss of self-consciousness, concentration, and self-awareness during the interaction process, which offers attraction and creativity. This implies that the presence of entertainment enhances the likelihood of achieving the flow experience (Gao & Bai, 2014).

Ducoffe (1995) suggests that being contentedly entertained is a crucial indicator of satisfaction. Elmashhara and Soares (2019) found that entertainment plays a direct role in user satisfaction in the context of salespeople and shoppers. Choi et al.(2016) revealed that mobile travel applications positively affect users by associating entertainment with personal satisfaction in using travel applications.

Metaverse stores are known to enhance user engagement by providing interactive and pleasurable entertainment experiences that invoke a state of complete absorption, challenge, and gratification. Consequently, the following hypotheses have been formulated.

H3. The entertainment of metaverse stores shopping has a positive (+) effect on flow.

H4. The entertainment of metaverse stores shopping has a positive (+) effect on satisfaction.

3.3. Relationships between the personalized recommendations and flow/satisfaction

Users can receive a unique and individually tailored service through personalized recommendation systems, which help to address information overload (Wattal et al., 2009). The user's involvement in the customization process can be fully immersive and lead to a strong flow experience (Animesh et al., 2011).

Liang et al. (2006) established that user satisfaction increases when recommendations correspond to their interests, and this satisfaction level increases as the accuracy of the recommendations improves. Excellent recommendation systems not only increase user satisfaction but are also vital for user loyalty and sustained use (Taylor & Todd, 1995). Chen et al. (2010) found that personalized recommendations, based on a web-based recommendation system, improve consumer satisfaction when choosing a mobile phone, alleviating the problem of information overload.

Metaverse can enhance the shopping experience by offering personalized recommendations tailored to users' interests and preferences. Hence, the following hypotheses have been formulated.

H5. Personalized recommendations in metaverse stores shopping have a positive (+) effect on flow.

H6. Personalized recommendations in metaverse store shopping have a positive (+) effect on satisfaction.

3.4. Relationships between social interaction and flow/satisfaction

Social interaction creates a state of total concentration and bring users into a state of flow (Huang, 2003). Hu et al. (2019) also found that social interactions mediate the flow of experience between individuals. Bitner et al.(1994) suggested that user satisfaction is heavily influenced by the quality of interpersonal interaction with service providers. Harris (2007) proposed that interaction is essential in creating the user experience and is a critical predictor of user satisfaction in social interactions (Srivastava & Kaul, 2014).

The social interaction features provided by metaverse stores facilitate user-to-user communication and sharing. Consequently, based on this premise, the following hypotheses have been formulated.

H7. Social interaction in metaverse store shopping has a positive (+) effect on flow.

H8. Social interaction in metaverse store shopping has a positive (+) effect on satisfaction.

3.5. Relationships between flow and satisfaction

In the context of virtual digital services, user satisfaction is often a determinant of the ability to engender a flow experience due to intangibility and reliance on contextual cues used to evaluate virtual service performance. Previous research has demonstrated in various areas that satisfaction has a positive impact on the flow experience, such as in social network games (Chang, 2013), and online purchasing (Pu et al., 2015). Hence, the following hypotheses have been formulated.

H9. Users who experience greater satisfaction are more likely to receive a greater flow experience in metaverse store shopping.

3.6. Relationships between flow/ satisfaction and user Intentions of metaverse shopping

In the context of social commerce, users who experience flow can quickly engage with social commerce websites and easily share business information related to their purchases, leading to increased engagement and emotional involvement (Tuncer, 2021). This flow state also leads to users who are more likely to engage in activities such as sharing commercial information (Zhang et al., 2014). Previous research has confirmed the significant role of flow as a factor in determining user engagement behavior in social commerce (Pagani & Mirabello, 2011), in virtual products (Animesh et al., 2011), and in virtual worlds (Nah et al., 2012). Users who are satisfied with their experience of using online shopping are more likely to have the intention to use such systems again and maintain their loyalty to the online shop (Alalwan, 2020). Consequently, the following hypotheses have been formulated.

H10. The flow as an organism has a positive (+) effect on user intentions toward shopping in metaverse stores.

H11. User satisfaction as an organism has a positive (+) effect on their intentions toward shopping in metaverse stores.

4. Research methodology

4.1. Measurement of variables

The questionnaire consists of seven variables, namely telepresence, entertainment, personalized recommendations, social interaction, flow experience, satisfaction, and user intentions. The measurement scales utilized for each variable were derived from previous studies with necessary modifications and adaptations to reflect the current context of metaverse retailing.

The questions were measured on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Telepresence refers to the Lim et al.(2021) scale and contains 4 items; entertainment refers to the Sheng and Teo(2012) scale and contains 4 items; the scale for personalized recommendations is Srinivasan et al.(2002) and contains 5 items; the scale for social interaction is Chang and Chuang(2011) and contains 4 items; flow experience references the Zhang et al.(2014) scale and includes 3 items; and satisfaction references the Bhattacherjee(2001) scale and includes 4 items; intentions were based on the Venkatesh et al.(2012) and Hsieh and Tseng(2017) scales and contains 5 items. Table 1 shows the measurement items and sources of the variables.

4.2. Sample design and data collection

Before the commencement of the survey, the participants were provided with a brief introduction explaining the research objectives, and their consent was obtained to participate. A filter question was also used to determine whether participants had any prior experience shopping in the metaverse. The survey ensured that the personal information of participants would be kept confidential. Over 14 days, a total of 456 valid samples were collected in China using a random sampling method and distributed through “Questionnaire Star”. Of these, 39 were excluded due to either logical errors in their responses or insufficient data for empirical analysis, resulting in a recovery rate of 92.12%.

Demographic analysis was performed to verify the sample characteristics. Of the 418 respondents, males (51.1%) slightly outnumbered females (48.9%). Regarding age, the largest proportion was composed of individuals aged 21-29 and 30-39, accounting for 41.9% and 27.6% of the total, respectively, indicating that the sample predominantly comprised middle-aged and young adults. Concerning education, the highest proportion of respondents graduated from a four-year university, representing approximately 43.2% of the total, followed by specialist graduates (32.5%), master’s degree holders (12.7%), and those with a high school education or less (10.1%). The sample also included 10.3% of teachers (academic researchers) and 8.1% of private business owners. Concerning monthly income, the highest percentage was represented by individuals earning between 7,000-9,999 yuan, accounting for around 27.4% of total income, followed by those earning between 10,000-12,999 yuan (23.7%) and 4,000-6,999 yuan (18.2%). Overall, the sample of this study has certain representativeness and can reflect the basic characteristics of the research object.

〈Table 1〉 Survey Questionnaire Items

Constructs	Items	Measures	Sources
Telepresence	TP1	When browsing metaverse stores, I felt that my mind was inside the world created by this.	Lim et al. (2021)
	TP2	When browsing metaverse stores, I felt that I was immersed in this world had created.	
	TP3	The metaverse stores seemed to me to be 'somewhere I visited' rather than 'something I saw.'	
	TP4	I felt I was more in the 'real world' than in the 'computer world' when I was browsing in the metaverse stores.	
Entertainment	ENT1	The entertainment provided by metaverse stores lets me forgot everything temporarily.	Sheng and Teo (2012)
	ENT2	The entertainment provided by metaverse stores lets me escaped from real life temporarily.	
	ENT3	The metaverse stores can continued my positive mood.	
	ENT4	The entertainment provided by metaverse stores can satisfy my achievement.	
Personalized recommendations	PR1	The metaverse stores makes purchase recommendations that match my needs.	Srinivasan et al.(2002)
	PR2	The metaverse stores enables me to order products that were tailor-made for me.	
	PR3	The advertisements and promotions that the metaverse stores sends to me were tailored to my situation.	
	PR4	The metaverse stores makes me feel that I was a unique user.	
	PR5	I believed that the metaverse stores was customized to my needs.	
Social interaction	SI1	I maintain close social relationships with some members in the metaverse stores.	Chang and Chuang (2011)
	SI2	I spend a lot of time interacting with some members in the metaverse stores.	
	SI3	I have frequent communication with some members in the metaverse stores.	
	SI4	I know some members in the metaverse stores on a personal level.	
Flow experience	FLW1	My imagination was aroused when I interact within metaverse stores	Zhang et al. (2014)
	FLW2	I feel curious when interacting in metaverse stores.	
	FLW3	The interaction in metaverse stores was interesting.	
	FLW4	I was absorbed in the interaction in metaverse stores.	
Satisfaction	SAT1	I was satisfied with my decision to use metaverse stores.	Bhattacherjee (2001)
	SAT2	My choice to use metaverse stores was a wise one.	
	SAT3	I feel pleased with the services provided by metaverse stores.	
	SAT4	My experience with using metaverse stores was very satisfactory.	
user Intentions	INT1	I intend to shopping in the metaverse stores in next few months.	Venkatesh et al. (2012)
	INT2	I predict that I would use metaverse stores in next few months.	
	INT3	I plan to use metaverse stores in next months.	
	INT4	I would spread positive word of mouth about using metaverse stores.	Hsieh and Tseng (2017)
	INT5	I would recommend metaverse stores to my friends.	

5. Analysis and result

5.1. Variable Descriptive Analysis

Descriptive statistical analysis mainly focuses on the mean and standard deviation of each item, where the mean reflects the central tendency of the measurement item. The standard deviation is used to evaluate the deviation and variability of the measurement item relative to the mean. In the survey, the standard deviation should not be less than 0.5. The smaller the standard deviation, the lower the discrimination of the questionnaire by the respondents. Conversely, a larger standard deviation indicates that the respondents have a higher discrimination of the questionnaire and the answers have greater discriminability. The mean values of the Telepresence, Entertainment, Personalized recommendations, Social interaction, Flow experience, Satisfaction, and user Intentions items ranged from 3 to 4, and the standard deviation was greater than 0.5. This indicates that the respondents did not have extreme mean values for each variable item and had a high degree of discrimination, providing sufficient variation information for analysis. Moreover, from the skewness and kurtosis values of each variable, the absolute value of the maximum skewness was less than 3, and the absolute value of the maximum kurtosis was less than 10. This indicates that the sample of this study meets the normal distribution requirements. Overall, the questionnaire design and survey data quality were high, providing conditions for further model analysis.

5.2. Variable Reliability Analysis

Reliability refers to the internal consistency of a scale, and higher reliability indicates higher consistency of the scale. In this study, the reliability of the data was tested using Cronbach's α coefficient in SPSS 26.0 software to ensure that the scale has good reliability and internal consistency. Generally, when Cronbach's α is greater than 0.9, the reliability of the scale is excellent; when 0.8 < Cronbach's α < 0.9, the reliability of the scale is good; when 0.7 < Cronbach's α < 0.8, the reliability of the scale is relatively good; when 0.6 < Cronbach's α < 0.7, the reliability of the scale is acceptable; when Cronbach's α < 0.6, the reliability of the scale is poor and needs to be revised. From the table, it can be seen that Cronbach's α ranged from 0.855 to 0.951, indicating that the reliability of each variable is relatively high.

〈Table 2〉 Reliability Test Results

Variables	N of items	Cronbach's α
Telepresence	4	0.932
Entertainment	4	0.855
Personalized recommendations	5	0.893
Social interaction	4	0.912
Flow experience	4	0.859
Satisfaction	4	0.867
user Intentions	5	0.951

5.3. Validity Analysis

Confirmatory factor analysis was used to test the validity of the variables. Firstly, it was found that the fit of the measurement model was good (χ

2/df=2.251, GFI=0.898, NFI=0.919, IFI=0.953, TLI=0.946, CFI=0.953, RMR=0.042, RMSEA=0.050). Afterwards, the convergent validity and discriminant validity of each variable were examined.

5.3.1. Convergent Validity

There are three important reference indicators for convergent validity: factor loading, average variance extracted (AVE), and composite reliability (CR). Factor loading examines the degree to which observed indicators explain latent variables, and higher values indicate greater consistency between observed indicators and latent variables. AVE represents the extent to which the variation of all observed variables can be explained by the latent construct, while CR reflects the consistency of all observed indicators for each construct in explaining its characteristics. Generally, it is considered that factor loading > 0.5, CR > 0.7, and AVE > 0.5 indicates ideal convergent validity of the latent variable.

The results of the convergent validity analysis are shown in Table 3. From the table, it can be seen that the factor loadings are all greater than the standard of 0.5, and the CR values are all greater than 0.7, indicating good reliability among the observed variables of the same dimension. The AVE values are all greater than 0.5, indicating that the observed variables effectively reflect the latent traits of their common factor dimension, demonstrating good convergent validity.

〈Table 3〉 Reliability Test Results

Construct	Items	Loading	CR	AVE	Construct	Items	Loading	CR	AVE
Telepresence	TP1	0.882	0.934	0.780	Flow experience	FLW1	0.826	0.869	0.627
	TP2	0.927				FLW2	0.643		
	TP3	0.903				FLW3	0.758		
	TP4	0.817				FLW4	0.916		
Entertainment	ENT1	0.767	0.860	0.606	Satisfaction	SAT1	0.852	0.871	0.628
	ENT2	0.725				SAT2	0.704		
	ENT3	0.796				SAT3	0.769		
	ENT4	0.823				SAT4	0.836		
Personalized recommendations	PR1	0.813	0.895	0.630	User Intention	INT1	0.866	0.952	0.798
	PR2	0.751				INT2	0.873		
	PR3	0.828				INT3	0.912		
	PR4	0.762				INT4	0.927		
	PR5	0.810				INT5	0.885		
Social interaction	SI1	0.786	0.915	0.730					
	SI2	0.871							
	SI3	0.932							
	SI4	0.823							

5.3.2. Discriminant Validity

Discriminant validity pertains to the ability of variables to differentiate from one another. To test this, the Fornell-Larcker criterion was employed in this study. Specifically, the square root of the average variance extracted (AVE) was compared with the correlation coefficient among variables. When the square root of the AVE of a variable exceeds the correlation coefficient between that variable and others, it indicates that the internal correlation of the variable is stronger than its external correlation and that it possesses better discriminant validity. Based on Table 4, the square roots of AVE are all higher than the correlation coefficient between them and other variables, indicating that these variables possess good discriminant validity.

5.4. Structural Equation Model

This study utilized AMOS 26.0 to construct a structural equation model based on the theoretical framework and research hypotheses previously discussed. The model comprises 7 latent variables and 30 observed variables. The fit of the structural model was tested, and the results showed that the fit indices of the structural model were ($\chi 2/df=1.964$, GFI=0.903, NFI=0.930, IFI=0.964, TLI=0.960, CFI=0.964, RMSEA=0.046), indicating that the fit of the structural model in this study was acceptable.

The results of the path analysis are presented in Table 5. From the table, it can be seen that the standardized path coefficient of telepresence on flow experience is 0.117 ($p<0.05$), indicating a significant positive effect of telepresence on flow experience. Hence, H1 is supported. As the standardized path coefficient of telepresence on satisfaction is 0.179 ($p<0.01$), H2 is supported. The standardized path coefficient of entertainment on flow experience is 0.191 ($p<0.01$), indicating a significant positive effect of entertainment on flow experience. We can conclude that H3 is supported. As the standardized path coefficient of entertainment on satisfaction is 0.270 ($p<0.01$), H4 is supported. The standardized path coefficient of personalized recommendation on flow experience is 0.162 ($p<0.05$), indicating a significant positive effect of

〈Table 4〉 Results of Discriminant Validity Test

	Telepresence	Personalized recommendations	Entertainment	Social interaction	Flow experience	Satisfaction	User Intention
Telepresence	**0.883**						
Personalized recommendations	0.544***	**0.793**					
Entertainment	0.563***	0.687***	**0.778**				
Social interaction	0.531***	0.651***	0.611***	**0.855**			
Flow experience	0.496***	0.569***	0.582***	0.533***	**0.792**		
Satisfaction	0.484***	0.529***	0.560***	0.491***	0.556***	**0.793**	
User Intention	0.392***	0.358***	0.368***	0.437***	0.378***	0.407***	**0.893**

〈Table 5〉 Test results of path coefficients

hypothesis	Path relationship			unstandardized path coefficient	standardized path coefficient	SE	T	P	result
H1	Telepresence	→	Flow experience	0.100	0.117	0.046	2.202	0.028	Support
H2	Telepresence	→	Satisfaction	0.181	0.179	0.057	3.196	0.001	Support
H3	Entertainment	→	Flow experience	0.190	0.191	0.070	2.727	0.006	Support
H4	Entertainment	→	Satisfaction	0.314	0.270	0.085	3.675	***	Support
H5	Personalized recommendations	→	Flow experience	0.157	0.162	0.066	2.375	0.018	Support
H6	Personalized recommendations	→	Satisfaction	0.186	0.164	0.083	2.251	0.024	Support
H7	Social interaction	→	Flow experience	0.124	0.136	0.054	2.279	0.023	Support
H8	Social interaction	→	Satisfaction	0.142	0.133	0.068	2.088	0.037	Support
H9	Satisfaction	→	Flow experience	0.203	0.238	0.047	4.276	***	Support
H10	Flow experience	→	User Intention	0.293	0.228	0.075	3.913	***	Support
H11	Satisfaction	→	User Intentions	0.321	0.293	0.065	4.938	***	Support

personalized recommendation on flow experience. Hence, H5 is supported. The standardized path coefficient of personalized recommendation on satisfaction is 0.164 ($p<0.05$), indicating a significant positive effect of personalized recommendation on satisfaction. Therefore, H6 is supported. The standardized path coefficient of social interaction on flow experience is 0.136 ($p<0.05$), indicating a significant positive effect of social interaction on flow experience. This means that H7 is supported. The standardized path coefficient of social interaction on satisfaction is 0.133 ($p<0.05$), indicating a significant positive effect of social interaction on satisfaction. Hence, H8 is supported. The standardized path coefficient of satisfaction on flow experience is 0.238 ($p<0.01$), indicating a significant positive effect of satisfaction on flow experience. This means that H9 is supported. The standardized path coefficient of flow experience on user intentions is 0.228 ($p<0.01$), indicating a significant positive effect of flow experience on user intentions. Hence, H10 is supported. The standardized path coefficient of satisfaction on user intentions is 0.293 ($p<0.01$). Therefore, H11 is supported.

6. Conclusion

This study yields the following theoretical and practical implications. Applying the S-O-R model,

we showed the influence of the key factors describing the characteristics of metaverse shopping on the user intent of metaverse shopping. By identifying the stimuli of metaverse shopping as telepresence, entertainment, personalized recommendations, and social interaction, we examined their influence on flow experience, user satisfaction, and purchase intention. The S-O-R model has provided a theoretical foundation for the mediating role of flow experience and user satisfaction in explaining how telepresence, entertainment, personalized recommendations, and social interaction affect the purchase intention of users.

Our results indicate that metaverse retailers must provide users with a highly interactive, immersive, engaging, and personalized virtual environment by adopting leading-edge technologies and properly designing the experience. This will offer better means for real-time virtual gatherings and shared activities for social interaction. Improved virtual reality experiences, augmented reality overlays, or highly detailed virtual worlds will enhance entertainment by providing users with unprecedented levels of engagement and immersion. By leveraging vast amounts of data, the metaverse retailer can provide highly tailored experiences.

Moreover, the study reveals that user satisfaction is a crucial determinant of flow experience. This implies that the metaverse retailer can further enhance the flow experience by applying diverse means for improving user satisfaction. Besides, closely monitoring user satisfaction will provide good insights into the users' flow experience.

Although this study provides valuable insights into the effects of immersive technologies, multisensory customer experiences, and socially interconnected virtual services on virtual commerce in a metaverse, some limitations need to be acknowledged. Firstly, beyond the factors covered in our study, there must be other important factors for investigation. Hence, future research needs to explore other factors that may influence virtual commerce in the metaverse, such as trust and privacy concerns. Secondly, the study did not take into account the effects of cultural differences on virtual commerce in the metaverse. This brings the need for future research on cross-country investigation. Despite these limitations, this study contributes to the growing body of research on metaverse-based virtual commerce and provides a foundation for future research in this area.

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국문요약

메타버스 쇼핑 이용 의도에 영향을 미치는 요인에 관한 연구: S-O-R 모델을 기반으로

진유정* · 김은진**

메타버스 쇼핑은 새로운 형태의 소셜커머스로 최근 그 중요도가 높아지고 있다. 이에 본 연구는 S-O-R 모델을 기반으로 메타버스 쇼핑의 사용자 이용 의도에 영향을 미치는 요인을 분석하는 것을 목표로 한다. 본 연구의 결과는 텔레프레즌스, 엔터테인먼트, 개인화 추천 및 사회적 상호작용이 메타버스 쇼핑에서의 플로우 경험과 만족도에 유의미한 영향을 미치는 요인임을 보여주고 있다. 또한, 만족도와 플로우 경험은 사용자 이용 의도에 유의미한 영향을 주는 것으로 파악되었다. 이를 통해 본 연구는 메타버스 쇼핑의 사용자 경험 개선과 사용자 이용 의도 증대를 위한 실무적 시사점을 제시한다.

주제어 : 메타버스, S-O-R 모델, 텔레프레즌스, 엔터테인먼트, 개인화 추천, 사회적 상호작용

논문접수일 : 2023년 5월 12일 논문수정일 : 2023년 6월 21일 게재확정일 : 2023년 6월 25일
원고유형 : 학술대회 Fast Track 교신저자 : 김은진

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진유정
현재 경기대학교 글로벌비즈니스학과 박사과정에 재학 중이다. 주요 연구분야는 디지털 마케팅 및 온라인 소비자 행동으로 최근 메타버스, 인공지능 서비스 사용자 이용 의도에 관한 연구를 진행하고 있다.

김은진
KAIST 경영대학원에서 MIS 전공으로 석사, 박사학위를 취득하였다. 현재 경기대학교 소프트웨어경영대학 경영학부에 교수로 재직 중이다. 주요 관심분야는 온라인 프라이버시, 정보보안, 공유경제 및 지식 공유 플랫폼 등 플랫폼 경제의 경제학적, 사회학적 이론 분석이다.