

Factors Influencing the Intention to Continue Using the Metaverse: Focusing on the Influence of Social Norms

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Abstract

This study aims to examine factors influencing the intention to continue using the metaverse, focusing on the impact of social norms. Specifically, direct and indirect effects of technical characteristics (perceive quality, interactivity, perceived playfulness), user characteristics (self-efficacy, personal innovativeness), and social influence factors (descriptive norm, injunctive norm, subjective norm) on continuous use intention were examined. The role of perceived ease of use and perceived usefulness as a mediator was also examined. An online survey was conducted with 165 college students attending universities in two large cities in South Korea who had used the metaverse. As a result, perceived playfulness, descriptive norm, and perceived usefulness directly influenced continuous use intention. Perceived playfulness, interactivity, and subjective norm influenced continuous use intention indirectly through perceived usefulness. This study theoretically extends the Technology Acceptance Model by specifying social influence in metaverse contexts. Practical implications are provided in terms of marketing strategy for the metaverse industry to continue to grow and develop.

Keywords: Metaverse, Continuous Use Intention, Social Influence, Descriptive Norm, Subjective Norm, Technology Acceptance Model

1. Introduction

The metaverse refers to a three-dimensional virtual world where social, economic, and cultural activities similar to the real world occur [1]. The term originates from Neal Stephenson's 1992 novel "Snow Crash" [2]. During the coronavirus pandemic, digital transformation has accelerated, and interest in the metaverse has surged [3]. Large companies such as Facebook, which even rebranded itself as Meta in October 2021, have made substantial investments in metaverse-related technologies and businesses [4]. However, there is still active discussion among industry experts regarding its concept, scope, and future. According to Pew Research Center, technology experts are divided in their view of the future of the metaverse; 54% of 624 experts predicted that by 2040, the metaverse will have been significantly refined and will have become a fully

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immersive, well-operating component of daily life for over 500 million people worldwide, whereas the other 46% opposed the prediction [5]. In order for the metaverse to evolve further and become a part of people's lives, more research is needed from the perspective of consumers as well as opinions of experts.

Scholars have focused on various aspects of the metaverse, such as the current status [1, 6, 7], regulatory issues [8], and educational applications [9]. With regard to consumer perceptions of and user experiences with the metaverse, early studies focused on initial adoption of the metaverse [10, 11, 12]. Recently, there has been an increase in research exploring potential variables to maximize metaverse user experiences and boost continuous use intention [13, 14, 15]. There is still insufficient research on the factors influencing existing users' intention to continue using the metaverse.

Technology Acceptance Model (TAM) is one of the most commonly used theories that explain people's acceptance and use of new technologies. According to the TAM, perceived usefulness ("the degree to which a person believes that using a particular system would enhance his or her job performance", p. 320) and perceived ease of use ("the degree to which a person believes that using a particular system would be free of effort", p. 320) are the two constructs that determine individual's intention to use a new system [16]. TAM has been applied to predict the acceptance of various information and communication technologies, but the need to consider external variables that may influence perceived usefulness and perceived ease of use has been raised to increase the explanatory power of the model [17]. The Extension of the Technology Acceptance Model (TAM2) suggested including external variables of perceived social influence processes (subjective norm, voluntariness, image) and cognitive instrumental processes (job relevance, output quality, result demonstrability) [17]. With the emergence and development of various information and communication technologies, studies applying TAM2 have expanded the model by additionally incorporating external factors that reflect the unique characteristics of new technologies [18].

In recent research on the metaverse, TAM and TAM2 were also used to investigate factors influencing the intention to use the metaverse [11, 12, 19]. Factors found to influence one's intention to use the metaverse can be categorized into technical characteristics, user characteristics, and social influence. Technical characteristics such as perceived quality (the degree to which a person perceives that the metaverse provides quality contents) [12, 19], interactivity (the degree to which one believes that dialogue and information exchange occurs in a two-way manner within the metaverse) [11, 19], and perceived playfulness (the degree to which a person believes that fun and interest will be aroused through the use of the metaverse) [11, 12, 19] were positively associated with the user's intention to use the metaverse. Regarding user characteristics, self-efficacy (the degree of confidence in one's ability to perform the actions required to use the metaverse well) positively predicted the intention to use the metaverse [11, 12]. As another user characteristic, personal innovativeness (an individual characteristic that reflects a willingness to try out new technologies) influenced attitudes toward the metaverse [20].

In TAM2, social influence was another significant factor influencing the intention to use a particular system. In previous studies, social influence was defined as the extent to which individuals are influenced by people around them when using the metaverse [11, 12]. In these studies, social influence was broadly measured and does not reflect various facets of social influence on the metaverse. There is a need to examine various aspects of social influence in the metaverse use.

Subjective norm was drawn from Theory of Reasoned Action [21] and Theory of Planned Behavior [22] and incorporated as a key variable in TAM2's social influence process. Subjective norm refers to individuals' perception that most people who they regard as important approve or disapprove of the behavior in question

[21]. Subjective norm was a significant predictor of intention to use various technologies such as health apps and mobile learning [23, 24]. However, scholars have argued that subjective norm does not reflect various aspects of social influence and that other aspects of social norms such as descriptive and injunctive norms must be considered in addition to the subjective norm to capture diverse aspects of social influence [25]. Whereas subjective norm only includes expectations and perceptions of people who are important to someone, descriptive norm refers to the perceived prevalence of the behavior and injunctive norm refers to perceived approval of the behavior in the society [25]. By considering subjective, descriptive, and injunctive norms as social influence factors of continuous use intention of the metaverse, this study intends to examine the influence of various aspects of social influence on intention to use the metaverse.

The purpose of this study is to examine the factors influencing the intention to continue using the metaverse, focusing on the influence of social norms. Based on the literature review, technical characteristics (perceived quality, interactivity, perceived playfulness), user characteristics (self-efficacy, personal innovativeness) and social influence (descriptive, injunctive, and subjective norms) are included as factors that may influence continuous use intention. Theoretically, this study attempts to extend TAM2 by specifying social influence in the metaverse contexts. Practical implications will be provided in terms of marketing strategy for the metaverse industry to continue to grow and develop.

2. Methods

2.1. Sample

An online survey was conducted with 165 college students attending universities in two large cities in South Korea who had experiences in using the metaverse. After excluding four incomplete responses, a total of 161 responses was analyzed. The average age of respondents was 20.78 years ($SD=1.98$). Regarding gender composition, there were 37 men (23%) and 124 women (77%).

2.2. Measurement items

The measurement items were adapted and revised from previous studies. Variables measured in this study include technical characteristics (perceived quality, interactivity, perceived playfulness), user characteristics (self-efficacy, personal innovativeness), social influence factors (descriptive, injunctive, and subjective norms), mediators (perceived usefulness, perceived ease of use), and a dependent variable (intention to continue using the metaverse). Specific measurement items, mean, standard deviation, Cronbach's α as an indicator of reliability, and sources of each measurement were summarized in [Table 1].

Table 1. Measurement items

Measurement Items ¹		M	SD	Cronbach's α ²	Sources
Technical characteristics					
Perceived quality	1. The metaverse provides vivid and clear graphics (resolution, characters, backgrounds, items, etc.).	4.99	1.13	.84	26, 27
	2. I think the level of background music and sound effects in the metaverse is high.				
	3. I think the Metaverse's storytelling is well-constructed and contains realistic and exciting content.				
	4. The metaverse provides a variety of content.				
Interactivity	1. In the metaverse, interactive communication takes place.	5.27	0.97	.88	11

	2. The metaverse can quickly build a community. 3. The metaverse improves communication with others. 4. The metaverse promotes interaction with others. 5. The metaverse allows you to share a variety of information. 6. In the metaverse, sending and receiving of information is enabled.				
Perceived playfulness	1. Using the metaverse gives enjoyment to me. 2. Using the metaverse stimulates my curiosity. 3. Using the metaverse gives fun to me. 4. Using the metaverse arouses my imagination.	4.69	1.29	.90	28
User characteristics					
Self-efficacy	1. I feel confident understanding terms/words relating to the metaverse. 2. I feel confident learning skills relating to the metaverse. 3. I feel confident describing functions of the metaverse.	4.35	1.36	.88	12, 29
Personal innovativeness	1. If I heard about a new information technology, I would look for ways to experiment with it. 2. Among my peers, I am usually the first to try out new information technologies. 3. In general, I am hesitant to try out new information technologies. ^{(R)³} 4. I like to experiment with new information technologies.	4.66	1.08	.79	30
Social influence factors					
Descriptive norm	"What percentage of typical college students do you think is using the metaverse?"	32.40	22.98		31
Injunctive norm	1. Most people in general consider it appropriate for college students to use the metaverse. 2. Society in general considers it appropriate for college students to use the metaverse. 3. Most college students in general considers it appropriate for college students to use the metaverse.	4.48	1.05	.81	31
Subjective norm	1. Most people who are important to me would think that I should use the metaverse. 2. My friends would think that I should use the metaverse. 3. My family would think that I should use the metaverse.	2.55	1.32	.91	32
Mediators					
Perceived usefulness	1. I find the metaverse useful in my daily life. 2. I can do what I want more efficiently using the metaverse. 3. I can get a lot of information through the metaverse. 4. I can get help through the metaverse.	3.99	1.34	.96	11, 33
Perceived ease of use	1. Using the Metaverse is clear and understandable. 2. Using the metaverse does not require a lot of my effort. 3. I find the metaverse to be easy to use. 4. I find it easy to get the metaverse to do what I want it to do. 5. Learning how to use the metaverse is easy for me.	4.78	1.03	.85	17, 33
Dependent variable					

Intention to continue using the metaverse	1. I intend to frequently use the metaverse in the future 2. I intend to continue using the metaverse in the future. 3. I intend to recommend others to use the metaverse.	3.83	1.44	.90	28, 33, 34
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¹ A 7-point Likert scale (1=strongly disagree, 7=strongly agree) was used to measure each item except for the descriptive norm.

² Cronbach's α indicates reliabilities of measurement items.

³ (R) indicates a reverse-coded item.

3. Results

Hayes' PROCESS Macro Model 6 [35] was utilized to analyze the relationship between 1) technical characteristics, 2) user characteristics, 3) social influence factors, 4) perceived ease of use, 5) perceived usefulness, and intention to continue using the metaverse. Variance inflation factor (VIF) statistics ranged between 1.118 and 2.286, and Durbin-Watson statistics ranged between 1.862 and 2.021, confirming the basic assumptions of regression analysis (acceptable criteria: VIF less than 10, Durbin-Watson index between 1.5 and 2.5).

Regression analysis model 1 in [Table 2] represents a regression model where the metaverse's technical characteristics, user characteristics, social influence factors, perceived ease of use, and perceived usefulness lead to intention to continue using the metaverse. This model was statistically significant ($F=24.738, p<.001$). Model 2 represents a regression model where technical characteristics, user characteristics, and social influence factors lead to perceived ease of use, and it was statistically significant ($F=8.716, p<.001$). Model 3 represents a regression model in which technical characteristics, user characteristics, social influence factors, and perceived ease of use lead to perceived usefulness, and it was also statistically significant ($F=13.376, p<.001$).

Regarding intention to continue using the metaverse, perceived playfulness ($\beta=.522, p<.001$), descriptive norm ($\beta=.154, p<.01$), and perceived usefulness ($\beta=.212, p<.01$) had a direct positive effect on intention to continue using the metaverse. Regarding perceived ease of use, perceived playfulness ($\beta=.264, p<.01$), self-efficacy ($\beta=.243, p<.01$), and injunctive norm ($\beta=.155, p<.05$) were positively related to perceived ease of use. Regarding perceived usefulness, interactivity ($\beta=.207, p<.01$), perceived playfulness ($\beta=.264, p<.01$), self-efficacy ($\beta=.141, p<.05$), personal innovativeness ($\beta=-.134, p<.05$), and subjective norm ($\beta=.189, p<.05$) were predictors of perceived usefulness.

Regarding the indirect effects of each variable, the path from interactivity to perceived usefulness to continuous use intention ($B=.065, 95\% CI[.002\sim.162]$), the path from perceived playfulness to perceived usefulness to continuous use intention ($B=.058, 95\% CI[.010\sim.126]$), and the path from subjective norm to perceived usefulness to continuous use intention ($B=.044, 95\% CI[.004\sim.106]$) were statistically significant.

Table 2. Direct and indirect effects of variables (N=161)

Path (direct effects)		β	SE	t	F	R^2 ($adjR^2$)	
Model 1	Technical characteristics	perceived quality → CI	.006	.085	.082	24.738 ***	.623 (.597)
		interactivity → CI	-.037	.097	-.569		
		perceived playfulness → CI	.522	.085	6.887***		
	User characteristics	self-efficacy → CI	.005	.063	.091		
		personal innovativeness → CI	.089	.072	1.650		
	Social influence	descriptive norm → CI	.154	.004	2.745**		
	injunctive norm → CI	.046	.080	.779			

	factors	subjective norm → CI	.057	.069	.906		
	Perceived ease of use	perceived ease of use → CI	.006	.084	.103		
	Perceived usefulness	perceived usefulness → CI	.212	.072	3.153**		
Model 2	Technical characteristics	perceived quality → PE	.144	.081	1.625	8.716* **	.314 (.278)
		interactivity → PE	.015	.091	.170		
		perceived playfulness → PE	.264	.078	2.727**		
	User characteristics	self-efficacy → PE	.243	.058	3.195**		
		personal innovativeness → PE	.077	.068	1.080		
	Social influence factors	descriptive norm → PE	-.001	.003	-.010		
		injunctive norm → PE	.155	.076	2.017*		
		subjective norm → PE	-.061	.065	-.743		
Model 3	Technical characteristics	perceived quality → PU	.103	.095	1.278	13.376 ***	.444 (.410)
		interactivity → PU	.207	.106	2.681**		
		perceived playfulness → PU	.246	.093	2.752**		
		User characteristics	self-efficacy → PU	.141	.070		
		personal innovativeness → PU	-.134	.080	-2.082*		
	Social influence factors	descriptive norm → PU	.033	.004	.482		
		injunctive norm → PU	.108	.090	1.534		
		subjective norm → PU	.189	.076	2.528*		
	Perceived ease of use	perceived ease of use → PU	-.053	.095	-.716		
Path (indirect effects)				B	SE	LLCI	ULCI
Technical characteristics	interactivity → PU → CI			.065*	.042	.002	.162
	perceived playfulness → PU → CI			.058*	.030	.010	.126
Social influence factors	subjective norm → PU → CI			.044*	.027	.004	.106

Note: *p < 0.05, **p < 0.01, ***p < 0.001, CI = continuous use intention, PE = perceived ease of use, PU = Perceived usefulness

4. Discussion and conclusion

This study examined factors influencing the intention to continue using the metaverse, focusing on the influence of social norms. Specifically, direct and Indirect effects of technical characteristics (perceive quality, interactivity, perceived playfulness), user characteristics (self-efficacy, personal innovativeness) and social influence factors (descriptive norm, injunctive norm, subjective norm) on continuous use intention were examined. The role of perceived ease of use and perceived usefulness as mediators was also examined. An online survey was conducted with 165 college students attending universities in two large cities in South Korea who had used the metaverse. A discussion of key findings is provided below.

First, among the technical characteristics, perceived playfulness directly influenced continuous use intention. Perceived playfulness and interactivity influenced continuous intention indirectly through perceived usefulness. The influence of perceived playfulness and interactivity on intention to use the metaverse were also found in previous studies [11, 12, 19]. Perceived quality of the metaverse did not motivate existing users to continue using it. Rather, this study's findings emphasize the significance of the metaverse features and contents that provide fun and interactive communications in increasing existing users' intention to continue using the metaverse.

Second, among user characteristics, self-efficacy influenced perceived ease of use and perceived usefulness, whereas personal innovativeness influenced perceived usefulness. The direct and indirect effects of self-efficacy and personal innovativeness on continuous use intention were not statistically significant. The findings imply that self-efficacy and personal innovativeness may not be significant factors to motivate existing users to continue using the metaverse. Individuals' self-efficacy in using the metaverse and their tendency to try out new technologies may be more important in trying out the metaverse the first time.

Third, among social influence factors, descriptive norm directly influenced continuous use intention, injunctive norm influenced perceived ease of use, and subjective norm influenced continuous use intention indirectly through perceived usefulness. Interestingly, individuals' perceptions of prevalence of the metaverse use directly influenced existing users to continue using the metaverse. In contrast, subjective norm indirectly influenced continuous use intention through perceived usefulness. This could imply that if individuals believe that their significant others think they should use the metaverse, they may perceive the metaverse as more useful and wish to continue using it. The findings highlight the significance of descriptive and subjective norms in influencing existing users to continue using the metaverse.

Fourth, perceived usefulness was also a significant predictor of continuous use intention, and this is consistent with TAM literature [16, 17]. Perceived usefulness directly influenced continuous use intention and acted as a mediator between some of the external factors (interactivity, perceived playfulness, and subjective norm) and continuous use intention. However, perceived ease of use was not a significant predictor of continuous use intention. This finding may imply that existing users are already familiar with the metaverse, and its ease of use may no longer be a significant factor in their intention to "continue" using it. Nevertheless, the metaverse must still consistently provide useful content, to motivate existing users to continue using it.

This study's participants are university students in Korea, who may not be representative of the metaverse users in other countries. Korea is a highly collectivistic culture where members want to belong to a group and follow the majority culture [36]. The metaverse users in other Asian countries and western cultures may show different patterns of opinions, attitude, and behaviors regarding the metaverse. Future research comparing cultural differences between Western and Eastern metaverse users could provide meaningful implications for marketers of metaverse platforms.

In conclusion, this study was meaningful in that it extended TAM2 by specifying social influence in the metaverse contexts. This study specified various aspects of social influence and found different roles of these social influence factors. Additionally, this study provides useful practical implications for marketers of various metaverse platforms. To motivate existing users to continue using the metaverse, marketers of the metaverse platforms must provide interesting contents and increase interactivity of the platforms. Promoting the widespread use and usefulness of the metaverse via mass media and social media may also influence users' continuous use intention.

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