

## Article

# Do an Organization's Digital Transformation and Employees' Digital Competence Catalyze the Use of Telepresence?

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**Abstract:** Rapid changes in the external environment are increasing interest in digital transformation. In particular, the recent breakout of infectious diseases such as COVID-19 has required certain companies to restrict physical exchanges among their members. As a result, companies must strive to maintain productivity and performance by supporting business exchange activities through online platforms. A metaverse technology that supports individuals' exchange activities in a virtual space based on 3D technology has recently attracted attention from companies. However, as previous studies related to the metaverse have focused on strengthening personalized content and services, additional research is needed in order to understand the metaverse's effects at the organizational level. This study aims to present the conditions for strengthening the motivation to use the metaverse from the perspective of organizations and members who have applied the metaverse in the workplace on a trial basis. In this study, an online questionnaire was conducted targeting workers of organizations with a history of using the metaverse for business, and the hypotheses were tested using 304 valid samples. As a result of the analysis, it was found that telepresence, a characteristic of the metaverse, influences the intention to continue using the metaverse through informativeness, interactivity, and enjoyment. In addition, the shared goal of the organization's digital transformation moderated the influence relationship between telepresence and an individual's motivations, and an individual's digital competence moderated the influence relationship between motivation and the intention of continuous use. This study suggests a digital transformation strategy for an organization in terms of suggesting ways to strengthen the motivations for the use of the metaverse of employees in the organization.

**Keywords:** metaverse; intention of continuous use; use and gratification; telepresence; shared goal of digital transformation; digital competence



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## 1. Introduction

As COVID-19 and the threat of other future infections continue, members of society are being and may in the future be asked to minimize close contact with each other for the sake of society and their own safety. Accordingly, social actors are solving the problem of a lack of network activity by actively utilizing online technology. In other words, companies are actively using online meeting technologies such as Zoom and Webex, and people are increasing the use of social media and online meal ordering platforms. Recently, the metaverse platform—which performs a community role by grafting technologies that enhance reality, such as 3D avatars and spaces—has attracted attention from users. The metaverse did not emerge to solve the social distancing problems associated with COVID-19 but as a technology that has provided users with a sense of reality by engaging in virtual reality [1]. However, it is experiencing a high growth rate with members of society interested in online exchange experiences and reality simulations, and the related metaverse technology is developing rapidly. In fact, the global metaverse market is expected to grow

at an average annual rate of about 43%, and is anticipated to have a market size of about USD 82.9 billion by 2028 [2].

As the metaverse market has grown rapidly, the user base has expanded. Companies are pursuing digital transformation in order to maintain their businesses despite rapid changes in the external environment caused by the pandemic. In other words, companies are developing strategies that can ensure smooth business transactions using digital technology, even when experiencing constraints due to the supply chain and human resource utilization [3]. The metaverse supports efficient business exchanges between organizational members, strengthens homogeneity among colleagues through a sense of virtual presence, and supports workplace satisfaction [4]. It is used for online meetings, seminars, and corporate events to induce the participation of members of the organization.

Previous studies related to virtual reality technology have focused on methods that provide related technology and content to improve a sense of reality on personalized virtual reality devices. The study that suggested a method for enhancing the user's sense of presence while using virtual reality hardware presented conditions for improving user satisfaction and intention by using personalized virtual reality content [5,6]. The research of Daassi and Debbabi [7], Han et al. [8], and Wu and Lai [9] are representative examples. However, because the metaverse business model includes community roles, such as providing personalized content for intra-group exchange activities, it is necessary to present the conditions for establishing customized service strategies for each metaverse user.

According to the uses and gratification theory, a user's choice of a specific media is attributed to active need-gratification activities [10]. In other words, it is believed that individuals use the media necessary for their desired activity, and actively utilize this media to satisfy their motivation [11]. According to research on the use and gratification theory of personalized virtual reality, users want to engage in experiences—such as a sense of presence, immersion, and enjoyment—that provide a realistic feeling, and it has been confirmed that a user's selection of technologies and services supports this needs [6,12,13]. However, individual-oriented virtual reality technology has recently provided additional functions as a platform. The user desire for a platform that extends its role to community and exchange activities is different from individual-centered technology use motivation [14,15]. In particular, from the point of view of organizations and employees who want to use the metaverse for work, the organization can focus on technology that can efficiently share information and promote linkage between colleagues. In addition, employees' acceptance of an organization's technology may differ depending on the environmental support for the digital transformation of the organization, such as digital promotion strategies and climate shaping, and the ability to utilize digital technology from the perspective of the employees [3,16]. Thus, this study seeks to investigate two research question:

RQ1: What are the motivations of the members of the organization to use the metaverse for the organization's business?

RQ2: How can we strengthen the motivation to use the metaverse?

In order to confirm the research question, this study suggests the motivation for the use of the metaverse from the perspective of organizations and employees who use the metaverse for work on a trial basis. In other words, this study proposes motivations of employees for the use of the metaverse (informativeness, interactivity, and enjoyment) by applying the theory of use and gratification. This study prepares a motivation reinforcement method (telepresence) by utilizing the characteristics of the metaverse. In addition, the study examines how the shared goal of an organization's digital transformation and the digital competence of employees affect the mechanism between the metaverse environment, the motivation, and the intention of continuous use. This study provides a practical implementation of metaverse characteristics. It also offers individual approaches for organizations that want to utilize the metaverse to support business performance. It is judged that it will provide implications as a precedent study of metaverse utilization for organizational business improvement.

## 2. Theoretical Background and Framework

### 2.1. Metaverse and the Intention of Continuous Use by Employees

‘Metaverse’ is a term that combines ‘meta’, meaning virtual, and ‘universe’, meaning worldview, and is a technology that has grown rapidly due to the recent emphasis on online activity [17]. Smart et al. [1] viewed the metaverse as an immersive virtual world that links the hardware technology providing the virtual world, the interactive actors, and the associated real world, and connects the actors in the real and the virtual worlds. In other words, the metaverse refers to technology that supports users in having an interactive experience in a specific virtual reality [18].

As the market demand for online-connected technology increases, related companies are pursuing innovation and growth through the metaverse. First, metaverse platform providers are making efforts to introduce innovative business models for this market. Meta (previously known as Facebook) has built around 10,000 individual virtual worlds through Horizon World grafted with Oculus hardware to provide user-customized contents. In addition, the Mesh platform for Microsoft Teams supports meetings in virtual reality using personalized avatars [19]. In other words, metaverse platforms are rapidly developing and distributing technology that provides customized services for each segmented market demand. Second, companies are building flexible and highly productive organizational systems by promoting digital transformation through the metaverse. IT companies, such as Jikbang and Com2us in Korea, introduced the metaverse to provide a similar online work environment to the offline environment. Thus, companies are working to maintain efficiency and performance through the metaverse. In addition, some companies are holding events such as recruitment briefings, in-house discussion forums, and conferences on the metaverse.

However, because the services provided to companies by the metaverse platform have not been clearly established, it is necessary to check the motives for metaverse use and reflect this in the preemptive business model. Therefore, this study intends to identify the motivating factors for metaverse utilization that affect the continuous use intention of organizational employees by reflecting on the use and gratification theory. The intention of continuous use refers to the intention that the user will continue to use a particular technology or service [20]. In particular, the intention of continuous use is a factor that confirms whether to actively utilize a personalized platform such as social media or a specific technology adopted within the organization [7,21,22]. In order to provide a strategy for continuous utilization of the organization using the metaverse platform, we present the motivation for the use of the metaverse of the employees and identify the conditions for strengthening the motivation.

### 2.2. Uses and Gratification Theory, and the Organization-Related Metaverse

Uses and gratification theory is a perspective that explains users’ motivation to use mass media by providing an answer to the question “What do people do with mass media?” [10]. In particular, this theory assumes that users have a motive for the use of a media, and that they satisfy their needs through active media selection [11]. Earlier, Katz et al. [10] explained the user’s media selection process through the five assumptions of the uses and gratification theory. First, users are active and goal-oriented in their use of mass media. Second, the user has the right to select the media that provides satisfaction in the mass media communication process. Third, this media competes with other means to satisfy needs. Fourth, users fully know their motives for the use of this media. Fifth, the user determines the value of the media content. In other words, because the user has a determined requirement for the use of a specific media and selects it in a purpose-oriented manner, the media clearly recognizes the user’s needs and suggests that it is necessary to establish a customized value provision strategy [23].

Uses and gratification theory suggests users’ motives for the use of various media, from television to e-commerce, and explains ways to actively participate in the properties provided by this media [24]. Recently, use and gratification theory has contributed to

establishing user-customized strategies by explaining the motivation for the use of a platform that converges virtual reality or online technology in fields such as art, tourism, gaming, and education. Table 1 shows the relationships among various user motivations for each online platform, including virtual reality and user behavior within the platform. Previous research suggests that users' needs for each specific online platform exist in a variety of ways, and that platforms are selected in order to achieve their goals. In particular, previous studies related to virtual reality have suggested motivations for use such as enjoyment, social interactivity and sharing, convenience, informativeness, challenge and achievement.

In this study, we present conditions for the use and gratification of organizations and employees who use the metaverse for business purposes, such as virtual meetings and seminars, rather than the existing individual-centered virtual reality use. We present the factors (informativeness, interactivity, and enjoyment) of employees' motivation for the use of the metaverse that are necessary for business exchange activities.

First, informativeness is the user's motivation to acquire and utilize new information [23]. In order to adapt to their environment, users need to understand the structure, order, and knowledge by obtaining guidelines or information from relevant media [25]. For example, users in virtual reality games want to secure data on game content usage, and users in virtual reality transactions require information about products and sellers [23,26,27]. In other words, users are eager to obtain knowledge of each virtual reality field, and their preference increases for a media satisfying the need for knowledge acquisition. From the perspective of a metaverse used by an organization, it is judged that users, i.e., employees, want to quickly obtain necessary information from colleagues to apply to their work, and the application of this informativeness is the motivation for the use of the metaverse by employees.

Second, interactivity is a motive for exchanging information within groups and technologies [28]. In virtual reality, interactivity is achieved through interactions among users participating in the virtual world. Information, pleasure, social connection, and a sense of belonging are the core contents that a virtual reality platform should provide [23,25,26]. For example, increasing social interaction, such as by supporting online collaboration among users within a group, helps users form knowledge [29]. In addition, when social media enhances interactivity between users, collaborative innovation can be achieved [30]. Employees experience homogeneity through interactions with colleagues in the metaverse, increasing their attachment to the organization; thus, interactivity motivates metaverse use.

Third, enjoyment within a specific environment is a use motive [26]. Enjoyment is a user's intrinsic behavioral motive for engaging with new technologies such as media and games, contributing to the determination of intention [25,31]. Even in virtual reality, enjoyment is a prerequisite for the determination of users' virtual reality experience behavior, and users want to secure enjoyment through the entertainment elements and innovative technologies possessed by virtual reality [26,27,32]. Employees may anticipate a new experience from the metaverse, such as engaging with 3D content; thus, the enjoyment of this experience is a motivation for the use of the metaverse.

**Table 1.** Uses and gratification of an online platform.

Variable of Uses and Gratification	Dependent Variables	Domain	Reference
Hedonic Gratification	Self-disclosure	Social Network Site	[33]
Navigation, Enjoyment, Realism, Community, Coolness	User Attitude, Continued Use	Virtual Reality	[34]
Pursuing Learning from Entertainment, Pursuing Social Conformity, Pursuing Convenience	Content Attitude,	Virtual Reality of Arts	[27]
Pursuing Learning from Entertainment, Pursuing Social Conformity, Pursuing Convenience	WOM Intention	Virtual Reality of Arts	[27]
Academic Assistance, Convenience, Social Influence	Intention to Use	Educational Apps	[35]

Table 1. Cont.

Variable of Uses and Gratification	Dependent Variables	Domain	Reference
User's Feedback	Number of Creators' Posts,	Online Music Community	[36]
User's Feedback	Quality of Creators' Posts	Online Music Community	[36]
Social Interactivity	VR Use Intention,	Virtual Reality	[28]
Social Interactivity	VR Purchase Intention	Virtual Reality	[28]
Ritualized Use, Instrumental Use	Intention to Use	Online Streaming Service	[37]
Enjoyment, Fantasy, Escapism	Continuance	Virtual Game	[38]
Enjoyment, Fantasy, Escapism	Intention	Virtual Game	[38]
Information Seeking, Escape, Entertainment, Exposure, Social Sharing, Affection	Purchase	Virtual Goods	[26]
Information Seeking, Escape, Entertainment, Exposure, Social Sharing, Affection	Intention	Virtual Goods	[26]
Informativeness, Social Interactivity, Playfulness	Continuation	Virtual Reality Tourism	[23]
Informativeness, Social Interactivity, Playfulness	Intention	Virtual Reality Tourism	[23]
Informativeness, Social Interactivity, Playfulness	Behavioral	Virtual Reality Tourism	[23]
Virtual Interaction for Escaping from Reality, Play and Relaxation, Informational Learning, Pursuit of Practicability	Intention	Virtual Reality Tourism	[23]
Virtual Interaction for Escaping from Reality, Play and Relaxation, Informational Learning, Pursuit of Practicability	Advertising	Smart Speaker	[25]
Virtual Interaction for Escaping from Reality, Play and Relaxation, Informational Learning, Pursuit of Practicability	Attitude	Smart Speaker	[25]
Use for Entertainment, Use for Convenience, Use for Information, Use for Social, Social Media Co-creation,	Brand Attitude	Social Media Platform	[39]
Use for Entertainment, Use for Convenience, Use for Information, Use for Social, Social Media Co-creation,	Brand	Social Media Platform	[39]
Use for Entertainment, Use for Convenience, Use for Information, Use for Social, Social Media Co-creation, Arousal, Passing Time, Camaraderie, Entertainment, Self-expression, Habitual Use, Escape, Information Surveillance, Building a Virtual Community, Companionship, Coolness, Maintaining Relationships	Involvement	Social Media Platform	[39]
Use for Entertainment, Use for Convenience, Use for Information, Use for Social, Social Media Co-creation, Arousal, Passing Time, Camaraderie, Entertainment, Self-expression, Habitual Use, Escape, Information Surveillance, Building a Virtual Community, Companionship, Coolness, Maintaining Relationships	Behavioral	Sport Social Media	[40]
Arousal, Passing Time, Camaraderie, Entertainment, Self-expression, Habitual Use, Escape, Information Surveillance, Building a Virtual Community, Companionship, Coolness, Maintaining Relationships	Intention	Sport Social Media	[40]
Achievement, Challenge, Escapism, Social Interaction	Continuance of Intention to Play	AR Game	[41]
Enjoyment, Challenge, Outdoor Activity, Nostalgia	Intention to Reuse	AR Game	[32]
Product Variety, Stimulation, Social Interaction, Idea Seeking, Bargain	Before-search Web Personalization Use,	M-Shopping	[15]
Product Variety, Stimulation, Social Interaction, Idea Seeking, Bargain	After-search Web Personalization Use	M-Shopping	[15]
Social Connection Need	Continued Usage Intention	Social Network Site	[14]
Achievement, Enjoyment, Social Interaction	Proactive Stickiness	Online Game	[42]

When a specific platform specialized for each field satisfies users' needs, it positively affects users' gratification and the continuous use of the platform—see Table 1. Employees who use the metaverse for work want to obtain information and interact with their colleagues through the metaverse. In addition, they want to obtain pleasure from the new 3D-based work experience provided by the metaverse. Therefore, we conjecture that informativeness, interactivity, and enjoyment will positively affect the intention of continuous use of the metaverse; thus, we present the following research hypotheses.

**H1.** *The informativeness of the metaverse has a positive effect on the intention of continuous use.*

**H2.** *The interactivity of the metaverse has a positive effect on the intention of continuous use.*

**H3.** *The enjoyment of the metaverse has a positive effect on the intention of continuous use.*



### 2.3. Telepresence of the Metaverse

The metaverse technologies have been receiving increased attention in recent years because it is highly similar to service forms in the real world, and the provision of users with a sense of fun [17]. Individuals and organizations use the metaverse because it is a technology which supports users' access to experiences and behaviors that are similar to reality but using a virtual worldview that matches specific environments and conditions [43].

'Presence' refers to a psychological state in which a specific technology or environment is experienced similarly to reality [44]. With respect to virtual reality, the perception of the level of content provided by virtual technology being similar to physical reality is called 'telepresence'. In other words, telepresence relates to a sense of presence in an environment mediated by virtual technology rather than the real physical environment and the feeling of specific objects (services, products, etc.) within that environment [45]. Because telepresence is a concept confirmed through the sensory characteristics provided by virtual reality, it is required that the hardware and software used for virtual reality are organically linked, and that they provide realistic content [8]. In other words, when the role of the sensor controlling virtual reality, the type of sensor providing information, and the ability to modify the physical environment are effectively linked, a sense of telepresence can be secured [22].

The user's sense of presence in the virtual space helps form motivation related to the user's desire for the target technology. Han et al. [14] confirmed that the social presence provided by social media increases the intention to use the platform continuously through the gratification of social connection needs. Fu et al. [33] found that the virtual presence of social media is a hedonic gratification. It was confirmed that self-disclosure has increased in relation to virtual reality, and the sense of presence affects the formation of user motivation. Barreda-Ángeles and Hartmann [46] demonstrated that a virtual reality platform's spatial presence and social presence positively affected users' relatedness, self-expansion, and enjoyment. Kim and Ko [47] showed that the sense of telepresence affects satisfaction through the user's flow of experience. This study judges that the metaverse's sense of telepresence will affect the informativeness, interactivity, and enjoyment of employees, and proposes the following research hypotheses.

**H4.** *The metaverse's telepresence has a positive effect on informativeness.*

**H5.** *The metaverse's telepresence has a positive effect on interactivity.*

**H6.** *The metaverse's telepresence has a positive effect on enjoyment.*

### 2.4. Shared Goal of the Organization's Digital Transformation

The COVID-19 crisis has likely accelerated the need for digital transformation to address the inefficiencies it caused inside organizations. 'Digital transformation' refers to activities that improve an organization's primary business, such as operation management and customer support, by applying digital technology [3]. However, because digital transformation can change the overall organization through new technology, it is capable of increasing employee productivity and creating value, but it could also cause negative phenomena such as resistance to innovation and the invasion of privacy [48].

In order for employees to accept the positive aspects of digital transformation, it is necessary to help them understand the goals of digital transformation, and to support them in the use of technologies related to digital transformation at the organizational level. Shared goals are the aims and objectives that all stakeholders in an organization have in common [49]. Shared goals contribute to achieving a goal by forming identification and commitment through the identification of common values [50]. In other words, in order for employees to understand the fundamental purpose and value of digital technology and the associated policies promoted by the organization, organizations must share the goal of digital transformation and strive for it to take root in the culture [48,51].

Part of an organization's digital transformation is supporting the metaverse for the work of its employees. Organizations want to help their employees to achieve business performance, such as productivity, by strengthening the exchange of information and business cooperation through metaverse technology that has a sense of presence similar to the real world [52]. In other words, sharing digital transformation goals can increase acceptance and utilization by helping organizations secure a common understanding of specific digital technologies [48]. From this point of view, it is judged that a shared goal of digital transformation can affect the active use of the metaverse for employees.

In particular, shared goals not only contribute to positive motivation toward specific goals but also moderate the influence of the external environment on individual motivation formation. Chow and Chan [53] confirmed that a shared goal increases knowledge sharing intention by forming knowledge sharing attitudes and subjective norms. It was confirmed that it affects sustainability and contributes to a cooperative consumption attitude. Nadeem et al. [50] revealed that a shared goal is a condition for reducing the knowledge hiding behaviors of employees and proved that a shared goal weakened knowledge hiding through a moderating effect with trust. Hu and Liden [54] confirmed that servant leadership moderates goal clarity and process clarity in terms of increasing team potency. Tsai et al. [55] demonstrated that when online virtual teams provide images related to users' positive emotions, they positively affect knowledge sharing behavior, and that a shared vision has a moderating effect. In other words, it is judged that the shared goal of digital transformation will moderate the positive influence relationship between the sense of reality provided by the metaverse and the employees' metaverse-related motivations. Thus, we hypothesize the following:

**H7.** *The shared goal of the organization's digital transformation moderates the relationship between telepresence and metaverse motivations (informativeness, interactivity, and enjoyment).*

### 2.5. Digital Competence of Employees

'Digital competence' refers to the ability required to collect, store, and reproduce the information resources necessary for an individual's behavior in a digital environment [16]. Digital competence does not simply consider the ability to handle digital resources technically but also includes the value-oriented behavioral competency of members in a digital environment [56]. For example, actions such as technical hacking and negative comments online use digital processing technology, but they harm social desirability, and therefore go against digital capabilities. Thus, digital competence refers to knowledge and experience, etc., including ethical value that individuals in the digital age should perform in groups.

Digital competence consists of technical competence, ethical competence, and cognitive competence [16]. First, 'technical competence' refers to how users can flexibly identify and handle technical problems in a given digital environment [57]. In other words, technical competence is the understanding of technology concepts so that users can flexibly cope with technology issues found in organizations and societies. Second, ethical competence refers to how users judge that they can interact constructively with respect for others in a digital environment [16]. It is a sense of moral responsibility in interacting in a digital environment. Third, cognitive competence refers to how users judge their ability to process the data and information provided by the digital environment in consideration of usefulness [16]. Cognitive competence is the belief that purpose-based information processing in a digital environment is sufficient.

Digital competence not only positively affects the performance of users who have access to the digital environment but also moderates the influence of various individuals' perceptions or motivations of the digital environment on their behavior. In particular, in fields such as digital education, digital competence has been recognized as a prerequisite to help improve learning outcomes by increasing the understanding of online-based learning conditions [58–60]. In addition, digital competence changes behaviors in connection with the learner's motivation. Atoy et al. [61] suggest that digital competence has emotional

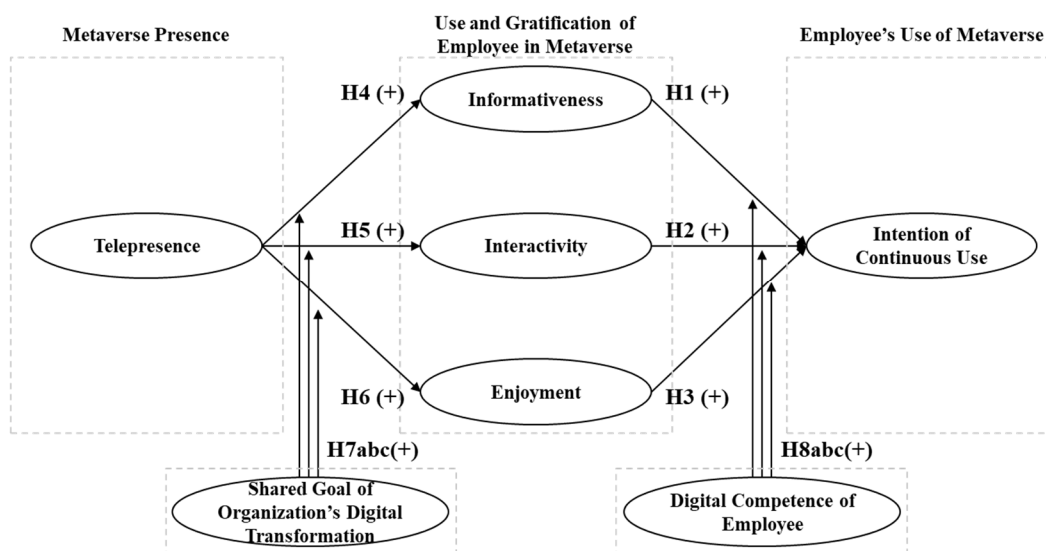
and interactive effects, such as a student's establishment of online information search strategies. Kuo and Kuo [62] confirmed that the learner's competence moderates the positive influence relationship between the sense of the learning community and learning behavior. In other words, Digital competence can change behavior by interacting with the user's motivation for the use of a particular digital environment. Accordingly, we judge that digital competence moderates the positive relationship between metaverse motivation and the intention of continuous use, and propose the following hypothesis.

**H8.** *Employee's digital competence moderates the relationship between metaverse motivations (informativeness, interactivity, and enjoyment) and intention of continuous use.*

### 3. Research Model and Hypotheses

#### 3.1. Research Model

This study presents the motivation for the use of the metaverse from the perspective of organizations and members who want to use it for work, and shows the conditions of the participating entities to strengthen the motivation for the use of the metaverse through metaverse conditions (telepresence), organizational conditions (a shared goal of digital transformation), and individual conditions (digital competence). Figure 1 is the research model.



**Figure 1.** Research model.

#### 3.2. Measurement and Data Descriptions

In this study, the research hypotheses are verified using a sample obtained by applying a questionnaire technique. A multi-item-based measurement tool of applied variables to be used as a questionnaire was secured through previous studies related to online platforms such as virtual reality, digital transformation, and competence. It was reconstructed according to the perspectives of organizations and employees using the metaverse. In addition, the questionnaire consists of a 7-point Likert scale (1: strongly disagree; 7: strongly agree) as a measurement tool for the factors of the research model.

Telepresence, informativeness, interactivity, enjoyment, intention of continuous use, and a shared goal of digital transformation are first-order factors, and digital competence is a second-order factor composed of technical competence, ethical competence, and cognitive competence. Table 2 shows the measurement tools of the factors applied to the research model.



**Table 2.** Item descriptions and reliability.

Constructs	Items	Items	References
Telepresence	TP1	When I used the metaverse, I felt that my heart was in the metaverse world.	[22,45]
	TP2	I felt immersed in the metaverse world while playing in the metaverse.	
	TP3	The metaverse environment seemed to be “a place I visited” rather than “what I saw.”	
	TP4	When I was in the metaverse, I felt closer to the real world.	
Informativeness	Inf1	I am grateful to be able to secure various things that I aim for in an organization through the metaverse.	[23]
	Inf2	While using the metaverse, I gain desired organizational experiences.	
	Inf3	Through the metaverse, I gain desired organizational knowledge.	
	Inf4	Through the metaverse, I collect information about my goals in the organization.	
Interactivity	Int1	Metaverse activities allow me to create social relationships with peers in my organization.	[23,30]
	Int2	Metaverse activities help me maintain social relationships with peers in my organization.	
	Int3	Metaverse activities help me become closer with my peers in my organization.	
	Int4	Metaverse activities enhance my social relationships with peers in my organization.	
Enjoyment	Enj1	Using the metaverse is enjoyable for me.	[23,31]
	Enj2	Using the metaverse VR activities is pleasurable for me.	
	Enj3	Using the metaverse is fun for me.	
	Enj4	Using the metaverse keeps me happy.	
The intention of Continuous Use	ICU1	I would like to continue to use the metaverse system for work.	[22,63]
	ICU2	I intend to continuously use the metaverse system for work.	
	ICU3	I predict that I will continue to use the metaverse system in the future.	
Shared Goal of Digital Transformation	DG1	Our organization shares the same vision for digital transformation goals.	[44]
	DG2	The members of our organization share a common goal of digital transformation.	
	DG3	The members of our organization are committed to achieving the organization’s digital transformation goals.	
	DG4	The members of our organization fully agree with the work in achieving digital transformation goals.	
Technological Competence	TC1	I can use the organization’s digital technology.	[60]
	TC2	I can adapt to the digital environment of the organization.	
	TC3	I can handle the digital content of the organization.	
Ethical Competence	EC1	I try to protect the privacy of others in the organization.	[60]
	EC2	I respect copyrights when retrieving and using information in my organization.	
	EC3	I am willing to pay to get the content I need.	
Cognitive Competence	CC1	I am aware of the sensitivity of information management in an organization’s digital environment.	[60]
	CC2	I understand the importance of securing digital information in an organization.	
	CC3	I understand the value of an organization’s digital resources.	

The first measurement tool derived was confirmed by ten business school graduate students with a history of work-related metaverse experience. The modified and supplemented measurement tool was used in the questionnaire.

The survey subjects were workers in organizations with a track record of using the metaverse for business purposes. In order to secure an appropriate sample, this study tried to secure workers of companies with a history of entering the metaverse platform, such as Gather Town and ZEPETO, among the sample of office workers. Furthermore, this study used office workers from an online research company in Korea to conduct the online survey. In order to check whether the participants had worked within the metaverse, prior to the survey, the participants were asked (1) whether or not they had

experience with the metaverse (① yes, ② no), (2) the metaverse experience period (① within six months, ② within one year, ③ one year or more), and (3) reasons for their metaverse experience (① personal reasons, ② organizational reasons). Once it was confirmed that the organizations of the participants use the metaverse and that participants have experience with it of within one year, the survey could be completed. In addition, consent was obtained before this survey for the purpose of the study and the statistical application method, and 304 valid samples were obtained.

The demographic characteristics of respondents are shown in Table 3. The gender of the respondents was 66.8% men and 33.2% women. Regarding age, the majority were in their 20s to 40s, accounting for 178 cases (58.6%), and it was found that they were evenly secured by age group. Looking at the characteristics of the organizations where the respondents work, based on industry, the ratio of manufacturing to service industries was about 3.5:6.5. As for the organization's size, 194 people (64.8%) work in organizations with more than 100 employees, which accounted for the majority. The frequency of metaverse use was 40.1%, which was 3–4 times a month, and the purpose of using the metaverse within an organization was for corporate events (62.1%) and team use (53.3%).

**Table 3.** Demographic characteristics of the respondents.

Demographic Categories		Frequency	Percentage (%)
Gender	Male	203	66.8
	Female	101	33.2
Age	21–30	44	14.5
	31–40	134	44.1
	41–50	89	29.3
	Over 51	37	12.3
Industry	Manufacturing	106	34.9
	Service	198	65.1
Organizational Size	Under 50	27	8.9
	51–100	83	27.3
	101–300	75	24.7
	Over 301	119	39.1
Job Position	Staff	81	26.6
	Assistant Manager	60	19.7
	Manager	80	26.3
	General Manager	83	27.3
Monthly Usage	1–2	98	32.2
	3–4	122	40.1
	5–6	35	11.5
	7–8	22	7.2
	Over 9	27	8.9
Purpose of Use (Multiple Response)	Organizational Event	189	62.1
	Team Meetings or Seminars	162	53.3
	Education & Training Programs	61	20.0
	Others	6	1.9
Total		304	100.0

## 4. Data Analysis and Results

### 4.1. Reliability and Validity

Because the study measured factors using a multi-item-based measurement tool, reliability and validity analysis of each factor was performed. In particular, because digital competence is a second-order factor, a second confirmatory factor analysis was applied for validity. First, reliability was checked through the consistency of the measurement tool for each factor, and the Cronbach alpha of SPSS 21.0 verified it. Previous studies required a Cronbach alpha of 0.7 or higher for each factor [64]. As a result of a reliability analysis

of 32 measurement tools for nine factors, two items (Inf2, Int4) that had problems with reliability were removed, and the Cronbach alpha of the other factors was 0.7 or higher—see Table 4.

**Table 4.** Results for the construct validity and reliability.

Construct	Item	Factor Loading	$\alpha$	CR	AVE
Telepresence	TP1	0.850	0.903	0.847	0.580
	TP2	0.838			
	TP3	0.838			
	TP4	0.822			
Informativeness	Inf1	0.833	0.860	0.804	0.578
	Inf3	0.835			
	Inf4	0.792			
Interactivity	Int1	0.822	0.902	0.847	0.649
	Int2	0.845			
	Int3	0.942			
Enjoyment	Enj1	0.833	0.907	0.862	0.610
	Enj2	0.839			
	Enj3	0.857			
	Enj4	0.840			
The intention of Continuous Use	ICU1	0.890	0.913	0.883	0.716
	ICU2	0.880			
	ICU3	0.875			
Shared Goal of Digital Transformation	SG1	0.847	0.907	0.848	0.583
	SG2	0.871			
	SG3	0.857			
	SG4	0.796			
Technological Competence	TC1	0.888	0.911	0.870	0.691
	TC2	0.918			
	TC3	0.834			
Ethical Competence	EC1	0.873	0.915	0.871	0.692
	EC2	0.885			
	EC3	0.898			
Cognitive Competence	CC1	0.860	0.926	0.887	0.724
	CC2	0.940			
	CC3	0.901			
Digital Competence <sup>a</sup>	TC	0.855	0.830	0.798	0.572
	EC	0.844			
	CC	0.651			

<sup>a</sup> = Second-order construct; TC, EC, CC.

Second, convergent validity, which is the consistency of the measurement tools for each factor, and discriminant validity, which is the difference between the factors, were confirmed. AMOS 22.0 was used to conduct a second confirmatory factor analysis. First, the fitness of the second confirmatory factor analysis was  $\chi^2/df = 1.27$ , GFI = 0.905, AGFI = 0.884, CFI = 0.986, NFI = 0.938, and RMSEA = 0.03. Previous studies reviewed the fitness requirements in a complex way but required an RMR of 0.05 or less, a GFI of 0.9 or more, an AGFI of 0.9 or more, an NFI of 0.9 or more, a CFI of 0.9 or more, and an RMSEA of 0.05 or less [65]. Although the AGFI was slightly lower than the suitability requirement of 0.9, it was found that there was no problem because it allowed up to 0.8, and other values met the requirements. Concentrated validity was used to check the construct reliability (CR) and the average variance extracted (AVE) values, requiring values of 0.7 or more and 0.5 or more, respectively [66]. Table 4 shows the concentrated validity results for each factor, and it was found that all of the factors secured the concentrated validity.

Discriminant validity analysis compares the correlation coefficient of the applied factor with the square root of the mean variance extraction, but it is considered that discriminant validity exists when the square root of the mean variance extraction is larger than the correlation coefficient [66]. As a result of the discriminant validity analysis, the square

roots of the mean variance extraction were all higher than the correlation coefficient, so discriminant validity was secured—see Table 5.

**Table 5.** Results for the discriminant validity.

Construct	1	2	3	4	5	6	7
Telepresence	<b>0.762<sup>b</sup></b>						
Informativeness	0.431 **	<b>0.760<sup>b</sup></b>					
Interactivity	0.557 **	0.371 **	<b>0.806<sup>b</sup></b>				
Enjoyment	0.317 **	0.519 **	0.326 **	<b>0.781<sup>b</sup></b>			
Intention of Continuous Use	0.646 **	0.567 **	0.618 **	0.477 **	<b>0.846<sup>b</sup></b>		
Shared Goal	0.540 **	0.441 **	0.518 **	0.362 **	0.671 **	<b>0.763<sup>b</sup></b>	
Digital Competence <sup>a</sup>	0.444 **	0.601 **	0.384 **	0.621 **	0.560 **	0.484 **	<b>0.756<sup>b</sup></b>

Note: \*\*  $p < 0.01$  ( $n = 304$ ). <sup>a</sup> Second-order construct; <sup>b</sup> bold and italic values along the diagonal indicate the square root of AVE.

Because the research confirmed the level of recognition at a single point in time for the factors applied to the research model to the survey subjects, there is a possibility that a response error between the independent variable and the dependent variable may occur. Accordingly, the study confirmed a common method bias problem. Although the method of confirming common method bias is approached in various ways, the research implemented a single-common-method-factor approach to confirm the influence of measurement items by adding a single factor to the confirmatory factor analysis structural model [67]. The goodness of fit of the model without a single factor ( $\chi^2/df = 1.27$ , GFI = 0.905, AGFI = 0.884, CFI = 0.986, NFI = 0.938, RMSEA = 0.03) and the goodness of fit of the model with a single factor ( $\chi^2/df = 1.162$ , GFI = 0.919, AGFI = 0.893, CFI = 0.992, NFI = 0.948, RMSEA = 0.023) met the requirements for goodness of fit, and the difference in the amount of change in influence of the measurement items according to the application of common factors was 0.3 or less, indicating a common method bias. We do not believe this is of much concern.

#### 4.2. Results of the Hypothesis Test

We performed the main effect analysis to confirm the mechanism between telepresence, the motivation of metaverse use (informativeness, interactivity, enjoyment), and the intention of continuous use. We conducted an analysis of the moderating effect of shared goals and digital competence for the reinforcement of metaverse motivation. Structural equation modeling was applied for the main effect analysis using AMOS 22.0, and process 3.1 of SPSS 21.0 was applied for moderating the effect analysis.

First, we confirmed the fit of the main effect model composed of the structural equation model, and it appeared as  $\chi^2/df = 2.017$ , GFI = 0.916, AGFI = 0.886, CFI = 0.969, NFI = 0.941 and RMSEA = 0.058. The AGFI was slightly lower than 0.9 but allowed up to 0.8, and the RMSEA was slightly larger than 0.5, but up to 0.1 is allowed, and the other values satisfies the requirements, so the path was verified with the structural equation model.

Figure 2 and Table 6 present the main effect analysis results. First, we verified the effect of the motive of using the metaverse on the intention of continuous use. The relationship between informativeness and the intention of continuous use (H1:  $\beta = 0.358$ ,  $p < 0.01$ ), interactivity and the intention of continuous use (H2:  $\beta = 0.508$ ,  $p < 0.01$ ), and the relationship between enjoyment and the intention of continuous use (H3:  $\beta = 0.198$ ,  $p < 0.01$ ); all had a statistically significant effect, such that all of the hypotheses between the motivation of the metaverse use and the intention of continuous use were accepted. We also verified the effect of telepresence on the motivation of metaverse use. The relationship between telepresence and informativeness (H4:  $\beta = 0.501$ ,  $p < 0.01$ ), the relationship between telepresence and interactivity (H5:  $\beta = 0.644$ ,  $p < 0.01$ ), and the relationship between telepresence and enjoyment (H6:  $\beta = 0.393$ ,  $p < 0.01$ ) all had a statistically significant effect, such that all the hypotheses between the telepresence of the metaverse motivation were accepted. We also checked the  $R^2$  values of the endogenous variables, and the level was confirmed with the intention of continuous use at 62.1%, informativeness at 25.1%, interactivity at 41.5%, and enjoyment at 15.5%.

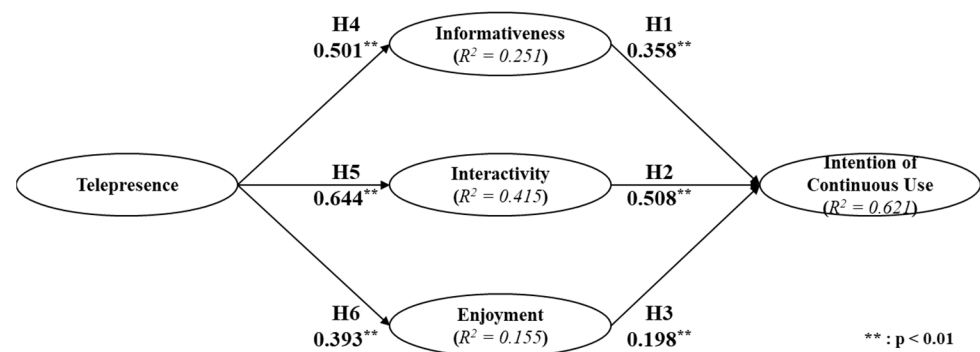


Figure 2. The results of the main effect.

Table 6. The results of the main effect.

Hypothesis	Path	Path Coefficient	t-Value	Result
H1	Informativeness → Intention of Continuous Use	0.358	6.929 **	Supported
H2	Interactivity → Intention of Continuous Use	0.508	9.507 **	Supported
H3	Enjoyment → Intention of Continuous Use	0.198	4.232 **	Supported
H4	Telepresence → Informativeness	0.501	7.804 **	Supported
H5	Telepresence → Interactivity	0.644	10.408 **	Supported
H6	Telepresence → Enjoyment	0.393	6.291 **	Supported

Note: \*\*  $p < 0.01$  ( $n = 304$ ).

Second, the study verified the moderating effect on the shared goal of the organization's digital transformation (H7) and the digital competence of employees (H8). Hayes' [68] Process 3.1 was applied to verify the moderating effect. Because all of the variables are composed of a Likert scale, model 1 of Process 3.1 (bootstrap 5000, 95% confidence level reflected) was applied. The results of the control effect analysis are shown in Table 7.

Table 7. Results of the moderating effect.

Hypothesis		Dependent Variable	Coefficient	t-Value	Result
H7a	Constant	Informativeness	0.3122	0.4449	Supported
	Telepresence		0.7921	4.5951 **	
	Shared Goal of Digital Transformation		0.7445	4.8115 **	
	Interaction		−0.1149	−3.3015 **	
$F = 37.6738, R^2 = 0.2736$					
H7b	Constant	Interactivity	0.2790	0.3755	Not Supported
	Telepresence		0.6429	3.5222 **	
	Shared Goal of Digital Transformation		0.5185	3.1645 **	
	Interaction		−0.0486	−1.3179	
$F = 61.3906, R^2 = 0.3804$					
H7c	Constant	Enjoyment	−0.1896	−0.2469	Supported
	Telepresence		0.9956	5.2789 **	
	Shared Goal of Digital Transformation		0.9916	5.8567 **	
	Interaction		−0.1764	−4.6324 **	
$F = 26.3590, R^2 = 0.2086$					
H8a	Constant	Intention of Continuous Use	−0.8849	−1.0697	Supported
	Informativeness		0.8315	4.1261 **	
	Digital Competence		0.8175	4.7361 **	
	Interaction		−0.0968	−2.5284 *	
$F = 72.5456, R^2 = 0.4204$					
H8b	Constant	Intention of Continuous Use	−0.0966	−0.1457	Not Supported
	Interactivity		0.6639	3.9283 **	
	Digital Competence		0.5920	4.4581 **	
	Interaction		−0.0471	−1.4617	
$F = 103.2519, R^2 = 0.5080$					



Table 7. Cont.

	Hypothesis	Dependent Variable	Coefficient	t-Value	Result
H8c	Constant	Intention of Continuous Use	−1.9543	−2.3626 *	Supported
	Enjoyment		0.9370	4.9366 **	
	Digital Competence		1.2081	6.9070 **	
	Interaction		−0.1539	−4.2594 **	
	$F = 64.8069, R^2 = 0.3932$				

Note: \*\*  $p < 0.01$ , \*  $p < 0.05$  ( $n = 304$ ).

The shared goal of digital transformation was found to moderate the relationships between telepresence and informativeness (H7a) and telepresence and enjoyment (H7b). The digital competence of the employees was found to moderate the relationship between informativeness and the intention of continuous use (H8a), and enjoyment and the intention of continuous use (H8c).

The study confirmed the simple slope to clearly understand the influence relationship of the moderating effect, as shown in Figure 3. Telepresence increased informativeness and enjoyment, and employees with a strong shared goal of digital transformation experienced higher informativeness and enjoyment than employees with a weak shared goal of digital transformation (H7a, H7c). In addition, informativeness and enjoyment increased the intention of continuous use, and employees with a strong digital competence experienced a higher intention of continuous use than employees with a weak digital competence (H8a, H8c).

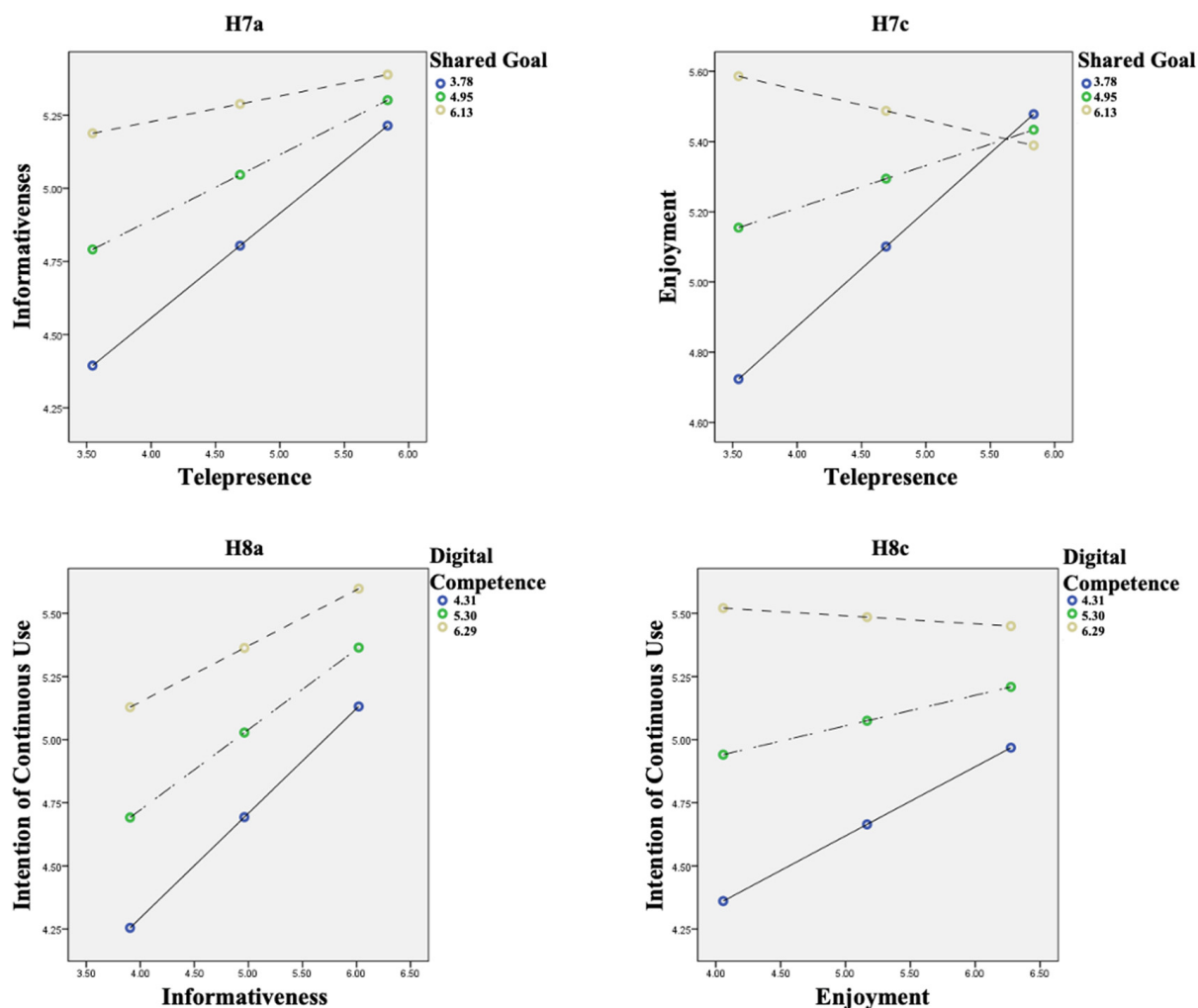


Figure 3. Results of the moderating effect (H7a, H7c, H8a, H8c).

### 4.3. Discussion

As a result of hypothesis testing, it was found that workers in organizations using the metaverse have a desire to secure the necessary information in order to work with colleagues within the organization (H1) and interact with colleagues through the metaverse (H2). In addition, there was a need to obtain technical pleasure through the new experience of the metaverse (H3). In other words, it was confirmed that the employees want to achieve efficient work performance and enjoyment through the metaverse. The results are similar to the studies of Kim et al. [23] and Kim and Lee [27], as the gratification of user needs on a virtual reality platform can be converted into positive behavior. Therefore, through the metaverse platform, the organization builds and supports user interfaces to efficiently exchange business information and diversify communication support content, such as meetings, such that employees can feel that they are interacting with colleagues. In addition, it is beneficial to support a service that can provide enjoyment beyond work through an avatar-based virtual reality.

The study also presented telepresence as a metaverse condition that can gratify employees' motivation for work through the metaverse, and confirmed that it affects informativeness, interactivity, and enjoyment (H4, H5, H6). In other words, it was confirmed that the experience of space and exchange provided by the metaverse that is similar to the real organization could increase the intention of continuous use by influencing the employees' motivation to use it. The results are similar to those of Fu et al. [33] and Han et al. [14], as the presence factor provided by the online platform increases the gratification of users' needs and induces positive behavior on the platform. Therefore, organizations must provide virtual reality technology for the metaverse platform in order to make it possible to feel that the exchange of information and interaction activities take place realistically and offer an entertainment element equipped with a sense of reality.

Finally, the study confirmed that the shared goal of an organization's digital transformation could increase the positive impact by moderating the relationship between metaverse telepresence, informativeness, and the enjoyment of employees (H7a, H7c). However, it did not affect the interactivity of employees. One possible explanation is that the focus of digital transformation is on individual task achievement and immersion rather than interactivity, such as exchanges between colleagues. In addition, the study confirmed that an individual's digital competence can increase the positive impact by moderating the relationship between metaverse motivation (informativeness and enjoyment) and the intention of continuous use. (H8a, H8c). However, it did not have a moderating effect between interactivity and the intention of continuous use. Similarly, we judged this to be rejected because an individual's digital competence centrally influences the emotions or behaviors of the individual.

## 5. Conclusions

### 5.1. Theoretical Implications

This study has academic implications regarding the expansion of the previous research in the metaverse field and filling gaps. First, the study viewed metaverse users as organizations rather than individuals, and suggested the requirements that employees need when using the metaverse platform for work. Previous studies have suggested the motivation for the use of an individual-centered virtual reality [6], but the study is about the motivation for the use of the platform for organizations and employees who use the metaverse in terms of digital transformation, such as strengthening work efficiency. In particular, from the perspective of work within the organization, the study determined that employees would like to obtain information from colleagues through the metaverse, and that they gain identification or attachment through interactive activities. As a result, this study has academic implications regarding presenting the motivation for the use of the metaverse platform from an organizational point of view at a time when metaverse platform users are increasing.

Second, the study presented the conditions for the gratification of employees' motivation. Previous studies have suggested improving individuals' motivation to use virtual reality by focusing on personalized virtual reality devices and content [5,8], while this study is a pilot study examining organizations rather than the individual. In particular, it was confirmed that telepresence, the core function of the metaverse, had a positive effect on the informativeness, interactivity, and enjoyment of employees. As a result, the study has academic implications in terms of suggesting the importance of a telepresence in organizations that use the metaverse for work.

Third, this study attempted to clarify the reasons for the use of the metaverse from an organizational point of view. Organizations are hoping to maintain a stable organizational structure in the face of changes in the external environment, such as COVID-19, and are trying to solve problems through digital transformation. The metaverse is a technology that helps organizations achieve results through efficient online exchanges as part of a digital transformation. Previous studies researched user motivation or content improvement from the perspective of metaverse usability [7,9], but this study is about a technology that responds to the environmental problems faced by organizations through the metaverse. We examined the moderating effect of a shared goal of digital transformation set by employees' motivation regarding the metaverse. As a result, the study has academic implications regarding expanding the organization's digital strategy, rather than merely the intention to use the metaverse platform.

Fourth, the study judged that employees' acceptance of metaverse technology would vary depending on the individual's digital competence. Digital competence is the ability of an individual to respond to the digital environment technically, ethically, and cognitively. Previous studies focused on the motivational satisfaction that individuals feel regarding metaverse technology and its contents [27,35], but this study focused on metaverse utilization motives according to the level of individual digital competence. As a result, this study has academic implications in terms of confirming that the level of digital competence possessed by metaverse users can affect an individual's digital experience.

## 5.2. Managerial Implications

This study has practical implications in suggesting a mechanism for improving the motivation to use the metaverse for businesses from the perspective of organizations and members. First, the study presented the motivation for the use of the metaverse from the perspective of organizations and members who have applied the metaverse to work on a trial basis. In particular, the study judged that metaverse utilization is part of an organization's digital transformation strategy. Currently, virtual interactions in the workplace are increasing due to COVID-19, and virtual organizational spaces such as a metaverse are used to achieve work efficiency through information exchange with colleagues. This information exchange helps motivate users to engage in continuous use through interactive activities. The metaverse provides realistic situations using constructs like 3D avatars to help achieve motivation for use through enjoyment. In other words, organizations need to build and support user interfaces and content so that the information which is necessary for work can more easily be transferred to members through the metaverse platform's operation. Technical support must be strengthened in order to ensure ease of use. In particular, organizations must provide services to support members' ability to immerse and participate in virtual work situations, so as to maintain their enjoyment while engaging with the metaverse platform.

Second, the study presented telepresence as a key condition that the metaverse provides to gratify employees' motivations. When the virtual office becomes similar to the real office, and online work execution becomes similar to that offline, employees can recognize telepresence. In particular, telepresence raises the perception of information acquisition and exchange activities for work, and forms pleasant emotions through realistic virtual experiences. Therefore, organizations need technical support in order to improve the telepresence of metaverse. Third, the study presented conditions for increasing the motivation

to use the metaverse for organizations that have introduced it on a trial basis. In particular, we confirmed that the metaverse motivation of employees can be strengthened when organizations share their goal of digital transformation. Therefore, the organization must conceptualize the digital transformation policies, goals, and values, etc., for the business use of the metaverse, and should ensure that employees feel involved in the goal activities by interacting with them. For example, during education and training on how to use the metaverse, organizations can provide preemptive information on the organization's direction, such as digital goals and values, etc. In this way, employees can acquire knowledge about digital transformation and the metaverse.

Finally, the study confirmed that the digital competence of those using the metaverse regulates their motivation to continue to use the metaverse. In other words, the study suggests that organizations should be aware that differences in levels of digital competence can cause changes to the related technology acceptance behaviors. Therefore, the organization must recognize that the gratification of employees' informational needs and enjoyment needs does not simply affect the intention of continuous use but may also differ depending on the individual's digital competence. Therefore, the organization is required to continue efforts such as informatization education in order to enhance the digital competence of its employees.

### 5.3. Limitations and Future Research

This study has implications for suggesting a method to continuously improve intentions to use the metaverse from the perspective of organizations and employees applying the metaverse to work. However, some limitations exist. First, this study confirmed the perceptions of metaverse experiences and the individual intentions of workers of organizations who have experience applying the metaverse. Although the common method bias was not detected, there may still be issues because the organizational unit element was identified by individual perception. Thus, in future research, it would be better to suggest a more objective and realistic change in behavior by differentiating and confirming group factors and individual factors. Second, many organizations still establish a business area within the existing metaverse platform, rather than building a metaverse platform themselves. Therefore, it is necessary to study the influence relationship between the motivation and performance of employees according to the metaverse adoption method, such as direct development or platform application. Finally, the study applied digital competence as an individual dimension factor. According to individual characteristics, behavioral change studies typically use accommodative regulatory focus theory and coping theory. However, there is still a lack of research that applies the individual dimension factor to metaverse studies. In other words, if differences in the behavioral changes of members in response to changes in the metaverse environment are presented, significant practical implications can be extracted.

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