TURKISH ACADEMIC RESEARCH REVIEW

Examining the Effects of Technology Self-Efficacy and Social Presence on Metaverse Attachment and Continuation Intention*

Teknoloji Öz Yeterliliği ve Sosyal Varlığın Metaverse Bağlanma ve Devam Niyeti Üzerindeki Etkilerinin İncelenmesi

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Öz
Bu çalışma, teknoloji uygunluk teorisi (technology affordance theory) ve uyaran-organizma-tepki (stimulus-organism-response theory) (SOR) teorisini benimsemektedir. Teknoloji uygunluk teorisi, bir teknolojinin kullanıcılarına belirli eylemleri gerçekleştirme fırsatları sunduğunu savunmaktadır. Bu teori, kullanıcıların tasarımın sunduğu imkanları nasıl fark ettikleri ve bu imkanları nasıl kullandıkları üzerine odaklanır. Öte yandan, uyaran-organizma-tepki teorisi, çevresel uyaranların birey üzerinde nasıl bir etki yaratarak, organizmanın (bireyin) bu uyaranlara nasıl tepki verdiğini açıklar. Dış dünyadaki bir uyaran (örneğin bir reklam, ürün tasarımı veya web sitesi arayüzü) bir organizma (birey) üzerinde bir etki yaratmaktadır. Bu etki, belirli bir tepkiye yol açmaktadır (örneğin, satın alma kararı, duygu durumu değişikliği, olumlu ya da olumsuz düşünceler vb.). Bu model, insanların çevresel faktörlere nasıl tepki verdiğini anlamaya yönelik psikolojik ve davranışsal bir çerçeve sunmaktadır. Bu teoriler ışığında, çalışma teknoloji öz yeterliliği ve sosyal varlığın metaverse bağlanma ve metaverse tabanlı sanal platformları kullanmaya devam etme niyeti üzerindeki etkilerini incelemektedir. Çalışma, nicel araştırma yöntemine dayanarak tasarlanmıştır. Araştırma tasarımı dijital oyunların metaverse dünyasına en yakın deneyimi sunduğu ve genç tüketiciler dijital oyunlara güçlü bir ilgi göstermesi nedeniyle dijital oyunlar üzerine kurgulanmıştır. Metaverse'teki dijital oyunlar üniversite öğrencilerine gösterilmiş ve çalışmaya katılmak isteyen katılımcılar bu dijital oyunları deneyimlemiştir. Araştırma verileri anket yoluyla 387 üniversite öğrencisinden toplanmıştır. Değişkenler arasındaki ilişkiler, Kısmi En Küçük Kareler Yapısal Eşitlik Modellemesi (PLS-SEM) tekniği kullanılarak analiz edilmiştir. Araştırma sonuçlarına göre, katılımcıların teknoloji öz yeterliliği, sosyal varlık ve metaverse bağlılığı üzerinde anlamlı bir etkisi olduğu görülmüştür. Sosyal varlık, metaverse'e bağlanma ve devam etme niyeti üzerinde de etkili olmaktadır. Ayrıca, metaverse'e bağlanmanın, metaverse tabanlı sanal platformları kullanmaya devam etme niyetini etkilediği belirlenmiştir. Araştırma ayrıca, metaverse bağlanma ve sosyal varlığın, teknoloji öz yeterliliği ile devam etme niyeti arasındaki ilişkide aracılık rolü oynadığını ortaya koymuştur. Sosyal varlığın da, teknoloji öz yeterliliği ile devam etme niyeti arasındaki ilişkide aracılık etkisi yaptığı tespit edilmiştir. Bu araştırma, tüketicilerin metaverse tabanlı teknolojik öz yeterlilik, sosyal varlık, bağlanma ve metaverse devam etme niyetine dair hem teorik hem de pratik içgörüler sunmaktadır. Teorik olarak, sanal ortamların toplumdaki artan rolünü göz önünde bulundurarak, çalışma metaverse katılımını anlamak ve geleceği şekillendirmek için değerli bir çerçeve sunar. Ayrıca, sanal dünya ile gerçek dünya arasındaki bağlantının incelenmesi, devam etme niyeti üzerine yeni yaklaşımların geliştirilmesi ve sanal ortamlarda sosyal etkileşimin derinlemesine anlaşılması açısından da katkı sağladığı düşünülmektedir. Pratik açıdan ise, metaverse gibi yeni teknolojilerin özellikle genç tüketiciler arasında nasıl kullanıldığını anlamak, teknoloji kabulü ve kullanıcı davranışları üzerine önemli veriler sağlar. Bu tür araştırmalar, teknoloji öz yeterliliği ve sosyal varlığın kullanıcı deneyimi üzerindeki etkilerini ortaya koyarak, metaverse platformlarının daha etkili bir şekilde tasarlanmasına katkıda bulunabilir. Sosyal varlık ve teknoloji algılarının, kullanıcıların metaverse'e olan bağlarını güçlendirebileceği ve platformları daha uzun süre kullanma niyetini etkileyebileceği anlaşılmaktadır. Bu bulgular, pazarlama stratejileri ve kullanıcılara yönelik tutundurma yöntemleri için değerli bilgiler sunmaktadır. Teknoloji öz yeterliliği ve sosyal varlık algısının, bireylerin metaverse deneyimlerine olan bağlanmaları ve sürekli kullanım niyetleri üzerindeki etkisini incelemek, hem psikolojik hem de teknolojik faktörlerin kullanıcı davranışları üzerindeki rolünü derinlemesine anlamaya yardımcı olabilir. Sonuç olarak, bu çalışma, metaverse platformlarını geliştiren işletmelerin kullanıcı odaklı stratejiler geliştirmelerine katkı sağlayabilir.

Anahtar kelimeler: Teknolojik öz yeterlilik, sosyal varlık, metaverse'e bağlanma, metaverse'e devam etme niyeti

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Abstract
This study adopts the technology affordance theory and stimulus-organism-response theory (SOR). Technology affordance theory argues that technology offers users opportunities to perform specific actions. This theory focuses on how users realize the opportunities provided by the design and how they use them. On the other hand, stimulus-organism-response theory explains how environmental stimuli affect the individual and how the organism (individual) responds to these stimuli. A stimulus in the external world (e.g. an advertisement, product design, or website interface) affects an organism (individual). This effect leads to a specific reaction (e.g. a purchase decision, mood change, positive or negative thoughts, etc.). This model provides a psychological and behavioral framework to understand how people respond to environmental factors. In light of these theories, the study examines the effects of technology self-efficacy and social presence on metaverse attachment and intention to continue using metaverse-based virtual platforms. The study was designed based on the quantitative research method. The research design was based on digital games because digital games offer the closest experience to the metaverse world, and young consumers show a strong interest in them. Digital games in the metaverse were shown to university students and participants who wanted to participate in the study experienced these digital games. The research data were collected from 387 university students through a survey. The relationships between the variables were analyzed using the Partial Least Squares Structural Equation Modeling (PLS-SEM) technique. According to the research results, the participants significantly affected their technology self-efficacy, social presence and metaverse attachment. Social presence also affects attachment to the metaverse and continuation intention. In addition, it was determined that attachment to the metaverse affects the intention to continue using metaverse-based virtual platforms. The research also revealed that metaverse attachment and social presence mediate the relationship between technology self-efficacy and continuation intention. It was also found that social presence mediates the relationship between technology self-efficacy and continuation intention. This research provides theoretical and practical insights into consumers' metaverse-based technological self-efficacy, social presence, attachment, and metaverse continuance intention. Theoretically, considering the increasing role of virtual environments in society, the study provides a valuable framework for understanding metaverse participation and shaping the future. In addition, it is thought that examining the connection between the virtual world and the real world contributes to the development of new approaches to continuance intention and an in-depth understanding of social interaction in virtual environments. In practical terms, understanding how new technologies such as the metaverse are used, especially among young consumers, provides important data on technology acceptance and user behavior. Such studies can contribute to the more effective design of metaverse platforms by revealing the effects of technological self-efficacy and social presence on user experience. It is understood that social presence and technology perceptions can strengthen users' attachments to the metaverse and affect their intention to use the platforms for extended periods. These findings provide valuable information for users' marketing strategies and promotional methods. Examining the impact of technology self-efficacy and social presence perception on individuals' commitment to metaverse experiences and continuous usage intentions can help deeply understand the role of psychological and technological factors on user behavior. As a result, this study can contribute to developing user-centered strategies by businesses developing metaverse platforms.

Keywords: Technological self-efficacy, social presence, attachment to the metaverse, intention to continue to metaverse

Introduction

Virtual-based platforms have been critical in individuals' lives in recent years. The Metaverse, which emphasizes interpersonal relationships and offers users an experience using advanced technology and refers to the virtual environment, is a pioneering platform that provides users with a parallel virtual life (Khan et al., 2022: 339).

With the proliferation of Metaverse, technologies such as virtual reality enrich the experience by making users feel more engaged and connected. Metaverse's integration offers users an immersive digital environment in which to interact with the real world. Metaverse brings users together through virtual reality headsets or avatars, merging digital and physical space (Payal et al.,2024: 4).

The Metaverse is conceived in science fiction as a digital environment where technologies such as online gaming platforms, augmented reality, and virtual reality come together. Metaverse is still under development. Although it is in the early stages of implementation, it has the potential to revolutionize the way businesses interact with customers through the virtual and real world (Jung et al.2024: 1).

With its emergence as a digital platform for user interaction, creation, and commerce, the Metaverse has generated considerable interest among practitioners. This community of connected virtual worlds offers immersive environments for users to explore, interact, and create content (Gil-Cordero et al.,2023: 124). Today, businesses create branded virtual locations, events, and experiences within the Metaverse to engage customers further (Dwivedi et al.,2024: 2). Consumers have slowly started to embrace the inclusion of more immersive and experiential content, such as virtual reality and augmented reality. These new-age technologies are creating opportunities by accelerating digital transformations in various fields. These platforms are used for a variety of purposes, including work, education, and social interaction. Users are actively involved and experiencing these platforms, not just as spectators (Yoon and Nam, 2024: 1).

The amount of time that younger generations spend on social platforms highlights the importance of understanding their digital behaviors and preferences. Participants have integrated technology into their daily lives and use social media platforms for communication, entertainment, information, education, and social interaction. This significant amount of time spent on social media reflects the central role of social media in their lives. It demonstrates their strong dependence on digital platforms for various activities (Oh et al.,2023: 1). This study on participants intention to continue metaverse is examined within the framework of technology appropriateness theory, which explains human-computer interaction and Stimulus-organism-response theory, which explains that the response of individuals is affected by the stimulus.

Technology Affordance Theory

The concept of affordance was developed by Gibson in 1977 and 1979. It was created and popularized by Norman (1988) with human-computer interaction. The theory is designed to design the utility of an object and the way this utility is transferred to the user. Norman (1998) developed the theory by stating that individuals understand and approach technology differently. Technology appropriateness refers to what an individual with a specific purpose can do with a technology. The usefulness of technology as perceived by users depends on their particular characteristics, purposes, and contexts. Mobile applications propose values to the service provider customer. The customer decides whether or not the proposed values are helpful. The value of a technology is shaped by how users perceive it and how they use it to achieve their goals rather than being intrinsic to the physical object. Therefore, the technology appropriateness theory suggests that the use of mobile apps depends

on users' perceived appropriateness of the app functions and their context-based interactions with the app (Vo-Thanh et al.,2021: 2).

Stimulus-Organism-Response Theory

The Stimulus-Organism-Response (SOR) theory was proposed by Mehrabian and Russell (1974). The theory suggests that consumers' response is influenced by the internal set-up of the organism to a stimulus. The theory has been developed in different studies over the years. Bitner (1992) expanded the SOR framework by including the concept of cognition in the theory. Kim and Lennon (2014) further extended the framework to include reputation/websites, emotion/cognition internal mechanism, and purchase intention as a response. Loureiro et al.(2020) and Ying et al.(2021) advocated for extending the SOR model in imaging by integrating additional features of usability with disruptive technologies such as virtual reality and metaverse. In this context, inspired by existing literature, a SOR framework was developed and tested to investigate consumer behavior patterns in the metaverse (Sun and Guo, 2024: 2).

The term 'stimulus' of SOR theory refers to elements that trigger a person's situational details. In the study, technological self-efficacy and social presence are treated as concepts that adapt to internal mechanisms. 'Organism' describes all internal structures and equipment related to external stimuli, such as perceptions and emotions. In our study, metaverse attachment is the organism. The response element of the SOR shows how a person's behavior depends on internal mechanisms and structures. In this study, the response element is continuance intention *(*Zhang and Wang, 2023:415).

Research Background and Gaps

The rising presence of metaverse creates a new area of interest for consumer research. Digital platforms with large user bases are distinguishing themselves by offering consumers a variety of virtual experiences and exciting social activities. Younger participants, spend significant time on social and online platforms. Similarly, using virtual spaces and platforms is becoming one of young consumers' most engaging metaverse activities. Participants represent the largest consumer segment of metaverse and stand out as the group that spends the most on technological innovations (statista.com).

When the studies in the literature in the field of metaverse and marketing are examined, Bozkurt et al. (2023), Fokides (2023) on scale development, Liu and Park (2023) on social presence, attitude, and intention, Anwar et al.,(2024) technological self-efficacy metaverse, Yoon and Nam, (2024) metaverse, social presence, and place attachment, behavioral intention in tourism marketing, Sun and Guo, (2024) social presence intention to rejoin, Lee et al.,2024 social identity and social presence intention to use, Mehrotra et al.,(2024) metaverse retailer consumer experience concepts. However, it is seen that research examining the effect of new virtual platforms on the change of consumer attitudes among young participants should be developed (Çelikkol, 2022; Berber, 2023; Kim et al.,2023; Oh et al.,2023; Liu and Park, 2023; Oleksy et al.,2023; Ghali et al.,2024; Yoon and Nam, 2024; Dwivedi et al.,2024). Therefore, although it is seen that interest in marketing and metaverse research has increased in recent years, there is a need for more detailed studies in this field.

In the studies, suggestions were made to fill the theoretical and practitioner research gaps in the field of metaverse and marketing. In the suggestions made for future studies in the studies conducted in the literature; Çelikkol, 2022; Berber, 2023; Sadamali Jayawardena et al..2023; Kim et al.,2023; Oh et al.,2023; Liu and Park, (2023); Balakrishnan et al.,2024, more research is needed to improve our understanding of how we should use this new platform and to develop positive social relationships and benefit from these relationships. Regarding

this point of view, Erçin Yurcu (2023) stated, metaverse is a subject of research for marketing practitioners and theorists as it is a new platform that is interactive, fast, highly accessible, and interesting. Ghali et al.(2024) stated that the number of studies examining the psychological consequences of metaverse-based social interactions among consumers is relatively low, and more research should be conducted in different cultural contexts/backgrounds. Yoon and Nam (2024), while examining the relationship between metaverse experience and travel decisions, stated that there is a need for studies that address the variables of place attachment, behavioral intention, and usage intention and that participants from different nationalities and cultural backgrounds are needed. Dwivedi et al.(2024) stated that future studies in the field of metaverse should include multi-factor designs. Lee et al.(2024) stated that it would be meaningful to determine the relationship between the social elements of the platform and its presence in future research. Güler and Zeren (2024) stated that metaverse, just like e-commerce or mobile commerce, is a research plane that contains dozens of different research questions that need to be investigated in the future, Sun and Guo (2024) stated that other studies should be conducted by focusing on various areas in future studies where current research focuses on metaverse concerts.

Research Aims and Value

The purpose of this study is to examine the effect of consumers' technological self-efficacy and social assets on metaverse attachment and intention to continue in the metaverse.

- It aims to contribute to the field of marketing and metaverse literature by determining the metaverse uses and results of the technology competencies of consumers who experience metaverse platforms.
- It aims to gain insight into how consumers interact with metaverse platforms and the consequences of this interaction.
- It aims to uncover the motivations that drive their participation in the metaverse.

This research contributes comprehensively to both theory and practice.

The theoretical study using SOR theory will allow us to examine the effects of young consumers' technology self-efficacy towards the metaverse and social presence in the metaverse on metaverse attachment. Second, the relationship between social presence and metaverse engagement on continuance intention is explored. Thirdly, the research enables us to investigate the continuance intentions of metaverse attachment. The findings of this research may contribute to the understanding of consumer behavior in the virtual world in marketing fields. It will contribute to the emerging literature on how customers use metaverse technologies for their benefit. For practitioners, the findings of this research emphasize that social presence and connectedness in the metaverse are essential for understanding consumer behavior. By providing a framework for future studies, the research enhances our understanding of the role of metaverse technologies across different contexts.

Literature Review

Self-Efficacy: self-efficacy, in essence, is the belief in one's ability to perform tasks and achieve specific goals. It influences various aspects of behavior, including motivation, emotions, thoughts, and actions. It is defined as individuals' confidence in managing social interactions effectively (Oh, 2023: 2).

Positivity is closely linked to self-efficacy, which is associated with perseverance, attachment, satisfaction, and engagement. Mobile self-efficacy is defined as the judgment of one's ability to engage in activities such as editing files, transferring data, using e-mail, surfing the Internet, searching for information, understanding information about mobile devices, and using specific mobile services through a mobile device

(Kaynar and Marangoz, 2023: 290). Especially in the field of technology, having a strong sense of self-efficacy related to a particular technology often leads to a greater willingness to take risks and try new things. Individuals with high levels of technology self-efficacy are confident in their skills and abilities to overcome technology-related challenges. Therefore, researchers hypothesize that participants' engagement in activities will have a positive correlation with their perceived technology self-efficacy (Lo et al.,2024: 21).

Social Presence: with the increase in web-based technologies, the concept of social presence has become a frequently used concept (Yoo and Nam, 2024: 2). Social presence is a key element that distinguishes between virtual space and the Metaverse. The term 'social presence' is used to describe the psychological sensation of being present within a computer-mediated system (Chen, 2023: 20). Social presence plays a vital role in influencing users' emotions, behaviors, and attitudes in the context of consumer behavior. Research shows that virtual characters play an essential role in social interactions and are a critical factor in increasing social presence, as they significantly influence people's emotional reactions in virtual environments (Ghali et al.,2024:3).

Due to the enhanced sense of social presence, virtual spaces in the Metaverse can offer users unique communication opportunities. Social presence becomes more salient in the context of virtual activities. The concept of social presence is an important variable that plays a role in user/consumer engagement in the virtual social environment (Yung et al., 2022: 2).

Attachment to Metaverse; Attachment to the metaverse has been identified as an antecedent or mediating factor in consumers' behavioral intentions (Kim and Bae, 2023: 5).

Loyalty is considered an essential construct for understanding customer-brand relationships in marketing. Developing loyalty has a significant impact on the success of marketing service-brand relationships. In addition, attachment is also effective in creating lasting customer relationships (Lee et al.,2024: 2613).

The cognitive, emotional, and behavioral investment made by the consumer in the virtual environment is considered a critical tool to increase users' loyalty and satisfaction. The interaction of consumers with the virtual reality ecosystem represents a crucial strategy to increase loyalty and satisfaction. Consumer engagement is enhanced through engagement that allows one to interact with customers in a virtual world more inclusively and creatively (Pal and Arpnikanondt, 2024: 2).

Attachment to virtual places is a concept that emerged from the metaverse and is considered to be necessary. Virtual spaces can provide the same experiences that cause individuals to connect to real places and perceive them as meaningful. This is a key factor that transforms an indifferent place into a place. Virtual places, like physical places, can foster a strong sense of place identity and attachment. Virtual environments designed to meet specific user needs, such as socializing, entertainment, or work, can foster this kind of addiction, making them an integral part of users' lives (Oleksy et al.,2023: 2). Individuals consciously and intentionally spend time in virtual spaces, creating attachment.

Intention to Continue to Use of Metaverse-based Virtual Platforms

Consumers with a proactive curiosity and predisposition to innovative buying experiences initially intend to research and use metaverse virtual stores. Consumers' digital curiosity and predisposition are essential for using metaverse-based virtual stores (Dwivedi et al., 2024: 5). Once consumers start using virtual platforms, these attitudes lead to long-term behavior. Determining to continue using virtual stores based on the metaverse

implies an attachment. For businesses and platform developers in the metaverse space, it is essential to create positive first impressions to ensure user intent continues (Chakraborty et al.,2024: 4).

Hypotheses

Technological self-efficacy, social presence on attachment to the metaverse

Due to the differences in consumers' technology competencies, their technology adoption behaviors may also differ. It has been stated that consumers with high levels of technological self-efficacy are more likely to perceive and use mobile (Kaynar and Marangoz, 2023: 291).

Social presence is referred to as a sense of being with someone else and is an important driver of user engagement in a virtual social environment. Without a social presence, other users are only perceived as artificial. Social presence influences the perception of virtual actors as vividly simulated and generates positive emotions toward the metaverse (Oh et al.,2023: 2).

Waheed Khan (2022) examined the effect of openness to experience new technologies on the intention to use the metaverse, Anwar et al.(2024) examined the relationship between technological self-efficacy and digital technology, Yoon and Nam (2024) examined the effect of social presence and place attachment on behavioral intention and intention to use, Zarouali (2024) examined the impact of psychological perceptions (social presence) on behavioral intention. Based on the existing literature, hypotheses H1 and H2 were formulated.

H1: Technological self-efficacy affects social presence.

H1A: Attachment to metaverse has a mediating effect in the relationship between technological self-efficacy and intention to continue metaverse.

H1B: Social presence and attachment have a mediating effect on the relationship between technological self-efficacy and intention continuation metaverse.

H1C: Social presence has a mediating effect on the relationship between technological self-efficacy and intention continuation metaverse.

H1D: Social presence has a mediating effect on the relationship between technological self-efficacy and attachment to a metaverse

H2: Technological self-efficacy affects attachment metaverse.

Social presence on attachment to the metaverse, intention to continuation;

Traditional place attachment is negatively related to real-world migration but positively related to willingness to migrate in the metaverse. This is because virtual migration is possible while remaining in one's physical location. People who are more willing to explore different options to discover the possibilities of the metaverse, including using the metaverse in general, express that metaverse connectedness creates a greater willingness to participate (Oleksy et al.,2023: 4).

In the context of online social interaction environments, a substantial body of existing research has emphasized the role of interaction on users' behaviors or attitudes. The capacity for rich interaction enables users to disseminate and exchange their sentiments, dispositions, perceptions, and experiences with others. It can be reasonably deduced that the more interaction occurs, the greater the likelihood of social presence among group members. Moreover, the stronger the perception of social presence, the greater the likelihood of group members forming interpersonal relationships. It can, therefore, be posited that the concept of social presence, as facilitated by the metaverse, will increase the possibility of participation (Lee et al.,2024:2616). Studies; Liu and Park,

(2023) on the effect of social presence on attitude and intention within the framework of the technology acceptance model**,** Kim et al.,(2023) the effect of social presence on avatar use, Zhang and Wang, (2023) the impact of social presence and interaction on image development and intention to visit, Oleksy et al.,(2023) the effect of attachment on willingness to participate in Metaverse, Oh et al.,(2023) examined the interaction of social presence in metaverse, Lee et al.(2024) examined the effect of social identity and social presence on intention to use, Sun and Guo, (2024) examined the effect of social presence on intention to rejoin and the mediating impact of emotional involvement on the effect of ease of use and usefulness on intention to rejoin. Based on the studies conducted in the literature, hypotheses H3 and H4 were formed.

H3: Social presence affects the attachment metaverse.

H3A: Attachment has a mediating effect on the relationship between social presence and intention continuation metaverse.

H4: Social presence affects continuation intention metaverse.

Attachment to metaverse on intention to continuation

The extant research on virtual environments indicates that social presence can enhance online engagement and influence loyalty intentions. The presence of a real person in virtual reality content facilitates the development of a robust psychological bond through several mechanisms (Balakrishnan et al.,2024:5).

In contrast, virtual reality applications and content with more social presence can be more personal and interactive, making it easier for users to get up to speed with the information provided by marketing systems. The perception of virtual reality applications by a real individual can help users feel more confident about virtual reality information or content, thus increasing their attitudes and attachment toward marketing activities. Higher levels of social presence are therefore key elements of the metaverse environment that need to be present to encourage higher levels of repeat visits for consumers.

Bousba and Arya, (2022) the effect of engagement on satisfaction; Kim et al.,(2023) aim to examine the impact of actual and persona self congruence on luxury brand loyalty and the effects of luxury brand loyalty on attitudes towards luxury brands and purchase intention of Metaverse users. Shin et al. (2024) examined the impact of experience on intention to use**,** Kaynar and Marangoz (2023) examined the relationship between self-efficacy and online purchasing, Jo et al.(2023) examined the effect of perceived benefit on intention to continue using, Dwivedi et al.(2024) examined the impact of experience on intention to continue, Balakrishnan et al.(2024) examined the effect of metaverse experience on intention to continue. Based on the studies conducted in the literature, H5 hypotheses were formed.

H5: Attachment affects the intention to continue metaverse.

Methodology

Research Model

Figure 1 below illustrates the research framework of the current study. This study proposes that technological self-efficacy and social presence shape Metaverse attachment and Metaverse continuance intention. It is also hypothesized that social presence will influence the intention to continue using the metaverse. The study suggests that attachment to the metaverse will affect continuance intention.

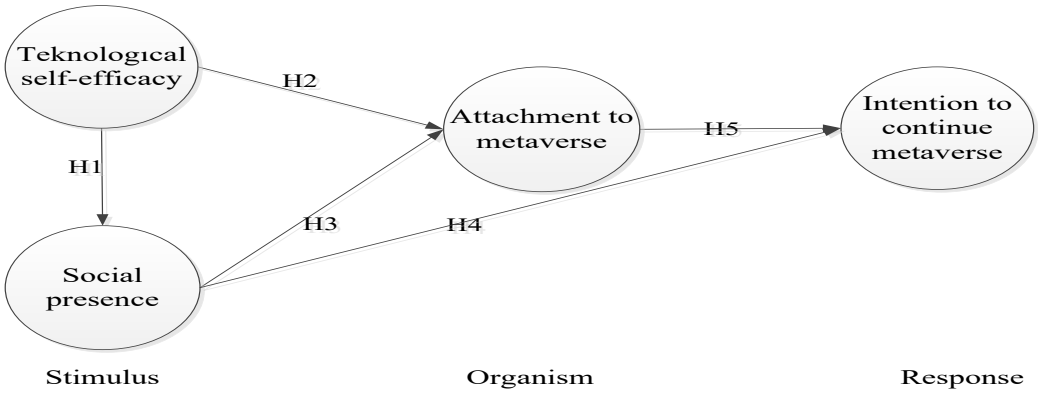

Figure 1. Research Model

Research Design

The research was designed quantitatively. Digital games in the metaverse were shown to university students. Participants interested in the study and wanted to participate experienced the metaverse digital games.

This study was deemed ethically appropriate by our University's Social and Human Sciences Scientific Research and Publication Ethics Committee at its session dated 27.05.2024 and numbered .290122.

Sampling and Data Collection

Digital games are said to offer the closest experience to the metaverse world (Berber, 2023: 606). It is a digital environment combining gaming, social interaction, and user-generated content. The Game Metaverse concept has emerged recently (Koç, 2023: 33). The platforms integrate gaming, social interaction, and user-generated content. In these virtual worlds, players can create, play, and monetize their games, fostering a vibrant ecosystem. Businesses can engage customers in various ways, including in-game advertising, branded products, and immersive gaming experiences. These methods allow firms to capitalize on the large user base of players in the Metaverse (Rane et al.,2023: 8).

Younger consumers show a strong interest in digital games. For example, a survey of 5,521 metaverse users playing Minecraft, Fortnite, and Roblox found that they were mainly under 20 (Zhou, 2022). In addition, Zepeto, which has around 15-20 million monthly active users, is primarily popular among users aged 13-21 (Davies and Song, 2022). Therefore, this study uses digital games such as Roblox, Minecraft, Sandbox, Zepeto, Fortnite, and Meta Horizon as the metaverse. While the study's population consists of 1650 undergraduate and 18 graduate students at a university in Turkey. The sample size used in this study was deemed adequate according to the recommendations of Hair et al. (2022) and Kock and Hadaya (2018). The complexity of the structural model does not significantly affect the sample size requirements for the PLS-SEM method. So, The low minimum sample size requirement is a significant reason for the widespread preference for PLS-SEM across various disciplines (Ghasemy et al., 2020). Kock and Hadaya (2018) presented a calculation method with different expected path coefficient levels to determine the minimum sample size for 1%, 5%, and 10% significance levels in the PLS-path model. The present study determined that 209 observations were necessary to ensure significance at the 5% level under the assumption that the minimum (Hair et al., 2022; Kock and Hadaya, 2018). 387 participants were included in the study. Data were collected through questionnaires. Participation in the surveys was voluntary. As a data collection method, a stratified sampling method based on probability was used. A certain number of students from different departments and classes were included in the study at the university where the study was conducted.

Measures

Among the scale expressions used within the scope of the study, technology self-efficacy was adapted from Lo et al. (2024), metaverse attachment was adapted from Ghali et al. (2024), social presence was adapted from Boo and Suh (2024); Ghali et al. (2024) and continuance intention was adapted from Balakrishnan et al. (2024). Each item was measured on a 5-point scale. Scoring ranged from 5 - strongly disagree to 1 - strongly agree.

Data Analysis and Results

Descriptive Statistics

According to Table 1, the participants are undergraduate and graduate students. Participants are aged between 18 and 28 years old and have a Roblox, Minecraft, Sandbox, or Zepeto account. On average, participants spend about 1 to 5 hours every day.

Table 1: Demographic Information

		Frequency	Percent
Gender	Female	220	56,8
	Male	167	43,2
Age	18-28 years old	387	100,0
Education	Graduate	369	95,3
	Postgraduate	18	4,7
Hours spent in the metaverse	Less than 1 hour	67	17,3
	1 to 5 hours	232	59,9
	between 5-10 hours	73	18,9
	10 hours and over	15	3,9
Most used metaverse	Roblox	279	72,1
	Minecraft	46	11,9
	Sandbox	19	4,9
	Zepeto	24	6,2
	Other	19	4,9
Total		387	100,0

No identifiable information was collected to protect the privacy of individuals. Participants' information is summarized in the table 1.

Validity and Reliability

The confirmatory analysis results conducted within the scope of the research are presented in Table 2. In confirmatory factor analysis, factor loadings should be 0.70 and above (Hair et al., 2019). The factor loadings of the variables are 0.70 and above. One expression from the dimensions of social presence, attachment to metaverse, and continuance intention was removed from the analysis because its factor loading was below 0.70. Cronbach states that the alpha should be 0.70 and above (Nunnally and Bernstein, 1994). Cronbach alpha (α) is 0.70 and above. Composite Reliability (CR) and Rho_A values are expected to be 0.70 and above, and Average Variance Extracted (AVE) values are expected to be 0.50 and above (Fornell and Larcker, 1981; Hair et al., 2022; Nunnally and Bernstein 1994). (CR) and Rho_A values are 0.70 and above, and (AVE) values are 0.50 and above (Hair et al.2017). When Table 2 is examined, it is revealed that all values meet the validity and reliability criteria.

Table 2: Measurement Scale's Psychometric Properties

Factor	Items	Loadings	Cronbach's alpha	(rho_a)	(rho_c)	(AVE)
Techological_self-efficacy	VAR00011	0,811				
	VAR00012	0,912				
	VAR00013	0,788				
	VAR00014	0,762	0,839	0,858	0,891	0,673
Social _Presence	VAR00015	0,815				
	VAR00016	0,839				
	VAR00017	0,808				
	VAR00019	0,719	0,810	0,835	0,874	0,635
Attachment _metaverse	VAR00020	0,836				
	VAR00021	0,926				
	VAR00022	0,821	0,826	0,832	0,897	0,744
Intention _continuation	VAR00031	0,954				
	VAR00033	0,960	0,908	0,911	0,956	0,916

In the study**,** AVE and Henseler et al. (2015) HTMT values are examined within the scope of discriminant validity. When Table 3 is examined, it is seen that the HTMT is less than 0.90 and meets the desired criteria. (Henseler et al.,2016; Hair et al.,2017; Sarstedt et al.,2020)**.**

Table 3: Heterotrait-monotrait ratio (HTMT) – Matrix

	Attachment _metaverse	Intention _continuation	Social _ Presence	Technological_self-efficacy
Attachment _metaverse				
Intention _continuation	0,750			
Social _Presence	0,823	0,670		
Technological_self-efficacy	0,612	0,471	0,600	

When Table 4 is examined, it is seen that variables other than service provider continuance intention and social presence meet the condition that the relationship between the two constructs is less than 1 and the square root of the explained variance value is greater than the highest correlation value between the dimensions (Hair et al.,2014; Iacobucci et al.,1995). The measurement model has discriminant validity.

Table 4: Fornell-Larcker Criterion

	Attachment metaverse	Intention continuation	Social Presence	Technological_self-efficacy
Attachment _metaverse	0,863			
Intention _continuation	0,652	0,957		
Social _Presence	0,680	0,588	0,797	
Technological_self-efficacy	0,521	0,434	0,537	0,820

Structural Model

Table 5 displays the modeled relationships, path coefficients, p-values, VIF, f-square, and t-statistics. Upon analyzing Table 5, H5 ($\beta = 0.469$, $T = 7.120$, $p < 0.01$) confirmed that attachment to metaverse positively affects continuance intention. H3 ($\beta = 0.469$, $T = 13.965$, $p < 0.01$) confirmed that social presence positively

affects attachment to metaverse. H4 (β = 0.269, T = 4.787, p < 0.01) confirmed that social presence positively influences continuance intention. H2 (β = 0.219, T = 5.650, p < 0.01) confirmed that technological self-efficacy positively affects metaverse attachment. H1 (β = 0.537, T = 12.477, p < 0.01) confirmed that technological self-efficacy positively impacts social presence. Furthermore, the explanatory power of these factors is evident when evaluated according to their descriptive power (R^2) values. When R^2 ratios are examined, social presence and technological self-efficacy explain 0.496 of the metaverse attachment rate. 0.464 of the intention to continue in the metaverse is explained by attachment to the metaverse. Similarly, the concept of technological self-efficacy explains 0.288 of the social presence.

Table 5: Path Analysis

	β	VIF	*f*2	T	P	Result
H5: Attachment _metaverse -> Intention _continuation	0,469	1,859	0,220	7,120	0,000	Supported
H3: Social _Presence -> Attachment _metaverse	0,469	1,405	0,446	13,965	0,000	Supported
H4: Social _Presence -> Intention _continuation	0,269	1,859	0,073	4,787	0,000	Supported
H2: Technological_self-efficacy -> Attachment _metaverse	0,219	1,405	0,068	5,650	0,000	Supported
H1: Technological_self-efficacy -> Social _Presence	0,537	1,000	0,405	12,477	0,000	Supported

In the study, the Bootstrap Method was utilized to test the mediating relationships. The bootstrap method is essential for testing mediating relationships because it calculates confidence intervals and effect sizes more accurately. The bootstrapping of 5,000 subsamples is a well-established statistical technique that ensures the robustness of results and the accuracy of confidence intervals and significance tests. This method is frequently employed in hypothesis testing, especially in complex models such as PLS-SEM, where the conventional assumptions about data distributions may be violated (Hayes, 2013; Preacher and Hayes, 2008; Hair et al., 2014).

To establish a mediating relationship, it is necessary to follow a path from the independent variable to the mediator and from the mediator to the dependent variable. In this study, the mediation hypotheses were constructed as H1A, H1B, H1C, H1D, and H3A. According to Table 6; β = 0.302 β = 0.145, β = 0.263, β = 0.103, β = 0.141 p < 0.01).

Table 6: Mediating Effects

Indirect effect results	Specific indirect effects	SD	T	LLCI	ULCI	P values	Result
H1D: Technological_self-efficacy -> Social _Presence -> Attachment _metaverse	0,302	0,034	8,969	0,239	0,37	0,000	Supported
H1C: Technological_self-efficacy -> Social _Presence -> Intention _continuation	0,145	0,034	4,218	0,084	0,217	0,000	Supported
H3A: Social _Presence -> Attachment _metaverse -> Intention _continuation	0,263	0,042	6,322	0,184	0,348	0,000	Supported
H1A: Technological_self-efficacy -> Attachment _metaverse -> Intention _continuation	0,103	0,026	3,969	0,055	0,159	0,000	Supported
H1B: Technological_self-efficacy -> Social _Presence -> Attachment _metaverse -> Intention _continuation	0,141	0,026	5,473	0,094	0,198	0,000	Supported

Conclusion and Discussion

The metaverse development is expected to become a crucial marketing tool to drive change by advancing the virtualization of our everyday lives. This study contributes to the growing metaverse and marketing research.

When the study results were analyzed, the H1 hypothesis was supported. Technological self-efficacy metaverse positively affects social presence. The mediating effects of social presence and attachment to the metaverse were confirmed. The H2 hypothesis is supported. Technological self-efficacy positively affects metaverse attachment. The study's results are similar to those of the studies conducted in the literature. In the studies, Anwar et al.(2024) concluded that technological self-efficacy affects digital technology, Kim et al. (2023) concluded that social presence affects avatar use, Waheed Khan (2022) concluded that openness to experience new technologies affects the intention to use metaverse.

Additionally, in the literature (Bandura, 1997; Venkatesh et al., 2003), it is suggested that individuals' confidence and competence in technologies play a decisive role in their decisions to adopt and use these technologies. The results show that new-generation technologies, such as metaverse platforms, are essential in determining the extent to which users can connect to these technologies. It is expected that individuals with high technological self-efficacy will tend to be more willing and successful in connecting to the metaverse, which is consistent with the findings of the research.

Hypotheses H1A, H1B, H1C, and H1D, in which mediating relationships were examined, were also confirmed. Yoon and Nam (2024), in their study investigating metaverse experience and travel decisions, found that social presence and platform engagement have an impact on behavioral intention and intention to use, Sun and Guo (2024) found that social presence has an impact on intention to rejoin and emotional involvement mediate the effect of ease of use and usefulness on intention to rejoin, Kim et al.,(2023) The impact of actual and persona self congruence of metaverse users on luxury brand loyalty and the effect of luxury brand loyalty on attitudes towards luxury brands and purchase intention, Safitri et al.,(2024) SMEs' marketing strategies in virtual worlds as metaverse user experience, customer loyalty, and brand awareness. Based on this result, it is seen that metaverse applications of businesses towards the consumer segment with high technological self-efficacy can improve their behaviors, such as brand, product, firm loyalty, etc. Firms can implement such activities for groups with high technological self-efficacy. Determining the motivations of consumers with different regional/cultural and demographic characteristics towards the virtual world, which is thought to affect businesses in the future, is considered as a difference provided by this research.

Hypothesis H3 and H3A are supported. Social presence has a positive effect on metaverse attachment. Hypothesis H4 is supported. Social presence attachment in the metaverse has a positive effect on the intention to continue with the metaverse. Social presence has an impact on metaverse attachment and continuance intention. The study's results are similar to those of the studies conducted in the literature. Similar to the results of the studies, Liu and Park (2023) found that social presence has an effect on attitude and intention within the framework of the technology acceptance model, Zhang and Wang (2023) found that social presence and interaction affect image development and intention to visit, Oh et al.(2023) found that social presence in metaverse supports interaction in metaverse. Lee et al.(2024) concluded that social identity and social presence impact the intention to use. Social presence is a factor that enables individuals to feel a sense of community and

belonging by interacting with other users in the virtual world. The findings of this study show that social presence affects metaverse connectivity and shapes continuation intention. In virtual environments, people meet the need for not only personal experience but also acceptance and interaction within the community. In this context, a more substantial social presence on metaverse platforms can increase users' commitment to the platform and their desire to continue there. In addition, users' experiences with social interaction significantly shape their intent to remain on a platform. The sense of social presence can enhance users' commitment to the platform and extend their use duration as the interaction level increases. This finding indicates that social experiences in the metaverse boost individuals' time on the platform and their interactions within it. On platforms that emphasize social interactions, such as the metaverse, users' perception of social interaction can elevate their long-term usage decisions and loyalty.

Hypothesis H5 is supported. Attachment to metaverse positively affects the intention to continue metaverse. The results of the study are similar to the results of the studies conducted in the literature. Similar to the results of the research, Bousba and Arya (2022) found that participation affects satisfaction, Balakrishnan et al.(2024) found that metaverse experience affects intention to continue, Dwivedi et al.(2024) found that experience affects intention to continue, Oleksy et al.(2023) found that attachment affects intention to use metaverse, Jet al. al,(2023) found that perceived benefit affects intention to continue using, Mehrotra et al.(2024) found that virtual engagement affects metaverse retailer consumer experience, Shin et al.(2024) found that experience affects intention to use. Attachment refers to how much a customer is connected to a platform and lives there. Attachment and intention to continue metaverse are directly linked to the quality and sustainability of the experience they have on the platform. This finding suggests that the process by which users connect to the metaverse shapes their long-term usage intention, which will strengthen their loyalty to the platform.

The theories discussed in the study support the results obtained in the research. According to technology affordance theory, the opportunities offered by technology, combined with the user's competence and context, lead to certain behaviors. The theory provides a suitable framework for understanding metaverse use. Technological self-efficacy and social presence affect the way users perceive the opportunities offered by the metaverse, allowing them to connect to the metaverse and continue to use these platforms. Stimulus-Organism-Response (S-O-R) Theory, on the other hand, causes a stimulus (S) to affect an individual's internal state or cognitive-emotional organism (O) and lead to a reaction (R). It provides a strong framework for understanding why users connect to these platforms and continue to use them in the context of the metaverse. Technological self-efficacy and social presence act as stimuli (S) that enable users to have positive experiences in the metaverse. These stimuli affect users' decisions to continue to use metaverse platforms (R) through metaverse attachment (O), causing the process to work holistically.

Since today's marketing activities require continuity, this continuity is also important in the metaverse world. In order to compete effectively in the metaverse world, it is necessary to determine the variables that affect continuation intention. This research reveals that the concepts of technological self-efficacy and social presence play a critical role in understanding and strengthening user engagement on metaverse platforms. Social interaction experiences have a significant impact on the time individuals spend on the platform and their engagement with the platform. These findings suggest the integration of social and technological factors to optimize the user experience of digital platforms such as the metaverse.

Theoretical, Managerial, and Economic Implications

This research contributes to marketing-oriented metaverse studies in several ways. The study develops and tests a framework to explain consumers' continuance intentions by bringing together concepts such as metaverse technological self-efficacy, social presence, and metaverse attachment within the framework of SOR theory and technology affordance theory. First, it was observed that technological self-efficacy and social presence in the metaverse of consumer users have a positive impact on engagement. This research makes several contributions to understanding the determination of users' behavior from a metaverse and marketing perspective. It extends existing research on consumer behavior in the context of the metaverse. The findings show how technological self-efficacy and social presence of sites can adopt metaverse virtual technologies to promote metaverse engagement and, consequently, continuation intentions. Further work could be done to identify the context and conditions under which a consumer's continuance intentions are reinforced by technological self-efficacy, social presence, and metaverse attachment. The results are theoretically essential and contribute to the expansion of existing research.

This study identifies several managerial implications for the metaverse and marketing. It reveals that the game-based metaverse helps customers develop a social presence and attachment to the metaverse, influencing their intentions to stay. The study results show that users can more easily switch to metaverse virtual environments. It is seen that building metaverse platforms that give practitioners a sense of social presence will make it easier to attract consumers to virtual platforms. Therefore, practitioners need to determine what kind of social presence they create in the metaverse due to the positive effect of social presence on metaverse engagement and intention to continue. It is recommended that potential users connect to the metaverse more easily. Practitioners should recognize the importance of customer/brand relationships and intentions to continue and strive to foster these relationships. However, they should also consider the importance of interacting with the metaverse. Therefore, by engaging with the customer through the metaverse and encouraging their participation, they can increase brand loyalty and continuance intentions. This is an effective way to enrich the customer experience and build a strong relationship between the customer and the brand by fully utilizing the potential of the metaverse. This effort can provide a competitive advantage and increase customer loyalty across a variety of industries.

Since the metaverse is a rapidly growing digital marketplace, such research can help platform operators make strategic decisions to gain an economic competitive advantage. Increasing social interactions and improving users' technological skills allow platforms to achieve financial gains by ensuring user loyalty and long-term user engagement. In addition, users spending more time in the metaverse and interacting more with the platform can positively affect the platforms' revenue model. Various sources of income can be created from an economic perspective, such as advertising revenues, subscription systems, and content creation opportunities. Economic growth can be achieved as users' interest in metaverse experiences increases.

Limitations of the study and future research opportunities

This research has some limitations that can be suggested for future studies. First, the current research focuses on games in the metaverse. However, other platforms within the metaverse and different experience periods have not yet been examined. Therefore, it is recommended that our research be expanded to include various platforms and experience periods in future studies. Second, the study was conducted in only one country. It was conducted on a specific group (participants studying at a university). No comparison was made by considering the departments or branches at the university. This situation limits the generalizability of the

findings to the general population. Because individuals with different demographic characteristics may have different metaverse experiences, further research in various cultural contexts is recommended, and the model should be tested in other countries where virtualization is increasing. Third, the research used technological self-efficacy, social presence, attachment, and continuation intentions. As a result, future studies should utilize other factors, such as attitude/experience towards the metaverse. Fourth, digital platforms like the metaverse are constantly evolving and changing environments. The research was conducted at a specific point in time. However, participants' continuation intentions and attachment behaviors may change over time. The fact that the research is based on a cross-sectional design may prevent observation of changes that will occur in the long term. Therefore, longitudinal studies are recommended in future studies.

References

Alkan, N., Tan, A., & Armutcu, B. (2023). A Research on the Evaluation of Metaverse World in Terms of Consumer Purchasing Behaviors, *VI. ASC Fall Congress*,136-143.

Anwar, C., Sofyan, H., Ratnaningsih, N., & AM, M. A. (2024). Digital technology practices for vocational teachers in the industrial revolution 4.0: Mediating technology self-efficacy. *Journal of Pedagogical Research*, *8*(1), 172-190.

Balakrishnan, J., Das, R., Alalwan, A. A., Raman, R., & Dwivedi, Y. K. (2024). Informative and peripheral metaverse: Which leads to experience? An investigation from the viewpoint of self-concept. *Computers in Human Behavior*, *156*, 108223.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* W.H. Freeman.

Berber, Ş. (2023). Metaverse and Businesses: Current Practices-Future Scenarios. *Journal of Anadolu University Faculty of Economics and Administrative Sciences, 24*(3), 598-631.

Boo, C., & Suh, A. (2024). Developing scales for assessing metaverse characteristics and testing their utility. *Computers in Human Behavior Reports*, *13*, 100366.

Bousba, Y., & Arya, V. (2022). Let's connect in metaverse. Brand's new destination to increase consumers' affective brand engagement & their satisfaction and advocacy. *Journal of Content Community Communication*, *14*, 276-293.

Bozkurt, S., Gligor, D., Locander, J., & Rather, R. A. (2023). How social media self-efficacy and social anxiety affect customer purchasing from agile brands on social media. *Journal of Research in Interactive Marketing*, (ahead-of-print).

Chakraborty, D., Polisetty, A., & Rana, N. P. (2024). Consumers' continuance intention towards metaverse-based virtual stores: A multi-study perspective, *Technological Forecasting and Social Change*, *203*, 123405.

Chen, H. J. (2023). Gather in the metaverse: Learning outcomes, virtual presence, and perceptions of high-and low-achieving pre-service teachers of English as a Foreign Language. *Education and Information Technologies*, 1-29.

Çelikkol, Ş. (2022). Evaluation of the Metaverse World in terms of Consumer Purchasing Behavior. *Istanbul Kent University Journal of Human and Social Sciences*, 3(1), 64-75.

Davies, C., & Jung-a, S. (2022). Asia's largest metaverse platform Zepeto ramps up global expansion. *Tersedia dalam Talian: https://www.ft.com/content/14c88e84-f3c8-485e-a9df-31ead34e48f0.*

Dwivedi, Y. K., Balakrishnan, J., Mishra, A., De Bock, K. W., & Al-Busaidi, A. S. (2024). The role of embodiment, experience, and self-image expression in creating continuance intention in the metaverse. *Technological Forecasting and Social Change*, *203*, 123402.

Efron, B., & Tibshirani, R. J. (1993). *An Introduction to the Bootstrap.* Chapman & Hall/CRC.

Erçin Yurcu, M. (2023). Pazarlama ve Dijital Teknolojiler: Uygulama Örnekleri, Sentez ve Araştırma Ajandası in Pazarlamanın Dijital Dönüşümü: Pazarlama 5.0.Fettahoğlu, H. S. (ed), Bilginer Özsaatcı, F. G. (ed) (2023). Özgür Publications. DOI: https://doi.org/10.58830/ozgur.pub254. License: CC-BY-NC 4.0

Fokides, E. (2023). Development and testing of a scale for examining factors affecting the learning experience in the Metaverse. *Computers & Education: X Reality*, *2*.

Fornell, C., & Larcker, D. F. (1981). *Evaluating Structural Equation Models with Unobservable Variables and Measurement Error.* Journal of Marketing Research, 18(1), 39-50.

Ghali, Z., Rather, R. A., & Khan, I. (2024). Investigating metaverse marketing-enabled consumers' social presence, attachment, engagement and (re)visit intentions. *Journal of Retailing and Consumer Services*, *77*, 103671.

Ghasemy, M., Teeroovengadum, V., Becker, J.-M., & Ringle, C. M. (2020). This Fast Car Can Move Faster: A Review of PLS-SEM Application in Higher Education Research. *Higher Education*, 79(5), 1045-1069.

Gil-Cordero, E., Maldonado-López, B., Ledesma-Chaves, P., & García-Guzmán, A. (2024). Do small-and medium-sized companies intend to use the Metaverse as part of their strategy? A behavioral intention analysis. *International Journal of Entrepreneurial Behavior & Research*, *30*(2/3), 421-449.

Güler, G., & Zeren, D. (2024). Metaverse: Bibliometric Analysis of National Literature. *Academic Sensitivities*, *11*(24), 599-623.

Hair et al. (2017): Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. SAGE Publications.

Hair Jr, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European Business Review*, *26*(2), 106-121.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate Data Analysis* (8th ed.). Cengage Learning.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2014). *A primer on partial least squares structural equation modeling (PLS-SEM)*. SAGE Publications.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (3rd ed.). Sage Publications.

Hayes, A. F. (2013). *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach.* The Guilford Press.

Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: updated guidelines. *Industrial management & data systems*, *116*(1), 2-20.

Hooper, A. (2008). A multi-temporal InSAR method incorporating both persistent scatterer and small baseline approaches. *Geophysical Research Letters*, *35*(16).

https://www.statista.com/statistics/1295784/metaverse-market-size/

Iacobucci, D., Ostrom, A., & Grayson, K. (1995). Distinguishing service quality and customer satisfaction: the voice of the consumer. *Journal of consumer psychology*, *4*(3), 277-303.

Jayawardena, N. S., Thaichon, P., Quach, S., Razzaq, A., & Behl, A. (2023). The persuasion effects of virtual reality (VR) and augmented reality (AR) video advertisements: A conceptual review. *Journal of Business Research*, *160*, 113739.

Jo, H. (2023). Tourism in the digital frontier: A study on user continuance intention in the metaverse. *Information Technology & Tourism*, *25*(3), 307-330.

Jung, T., Cho, J., Han, D. I. D., Ahn, S. J. G., Gupta, M., Gopal, D., ... & Tom Dieck, M. C. (2024). Metaverse for service industries: Future applications, opportunities, challenges and research directions. *Computers in Human Behavior*, 108039.

Kaynar, K. E., & Marangoz, A. Y. (2023). The Relationship of Consumer Mobile Self-Efficacy and Online Consumer Comments with Online Purchase Intention. *Journal of Anadolu University Faculty of Economics and Administrative Sciences, 24*(4), 287-309.

Khan, S. W., Raza, S. H., & Zaman, U. (2022). Remodeling digital marketplace through Metaverse: A multi-path model of consumer neuroticism, parasocial relationships, social media influencers credibility, and openness to Metaverse experience. *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, *16*(3), 337-365.

Kim, D. Y., Lee, H. K., & Chung, K. (2023). Avatar-mediated experience in the metaverse: The impact of avatar realism on user-avatar relationship. *Journal of Retailing and Consumer Services*, *73*, 103382.

Kim, J., & Bae, J. (2023). Influences of persona self on luxury brand attachment in the Metaverse context. *Asia Pacific Journal of Marketing and Logistics*.

Kock, N., & Hadaya, P. (2018). Minimum sample size estimation in PLS-SEM: The inverse square root and gamma-exponential methods. *Information systems journal*, *28*(1), 227-261.

Koç, F. N. (2023). *Opportunities and limitations of digital marketing to the metaverse phenomenon: An examination of the textile industry* (Master's thesis, Istanbul Gelisim University Graduate School of Education).

Lee, M., Min, K. Z. L., & Kim, S. H. (2024). Does the Experience of Using Metaverse Affect the Relationship between Social Identity, Psychological Ownership, and Engagement?

Liu, H., & Park, K. S. (2024). Exploring the impact of metaverse tourism experiences on actual visit intentions: An integrated model of presence, the Technology Acceptance Model, and the Theory of Planned Behavior. *International Journal of Tourism Research*, *26*(1), e2616.

Lo, F. Y., Su, C. Y., & Chen, C. H. (2024). Identifying Factor Associations Emerging from an Academic Metaverse Event for Scholars in a Postpandemic World: Social Presence and Technology Self-Efficacy in Gather. Town. *Cyberpsychology, Behavior, and Social Networking*, *27*(1), 19-27.

Mehrotra, A., Agarwal, R., Khalil, A., Alzeiby, E. A., & Agarwal, V. (2024). Nitty-gritties of customer experience in metaverse retailing. *Journal of Retailing and Consumer Services*, *79*, 103876.

Netemeyer, R. G., Bearden, W. O., & Sharma, S. (2003). *Scaling procedures: Issues and applications*. Sage Publications.

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric Theory* (3rd ed.). McGraw-Hill.

Oh, H. J., Kim, J., Chang, J. J., Park, N., & Lee, S. (2023). Social benefits of living in the metaverse: The relationships among social presence, supportive interaction, social self-efficacy, and feelings of loneliness. *Computers in Human Behavior*, *139*, 107498.

Oleksy, T., Wnuk, A., & Lassota, I. (2023). Attachment to real-world places and willingness to migrate to metaverse virtual worlds. *Journal of Environmental Psychology*, *92*, 102161.

Pal, D., & Arpnikanondt, C. (2024). The sweet escape to the metaverse: Exploring escapism, anxiety, and virtual place attachment. *Computers in Human Behavior*, *150*, 107998.

Payal, R., Sharma, N., & Dwivedi, Y. K. (2024). Unlocking the impact of brand engagement in the metaverse on Real-World purchase intentions: Analyzing Pre-Adoption behavior in a futuristic technology platform. *Electronic Commerce Research and Applications*, *65*, 101381.

Preacher, K. J., & Hayes, A. F. (2004). *SPSS and SAS procedures for estimating indirect effects in simple mediation models.* Behavior Research Methods, Instruments, & Computers, 36(4), 717-731.

Preacher, K. J., & Hayes, A. F. (2008). *Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models*. *Behavior Research Methods*, 40(3), 879-891.

Rane, N., Choudhary, S., & Rane, J. (2023). Metaverse for Enhancing Customer Loyalty: Effective Strategies to Improve Customer Relationship, Service, Engagement, Satisfaction, and Experience. *Service, Engagement, Satisfaction, and Experience.*

Safitri, A., Husin, N., Arifah, I. D. C., Dewi, R. S., Kharisma, F., & Kautsar, A. (2024). Metaverse User Experience, Customer Engagement, and Brand Awareness Relation as SMEs Marketing Strategies in Virtual Worlds. In *2024 ASU International Conference in Emerging Technologies for Sustainability and Intelligent Systems (*1092-1096).

Salvador, F., Rungtusanatham, M. J., & Montanez, J. P. M. (2015). Antecedents of mass customization capability: Direct and interaction effects. *Transactions on Engineering Management*, *62*(4), 618-630.

Sarstedt, M., Ringle, C. M., Cheah, J. H., Ting, H., Moisescu, O. I., & Radomir, L. (2020). Structural model robustness checks in PLS-SEM. *Tourism Economics*, *26*(4), 531-554.

Shin, S., Koo, C., Kim, J., & Gursoy, D. (2024). Effects of metaverse experience on behavioral intention of visitors: moderating role of similarity between virtual and real experience. *International Journal of Contemporary Hospitality Management*.

Sun, H., & Guo, R. (2024). The Effect of Metaverse Concert Characteristics on User Re-Participation Intention: A Combination of the ETAM and the SPICE Model. *International Journal of Human-Computer Interaction*, 1-14.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). *User acceptance of information technology: Toward a unified view.* MIS quarterly, 27(3), 425-478.

Vo-Thanh, T., Zaman, M., Hasan, R., R., Rather, R. A., Lombardi, R., & Secundo, G. (2021). How a mobile app can become a catalyst for sustainable social business: The case of Too Good To Go. *Technological Forecasting and Social Change*, *171*, 120962.

Yoon, S., & Nam, Y. (2024). Metaverse engagement and Korea travel intentions: Understanding affordances, presence, and place attachment among Brazilian ZEPETO users. *Journal of Destination Marketing & Management*, *31*, 100865.

Yung, R., Le, T. H., Moyle, B., & Arcodia, C. (2022). Towards a typology of virtual events. *Tourism Management*, *92*, 104560.

Zarouali, B. (2024). People's Intentions to Use Metaverse Technology: Investigating the Role of Gratifications and Perceptions. *Presence: Virtual and Augmented Reality*, 1-14.

Zhang, W., & Wang, Y. (2023). An empirical study of the impact of metaverse storytelling on intentions to visit. *Information Technology & Tourism*, *25*(3), 411-432.

Zhou, L. (2022). Metaverse statistics 2022: Market size, users, and industry growth. Luisa Zhou https://www.luisazhou.com/blog/metaverse-statistics/.