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Metaverse: Exploring the impact of Perceived Proximity, Reciprocity, and Intimacy on Consumer Purchase Intention in Virtual and Traditional Shopping Environments

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Academic Year 2023/2024

A Giacomo, l’amico che tutti avrebbereo voluto, che con la sua
energia riusciva sempre a dare vita ad ogni momento.
Il tuo ricordo continua a ispirarmi ogni giorno.

A Mamma e Papà, per il loro amore incondizionato,
il sostegno continuo e per aver creduto sempre in me.
Ogni passo di qusto percorso è stato possibile grazie a voi.
Ogni tragurdo raggiunto è anche il vostro.

Exploring the Impact of Perceived Proximity, Reciprocity, and Intimacy on Consumer Purchase Intention Across Virtual and Traditional Shopping Environments

ABSTRACT

With the rise of immersive digital environment and the evolution of the consumer behavior in the context of the 4.0 industrial revolution, the Metaverse has become a key area of interest for various industries. This research attempts to analyzes the impact of perceived proximity, reciprocity, and intimacy on consumers' purchase intention in three distinct purchase environments: a virtual metaverse, a television broadcast, and a conference. By exploring how these psychological constructs shape consumer behavior in various purchase contexts, the research aims to provide a deeper understanding of the factors that drive purchase intention. In addition, the study examines the potential moderating role of social presence, focusing on how social interaction within each environment influences consumer perceptions and decision-making processes. This research adopts a quantitative approach, through scenario-based surveys, with a sample of 195 respondents, randomly assigned to one of the three scenarios. The study test multiple hypothesis using correlation and multiple regression analysis, including the moderating effect of social presence. Statistical methods were applied using SPSS to analyze the relationships between the independent variables (perceived Intimacy, Perceived Proximity, Perceived Reciprocity) and the dependent variable (Purchase Intention) across the three scenarios. This research provides insights into the evolving dynamics of consumer engagement in both virtual and traditional shopping experiences, offering valuable implications for companies seeking to improve customer relationships and marketing strategies across multiple platforms. This study contributes to the growing literature on consumer behavior in virtual environments by empirically examining the effects of psychological and social factors on purchase intention. It highlights the importance of perceived proximity and reciprocity as key drivers of consumer engagement in different contexts and offers practical guidance for leveraging these factors to improve marketing strategies in both virtual and real-world contexts.

Keywords: Metaverse, Consumer Behavior, Purchase Intention, Intimacy, Proximity, Reciprocity, Social presence

INTRODUCTION

The metaverse represents one of the latest innovations in the field of communication, characterized by its revolutionary potential to redefine the modes of interaction among individuals and to influence a wide range of social, economic, and cultural contexts. This emerging phenomenon promises to deeply permeate the fabric of society, transforming not only interpersonal communication but also the dynamics of work, learning, entertainment, and commerce. In recent years, the concept of the metaverse has rapidly captured the imagination of both technology enthusiasts and business leaders alike, emerging as a transformative force in the digital landscape. Rooted in science fiction and popularized by visionary authors such as Neal Stephenson in his seminal novel "Snow Crash" (1992), in which the characters become avatars and work in a 3-dimensional (3D) virtual reality, and this 3D virtual reality is called the metaverse. the metaverse has evolved from a speculative concept to a tangible reality with profound implications for various facets of society (Stephenson, 1992).

For instance, Matthew Ball describes the metaverse as a continuous and interconnected system of 3D virtual realms, poised to become the primary access point for online activities while also influencing various aspects of the physical world (Ball, 2022). Previously confined to the realms of science fiction and gaming, these concepts are now on the brink of transforming numerous industries and functions, ranging from finance and healthcare to education, consumer goods, urban development, dating, and beyond.

The unprecedented growth and expansion of the metaverse have been driven by advancements in technology and shifting consumer behaviors. With the advent of augmented reality (AR), virtual reality (VR), mixed reality (MR), and other cutting-edge technologies, the boundaries between the physical and digital worlds are becoming increasingly blurred. This convergence of technologies has paved the way for the creation of virtual environments that offer users persistent, immersive experiences transcending traditional limitations.

From virtual meetings to social gatherings, from immersive gaming experiences to virtual commerce, the metaverse is reshaping the way we work, play and connect in the digital age, enabling companies to engage consumers in more meaningful and personalized ways.

The growing literature on virtual environments and digital interactions provides a solid foundation for understanding how the metaverse affects consumer behavior.

For example, intimacy has been identified as a key factor influencing purchase decisions in social commerce (Lee Y, 2011). Intimacy fosters emotional closeness and trust, which can lead to stronger purchase intentions when consumers feel connected to a brand or vendor, even in virtual spaces (McKinsey & Company, 2023). In addition, perceived proximity, often conceptualized as psychological distance, has been shown to affect how consumers perceive virtual products. Technologies such as AR have helped reduce psychological distance by creating immersive product experiences that improve consumer engagement (Joerß, 2021). Finally, reciprocity-direct or generalized-plays a significant role in virtual commerce by fostering trust and cooperative behavior between consumers and brands (Bagozzi, 1995).

Despite the substantial body of research, exploring various aspects of virtual interaction and online commerce, several key gaps remain in understanding consumer behavior across distinct purchase environment. It's impotant to study the consumer behavior through three distinct scenarios, because environmental cues can significantly influence a person's emotional state, subsequently influencing his or her behavior in terms of adoption or avoidance (Abumalloh, 2024). This study aims to fill the gaps by providing a comparative analysis of the three scenarios, focusing on psychological variables of perceived intimacy, reciprocity and intimacy, while also exploring the potential moderating role of social presence, focusing on how social interaction within each environment influences consumer perceptions and decision-making processes.

The Stimulus-Organism-Response (SOR) model is widely used to explain how environmental cues influence internal processes and ultimately behavioral responses (Mehrabian & Russell, 1974). According to this model, external cues, such as visual displays or interactions with avatars in virtual shopping environments, act as stimuli that influence the organism-represented by cognitive, emotional, and perceptual processes-that then leads to a behavioral response, such as the purchase decision (Abumalloh, 2024).

In summary, this study aims to investigate the extent to which perceived intimacy, reciprocity and proximity influence purchase inttention across three distinct shopping enviromens: a virtual Metaverse, Television shopping experience and a conference product presentation. Additionally, the study will explore the moderating role of social presence in these relationships, offering valuable insights into how social interactions with each scenario shapes consumers' perceptions and decision-making processes. The results of this study will have practical and theoretical implications for companies' approaches to digital marketing and consumer engagement in evolving virtual environments such as the metaverse.

This Study is structured as follows: Section 1 provides an in-depth exploration of the metaverse, augmented reality (AR) and virtual reality (VR), emphasizing their role in reshaping consumer experiences. Section 2 presents a comprehensive literature review, discussing key psychological constructs such as intimacy, reciprocity, proximity and social presence in virtual environments. Section 3 outlines the research methodology, detailing the design of three distinct shopping scenarios and the data collection process. Section 4 presents the results of the study, and Section 5 concludes with a discussion of the practical and theoretical implications, offering insights into how companies can leverage these psychological factors in digital marketing strategies.

Chapter 1: Metaverse

1.1 Metaverse

The term "metaverse," derived from the Greek prefix "meta" meaning "beyond," underscores the expansive possibilities for growth and exploration within the virtual realm. Initially popularized by Neal Stephenson's groundbreaking novel "Snow Crash" in 1992, the metaverse concept envisaged a 3-dimensional (3D) virtual reality where characters engage as avatars in immersive digital environments (Stephenson, 1992).

This visionary narrative not only captivated imaginations but also hinted at the transformative potential of virtual worlds.

In 2003, inspired by "Snow Crash," a group of software developers created Second Life, an online virtual world where users can create avatars and interact within a variety of virtual spaces. Second Life was developed before the widespread adoption of smartphones and lost

some of its appeal as it could not provide real-time interactions or support mobile devices. Despite this, it served as an early precursor to the concept of the metaverse, demonstrating the possibilities of virtual worlds for social interaction and creativity (Hollensen, 2022).

One of the first theoretical definition of Metaverse was put forward by Matthew Ball, who has defined it as a continuous and interconnected system of 3D virtual realms, poised to become the primary access point for online activities while also influencing various aspects of the physical world (Ball, 2022). Previously confined to the realms of science fiction and gaming, these concepts are now on the brink of transforming numerous industries and functions, ranging from finance and healthcare to education, consumer goods, urban development, dating, and beyond (Ball, 2022).

The emergence of immersive environments and virtual reality technologies has reshaped the landscape of technology and digital innovation. Among the first sectors to be impacted by this new transformative wave is certainly the technology sector. The strategic maneuvers undertaken by tech giants such as Meta, Microsoft, and Nvidia, each of which positions itself as a pioneer in the dynamic landscape of the evolving metaverse ecosystem, serve as compelling evidence of this paradigm shift.

In 2021, Mark Zuckerberg made a bold announcement, signaling a significant shift in his company's direction. Facebook was set to pivot towards prioritizing the "metaverse", reflecting a strategic vision aimed at integrating virtual and augmented reality technologies to shape a new online domain (Kelly, 2021).

Microsoft, as well, made significant strides in the immersive environment sector with its acquisition of gaming giant Activision Blizzard in 2022 (Microsoft. , 2022).

Moreover, they introduced virtual presence and shared experiences through mixed reality applications in their widely-used Microsoft Teams platform with Mesh (Roach, 2021; Zallio, 2022).

Nvidia, on the other hand, championed the concept of the omniverse, an extensible open platform geared towards virtual collaboration and real-time, physically accurate simulation. This platform facilitates connectivity among major design tools, assets, and projects, allowing creators, designers, researchers, and engineers to collaborate seamlessly in shared virtual spaces (Mendizabal, 2022).

As interest in this technology continues to surge and the market shows increased enthusiasm, numerous companies, including Meta, Microsoft, and Nvidia, have articulated their respective visions for the future of the metaverse. While some conceptualize the metaverse as a collection of interconnected digital realms, offering immersive 3D experiences that enable seamless navigation (Zallio, 2022), others envision it as a gaming-centric platform with applications spanning entertainment, work, and social interactions (Waters, 2022).

In the luxury and fashion industry emerges the case of Gucci, which has engaged in numerous activations to determine the optimal methods and platforms to connect with Generation Z. Notably, Gucci garnered significant attention last year by unveiling a digital replica of its iconic Gucci Garden on the popular gaming platform Roblox, attracting an impressive 19.9 million visitors over a two-week period (Marr, 2022). This proactive approach mirrors a broader trend observed among brands, as they anticipate the potential for direct-to-avatar sales in the emerging metaverse landscape. Although direct sales may not yet dominate this space, the market for virtual goods sold directly to avatars is already valued at $54 billion, prompting forward-thinking brands to explore innovative avenues for revenue generation. Noteworthy examples include Gucci's digital rendition of its Dionysus bag, priced at $4,115, underscoring the brand's commitment to embracing virtual commerce. Similarly, Nike's exploration of unique non-fungible tokens (NFTs) with its Nike Cryptokicks initiative reflects a forward-looking approach to virtual product offerings. As brands increasingly prepare for the metaverse's impact on consumer behavior, we anticipate a rise in metaverse-to-offline opportunities, such as Chipotle's recent initiative to offer real-life rewards for digital currency spent in its metaverse restaurant on Roblox (Hazan, 2022).

The virtual spaces, created by digital technologies, represents a convergence of physical and digital realities, offering users persistent and immersive experiences that transcend traditional boundaries (GSMA, 2022). One of the defining characteristics of the Metaverse is its device-agnostic nature, allowing access from a wide range of platforms including tablets, smartphones, and head-mounted displays. This accessibility ensures that users can seamlessly transition between different devices while remaining immersed in the virtual

environment. Furthermore, the Metaverse harnesses an array of cutting-edge technologies to enhance user experiences. From virtual reality and augmented reality to emerging payment systems such as Non-Fungible Tokens (NFTs) and cryptocurrencies, the Metaverse offers a multifaceted digital landscape (GSMA, 2022). Additionally, features like chatbots, digital avatars, and digital assistants contribute to the interactive nature of the Metaverse, enabling users to engage with each other and navigate virtual spaces with ease. Central to the vision of the Metaverse is the concept of Web3.0, which integrates 3D graphics, blockchain technology, and artificial intelligence to create a more immersive and interconnected digital environment (GSMA, 2022).

The upcoming era of the internet aims to close the divide between offline and online encounters, granting users the physical sensations of real-world interactions while enjoying the benefits of digital connectivity. Essentially, the Metaverse signifies a fundamental change in how people engage with digital surroundings, hinting at a future where distinctions between physical and digital realms become less defined. As both businesses and individuals delve into the potential of this emerging platform, the Metaverse holds the potential to transform how we engage in work, leisure, and social connections in the digital age (Payala, 2024). However, to fully realize this potential, the metaverse relies heavily on robust high-speed internet infrastructure. Since then, this speculative idea has evolved into a tangible reality, with profound implications across various facets of society.

1.2 Virtual Reality, Augmented Reality and Mixed reality

The Metaverse represents a paradigm beyond reality, that integrates physical reality with digital virtuality. It emerges from the convergence of technologies facilitating multisensory engagements with virtual environments, digital entities, and individuals, including virtual reality (VR), augmented reality (AR) and mixed reality (MR). Extended Reality or Cross Reality (XR) is a broad term that encompasses a variety of immersive technologies; electronic and digital environments in which data is represented and projected. XR includes Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR) (Mystakidis, 2022; Pellas, 2021). Across all these dimensions of XR, individuals engage and interact within a

digital realm that is wholly or partially artificial, crafted through technological means. VR is an alternative, separate, digitally created and artificial environment. In VR, users feel immersed, as if they are in a different world and operate similarly to the physical environment (Slater & Sanchez-Vives, 2016). Through the help of specialized multisensory equipment, such as immersion helmets, VR headphones, and omnidirectional treadmills, this experience is amplified through modes of vision, sound, touch, movement, and natural interaction with virtual objects (Mystakidis, 2022).

Augmented reality (AR) represents a method of enhancing the physical world around us by integrating additional layers of digital information through location-aware systems and interfaces (Smart J, 2007). These interfaces, categorized as Global Positioning System (GPS)-based, marker-based, and see-through-based, facilitate the augmentation of real-world environments (Kye B, 2021). Through the utilization of mobile devices' GPS and Wi-Fi capabilities, AR provides contextual information based on the user's location or recognizes markers such as QR codes to overlay additional information (Arena, Collotta, Pau, & Termine, 2022). Furthermore, AR enables the blending of real-world and virtual graphics in real-time, often through wearable devices like glasses or lenses.

There are many discussions about new realities, that often tend to focus on AR or VR, overlooking what could be the most stimulating type of virtual reality for many businesses: Mixed Reality (MR). The latter represents an intriguing fusion of constructs from the real world and computer-generated constructs, which can be both real and possible. In addition to combining aspects of actual reality - the physical world that surrounds us - with the potential of virtual reality, Mixed Reality combines what is real with what is potentially imaginable. It allows for the experience of new objects or scenarios that would otherwise not exist. For example, imagine adding virtual objects or characters into a live video stream of the real world (Farshid, 2018).

In the healthcare sector, medical mannequins can be animated for training scenarios, contributing to increased empathy among healthcare professionals (DeSouza, 2016).

1.3 NFT, Blockchain and Consumer Trust

Technological innovation is increasingly opening the door to a virtual world, where many of our daily actions are being replaced by their digital counterparts. In the metaverse, blockchain is a key technology to ensure decentralized ownership and security of digital transactions. Thanks to blockchain, users can buy, sell and trade digital goods with the certainty that every transaction is traceable, immutable and verifiable. This is particularly relevant in virtual markets where digital assets, such as avatars, gaming objects or NFTs (non-fungible tokens), are traded. Blockchain not only allows the verification of the authenticity of these goods, but also provides a transparent and secure network for managing their property, minimizing the risk of counterfeiting or fraud.

In a context where virtual interactions are becoming more and more frequent, especially as the metaverse expands, The use of blockchain to certify and track digital assets is revolutionizing how consumers perceive the value of such assets. This is particularly evident in platforms offering NFT, tools that represent the ownership of unique digital assets, and which rely on blockchain to ensure scarcity and authenticity.

Blockchain is a decentralized digital ledger technology that allows data to be stored across multiple nodes in a secure and immutable manner. It was first introduced in 2008 by Nakamoto Satoshi in the context of Bitcoin, but its applications have since expanded to various industries beyond cryptocurrencies (Nakamoto, 2008). At its core, blockchain operates through a series of blocks, each containing a cryptographic hash of the previous block, a timestamp, and transaction data. These blocks form a chain, making it nearly impossible to alter any one block without changing all subsequent blocks, ensuring the security and integrity of the data (Huo, 2022).

Blockchain's relevance to the metaverse lies in its ability to create a trusted, secure, and transparent digital environment where users can interact, trade, and engage in a wide range of activities. In the metaverse, where vast amounts of data and digital assets are exchanged, blockchain provides the backbone for trust. The decentralized nature of blockchain ensures that no single entity has control over the data, enhancing transparency and reducing the risks of fraud or manipulation. This is crucial in a virtual world where users demand security for their digital assets and privacy for their personal data. Blockchain’s role in verifying

ownership, enabling secure transactions, and safeguarding data makes it indispensable for the future development of the metaverse.

However, recent research highlights a challenge: while blockchain is designed to ensure the transmission of transparent and secure information, many consumers perceive product information provided by blockchain as less credible compared to information from human sources (Mazzù, Baccelloni, & Lavini, 2022). This perception is significant because it impacts consumer behavior, including word-of-mouth (WOM) sharing, purchase intention, and actual purchase behavior. An elevated level of transparency is highly valued by consumers, who tend to show an increased willingness to pay when they trust the information provided to them (Van Doorn & C., 2011; Marcketti, 2009). Blockchain technology, with its capabilities for traceability and delivering trustworthy information, can serve as a facilitator in this area (Galvez, Mejuto, & Simal-Gandara, 2018). A well-executed implementation can offer transparent insights into the activities, production processes, and/or supply chains involved in creating a product, coupled with a certification ensuring the data is reliable and tamper-proof (Pun, Swaminathan, & Hou, 2018), thus supporting product lifecycle tracking (Zhang, 2020; Mazzù, Baccelloni, & Lavini, 2022).

A study by Mazzù et al. (2023) demonstrated that consumers tend to trust human-provided information more than blockchain technology. This reduced trust in blockchain-provided data can lead to lower willingness to share information about products on social media and lower purchase intentions (Mazzù, Baccelloni, & Lavini, 2022). Additionally, this effect is particularly strong among consumers with a lower need for cognition, meaning those who are less inclined to engage in thoughtful or effortful cognitive activities when processing information (Puntoni, 2021). These consumers are more likely to trust familiar, human sources over technological ones, which poses a challenge for companies leveraging blockchain technology to promote their products (Mazzù, Andria, & Bacelloni, 2023; Puntoni, 2021).

However, the study also provides actionable insights for improving blockchain's credibility. The use of social proof, where companies highlight how many satisfied customers have trusted the blockchain-based certification of a product, has been shown to significantly

enhance the perceived credibility of blockchain. This form of social influence can bridge the trust gap between blockchain and human sources by validating the reliability of the technology through collective endorsement (Risselada, 2014).

As a result, companies using blockchain in the metaverse can improve consumer confidence by showcasing user satisfaction, which in turn increases WOM and intention to share product information on social media (Giakoumaki, 2020). Word of mouth is an important indicator of credibility (Pozharliev, Rossi, & De Angelis, 2022), as it has a significant impact on the confidence consumers place in a product or servic . Word of mouth is considered more credible than traditional media because consumers tend to trust personal experiences shared by others (Babić Rosario, 2016), especially when they have to decide whether or not to buy a product.

The integration of blockchain technology into the metaverse has the potential to transorm consumer purchase intentions by enhancing trust in digital transactions, ensuring transparency and safeguarding the authenticity of digital assets. As virtual marketplace grow, especially is sectors like luxury retail and NFTs, blockchain ability to certify ownership. And prevent fraud could significantly bolster consumer confidence in purchasing high value digital goods. Yet, individual differences, such as need for cognition, shape how consumers perceive the credibility of blockchain information. Through strategic marketing actions like social proof, companies can enhance consumer confidence in blockchain, improving both user engagement and purchasing behavior in metaverse environments .

Chapter 2: Literature Review

2.1. Customer engagement

In the context of my thesis, customer engagement is a pivotal concept for understanding consumer behavior across virtual shopping environments like the metaverse. Consumer engagement refers to an “individual-specific, motivational, and context-dependent variable emerging from two-way interactions between relevant engagement subjects and objects” (Hollebeek, 2011). Its primary aim is to foster brand loyalty and improve customer retention (Cowan, Lim, & Alycia). As consumers transition to immersive virtual environments, including the metaverse, the nature of engagement evolves significantly. Traditional

ecommerce platforms, where consumers purchase online but consume offline, are giving way to a hybrid of physical and virtual items, thanks to the metaverse (Nasr & El-Deeb, 2023). The immersive experiences offered by the metaverse blur the lines between reality and digital interaction, allowing consumers to engage with brands as if they were in the real world (Grupac & Roiu., 2022).

This immersive engagement within the metaverse is facilitated by disruptive technologies like virtual reality (VR), augmented reality (AR), artificial intelligence (AI), and blockchain (Tayal & Rajagopal, 2023). VR and AR allow consumers to interact with brands and products on a deeper level, enhancing emotional connections and brand affinity (Grupac & Roiu., 2022). Blockchain ensures the security and authenticity of digital assets, which is crucial in a space where transactions and assets exist in both physical and digital forms (Deepa, 2023). Furthermore, AI-driven algorithms allow for personalized, tailored experiences, increasing the relevance and satisfaction of user interactions (Rosário, Lopes, & Rosário, 2023).

This metaverse ecosystem, which integrates social media, gaming platforms, and decentralized blockchain technologies, creates unique opportunities for consumer engagement. Social platforms like Facebook Horizon and Decentraland enable consumers to socialize and interact within branded spaces, while gaming platforms such as Fortnite and Roblox facilitate interactive brand experiences. This convergence of platforms demands a strategic, cross-channel approach from marketers, aiming to craft cohesive experiences that foster loyalty and long-term engagement (Dwivedi, 2022; Wasiq, 2024).

Purchase intent refers to consumers' inclination or intention to purchase specific products or services. Marketing strategies often adjust based on an understanding of consumer purchase intent to prompt consumers to make purchase decisions. Purchase intent is influenced by various factors, including personal needs and preferences, pricing, brand reputation, and product characteristics. Previous research has found that consumer satisfaction with the shopping experience significantly impacts purchase intent (Mittal, 2001). The distinct characteristics of different extended reality (XR) environments, such as virtual reality's heightened immersion and augmented reality's emphasis on the interaction and experience of virtual objects within the real environment, contribute to variances in consumer perceptions and conveyed product information (Chen T. H., 2024).

In previous reserch on how to promote purchase in Metaverse, Shen et al. (2021) conducted a systematic literature review to explore how immersive technologies, such as virtual and augmented reality, influence consumer purchase behavior in virtual commerce contexts. Their findings provide crucial insights into design elements that can improve user engagement and purchase intentions, using the Stimulus-Organism-Response (SOR) model (Mehrabian & Russell, 1974), which serves as a basis for understanding how environmental stimuli influence behavioral outcomes (Shen, Tan, Guo, Zhao, & Qin, 2021). This connection between immersive technologies and consumer psychology is central to my research on perceived proximity, reciprocity, and intimacy, as these constructs also mediate the relationship between environmental stimuli and purchase intention (Shen, Tan, Guo, Zhao, & Qin, 2021).

According to Shen et al, key factors such as user engagement, trust, and perceived immersion directly contribute to consumers' purchase intentions. These factors are in line with the psychological constructs studied in this thesis, particularly perceived proximity and intimacy in virtual shopping environments. The research by Shen et al. highlights how realism in product presentation and user control mechanisms play a crucial role in fostering perceived proximity and trust (Shen, Tan, Guo, Zhao, & Qin, 2021). This connection reinforces the importance of virtual product experiences, where immersive technologies can reduce the psychological distance between consumers and virtual products (Joerß, 2021), thus influencing purchase decisions.

In addition, in the research of Shen (2021) it was found that trust and engagement promoted through carefully designed virtual commerce interfaces reflect my investigation of perceived reciprocity and intimacy, particularly in terms of how emotional connections are formed in digital interactions (Shen, Tan, Guo, Zhao, & Qin, 2021). Their research supports the idea that by optimizing these design elements, companies can create immersive environments that mimic real-world interactions while deepening the consumer's emotional and psychological investment, which leads to stronger purchase intentions. This is particularly relevant in the context of the metaverse, where virtual experiences strive to replicate and surpass traditional shopping environments (Ball, 2022).

Ultimately, the synthesis of design elements and consumer behavioral responses in the work of Shen enhances the understanding of how virtual commerce applications can actually drive user engagement and purchase intention. This is in line with my research on how different shopping environments, whether in the metaverse, television broadcasts or conferences, shape consumer behaviors through psychological mechanisms such as proximity, reciprocity and intimacy. The use of immersive technologies as stimuli within these environments demonstrates the potential for companies to foster deeper relationships with consumers through innovative digital strategies.

2.2. The S-O-R model

This study attempts to explore the impact of intimancy, proximity and reciprocity on consumers purchase intention, as well as the moderator role of social presence on it. Through comprehensive analysis and empirical investigation, this study endeavors to contribute valuable insights into consumer behavior within the context of emerging digital environments, based on the Stimulus-Organism-Response (S-O-R) theoretical model.

The Stimulus-Organism-Response (S-O-R) framework was proposed by Mehrabian & Russell in 1974, posits that environmental stimuli influence an individual's cognitive and affective responses, thereby impacting their behavioral intentions (Mehrabian & Russell, 1974). The S-O-R model comprises three core elements: stimulus variables, organism variables, and response variables. Essentially, the model posits that when an individual engages in activities within their environment, they are stimulated by environmental cues, leading to a stress response. Throughout this process, the individual's mental state during the activity, among other factors, also plays a significant role in influencing their response (Dwyer, 2023). The S-O-R model has indeed been useful in exploring the phenomena of virtual reality, augmented reality, and online platforms, as demonstrated by previous research, such as that conducted by Kim et al. (2020) on consumers' behavioral intentions in virtual tourism (Kim, Lee, & Jung, 2020), Lee et al. (2022) on consumers' adoption of augmented reality-enhanced virtual trials, have provided valuable insights using this framework (Lee, Xu, & Porterfield, 2022). In addition, previous studies have demonstrated the positive impact

of interactivity and vividness of virtual reality on users' perceptions and impulse buying behavior in the context of online shopping (Payala, 2024).

The existing research provides a solid groundwork for applying the S-O-R model in our study. It also allows us to investigate how intimacy, proximity, and reciprocity impact consumers' purchase intention, while considering the moderating effect of social presence. Furthermore, our study will be conducted simultaneously across three distinct scenarios: Avatar in the Metaverse Demonstrates a Product, Television Presenter Explains the Product, and Conference Attendees Discuss a Product.

2.3 Reciprocity

Reciprocity is considered to be very important in order to have a lasting long-term consumer-firm relationship (Fournier, 1998). It is defined as a consumer's conscious tendency to engage in a reciprocal and mutually beneficial relationship with a brand provider (Morales, 2005). When people purchase products and services, they look for a reciprocal relationship with the sellers from whom they make these purchases. Consumers show personal reciprocity by rewarding firms for the efforts that firms direct towards them. Consumers willingly provide firms with their personal information like their preferences; in return they expect the firms to give those benefits such as club memberships, better products and services and new product information updates (Wei-Ping, Lin, Zheng-Ping, & altr, 2008). It is assumed that a social group or unit is more like to contribute to another group which provides it with benefits that a group which does not. According to Malinowski (1922), reciprocity means interlocking status duties which people owe each other. Reciprocity is therefore considered as a mutually gratifying pattern in which goods and services are exchanged. He insisted that most economic acts are found to belong to a chain of reciprocal gifts and counter-gifts, which benefit each other in the long run. People do not just blindly get into a reciprocal transaction, they are aware of the consequences of reciprocity and of its breakage. They believe that those who they helped can be expected to help them back in the future (B. & Furtado, 2019).

The behavior of individuals, in terms of resource exchange process,is explained by the Social exchange theory (Emerson, 1976). It argues that people exchange resources with others due to the expectation of acquiring something through the contact. People offer to help other

peers with the general anticipation of some future payback but without a clear promise of future reciprocity (Kankanhall, Tan, & Wei, 2005). Social exchange theory is widely employed to explore various behaviors across different areas, including job performance, intentions to use social recommendation systems, CGC in the online community and information sharing on s-commerce (Yang X. , 2018; Yang J. S., 2016).

A central ement of social exchange theory is reciprocity expectations, (Faraj & Johnson, 2011) which refer to a perceived obligation to return favors based on past interactions (Gouldner, 1960). In online enviroments, sharing product recommendations and shopping experiences with others can maintain, is often viewed as part of a broader exchange of knowledge and social capital (Chang & Hsiao, 2013).

Sine people's time, vigor, resources and knowledge are limited, so they usually expect a beneficial repayment for their deeds (Lai & Chen, 2014). Those who receive information are indebted to offer equivalent information, since they have received valuable information from others. It is suggested that such reciprocity in terms of social exchange was proven to be a major driver in information sharing (Hau, Kim, Lee, & Kim). In s-commerce sites, consumers can share their purchase experiences, disseminate product information and provide emotional support to others. If consumers anticipate equitable and beneficial feedbacks, they would be motivated to participate in s-commerce activities continuously (Yang X. , 2018).

Based on previous research, therefore, it became important to explore in this study, how reciprocity affects purchase intentions, to better understand its impact and how it differs in different purchase environments, including the metaverse, television, and conferences.

Previous research has proposed two key forms of reciprocity: restricted (or direct) reciprocity and generalized (or indirect) reciprocity (Uehara, 1990). In line with this distinction, Bagozzi (1995) noted that reciprocity serves two crucial functions. At a societal level, generalized reciprocity helps maintain social equilibrium and foster solidarity by facilitating exchanges that are not immediately reciprocated, creating a culture of trust and cooperation (Bagozzi, 1995). In virtual environments, where direct face-to-face interactions are absent, generalized reciprocity plays a pivotal role in sustaining long-term relationships and trust within digital

communities. At an individual level, restricted reciprocity emphasizes the predictability and obligation of direct exchanges between parties. This form of reciprocity is particularly important in virtual settings, where transparency and accountability can be more challenging to establish. Restricted reciprocity helps ensure that interactions remain trustworthy by reinforcing the expectation of mutual exchange.

A previous study on the central role of reciprocity in user interactions within C2C social commerce employed both restricted and generalized reciprocity to understand the dynamics of reciprocal trust in virtual commerce settings, where maintaining balance in social interactions and fostering predictable, trustworthy exchanges are crucial to the success of digital transactions (Leung, 2019) .

2.4. Intimacy

Intimacy is defined as the degree of closeness, encompassing a sense of emotional connection and spiritual support, including liking and mutual psychological support (Lee Y, 2011). In this study, intimacy refers to the emotional bond with relatives and friends, including interaction levels and the exchange of psychological support. Based on this definition, intimacy extends to certain types of business relationships. Previous research has demonstrated that intimacy significantly influences purchasing decisions (K & T., 1999), repurchase intentions, continuous usage intentions, sustainable usage intentions, and the number of services purchased by clients (Wang M, 2021).

Intimacy, as a key feature of emotional interaction in social commerce, plays a vital role in reducing information asymmetry and enhancing user experience. It is well established that intimacy is positively associated with purchase intentions. Close relationships often lead to an increased willingness of customers to buy products recommended by friends. Additionally, customers with high levels of intimacy, such as close friends and family members, are more likely to adopt product recommendations due to the inherent trust and loyalty that come with these strong relationships (Wang M, 2021).

Previous studies found that interpersonal relationships are vital to building close ties linking buyers and sellers and enhancing the possibility of online trading between them (Cheng,

2020). In the online market, a buyer's switching costs between different shopping platforms and different sellers are very low (Singh, 2020). If a seller cannot establish a good interpersonal relationship with a buyer to quickly stimulate his or her purchasing activities, then that buyer will become a customer of other sellers. In the context of online commerce, swift guanxi, or rapidly formed personal connections, describes how buyers and sellers can quickly establish relationships in digital environments (Ou, 2014; Chen H. Z., 2021). In the context of online commerce, swift guanxi, or rapidly formed personal connections, describes how buyers and sellers can quickly establish relationships in digital environments. It underscores how sellers can build trust and emotional bonds with buyers, even without long-term interaction, by fostering a sense of connection that encourages transactions (Shi, 2018).

Live stream shopping, a new kind of online shopping, accelerates the establishment of personal connections and potentially enhances buyers' purchase intention because it allows the interaction between buyers and sellers to be more real and frequent, becoming more similar to a face-to-face interaction offline (Wongkitrungrueng, 2020).

These previous studies highlight the critical role of intimacy and personal ties in promoting trust and driving purchase decisions in online commerce. By demonstrating how emotional ties, even rapidly formed ones, can influence consumer behavior, they provide fundamental insight to explore how intimacy affects purchase intentions in various digital environments. This research will leverage these insights to study how intimacy influences consumer decisions in different online shopping scenarios, offering a deeper understanding of the psychological factors underlying interactions in virtual commerce.

2.5. Proximity

In the context of digital interactions, perceived proximity has emerged as a significant factor influencing consumer behavior, particularly in environments where physical proximity is absent. As discussed by (Wilson, O'Leary, Metiu, & Jett, 2008), the concept of perceived proximity challenges the traditional understanding of physical closeness. Research shows that members of virtual teams can feel close to one another despite being geographically dispersed, and conversely, people in close physical proximity do not always feel subjectively

close (Dougherty, 1992; Cohen & Bailey, 1997). This paradox is particularly relevant in the age of digital marketing and virtual environments, where consumer interactions with brands occur without any physical closeness.

This idea is highly relevant to my research, where perceived proximity to a virtual product can significantly influence purchase intention, especially when technologies like Augmented Reality (AR) are used to reduce the psychological distance between the consumer and the product.

According to Construal Level Theory (CLT) (Liberman, Trope, & Stephan, 2007) (Liberman & Trope, 2008), individuals navigate different types of psychological distances through comparable mental processes of construal (Liberman, Trope, & Stephan, 2007). Different types of psychological distances, such as temporal, spatial or hypothetical, are addressed through similar mental processes of construction. These distances, which all share an egocentric reference point, are cognitively related, meaning that an increase in psychological distance leads to more abstract mental representations. In turn, more abstract constructions further increase perceived psychological distance. This mutual relationship suggests that changes in one dimension of distance can affect how distant or close other dimensions are mentally construed (Liberman, Trope, & Stephan, 2007).

In the context of virtual products, this pattern helps explain how perceived proximity affects consumer behavior. The closer consumers feel to a virtual product, the more concretely they process its features, such as measurement feedback, which affects their purchase intentions.

Perceived proximity, also referred to as psychological distance, plays a key role in shaping consumers' perceptions of augmented reality (AR) technology, which can increase the sense of proximity to virtual products. Psychological distance, in this context, is defined as consumers' perceived gap to the virtual product. This study uses perceived proximity to virtual products as a measure of psychological distance, indicating how connected or close consumers feel to the virtual product.

Augmented reality (AR) technology reduces psychological distance by projecting three-dimensional images of products into the consumer's real environment, thereby increasing perceived proximity to these virtual products. Although AR is designed to increase a consumer's sense of proximity to a virtual product by superimposing a 3-D image onto the

physical world, consumers may still have doubts about whether the virtual product's spatial attributes (such as size, height, and width) accurately reflect those of the real product (Poushneh, 2021).

As consumers feel a closer connection to a virtual product, they are more likely to process product information in a more tangible way, paying attention to specific details such as measurements and other peripheral features (Joerß, 2021). Augmented Reality (AR) plays a crucial role in this process by providing real-time, relevant information about the product, thereby lowering the effort required for consumers to gather details during their purchasing decision (Joerß, 2021). By integrating virtual products into the consumer's immediate environment, AR reduces the perceived distance between the consumer and the product. This immersive interaction not only enhances the consumer's understanding of the product but also reduces the time spent on searching for information, as AR overlays allow for a more intuitive exploration. Consequently, the proximity facilitated by AR makes the virtual product feel more accessible, increasing the likelihood of engagement and purchase.

2.6. Social presence

In the realm of virtual worlds and the metaverse, presence is a key feature that captures the sense of non-mediation that users experience-essentially, the feeling of being "there" in a digital environment. This perception results from a complex interplay among user attributes, medium characteristics, content dynamics, technological elements, and social interactions (Lombard & Ditton, 1997). Immersive technologies within these virtual environments are specifically designed to foster social engagement by addressing the social needs of users (Cole & Griffiths, 2007)

Social presence, or the sense of being present with others in a virtual space, emerges as a critical factor in driving user engagement in these digital social landscapes, where diverse social actors coexist and interact (Biocca, Harms, & Burgoon, 2003). This sense of social presence is critical to making interactions within virtual environments feel authentic and meaningful. Without authentic social interactions, users risk being perceived as mere artificial entities, lacking the vitality and richness that come from real social connections (Lee, Peng, & Jin, 2006).

Research highlights how social presence increases consumers' engagement and shapes their behaviors and attitudes within virtual spaces. For example, social presence in extended reality environments has been shown to positively influence consumers' perceived benefits, attitudes, and intentions (Ying, 2021). Brand experiences in VR have been found to trigger higher levels of social presence, which in turn contribute to brand engagement and advocacy (De Regt, Plangger, & Barnes, 2021). Similarly, AR experiences can increase sociability and user engagement (Scholz & Smith, 2016).

In large virtual environments, such as the metaverse, experiences can range from low to high levels of social interaction, which can hinder or foster behaviors such as sharing, collaboration, and co-creation (Bonsu & Darmody, 2008). User-generated content is another example: social features motivate consumers to engage in activities that are meaningful within their online communities (Daugherty, Eastin, & Bright, 2008). Furthermore, creativity and co-creation have been shown to significantly improve consumer outcomes, particularly for those highly engaged in the virtual experience (Cowan & Ketron, 2019).

Therefore, social presence not only facilitates deeper engagement in virtual environments, but also plays a key role in influencing user interactions, brand advocacy, and collaborative behaviors within these increasingly immersive spacesIn the realm of virtual worlds and the metaverse, presence is a distinctive feature that encapsulates the sense of non-mediation experienced by users. This perception emerges from a complex interplay of user attributes, medium characteristics, content dynamics, technological elements and social interactions (Lombard & Ditton, 1997). Immersive technologies within virtual environments are specifically made to facilitate social engagement and meet the social needs of users (Cole & Griffiths, 2007).

The Embodied Social Presence (ESP) theory, proposed by Mennecke, adds futher depth to our understanding of social presence in virtual enviroments by emphasizing the role of avatars as mediators of social interactions in virtual worlds. According to this theory, social presence is derived from the users' interactions with avatars, which stimulate

In the context of embodiment, the occurrence of specific acts of communication and interaction creates a sense of presence that is derivative of human cognition and similar to real interactions in the real world (Wang, Xing, & Laffey, 2018). The core of the theory is

that in a virtual world, users must first feel the existence of their own avatars, then through interaction with other avatars, they feel a common existence with others and generate a sense of social presence in the virtual world (Mennecke, Triplett, Hassall, Conde, & Heer, 2011). However, to achieve ESP, a person must first achieve an adequate level of perceived presence and co-presence (Mennecke, Triplett, Hassall, Conde, & Heer, 2011).

Therefore, social presence, embodying the feeling of sharing presence with others, emerges as a crucial factor driving user engagement within these virtual social landscapes that teem with diverse social actors (Biocca, Harms, & Burgoon, 2003). Without the presence of social interaction, users risk being relegated to mere artificial entities, lacking the vitality inherent in authentic social beings (Lee, Peng, & Jin, 2006).

Chapter 3: Research Framework and Hypotheses

3.1. Research Framework

As reported in the introduction of the paper with this study we attempt to provide an answer to the following research question,

"*To what extent do perceived intimacy, reciprocity, and proximity, moderated by social presence, influence consumer purchase intentions in different shopping scenarios?*"

This research focuses on exploring the psycological factors that drive consumer behavior in distinct enviroments - metaverse,television and conference settings – and examines how social presence moderates these relationships.

To answer this question, an experimental study aimed to pursues two primary objectives:

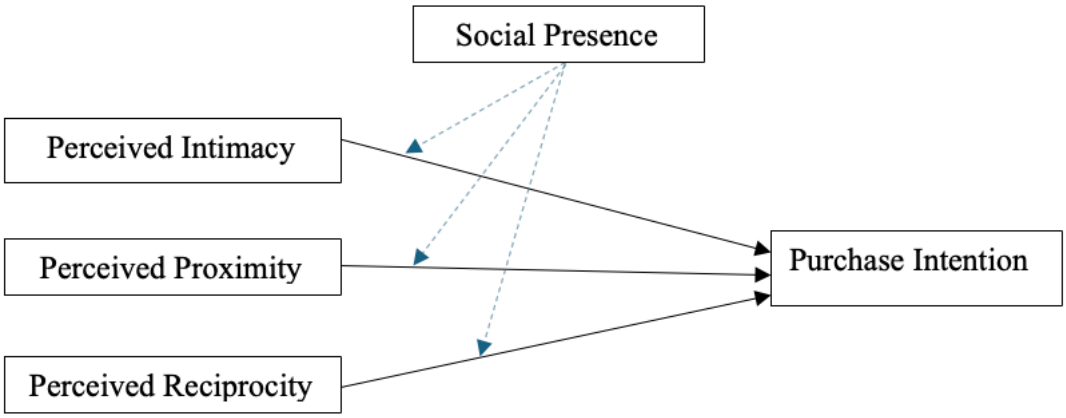
1) Indentify key psycological variables: the purpose is to detarmine which psychological factors (specifically perceived intimacy, perceived proximixty and perceived Reciprocity) significantly influence consumer purchase intention in different shopping enviroments.
2) Examine the moderating role of social presence: the study aims to asses how social presence intercts with these psychological variables to affect purchace intention across the metaverse, televission shopping and conference product presentation settings.

While previous literature has explored the impact of these constructs in various contexts (e.g., online commerce and virtual interactions), there is little research that focuses on how these factors shape consumer behavior in different shopping scenarios.

Previous research has extensively examined these constructs individually in various contexts. For example, (France, Merrilees, & Miller) and (Bozkurt & Gligor, 2021) explored how perceived intimacy and reciprocity influence online customer engagement, while (Liberman & Trope, 2008)and Joerß (Joerß, 2021) focused on the role of psychological distance, particularly perceived proximity, in influencing consumer behavior in digital contexts. Despite these insights, there remains a gap in the literature on how these factors collectively influence consumer behavior in different shopping environments, such as the metaverse, television shopping, and conference product presentations.

To fill this gap, the present study uses a multidimensional framework (Figure 1) that examines the relationship between the independent variables (Perceived Intimacy, Perceived Proximity, Reciprocity, and Social Presence) and the dependent variable (Purchase Intention) (Mehrabian & Russell, 1974; Shen, Tan, Guo, Zhao, & Qin, 2021). Based on the fundamental Stimulus-Organism-Response (S-O-R) model proposed by Mehrabian & Russell (1974), this study seeks to understand how external stimuli in different purchase environments (e.g., avatars in the metaverse or TV presenters) trigger cognitive and emotional responses, leading to behavioral outcomes such as purchase intention.

In addition, the study investigates the moderating role of social presence, which has been shown to improve user engagement and trust in virtual environments (Biocca, Harms, & Burgoon, 2003; Ying, 2021). By incorporating social presence as a moderating variable, this research aims to explore how the feeling of being socially connected strengthens or weakens the effects of psychological constructs on purchase intention.



3.2. Hypothesis

In line with the literature and taking into account the different scenarios, the following research hypotheses were developed for this study:

Scenario 1: Metaverse Shopping Experience

H1a: Intimacy in a metaverse shopping environment will have a positive influence on purchase intention.

H1b: Perceived proximity to an avatar in a metaverse shopping environment will have a positive influence on purchase intention.

H1c: Perceived reciprocity with an avatar in a metaverse shopping environment will positively affect purchase intention.

H1d: The effect of intimacy on purchase intention in a metaverse shopping environment will be moderated by perceived social presence, such that higher social presence strengthens the relationship.

H1e: The effect of proximity on purchase intention in a metaverse shopping environment will be moderated by perceived social presence, such that higher social presence strengthens the relationship.

H1f: The effect of reciprocity on purchase intention in a metaverse shopping environment will be moderated by perceived social presence, such that higher social presence strengthens the relationship.

Scenario 2: Television Shopping Experience

H2a: Intimacy in a television shopping environment will have a positive influence on purchase intention.

H2b: Perceived proximity to a television presenter will positively influence purchase intention.

H2c: Perceived reciprocity with a television presenter will positively affect purchase intention.

H2d: The effect of intimacy on purchase intention in a television shopping environment will be moderated by perceived social presence, such that higher social presence strengthens the relationship.

H2e: The effect of proximity on purchase intention in a television shopping environment will be moderated by perceived social presence, such that higher social presence strengthens the relationship.

H2f: The effect of reciprocity on purchase intention in a television shopping environment will be moderated by perceived social presence, such that higher social presence strengthens the relationship.

Scenario 3: Conference Product Presentation

H3a: Intimacy in a conference product presentation will have a positive influence on purchase intention.

H3b: Perceived proximity to the presenter in a conference setting will positively influence purchase intention.

H3c: Perceived reciprocity with the presenter in a conference setting will positively affect purchase intention.

H3d: The effect of intimacy on purchase intention in a conference setting will be moderated by perceived social presence, such that higher social presence strengthens the relationship.

H3e: The effect of proximity on purchase intention in a conference setting will be moderated by perceived social presence, such that higher social presence strengthens the relationship.

H3f: The effect of reciprocity on purchase intention in a conference setting will be moderated by perceived social presence, such that higher social presence strengthens the relationship.

Chapter 4: Research methodology

4.1. Research Design

The research design is experimental, where in partipants of the survey are randomly assigned to one of the trhee conditions, each corresponding to one of the shopping scenarios: purchase experience in the metaverse, purchase experience on television, and product presentation at a conference. This random assignment ensures that any differences in purchase intention can be attributed to the specific scenario rather than other variables.

Once the questionnaire was opened, participants were greeted by a brief introduction that clearly explained the study guidelines, research objectives, and how to participate. The introduction aimed to provide a general overview of the experience and to put participants at ease before proceeding to fill out the questionnaire. In the first section of the questionnaire, they were asked to provide demographic information by answering questions regarding age, gender, education level, and occupation. These demographic data were collected to ensure proper analysis of the results, taking into account individual differences among participants. In the second section, participants were presented with a detailed description of the scenario to which they were randomly assigned. This description was carefully designed to ensure that each participant fully understood the context and role he or she would assume in the scenario, which could be about a shopping environment in the metaverse, a TV shopping experience, or a product presentation at a conference:

Scenario 1 Shopping Experience in the Metaverse

“Imagine that you are inside an immersive virtual environment, such as the Metaverse. Here you move around as an avatar and interact with a virtual assistant, also represented by an avatar. The assistant shows you various products, answers your questions and offers recommendations based on your preferences. While exploring, you can view products in 3D, move them around and see them from different angles, as if you were physically in a store.”

Scenario 2 TV shopping experience

“Imagine you are sitting in your living room and watching a TV channel dedicated to shopping. A television presenter shows you various products for sale, explaining their

features, benefits, and prices. During the presentation, the presenter offers advice and shows how the products can be used in your daily life. You can purchase the products directly through the website or phone number shown on the screen."

Scenario 3 Product Presentation at Conference

"Imagine attending a conference where a presenter introduces a new product in front of an audience of attendees. The speaker introduces the product, describes its features, and demonstrates its use through a hands-on demonstration. At the end of the presentation, participants can ask questions and interact with the speaker, getting more details about the product."

The goal was to immerse participants in the specific situation, allowing them to assess the psychological and social dynamics described in the questionnaire, fostering a more authentic and engaged response.

After reading the information about each scenario, participants were asked to make some evaluations by answering items on a questionnaire that measured "Perceived Intimacy," "Perceived Proximity," "Percived Reciprocity," "Social Presence," and "Purchase Intention." The scores of each items (for each variables) were used as predictors within a regression model in order to predict purchase intention scores. This analysis was conducted separately for each scenario.

Futhemore, "Perceived Intimacy," "Perceived Proximity," "Perceived Reciprocity," "Social Presence," and "Purchase Intention" were used as dependent variables to make a comparative analysis between individual ratings made by participants assigned to the different scenarios. This approach enabled the identification of which specific variables had the most significant impact across the three scenarios.

4.2. Data collection and sample profile

In this research, the data collection process was carried out through a structured online survey designed to investigate the impact of *Intimacy*, *Proximity*, and *Reciprocity* variables on *Purchase Intention*, with *Social Presence* serving as a moderating factor.

The survey, administered digitally, was specifically created to capture participants' perceptions and behaviors across three distinct scenarios, randomly assigned to each respondent, to ensure that no individual encountered more than one scenario.

In total, 195 participants took part in the study. The survey was created using a web platform and distributed through various online channels. Respondents were recruited voluntarily and provided informed consent before participating. The sample was designed to represent a wide range of demographic categories, including age, gender, education and occupation, ensuring that the results could be generalized to different segments of the population.

Data collection took place over a defined period, with the survey available for completion during 2 weeks. During this period, participants were encouraged to participate through various online channels. The questionnaire was designed to be completed in about 10 to 15 minutes.

In each scenario presented, a possible interaction was outlined for participants to experience. These scenarios were designed to simulate realistic situations, providing sufficient context for participants to grasp the dynamics of the interaction. This allowed for more accurate and authentic responses regarding their perceptions and purchase intentions.

After the scenario presentation, each participant was asked to answer a series of questions.

The questionnaire included a series of demographic questions and collected basic data on participants, including age, gender, education level and occupation. The second section, Perception of Intimacy, Proximity and Reciprocity, captured participants' interactions within the scenario, all measured with Likert-scale questions, along with importance and agreement scales, to assess participants' attitudes and perceptions across different dimensions. The third section, on social presence, explored how participants' sense of social connection with the presenter (avatar or human) influenced their behavior. Finally, the fourth section focused on purchase intention, assessing participants' likelihood of making a purchase based on their interaction.

4.3 Reliability Assessment

In this study, I conducted several statistical analyses to ensure the validity and reliability of the constructs used in our measurement model. Ensuring both external and internal validity was essential throughout the research process. External validity refers to the extent to which the results can be generalized across different settings and populations (Cook & Campbell, 1979), while internal validity focuses on the degree to which the observed outcomes can be confidently attributed to the experimental manipulations rather than external influences (Malhotra & Birks, 2003). Achieving a balance between these two types of validity is crucial; insufficient levels of either can lead to inconclusive or irrelevant findings.

The rise of online experiments has enhanced the ability to recruit large numbers of participants and produce findings that are more broadly applicable (Dandurand, Shultz, & Onishi, 2008). However, online studies often present challenges related to lower internal validity due to reduced control over participant behavior and experimental conditions. Factors such as participant self-selection and reliance on digital platforms may also introduce concerns regarding external validity (Birnbaum, 2004). Despite these challenges, the online experimental method was selected for this study due to its efficiency, scalability, and potential for producing generalizable insights (Birnbaum, 2004). To mitigate these concerns,

And to further ensure the integrity of the measurement model, it was crucial to confirm that each construct was accurately represented by its corresponding items and demonstrated strong internal consistency. An Exploratory Factor Analysis (EFA) was conducted to identify the underlying factor structure, followed by the calculation of Composite Reliability (CR) and Average Variance Extracted (AVE) to assess the reliability and convergent validity of each construct. After performing EFA, a Confirmatory Factor Analysis (CFA) was also carried out to further validate the measurement model. While EFA helped to uncover the factor structure, CFA was essential to confirm that the number of factors and the loadings of the observed variables aligned with theoretical expectations. This step ensured that each construct was not only accurately represented by its corresponding items but also fit the overall model structure. These analyses provided a solid foundation for the subsequent structural equation modeling and hypothesis testing, ensuring that the constructs used in the

study were both accurate and meaningful representations of the phenomena being investigated. These analyses provided a solid foundation for the subsequent structural equation modeling and hypothesis testing, ensuring that the constructs used in the study were both accurate and meaningful representations of the phenomena being investigated.

4.3.1. EFA

Exploratory Factor Analysis (EFA) is a statistical technique employed to explain the variability among observed, correlated variables. The aim of EFA is to identify underlying, unobserved variables, known as factors (Sarmento, 2017). This method can reveal that a smaller number of latent factors may account for the variations seen in a larger set of observed variables. In EFA, the observed variables are represented as linear combinations of these latent factors, with an additional component accounting for error in the model approximation (Sarmento, 2017).

The exploratory factor analysis (EFA) for the construct "Intimacy" revealed a single-factor solution, with an eigenvalue of 2.374, accounting for 59.35% of the total variance. This suggests that the intimacy-related items are adequately explained by a single factor, capturing a significant portion of the variance. Factor loadings ranged from 0.680 to 0.824, which indicates a strong correlation between the items and the latent construct of intimacy. The communality values for each item, which ranged from 0.463 to 0.678, demonstrate that a substantial amount of each item's variance is explained by this factor. These results suggest good internal consistency among the intimacy items and confirm that they contribute meaningfully to the measurement of the construct.

Similarly, the EFA for the Proximity construct resulted in a single-factor solution, with an eigenvalue of 2.341, explaining 58.54% of the total variance. The factor loadings for proximity-related items ranged between 0.638 and 0.822, indicating that each item is strongly correlated with the latent factor representing proximity. Communality values, ranging from 0.406 to 0.676, further confirm that the factor explains a significant portion of the item variance. This suggests that the proximity items are reliable indicators of the underlying construct and exhibit strong internal consistency.

For the construct Reciprocity, the EFA also produced a single-factor solution with an eigenvalue of 2.470, accounting for 61.75% of the total variance. The factor loadings were strong, ranging from 0.746 to 0.806, indicating that each item is closely related to the latent construct of reciprocity. Communalities, which ranged from 0.557 to 0.647, show that the factor explains a substantial proportion of the item variance. These results demonstrate that the reciprocity items effectively represent the construct, with satisfactory factor loadings and a good amount of explained variance.

The EFA for the Social Presence construct, considered as a moderating variable, yielded an eigenvalue of 2.505, explaining a remarkable 83.51% of the total variance. The factor loadings for this construct were notably high, ranging from 0.868 to 0.979, indicating very strong relationships between the items and the latent social presence construct. Communality values, ranging from 0.753 to 0.958, confirm that most of the variance in these items is explained by the underlying factor, further highlighting the reliability of the items in measuring social presence.

Finally, the EFA for the Purchase Intention construct identified a single-factor solution, with an eigenvalue of 1.906, accounting for 63.52% of the total variance. Factor loadings ranged from 0.764 to 0.835, indicating strong correlations between the items and the latent construct of purchase intention. Communality values, which ranged from 0.584 to 0.698, suggest that the factor explains a substantial portion of the variance in the purchase intention items, confirming that these items are reliable indicators of the construct. The high percentages of variance explained for each construct reinforce the robustness of the measurement model, indicating that the items are valid and reliable indicators of their respective constructs. However, while EFA is crucial for identifying the factor structure and ensuring that items load onto the appropriate latent variables, it is equally important to evaluate the reliability and validity of the constructs using more advanced metrics.

4.3.2. CFA

After conducting the Exploratory Factor Analysis (EFA), it is crucial to validate the results through Confirmatory Factor Analysis (CFA). CFA is a method designed to verify whether the number of factors (or constructs) and the loadings of the observed indicator variables

align with theoretical expectations (Malhotra, 2007). To achieve this confirmation and to ensure that the constructs are accurately represented by the observed variables, it is essential to assess both the reliability and validity of the scale (Hair, 2009). One of the most commonly employed methods for assessing reliability and internal consistency is Cronbach's Alpha. According to Rui Sarmento & Costa, the accepted thresholds for Cronbach's Alpha in evaluating internal consistency are as follows: values between 0.60 and 0.69 are considered questionable, values from 0.70 to 0.79 are deemed acceptable, values between 0.80 and 0.89 are classified as good, and values ranging from 0.9 to 1 are considered excellent (Sarmento, 2017).

For the construct "Intimacy," a Cronbach's Alpha of 0.770 was obtained, based on four items. This value signifies a good level of internal consistency, with item correlations ranging from 0.377 to 0.594, indicating that the items are consistently measuring the intimacy construct. Similarly, for the "Proximity" construct, a Cronbach's Alpha of 0.791 was recorded, also with four items. The inter-item correlations, ranging from 0.310 to 0.565, reflect a reliable scale with moderately strong internal coherence.

The "Reciprocity" construct displayed a Cronbach's Alpha of 0.791, indicating solid internal reliability across its four items, with correlations between 0.424 and 0.547. This level of internal consistency suggests that the scale is robust in measuring the reciprocity construct. For "Social Presence," a higher Cronbach's Alpha of 0.900 was observed, indicating excellent internal consistency across the three items, with correlations ranging from 0.573 to 0.862. This high level of reliability confirms the strong relationship among the items in the social presence scale.

Finally, the "Purchase Intention" construct showed a Cronbach's Alpha of 0.709 with three items. While this value is lower than the others, it still falls within the acceptable range for internal reliability. The inter-item correlations, which range from 0.383 to 0.506, suggest that the items are moderately correlated and consistently measure purchase intention.

Reliability was rigorously tested using Cronbach's Alpha, a widely accepted measure of internal consistency that evaluates the correlation between items within a scale. A Cronbach's Alpha value of 0.70 or higher is considered the benchmark for acceptable reliability (Fornell, 1981; Hair, Black, Babin, & Anderson, 2010). The reliability analysis for the constructs in

this study yielded strong results, confirming that all scales demonstrated high internal consistency.

4.3.4. Cronbach's Alpha VS Composite Reliability (CR) and Average Variance Extracted (AVE)

Alternatively, Construct Reliability (CR) has been adopted as a measure, which is a key measure of internal consistency, defined by Hair (2009) as the "measure of reliability and internal consistency of measured variables that represent a latent construct" (Hair, 2009). While similar to Cronbach's Alpha, CR is generally more suited to factor models, offering a more precise evaluation of whether the variables consistently reflect the underlying construct. CR should be assessed prior to evaluating construct validity to ensure that the items reliably measure the latent variable. After confirming CR, additional validity tests, such as Average Variance Extracted (AVE), can be applied to further assess the accuracy of the measurement model.

The goal of validity testing is to confirm that the scale accurately operationalizes the intended construct. Depending on the research objectives, different validity methods can be used, with convergent and discriminant validity being the most common. Convergent validity examines whether expected relationships between measures exist, focusing on relationships between variables measured by different instruments designed to assess the same construct, and relationships with instruments that assess other aspects where a positive or negative relationship is anticipated (Silva, Macêdo, & Silva, 2013). Convergent validity is evaluated using both CR and AVE, which assesses the proportion of variance explained by the construct's items. According to Hair (2009), convergent validity is achieved when CR exceeds AVE, and AVE surpasses 0.5, indicating that the construct explains more than half of the variance in its observed variables (Hair, 2009).

Although CR and Cronbach's Alpha both measure internal consistency, CR is better suited for factor models as it provides a more accurate assessment of whether the items represent

the latent construct. A CR value above 0.70 is considered reliable, indicating that the construct is well-represented by the items. Meanwhile, AVE evaluates how much variance is captured by the construct relative to measurement error, with values above 0.50 signaling sufficient convergent validity. This means that the construct explains more than half of the variance in the observed variables, ensuring that the model is robust and reliable.

For the Intimacy construct, the Composite Reliability (CR) was 0.853, exceeding the 0.70 benchmark, indicating strong reliability. The Average Variance Extracted (AVE) was 0.594, confirming adequate convergent validity, as more than half of the variance in the intimacy-related items was accounted for by the factor. Similarly, the Proximity construct demonstrated a CR of 0.848 and an AVE of 0.585, showing that the items consistently represent the proximity construct and that the latent factor explains their variance effectively. The Reciprocity construct exhibited strong internal consistency, with a CR of 0.866 and an AVE of 0.617, confirming its reliability and validity. The Social Presence construct, which serves as a moderating variable in the study, showed excellent reliability with a CR of 0.938 and an AVE of 0.835, indicating that the construct captures most of the variance in its items with minimal error. Finally, the Purchase Intention construct also demonstrated solid reliability, with a CR of 0.839 and an AVE of 0.635, both surpassing the acceptable thresholds for reliability and convergent validity.

In conclusion, these metrics provide a deeper level of validation beyond the exploratory factor analysis, confirming that the measurement model is both reliable and valid, and setting a strong foundation for further analysis of the relationships between these constructs.

Chapter 5: Results

5.1. Scenario 1: Metaverse Shopping Experience

In this scenario, participants are placed in a virtual shopping environment within the metaverse. Here, they interact with an avatar, representing either a store assistant or a virtual brand ambassador, designed to help guide them through their purchasing experience. The metaverse allows for immersive shopping, where participants can explore products, engage with interactive displays, and simulate real-world actions like examining items up close or virtually trying them out. The goal of this scenario is to simulate how consumers respond to

virtual environments and the personalized interaction facilitated by avatars in driving their purchase intention.

A total of 195 participants took part in the study, with 69 respondents being assigned to Scenario 1 (35.4% of the total sample). This scenario focused on the interaction between participants and an avatar within the metaverse. The demographic breakdown for this scenario indicates that 44 females (38.6%) and 25 males (31.3%) responded, with no participants choosing the option to prefer not to disclose their gender. The correlation analysis demonstrated varying degrees of association between the independent variables and purchase intention. Intimacy showed a weak, non-significant correlation with purchase intention ($r = 0.110$, $p = 0.370$). This suggests that, while there is some relationship between intimacy and purchase intention, it is not strong enough to be considered statistically significant. On the other hand, proximity was moderately correlated with purchase intention ($r = 0.512$, $p < 0.001$), indicating a significant and positive relationship. Reciprocity also showed a moderate positive correlation with purchase intention ($r = 0.498$, $p < 0.001$), suggesting that higher perceptions of reciprocity lead to stronger purchase intentions.

Following the correlation analysis, a multiple regression was conducted to further explore how intimacy, proximity, and reciprocity predict purchase intention. Initially, the model was run without the moderating effect of social presence. In this model, proximity and reciprocity emerged as significant predictors of purchase intention. Specifically, proximity had a positive influence on purchase intention ($\beta = 0.214$, $p = 0.050$), as did reciprocity ($\beta = 0.327$, $p = 0.037$). Intimacy, however, did not significantly predict purchase intention ($\beta = 0.065$, $p = 0.297$), aligning with the weak correlation observed earlier.

The model explained 31.4% of the variance in purchase intention, as indicated by the R-squared value. This suggests that while intimacy, proximity, and reciprocity are important factors, other unexamined variables may also contribute to consumers' purchase decisions. The significance of the regression model was further supported by an ANOVA test ($F = 9.925$, $p < 0.001$), confirming that the predictors collectively provide a statistically meaningful explanation of purchase intention.

Riepilogo del modello

Modello	R	R-quadrato	R-quadrato adattato	Errore std. della stima
1	.561[a]	.314	.283	2.62728

a. Predittori: (costante), Reciprocity_composite, Intimacy_composite, Proximity_composite

ANOVA[a]

Modello		Somma dei quadrati	gl	Media quadratica	F	Sign.
1	Regressione	1226.889	3	408.963	71.333	<.001[b]
	Residuo	1095.029	191	5.733		
	Totale	2321.918	194			

a. Variabile dipendente: PurchaseIntention_composite

b. Predittori: (costante), Reciprocity_composite, Intimacy_composite, Proximity_composite

Coefficienti[a]

Modello		Coefficienti non standardizzati		Coefficienti standardizzati		
		B	Errore standard	Beta	t	Sign.
1	(Costante)	4.389	2.005		2.189	.032
	Intimacy_composite	.065	.061	.111	1.051	.297
	Proximity_composite	.214	.107	.289	1.994	.050
	Reciprocity_composite	.327	.154	.309	2.126	.037

a. Variabile dipendente: PurchaseIntention_composite

The moderating role of social presence was introduced into the regression analysis. Interaction terms were created between social presence and each of the three independent variables, intimacy, proximity, and reciprocity. With the inclusion of these interaction terms, the R-squared value slightly increased to 33.2%, indicating a marginal improvement in the model's explanatory power. However, none of the interaction effects were significant. Social presence did not significantly interact with intimacy ($\beta = 0.004$, $p = 0.384$), proximity ($\beta = 0.003$, $p = 0.774$), or reciprocity ($\beta = 0.015$, $p = 0.138$). This suggests that the presence of a socially interactive element does not notably change how intimacy, proximity, or reciprocity impact purchase intention.

Riepilogo del modello

Modello	R	R-quadrato	R-quadrato adattato	Errore std. della stima
1	.576[a]	.332	.301	2.59359

a. Predittori: (costante), SocialPresence_Reciprocity1, SocialPresence_Intimacy, SocialPresence_Proximity1

ANOVA[a]

Modello		Somma dei quadrati	gl	Media quadratica	F	Sign.
1	Regressione	216.965	3	72.322	10.751	<.001[b]
	Residuo	437.237	65	6.727		
	Totale	654.203	68			

a. Variabile dipendente: PurchaseIntention_composite

b. Predittori: (costante), SocialPresence_Reciprocity1, SocialPresence_Intimacy, SocialPresence_Proximity1

Coefficienti[a]

Modello		Coefficienti non standardizzati		Coefficienti standardizzati		
		B	Errore standard	Beta	t	Sign.
1	(Costante)	10.314	.788		13.090	<.001
	SocialPresence_Intimacy	.004	.004	.095	.877	.384
	SocialPresence_Proximity 1	.003	.009	.091	.288	.774
	SocialPresence_Reciprocity1	.015	.010	.462	1.502	.138

a. Variabile dipendente: PurchaseIntention_composite

5.2. Scenario 2: Television Shopping Experience

In this scenario presents a more traditional setting, where participants are situated as viewers of a television broadcast in which a presenter introduces and demonstrates a product for sale. The presenter's role is to describe the features, benefits, and potential uses of the product, engaging the audience through a one-way communication channel. The aim is to analyze how viewers, without direct interaction, perceive the product's value based on the presenter's demonstration and narrative, and how that influences their purchase decision. This scenario mimics TV shopping channels or infomercials, focusing on the effects of passive observation on consumer behavior.

In Scenario 2, a total of 63 participants engaged in the study. The gender distribution included 36 females, representing 31.6% of the total, 26 males, accounting for 32.5%, and 1 participant who preferred not to disclose their gender, representing 100% of this category.

The correlation analysis revealed different levels of association between the independent variables and purchase intention.

Intimacy demonstrated a weak, non significant correlation with purchase intention ($r = 0.121$, $p = 0.345$), suggesting that while there is a slight positive relationship between intimacy and purchase intention, it is not strong enough to be statistically significant. In

contrast, proximity exhibited a strong, significant positive correlation with purchase intention ($r = 0.690$, $p < 0.001$), indicating that participants who felt a greater sense of closeness with the presenter had a stronger intention to purchase. Similarly, reciprocity was strongly correlated with purchase intention ($r = 0.662$, $p < 0.001$), showing that a heightened perception of reciprocal interaction also led to an increased purchase intention.

Following the correlation analysis, a multiple regression was conducted to further examine the predictive strength of intimacy, proximity, and reciprocity on purchase intention. In the initial model, without the inclusion of the moderating variable (social presence), proximity and reciprocity emerged as significant predictors of purchase intention. Specifically, proximity positively influenced purchase intention ($\beta = 0.444$, $p < 0.001$), as did reciprocity ($\beta = 0.340$, $p = 0.010$). However, intimacy did not significantly predict purchase intention ($\beta = 0.021$, $p = 0.815$), in line with the earlier correlation results.

This model explained 53.4% of the variance in purchase intention, as indicated by the R-squared value. This suggests that while proximity and reciprocity are important factors influencing purchase decisions, other unexplored variables may also contribute to the remaining variance. The statistical significance of the regression model was supported by an ANOVA test ($F = 22.533$, $p < 0.001$), confirming that the independent variables collectively provide a significant explanation of purchase intention.

Riepilogo del modello

Modello	R	R-quadrato	R-quadrato adattato	Errore std. della stima
1	.731[a]	.534	.510	2.46566

a. Predittori: (costante), Reciprocity_composite, Intimacy_composite, Proximity_composite

ANOVA[a]

Modello		Somma dei quadrati	gl	Media quadratica	F	Sign.
1	Regressione	410.962	3	136.987	22.533	<.001[b]
	Residuo	358.689	59	6.079		
	Totale	769.651	62			

a. Variabile dipendente: PurchaseIntention_composite

b. Predittori: (costante), Reciprocity_composite, Intimacy_composite, Proximity_composite

Coefficienti[a]

Modello		Coefficienti non standardizzati		Coefficienti standardizzati		
		B	Errore standard	Beta	t	Sign.
1	(Costante)	.683	1.513		.451	.654
	Intimacy_composite	.014	.061	.021	.235	.815
	Proximity_composite	.362	.104	.444	3.482	<.001
	Reciprocity_composite	.351	.132	.340	2.646	.010

a. Variabile dipendente: PurchaseIntention_composite

Next, the moderating role of social presence was introduced into the regression analysis. Interaction terms were created between social presence and each of the independent variables: intimacy, proximity, and reciprocity. After adding these interaction terms, the R-squared value slightly decreased to 51.6%, reflecting a minor reduction in the model's explanatory power. However, none of the interaction effects were statistically significant. Social presence did not significantly interact with intimacy ($\beta = 0.024$, $p = 0.805$), proximity ($\beta = 0.513$, $p = 0.107$), or reciprocity ($\beta = 0.203$, $p = 0.518$), suggesting that the presence of a socially interactive element did not notably change the influence of intimacy, proximity, or reciprocity on purchase intention.

Riepilogo del modello

Modello	R	R-quadrato	R-quadrato adattato	Errore std. della stima
1	.718[a]	.516	.492	2.51238

a. Predittori: (costante), SocialPresence_Reciprocity1, SocialPresence_Intimacy, SocialPresence_Proximity1

ANOVA[a]

Modello		Somma dei quadrati	gl	Media quadratica	F	Sign.
1	Regressione	397.241	3	132.414	20.978	<.001[b]
	Residuo	372.410	59	6.312		
	Totale	769.651	62			

a. Variabile dipendente: PurchaseIntention_composite

b. Predittori: (costante), SocialPresence_Reciprocity1, SocialPresence_Intimacy, SocialPresence_Proximity1

Coefficienti[a]

Modello		Coefficienti non standardizzati		Coefficienti standardizzati		
		B	Errore standard	Beta	t	Sign.
1	(Costante)	7.695	.686		11.213	<.001
	SocialPresence_Intimacy	.001	.005	.024	.248	.805
	SocialPresence_Proximity1	.017	.011	.513	1.636	.107
	SocialPresence_Reciprocity1	.008	.012	.203	.650	.518

a. Variabile dipendente: PurchaseIntention_composite

In Scenario 2, both proximity and reciprocity emerged as significant predictors of purchase intention. However, intimacy did not show a significant impact on purchase behavior in this context. The introduction of social presence as a moderating factor did not significantly alter the relationships between the independent variables and purchase intention.

5.3. Scenario 3: Conference Product Presentation

In the third scenario, participants are positioned within a conference setting, where a speaker introduces and discusses a product to an audience. Unlike the personalized experience in the metaverse or the direct, visually focused TV broadcast, this environment is more formal and structured, often within a larger group setting. The presenter engages with the audience collectively rather than individually, explaining the product's features and making a case for its value. The objective is to assess how consumers react to a more communal, less personalized experience of product presentations, particularly in a setting where interaction is limited to the group rather than one on one.

In Scenario 3, a total of 63 participants took part, representing 32.3% of the overall sample. This scenario focused on participants interacting within a conference setting, where they attended a presentation of a product with a presenter. The demographic distribution for this scenario indicates that 36 females (31.6%) and 26 males (32.5%) participated, with one participant preferring not to disclose their gender.

The correlation analysis revealed varying degrees of association between the independent variables and Purchase Intention. Intimacy exhibited a weak, non-significant correlation with Purchase Intention ($r = 0.121$, $p = 0.345$), suggesting that intimacy in the virtual

conference had a limited impact on participants' purchase intentions. In contrast, Proximity showed a strong, positive correlation with Purchase Intention ($r = 0.690$, $p < 0.001$), indicating that the perceived closeness to the presenter in the conference had a significant and positive impact on participants' willingness to purchase. Similarly, Reciprocity demonstrated a strong, significant correlation with Purchase Intention ($r = 0.662$, $p < 0.001$), implying that a stronger perception of reciprocal interaction between participants and the presenter increased their purchase intentions. These findings suggest that Proximity and Reciprocity are key drivers of Purchase Intention in this conference setting, indicating that the closer the participants felt to the presenter and the more they perceived a reciprocal relationship, the higher their intention to purchase.

A multiple regression analysis was conducted to further explore the effects of Intimacy, Proximity, and Reciprocity on Purchase Intention. The model explained 68.8% of the variance in Purchase Intention (R-squared = 0.688). The ANOVA results ($F = 43.420$, $p < 0.001$) confirmed the significance of the model, suggesting that the combination of predictors meaningfully explained the variance in purchase intention. Examining the regression coefficients revealed that Intimacy did not significantly predict Purchase Intention ($\beta = 0.057$, $p = 0.493$), indicating that perceived intimacy had no substantial effect on participants' purchasing decisions. Proximity had a positive but non-significant effect on Purchase Intention ($\beta = 0.206$, $p = 0.130$), meaning that although proximity is an important factor, its influence was not statistically significant in this model. Reciprocity emerged as a significant predictor of Purchase Intention ($\beta = 0.626$, $p < 0.001$), demonstrating that perceptions of reciprocity had a strong and positive impact on participants' likelihood to purchase. The regression model explained 68.8% of the variance in Purchase Intention, indicating a strong relationship between the predictor variables and purchase decisions.

Riepilogo del modello

Modello	R	R-quadrato	R-quadrato adattato	Errore std. della stima
1	.830[a]	.688	.672	1.94620

a. Predittori: (costante), Reciprocity_composite, Intimacy_composite, Proximity_composite

ANOVA[a]

Modello		Somma dei quadrati	gl	Media quadratica	F	Sign.
1	Regressione	493.383	3	164.461	43.420	<.001[b]
	Residuo	223.474	59	3.788		
	Totale	716.857	62			

a. Variabile dipendente: PurchaseIntention_composite

b. Predittori: (costante), Reciprocity_composite, Intimacy_composite, Proximity_composite

Coefficienti[a]

Modello		Coefficienti non standardizzati		Coefficienti standardizzati		
		B	Errore standard	Beta	t	Sign.
1	(Costante)	1.205	1.242		.970	.336
	Intimacy_composite	.022	.031	.057	.690	.493
	Proximity_composite	.166	.108	.206	1.537	.130
	Reciprocity_composite	.582	.118	.626	4.934	<.001

a. Variabile dipendente: PurchaseIntention_composite

Next, the moderating role of Social Presence was examined to determine whether it influenced the relationships between Intimacy, Proximity, Reciprocity, and Purchase Intention. Interaction terms were created between Social Presence and each of the independent variables. With the inclusion of these interaction terms, the R-squared value for the model slightly decreased to 67.8%, but it still explained a significant portion of the variance in Purchase Intention. The ANOVA results ($F = 41.349$, $p < 0.001$) confirmed the overall significance of the model. However, when analyzing the interaction terms, Social Presence did not significantly interact with Intimacy ($\beta = 0.125$, $p = 0.176$), Proximity ($\beta = 0.035$, $p = 0.910$), or Reciprocity ($\beta = 0.715$, $p = 0.018$). While Reciprocity showed some interaction, the moderation effect of Social Presence was not robust across all variables. Thus, the presence of a socially interactive element in the metaverse conference did not notably alter the effects of Intimacy, Proximity, or Reciprocity on Purchase Intention, except for a small effect observed with reciprocity.

Overall, Reciprocity was the most influential predictor of Purchase Intention in this scenario, with Proximity also playing a significant role, albeit not statistically in this particular analysis. Social Presence, as a moderating factor, did not significantly impact how these variables influenced purchase intention, except for a minor interaction with Reciprocity.

Riepilogo del modello

Modello	R	R-quadrato	R-quadrato adattato	Errore std. della stima
1	.823[a]	.678	.661	1.97895

a. Predittori: (costante), SocialPresence_Reciprocity1, SocialPresence_Intimacy, SocialPresence_Proximity1

ANOVA[a]

Modello		Somma dei quadrati	gl	Media quadratica	F	Sign.
1	Regressione	485.798	3	161.933	41.349	<.001[b]
	Residuo	231.059	59	3.916		
	Totale	716.857	62			

a. Variabile dipendente: PurchaseIntention_composite

b. Predittori: (costante), SocialPresence_Reciprocity1, SocialPresence_Intimacy, SocialPresence_Proximity1

Coefficienti[a]

Modello		Coefficienti non standardizzati		Coefficienti standardizzati		
		B	Errore standard	Beta	t	Sign.
1	(Costante)	8.815	.584		15.085	<.001
	SocialPresence_Intimacy	.003	.002	.125	1.369	.176
	SocialPresence_Proximity 1	.001	.009	.035	.114	.910
	SocialPresence_Reciprocity1	.024	.010	.715	2.423	.018

a. Variabile dipendente: PurchaseIntention_composite

5.4. Post-Hoc Comparisons: Unpacking the Differences Between Scenarios

In this section, we present the results of the statistical analysis conducted to examine the differences between the three experimental scenarios in relation to the psychological variables of interest: intimacy, proximity, reciprocity, social presence, and purchase intention. After performing an analysis of variance (ANOVA) for each variable, which showed significant differences between the groups, the Tukey HSD Post-Hoc comparison test was applied. This test allows each pair of scenarios to be compared to determine exactly where significant differences occur between participants' perceptions in different contexts. The goal of this analysis is to identify the extent to which different scenarios influence participants' perceptions of the variables under consideration, thus providing a deeper understanding of the psychological dynamics that influence purchase intentions in different shopping environments.

5.4.1. Intimacy

An analysis of variance (ANOVA) was conducted to examine differences in perceived intimacy (Intimacy_composite) across the three experimental scenarios. The results show a

significant effect of the scenario on participants' perception of intimacy, with an F-value of 9.631 and a p-value of less than 0.001. This suggests that the level of intimacy perceived by participants varied significantly depending on the scenario to which they were exposed.

A Tukey HSD post-hoc test was used to explore pairwise differences between the scenarios. It was found that there was a significant difference in perceived intimacy between Scenario 1 and Scenario 3 (Mean difference = -4.64734, $p < 0.001$), with participants in Scenario 3 reporting significantly higher levels of intimacy compared to those in Scenario 1. Similarly, a significant difference was noted between Scenario 2 and Scenario 3 (Mean difference = -4.32540, $p = 0.001$), indicating that participants in Scenario 3 also reported higher levels of intimacy compared to those in Scenario 2. However, no significant difference in intimacy was observed between Scenario 1 and Scenario 2 ($p = 0.959$).

The average levels of intimacy perceived in each scenario were: Scenario 1 (Mean = 3.9638), Scenario 2 (Mean = 4.2857), and Scenario 3 (Mean = 8.6111). These results suggest that participants in Scenario 3 perceived significantly higher levels of intimacy than those in the other two scenarios. The lack of significant difference between Scenario 1 and Scenario 2 suggests that these two scenarios produced similar intimacy perceptions.

Effect size metrics were calculated to assess the magnitude of these differences, with the results showing a moderate effect size. Eta-squared was 0.091, indicating that approximately 9.1% of the variance in intimacy was explained by the scenario differences. Epsilon-squared was 0.082, while Omega-squared for the fixed effect was 0.081, both of which also suggest moderate effects. Omega-squared for the random effect was lower at 0.042, indicating a small to moderate effect when accounting for random factors.

The significant increase in intimacy observed in Scenario 3 implies that the characteristics of this scenario may foster a stronger sense of closeness and connection between participants and the communicator. The moderate effect sizes underline the practical relevance of this difference, while the lack of a significant difference between Scenario 1 and Scenario 2 suggests that the elements of intimacy in these conditions are comparable.

ANOVA

Intimacy_composite

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	864.577	2	432.288	9.631	<.001
Within Groups	8617.739	192	44.884		
Total	9482.315	194			

ANOVA Effect Sizes[a]

		Point Estimate	95% Confidence Interval Lower	Upper
Intimacy_composite	Eta-squared	.091	.024	.169
	Epsilon-squared	.082	.014	.160
	Omega-squared Fixed-effect	.081	.014	.160
	Omega-squared Random-effect	.042	.007	.087

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

Multiple Comparisons

Dependent Variable: Intimacy_composite

Tukey HSD

(I) Scenario	(J) Scenario	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Scenario 1	Scenario 2	-.32195	1.16745	.959	-3.0795	2.4356
	Scenario 3	-4.64734*	1.16745	<.001	-7.4049	-1.8898
Scenario 2	Scenario 1	.32195	1.16745	.959	-2.4356	3.0795
	Scenario 3	-4.32540*	1.19369	.001	-7.1449	-1.5059
Scenario 3	Scenario 1	4.64734*	1.16745	<.001	1.8898	7.4049
	Scenario 2	4.32540*	1.19369	.001	1.5059	7.1449

*. The mean difference is significant at the 0.05 level.

Intimacy_composite

Tukey HSD[a,b]

Scenario	N	Subset for alpha = 0.05 1	2
Scenario 1	69	3.9638	
Scenario 2	63	4.2857	
Scenario 3	63		8.6111
Sig.		.960	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 64.881.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

5.4.2. Proximity

The ANOVA revealed a significant difference in perceived proximity across the three scenarios, with an F-value of 3.810 and a p-value of 0.024, indicating that participants' proximity perceptions varied significantly depending on the scenario. Post-hoc Tukey HSD comparisons showed a significant difference between Scenario 1 and Scenario 2 (Mean difference = 1.81504, p = 0.039), with participants in Scenario 1 perceiving higher proximity

than those in Scenario 2. No significant difference in proximity was found between Scenario 1 and Scenario 3 ($p = 0.997$), or between Scenario 2 and Scenario 3 ($p = 0.053$), though the latter approached significance.

The average levels of perceived proximity were: Scenario 1 (Mean = 18.2754), Scenario 2 (Mean = 16.4603), and Scenario 3 (Mean = 18.2222). The results indicate that participants in Scenario 1 and Scenario 3 perceived similar levels of proximity, while those in Scenario 2 reported significantly lower proximity.

Effect size calculations showed a small effect, with Eta-squared at 0.038, indicating that approximately 3.8% of the variance in proximity was explained by the scenarios. Epsilon-squared was 0.028, and Omega-squared for the fixed effect was 0.028, both suggesting small effects. Omega-squared for the random effect was 0.014, reinforcing the small effect size.

The significant difference between Scenario 1 and Scenario 2 suggests that the conditions in these scenarios influenced participants' perceptions of proximity. However, the small effect sizes indicate that the practical impact may be limited, with proximity likely being influenced by additional factors not captured in the current design.

The significant difference in proximity between Scenario 1 and Scenario 2 suggests that the experimental conditions in these scenarios influence participants' perceptions of proximity. The small effect sizes, however, indicate that while the differences are statistically significant, their practical impact may be limited.

The absence of a significant difference between Scenario 1 and Scenario 3 implies that participants in these scenarios perceive proximity in a similar way, whereas Scenario 2 tends to produce lower proximity perceptions overall.

While the ANOVA results highlight a significant scenario effect, the small effect sizes suggest that proximity is likely influenced by other factors not captured in the current experimental setup. Future studies could explore additional variables that may contribute to proximity perception or examine the elements within Scenario 2 that lead to the lower proximity ratings.

ANOVA

Proximity_composite

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	136.687	2	68.344	3.810	.024
Within Groups	3444.308	192	17.939		
Total	3580.995	194			

ANOVA Effect Sizes[a,b]

		Point Estimate	95% Confidence Interval Lower	Upper
Proximity_composite	Eta-squared	.038	.000	.098
	Epsilon-squared	.028	-.010	.088
	Omega-squared Fixed-effect	.028	-.010	.088
	Omega-squared Random-effect	.014	-.005	.046

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.

Multiple Comparisons

Dependent Variable: Proximity_composite

Tukey HSD

(I) Scenario	(J) Scenario	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Scenario 1	Scenario 2	1.81504*	.73806	.039	.0717	3.5584
	Scenario 3	.05314	.73806	.997	-1.6902	1.7965
Scenario 2	Scenario 1	-1.81504*	.73806	.039	-3.5584	-.0717
	Scenario 3	-1.76190	.75465	.053	-3.5444	.0206
Scenario 3	Scenario 1	-.05314	.73806	.997	-1.7965	1.6902
	Scenario 2	1.76190	.75465	.053	-.0206	3.5444

*. The mean difference is significant at the 0.05 level.

Proximity_composite

Tukey HSD[a,b]

Scenario	N	Subset for alpha = 0.05 1	2
Scenario 2	63	16.4603	
Scenario 3	63		18.2222
Scenario 1	69		18.2754
Sig.		1.000	.997

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 64.881.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

5.4.3. Reciprocity

The ANOVA showed a significant difference in perceived reciprocity across the three scenarios, with an F-value of 4.903 and a p-value of 0.008. Post-hoc comparisons revealed a significant difference between Scenario 1 and Scenario 2 (Mean difference = 1.81159, p =

0.006), with participants in Scenario 1 reporting higher levels of reciprocity than those in Scenario 2. No significant differences were found between Scenario 1 and Scenario 3 ($p = 0.452$) or between Scenario 2 and Scenario 3 ($p = 0.151$).

The average levels of perceived reciprocity were: Scenario 1 (Mean = 17.8116), Scenario 2 (Mean = 16.0000), and Scenario 3 (Mean = 17.1111). The results indicate that participants in Scenario 1 perceived higher reciprocity than those in Scenario 2, while perceptions in Scenario 3 were similar to those in both Scenarios 1 and 2.

Effect size results showed moderate effects, with Eta-squared at 0.049, suggesting that approximately 4.9% of the variance in reciprocity was due to scenario differences. Epsilon-squared was 0.039, and Omega-squared for the fixed effect was 0.038, both indicating moderate effects. Omega-squared for the random effect was 0.020, pointing to a small to moderate effect when accounting for random factors.

The higher reciprocity levels reported in Scenario 1 suggest that this scenario may better facilitate a sense of mutual exchange. However, the moderate effect sizes indicate that additional factors may influence reciprocity perceptions across scenarios.

The significant difference in perceived reciprocity between Scenario 1 and Scenario 2 suggests that the experimental conditions in these scenarios have a notable impact on participants' perception of reciprocity. The moderate effect sizes reinforce the practical relevance of this difference, although the lack of significant differences between Scenario 1 and Scenario 3 or between Scenario 2 and Scenario 3 suggests that reciprocity is perceived similarly in these cases.

The higher levels of reciprocity perceived in Scenario 1 may indicate that this scenario facilitates a greater sense of mutual exchange or responsiveness between participants and the communicator. However, the relatively small effect sizes suggest that other factors may also influence reciprocity perception, beyond the experimental conditions alone.

Future research could further investigate the elements within Scenario 1 that contribute to higher reciprocity, as well as explore additional variables that may mediate this perception across the scenarios.

ANOVA

Reciprocity_composite

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	109.227	2	54.614	4.903	.008
Within Groups	2138.773	192	11.139		
Total	2248.000	194			

ANOVA Effect Sizes[a,b]

		Point Estimate	95% Confidence Interval Lower	Upper
Reciprocity_composite	Eta-squared	.049	.004	.113
	Epsilon-squared	.039	-.007	.104
	Omega-squared Fixed-effect	.038	-.007	.103
	Omega-squared Random-effect	.020	-.003	.054

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.

Multiple Comparisons

Dependent Variable: Reciprocity_composite

Tukey HSD

(I) Scenario	(J) Scenario	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Scenario 1	Scenario 2	1.81159*	.58160	.006	.4378	3.1854
	Scenario 3	.70048	.58160	.452	-.6733	2.0742
Scenario 2	Scenario 1	-1.81159*	.58160	.006	-3.1854	-.4378
	Scenario 3	-1.11111	.59467	.151	-2.5157	.2935
Scenario 3	Scenario 1	-.70048	.58160	.452	-2.0742	.6733
	Scenario 2	1.11111	.59467	.151	-.2935	2.5157

*. The mean difference is significant at the 0.05 level.

Reciprocity_composite

Tukey HSD[a,b]

Scenario	N	Subset for alpha = 0.05 1	2
Scenario 2	63	16.0000	
Scenario 3	63	17.1111	17.1111
Scenario 1	69		17.8116
Sig.		.143	.457

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 64.881.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

5.4.4. Social Presence

The ANOVA revealed a significant difference in perceived social presence across the three scenarios, with an F-value of 3.120 and a p-value of 0.046. Post-hoc comparisons showed a significant difference in social presence between Scenario 1 and Scenario 2 (Mean difference

= 1.72809, p = 0.042), with participants in Scenario 1 reporting higher levels of social presence. No significant differences were observed between Scenario 1 and Scenario 3 (p = 0.796) or between Scenario 2 and Scenario 3 (p = 0.191).

The average levels of perceived social presence were: Scenario 1 (Mean = 12.1884), Scenario 2 (Mean = 10.4603), and Scenario 3 (Mean = 11.7302). These results indicate that participants in Scenario 1 perceived higher social presence compared to Scenario 2, while perceptions in Scenario 3 were similar to the other scenarios.

Effect sizes were small, with Eta-squared at 0.031, suggesting that 3.1% of the variance in social presence was explained by the scenarios. Epsilon-squared was 0.021, and Omega-squared for the fixed effect was 0.021, both pointing to small effects. Omega-squared for the random effect was 0.011, reinforcing the small effect size.

The significant difference in perceived social presence between Scenario 1 and Scenario 2 suggests that the conditions in Scenario 1 facilitate a greater perception of being socially present compared to Scenario 2. However, the absence of significant differences between Scenario 1 and Scenario 3, as well as between Scenario 2 and Scenario 3, suggests that these scenarios are perceived similarly in terms of social presence.

The small effect sizes indicate that while the differences in social presence are statistically significant, their practical impact is limited. This suggests that social presence is likely influenced by other factors beyond the experimental scenarios. Further research could explore additional variables that may contribute to participants' perception of social presence across different contexts.

ANOVA

SocialPresence_composite

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	104.073	2	52.036	3.120	.046
Within Groups	3202.614	192	16.680		
Total	3306.687	194			

ANOVA Effect Sizes[a,b]

		Point Estimate	95% Confidence Interval Lower	Upper
SocialPresence_composite	Eta-squared	.031	.000	.087
	Epsilon-squared	.021	-.010	.078
	Omega-squared Fixed-effect	.021	-.010	.077
	Omega-squared Random-effect	.011	-.005	.040

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.

Multiple Comparisons

Dependent Variable: SocialPresence_composite

Tukey HSD

(I) Scenario	(J) Scenario	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Scenario 1	Scenario 2	1.72809*	.71169	.042	.0470	3.4091
	Scenario 3	.45825	.71169	.796	-1.2228	2.1393
Scenario 2	Scenario 1	-1.72809*	.71169	.042	-3.4091	-.0470
	Scenario 3	-1.26984	.72769	.191	-2.9887	.4490
Scenario 3	Scenario 1	-.45825	.71169	.796	-2.1393	1.2228
	Scenario 2	1.26984	.72769	.191	-.4490	2.9887

*. The mean difference is significant at the 0.05 level.

SocialPresence_composite

Tukey HSD[a,b]

Scenario	N	Subset for alpha = 0.05 1	2
Scenario 2	63	10.4603	
Scenario 3	63	11.7302	11.7302
Scenario 1	69		12.1884
Sig.		.182	.799

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 64.881.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

5.4.5. Purchase Intention

The ANOVA revealed a significant difference in purchase intention across the three scenarios, with an F-value of 8.126 and a p-value of less than 0.001. Post-hoc comparisons showed a significant difference in purchase intention between Scenario 1 and Scenario 2 (Mean difference = 2.05935, p = 0.001), with Scenario 1 reporting higher purchase intention. Similarly, a significant difference was observed between Scenario 2 and Scenario 3 (Mean difference = -2.06349, p = 0.002), with Scenario 3 showing higher purchase intention than

Scenario 2. No significant difference was found between Scenario 1 and Scenario 3 (p = 1.000).

The average levels of purchase intention were: Scenario 1 (Mean = 14.3768), Scenario 2 (Mean = 12.3175), and Scenario 3 (Mean = 14.3810). The results indicate that Scenario 2 produced significantly lower purchase intentions compared to Scenarios 1 and 3, which had similar purchase intention levels.

Effect size calculations revealed moderate effects, with Eta-squared at 0.078, indicating that 7.8% of the variance in purchase intention was due to scenario differences. Epsilon-squared was 0.068, and Omega-squared for the fixed effect was 0.068, both indicating moderate effects. Omega-squared for the random effect was 0.035, suggesting a smaller effect when accounting for random factors.

The significant differences in purchase intention between Scenario 1 and Scenario 2, as well as Scenario 2 and Scenario 3, indicate that the experimental conditions significantly impact participants' willingness to make a purchase. The moderate effect sizes suggest that the differences observed are not only statistically significant but also practically relevant.

Participants in Scenario 2 consistently reported lower levels of purchase intention compared to the other two scenarios, which may indicate that elements within Scenario 2 are less effective in driving purchase intention. In contrast, Scenario 1 and Scenario 3 showed similar levels of purchase intention, suggesting that these two scenarios may contain similar elements that promote a higher inclination toward making a purchase.

ANOVA

PurchaseIntention_composite

	Somma dei quadrati	df	Media quadratica	F	Sig.
Tra gruppi	181.207	2	90.604	8.126	<.001
Entro i gruppi	2140.711	192	11.150		
Totale	2321.918	194			

Dimensioni effetto ANOVA[a]

		Stima del punto	Intervallo di confidenza 95% Inferiore	Superiore
PurchaseIntention_composite	Eta quadratico	.078	.017	.153
	Epsilon quadratico	.068	.007	.144
	Effetto fisso omega quadratico	.068	.007	.143
	Effetto casuale omega quadratico	.035	.003	.077

a. Eta quadratico e epsilon quadratico vengono stimati in base al modello a effetto fisso.

Confronti multipli

Variabile dipendente: PurchaseIntention_composite

HSD di Tukey

(I) Scenario	(J) Scenario	Differenza della media (I–J)	Errore std.	Sig.	Intervallo di confidenza 95% Limite inferiore	Limite superiore
Scenario 1	Scenario 2	2.05935*	.58186	.001	.6850	3.4337
	Scenario 3	-.00414	.58186	1.000	-1.3785	1.3702
Scenario 2	Scenario 1	-2.05935*	.58186	.001	-3.4337	-.6850
	Scenario 3	-2.06349*	.59494	.002	-3.4688	-.6582
Scenario 3	Scenario 1	.00414	.58186	1.000	-1.3702	1.3785
	Scenario 2	2.06349*	.59494	.002	.6582	3.4688

*. La differenza della media è significativa al livello 0.05.

PurchaseIntention_composite

HSD di Tukey[a,b]

Scenario	N	Sottoinsieme per alfa = 0.05 1	2
Scenario 2	63	12.3175	
Scenario 1	69		14.3768
Scenario 3	63		14.3810
Sig.		1.000	1.000

Vengono visualizzate le medie per i gruppi nei sottoinsiemi omogenei.

a. Utilizza dimensione del campione della media armonica = 64.881.

b. Le dimensioni dei gruppi non sono uguali. Viene utilizzata la media armonica delle dimensioni dei gruppi. I livelli di errore di tipo I non sono garantiti.

Chapter 6: Discussion

The objective of this study was to explore how intimacy, proximity, and reciprocity influence purchase intention across different purchase environments—specifically, the metaverse, television shopping, and conference product presentations. The results reveal important insights into the dynamics of consumer behavior in each scenario, providing a clearer understanding of which psychological factors play a more substantial role in shaping purchase intentions in digital and virtual contexts.

Scenario 1: Metaverse Shopping Experience

In the metaverse shopping experience, proximity and reciprocity were significant predictors of purchase intention, while intimacy was not. This suggests that consumers in a highly immersive, interactive environment such as the metaverse place greater value on the sense of closeness to the brand representative (or avatar) and the mutual benefits of the interaction. The absence of a significant relationship between intimacy and purchase intention aligns with

recent research on virtual commerce, where the functional aspects of interaction (e.g., proximity and reciprocity) tend to outweigh emotional factors (Liberman & Trope, 2008; Joerß, 2021).

The weak correlation between intimacy and purchase intention may also be due to the mediated nature of the metaverse, where emotional bonds may not develop as easily as in face-to-face settings. The metaverse, while immersive, lacks some of the natural cues found in real-world interactions, which could explain why emotional closeness is not as critical as proximity or reciprocity in this environment. This also reflects Bagozzi's (1995) arguments that direct reciprocity can play a more pivotal role in digital transactions where trust is paramount (Bagozzi, 1995). Moreover, the lack of significant interaction between social presence and the independent variables suggests that the mere presence of a social element (such as an avatar) does not enhance the effects of intimacy, proximity, or reciprocity on purchase intention. This could imply that while social presence is essential for engagement in virtual spaces, its impact on consumer decision-making in the metaverse is relatively limited.

Scenario 2: Television Shopping Experience

In the television shopping experience, both proximity and reciprocity again emerged as significant predictors of purchase intention, but intimacy was not. Interestingly, the strength of the proximity effect was higher in this scenario than in the metaverse, indicating that consumers in a one-way communication environment (e.g., a television broadcast) may rely more heavily on how close they feel to the presenter. This finding aligns with research on parasocial relationships, where viewers form pseudo-relationships with media figures and base their purchasing decisions on the perceived proximity or "closeness" of the presenter (Biocca, Harms, & Burgoon, 2003).

The non-significant role of intimacy here reinforces the idea that emotional closeness may not be a primary driver of purchase decisions in non-personal, mediated environments. In the context of television shopping, where interactions are not reciprocal but rather one-sided, proximity and reciprocity become more relevant to consumers as they rely on cues of trust and credibility rather than emotional connection.

As with Scenario 1, the introduction of social presence did not significantly alter the relationships between the independent variables and purchase intention. This suggests that, similar to the metaverse environment, social presence in a television shopping setting does not significantly moderate the effects of intimacy, proximity, or reciprocity. This might indicate that consumers' purchasing decisions in this context are driven more by content and interaction quality than by the perceived social element.

Scenario 3: Conference Product Presentation

In the conference setting, proximity and reciprocity were again significant predictors of purchase intention, with reciprocity having the strongest effect. This suggests that in more formal, group-based environments like conferences, consumers still value the sense of mutual exchange and proximity, even if the setting is less personalized. The strong effect of reciprocity aligns with previous literature emphasizing the importance of fairness and mutual exchange in driving consumer decisions in formal presentations (Bagozzi, 1995).

However, intimacy did not significantly impact purchase intention, consistent with the findings from the other scenarios. The formal nature of a conference, where interaction is often limited to one-to-many communication, may reduce the importance of emotional closeness, focusing instead on the transactional aspects of the interaction (e.g., the exchange of information and perceived reciprocity).

In this scenario, social presence showed a small but significant interaction with reciprocity, suggesting that in a formal group setting, the perceived presence of others might slightly enhance the effect of reciprocity on purchase intention. This could imply that in environments like conferences, where social dynamics are more apparent, social presence may have a minor impact on how consumers perceive the reciprocity of the exchange.

Post-Hoc Comparisons Across Scenarios

The post-hoc analysis revealed significant differences in how participants perceived intimacy, proximity, reciprocity, and social presence across the three scenarios. Participants in Scenario 3 (conference) reported the highest levels of intimacy, suggesting that even in less personalized settings, the structured nature of the presentation may foster a greater sense

of closeness with the presenter. In contrast, participants in Scenario 2 (television shopping) reported the lowest levels of proximity and reciprocity, indicating that the passive nature of this environment may hinder consumers' ability to feel close to the presenter or perceive the interaction as reciprocal. Interestingly, purchase intention was significantly lower in Scenario 2 compared to the other two scenarios, which implies that the lack of direct interaction in television shopping may reduce consumers' likelihood to purchase. This finding underscores the importance of interactivity and mutual exchange in driving purchase intentions, as demonstrated by the higher purchase intention levels in Scenarios 1 (metaverse) and 3 (conference).

This study demonstrates that proximity and reciprocity are consistent predictors of purchase intention across different shopping environments, while intimacy plays a less significant role. The findings highlight the importance of interactive elements that foster a sense of closeness and mutual exchange, particularly in virtual environments like the metaverse. These insights offer practical implications for marketers seeking to optimize consumer engagement and purchase intention in evolving digital spaces.

Chapter 7: Limitations and future research

This study provides crucial insights for managers, especially those working in digital marketing and consumer engagement across various shopping enviroments. However, several limitations open the door for future exploration. A primary limitation lies in the relative small sample size, especially since the sample was divided across three different scenarios, reducing the statistical power to detect smaller but potentially important effects, such as the moderating role of social presence. For future reserch, it will be important to work with larger and more diverse samples to increase the generalizability of these results.

Another limitation of my study is that only one single interaction, in each purchase scenario, is captured. However, in the real word consumers often interact multiple times, with a brand or a product, before making purchase decisions. This single interaction may not capture the complexity and the dynamism of consumer behaviour, especially in virtual enviroments, such as the metaverse, where people may explore and interact repeatedly, and their perception and decisions may change or evolve over time. Future research should explore how continuous

and repeated interactions affect consumer behavior, leading to a more comphensive and dynamic understanding of the buying process. The measurement of social presence also presents limitations. While social presence was included as a moderator, it did not significantly influence the relationships between the key variables and purchase intention in most cases. This could be attributed to the way social presence was measured or to the limited opportunities for interaction in the experimental setup. Refining the measurement and exploring more interactive settings could lead to a deeper understanding of how social presence affects consumer decisions. Moreover, the study did not consider other psychological factors, such as trust or perceived authenticity, which are critical in both virtual and traditional shopping environments. Expanding the model to include these factors in future research would provide a more comprehensive understanding of consumer behavior.

Additionally, the metaverse shopping experience explored in the study may not generalize across all virtual platforms. Different metaverse environments offer varying degrees of immersion and interactivity, which could influence consumer perceptions differently. Future research should consider the broader context of different digital platforms and technologies to understand how they impact purchase intention. This would also open up opportunities to investigate cultural differences, as psychological constructs like intimacy and proximity may have varying effects across different cultural contexts.

Further research could also benefit from a longitudinal approach, exploring how consumers' perceptions evolve with repeated interactions in both virtual and traditional shopping environments. Understanding how continuous engagement with avatars or presenters affects purchase intention over time would add depth to current findings. Moreover, future studies could delve into real-world applications of the metaverse, where actual purchases are made, and virtual reality technology is employed to offer more realistic simulations. This would help bridge the gap between theoretical findings and practical applications.

Exploring additional moderating factors, such as technological familiarity, product involvement, or the level of interactivity, would provide a more nuanced understanding of consumer engagement. Likewise, future research should investigate the role of trust and authenticity in virtual transactions, particularly in the context of the metaverse, where avatar design and platform transparency may play significant roles. Additionally, comparative

studies across various digital platforms, such as social media shopping or live-streaming commerce, would offer valuable insights into how different channels influence consumer behavior and purchase intentions.

In summary, while this study provides important insights into how intimacy, proximity, and reciprocity influence consumer purchase intentions across various shopping environments, future research can build on these findings by addressing the limitations related to sample size, interaction dynamics, measurement of social presence, and the inclusion of additional psychological factors. Expanding the scope of research to explore cross-platform, longitudinal, and culturally diverse contexts will contribute to a more comprehensive understanding of consumer behavior in both traditional and virtual shopping experiences.

Chapter 8: Managerial implications

The results of this study present several key insights for managers, particularly in the area of digital marketing and consumer engagement within retail environments. From the perspective of managerial implications, the results of the study suggest that, in general, feelings of reciprocity and proximity increase purchase intention in all scenarios.

This finding signals the need to implement actions to increase the feeling of reciprocity and proximity, as this would increase purchase intention. Comparing the different scenarios, the study shows that reciprocity is more effectively promoted in the metaverse than in more traditional formats such as TV shopping. The personalized and immersive nature of the metaverse creates a stronger sense of mutual exchange between the consumer and the brand. In the metaverse, consumers can interact with avatars or the virtual sales assistant in real time, which leads to a greater perception of reciprocity, an essential driver of purchase intention.

This contrasts with the unidirectional communication style typical of TV shopping, in which the presenter introduces the product but has no direct, interactive engagement with the audience.

Proximity, which can be defined as the feeling of closeness to the product, was also significantly greater in the metaverse than in the television environment. The interactive and immersive nature of virtual environments, where consumers can explore products, simulate

actions with real words, and interact with digital avatars, creates a more personal and immersive experience. This sense of closeness is more difficult to replicate in a passive TV shopping experience, where the lack of interactivity limits the consumer's ability to feel connected to the product or brand.

Based on the results, by investing in interactive and personalized experiences within virtual environments, managers can improve consumer engagement and increase the likelihood of purchase. Given the clear advantages of the metaverse over traditional platforms, companies should prioritize its integration into their digital marketing strategies, ensuring that they stay ahead of the changing consumer landscape.

References

Abumalloh, R. A. (2024). The relationship between technology trust and behavioral intention to use Metaverse in baby monitoring systems' design: Stimulus-Organism-Response (SOR) theory. . *Entertainment Computing*.

Arena, F., Collotta, M., Pau, G., & Termine, F. (2022). An Overview of Augmented Reality. *Computers* .

B., H., & Furtado, R. (2019). How Consumer's Personal Reciprocity Influences Future Purchase Intention of Consumer Durables: An Empirical Study. *IUP Journal of Brand Management, 16*(4), p. 45–63.

Babić Rosario, A. S. (2016). The effect of electronic word of mouth on sales: A meta-analytic review of platform, product, and metric factors. *Journal of Marketing Research, 53*(3), 297–318.

Bagozzi, R. (1995). Reflections on relationship marketing in consumer markets. *Journal of the Academy of Marketing Science*, 272-277.

Ball, M. (2022). *The metaverse: And how it will revolutionize everything.* New York: Liveright Publishing Corporation.

Biocca, F., Harms, C., & Burgoon, J. K. (2003). Toward a more robust theory and measure of social presence: review and suggested criteria. *Teleoperat.Virtu. Environ., 12*, 456–480.

Birnbaum, M. H. (2004). Human research and data collection via the Internet. *Annual Review of Psychology, 55*, 803–832.

Bonsu, S. K., & Darmody, A. (2008). Co-creating Second Life: Market—Consumer Cooperation in Contemporary Economy. *Journal of Macromarketing, 28*(4), 355-368.

Bozkurt, S., & Gligor, D. (2021). Distinguishing between the impact of social media public and private compliments on customers' future service recovery expectations. *Journal of Retailing and Consumer Services, Volume 60, 2021, 102448,.*

Chang, T.-S., & Hsiao, W.-H. (2013). Factors influencing intentions to use social recommender systems: a social exchange perspective. *CyberPsychology, Behavior & Social Networking, Vol. 16* (No. 5), pp. 357-363.

Chen, H. Z. (2021). How do interpersonal interaction factors affect buyers' purchase intention in live stream shopping? The mediating effects of swift guanxi. *Internet Research, Vol. 31*, 1744-1766.

Chen, T. H. (2024). The Impact of Virtual Shopping Presentation Modes on Consumer Satisfaction and Purchase Intention. *Business, Government and Organizations. , vo 14720*.

Cheng, X. G. (2020). Interpersonal relationship building in social commerce communities: considering both swift guanxi and relationship commitment. *Electronic Commerce Research,, Vol. 20* (1), pp. 53-80.

Cohen, S., & Bailey, D. (1997). What makes team work: Group effectiveness research from the shop floor to the executive suite. *Journal of Management, volume 23*, p. 239 - 290 .

Cole, H., & Griffiths, M. D. (2007). Social interactions in massively multiplayer online role-playing gamers. *CyberPsychology & Behavior, 10(4), 575–583., 10*(4), 575–583.

Cook, T. D., & Campbell, D. T. (1979). *Quasi-Experimentation: Design and Analysis Issues for Field Settings. .* Houghton Mifflin.

Cowan, K., & Ketron, S. (2019). A dual model of product involvement for effective virtual reality: The roles of imagination, co-creation, telepresence, and interactivity. . *Journal of Business Research.*

Cowan, S., Lim, S., & Alycia, C. e. (n.d.). Lifestyle management in polycystic ovary syndrome – beyond diet and physical activity. *BMC Endocr Disord, 23*(14).

Dandurand, F., Shultz, T., & Onishi, K. (2008, May). Comparing online and lab methods in a problem-solving experiment. *Behav Res Methods, 40*(2), 428-434.

Daugherty, T., Eastin, M. S., & Bright, L. (2008). Exploring Consumer Motivations for Creating User-Generated Content. *Journal of Interactive Advertising, 8*(2), 16–25.

De Regt, A., Plangger, K., & Barnes, S. (2021). Virtual reality marketing and customer advocacy: Transforming experiences from story-telling to story-doing. . *Journal of Business Research*, 513-522.

Deepa, B. G. (2023). Proficiency of Metaverse using virtual reality for industry and users perspective. In Augmented and virtual reality in industry 5.0 De Gruyter. https://do. (pp. 99-126).

DeSouza, C. (2016, April). *Mixed reality – AR, VR, and holograms for the medical industry.* From Real Vision.: http://realvision.ae/blog/2016/04/mixed-reality-ar-vr-holograms-medical/

Dougherty, D. (1992). Interpretive barriers to successful product innovation in large firms . *Organization Science, volume 3* , p. 179 - 202 .

Dwivedi, Y. K.-N.-D. (2022). Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*.

Dwyer, R. J. (2023). *Digitalization and Management Innovation II: Proceedings of DMI. .* Ios Press.

Emerson, R. (1976). Social exchange theory. *Annual Review of Sociology, Vol. 2*, pp. 335-362.

Faraj, S., & Johnson, S. (2011). Network exchange patterns in online communities. *Organization Science, Vol. 22* (No. 6), pp. 1464-1480.

Farshid, M. P. (2018). Go boldly!: Explore augmented reality (AR), virtual reality (VR), and mixed reality (MR) for business. . *Business Horizons*, 657-663.

Fornell, C. &. (1981, Febraury). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. . *Journal of Marketing Research (JMR), 18*, 9–50. 12p. 1 Diagram.

Fournier, S. (1998). Consumers and their brands: Developing relationship theory in consumer research. *Journal of Consumer Research, 24*(4), 343–373.

France, C., Merrilees, B., & Miller, D. (n.d.). An integrated model of customer-brand engagement: Drivers and consequences. . *J Brand Manag 23*, 119–136 .

Galvez, J., Mejuto, J., & Simal-Gandara, J. (2018). Future challenges on the use of blockchain for food traceability analysis. *TrAC Trends Anal. Chem.* , 222–232.

Giakoumaki, C. &. (2020). Brand engagement in self-concept and consumer engagement in social media: The role of the source. *Psychology & Marketing, 37*(3), 457–465.

Gouldner, A. (1960). The norm of reciprocity: a preliminary statement. *American Sociological Review, Vol. 25* (No. 2), pp. 161-178.

Grupac, M., & Roiu., G. (2022). Image processing computational algorithms, sensory data mining techniques, and predictive customer analytics in the metaverse economy. *Review of Contemporary Philosophy, 21*, pp. 205-222.

GSMA. (2022, February 28). *GSMA Association.* From Exploring the metaverse and digital future. : https://www.gsma.com/asia-pacific/wp-content/uploads/2022/02/270222-Exploring-the-metaverse-and-the-digital-future.pdf.

Hair, J. F. (2009). Multivariate Data Analysis. . *Prentice Hall.*

Hair, J., Black, W., Babin, B., & Anderson, R. (2010). Multivariate Data Analysis. *7th Edition*.

Hau, Y., Kim, B., Lee, H., & Kim, Y. (n.d.). The effects of individual motivations and social capital on employees' tacit and explicit knowledge sharing intentions",. *International Journal of Information Management, Vol. 33* (No. 2), pp. 356-366.

Hazan, E. K. (2022). Marketing in the metaverse: An opportunity for innovation and experimentation. *McKinsey & Company*.

Hollebeek, L. (2011). Demystifying Customer Brand Engagement: Exploring the Loyalty Nexus. *Journal of Marketing Management, 27*, 785-807.

Hollensen, S. K. (2022). Metaverse – the new marketing universe. *Journal of Business Strategy*.

Huo, R. Z. (2022). A comprehensive survey on blockchain in industrial internet of things: Motivations, research progresses, and future challenges. *IEEE Communications Surveys*.

Joerß, T. H. (2021). Digitalization as solution to environmental problems? When users rely on augmented reality-recommendation agents. *J. Bus. Res.* , 510–523.

K, G., & T., A. (1999). The dark side of long-term relationships in marketing services. 132–141.

Kankanhall, A., Tan, B., & Wei, K.-K. (2005). Contributing knowledge to electronic knowledge repositories: an empirical investigation. *MIS Quarterly, Vol. 29* (1), pp. 113-143.

Kelly, S. M. (2021, October 28). *Facebook changes its company name to Meta.* From CNN Business.: https://www.cnn.com/2021/10/28/tech/facebook-mark-zuckerberg-keynote-announcements/index.html

Kim, M. J., Lee, C. K., & Jung, T. (2020). Exploring consumer behavior in virtual reality tourism using an extended stimulus-organism-response model. *Journal of Travel Research, 59*(1), 69-89.

Kye B, H. N. (2021). Educational applications of metaverse: possibilities and limitations. . *J Educ Eval Health Prof.*

Lai, H., & Chen, T. (2014). Knowledge sharing in interest online communities: a comparison of posters and lurkers. *Computers in Human Behavior, Vol. 35*, pp. 295-306.

Lee Y, K. O. (2011). Intimacy, familiarity and continuance intention: an extended expectation–confirmation model in web-based services. *Electron Commer Res*, 342–357.

Lee, H., Xu, Y., & Porterfield, A. (2022). Antecedents and moderators of consumer adoption toward AR-enhanced virtual try-on technology: A stimulus-organism-response approach . *International Journal of Consumer Studies, 46*(4), 1319-1338 .

Lee, K. M., Peng, W., & Jin, S. A. (2006). Can robots manifest personality?: An empirical test of personality recognition, social responses, and social presence in human–robot interaction. *Journal of Communication, 56*(4), 754-772.

Leung, W. K. (2019). Impacts of user interactions on trust development in C2C social commerce: The central role of reciprocity. *Internet Research*, 1124-1147.

Liberman, N., & Trope, Y. (2008). The psychology of transcending the here and now. *Science, 322(5905)*, 1201–1205.

Liberman, N., Trope, Y., & Stephan, E. (2007). *Psychological distance.* (Vols. Soc. Psychol.: Handbook of Basic Principles 2,).

Lombard, M., & Ditton, T. (1997, September 1). At the Heart of It All: The Concept of Presence. *Journal of Computer-Mediated Communication, Volume 3*(Issue 2).

Malhotra, N. H. (2007). Essentials of Marketing Research, An Applied Orientation. .

Malhotra, N. K., & Birks, D. F. (2003). *Marketing Research: An Applied Approach.* Pearson Education.

Marcketti, S. B. (2009). Consumer concern, knowledge and attitude towards counterfeit apparel products. . *International Journal of Consumer Studies, 33(3)*, 327–337.

Marr, B. (2022, November 30). *Gucci enters the metaverse.* From Forbes .

Mazzù, M. F., Andria, R., & Bacelloni, A. (2023). Overcoming the blockchain technology credibility gap. *Psychology & Marketing.*

Mazzù, M. F., Baccelloni, A., & Lavini, L. (2022). Injecting trust in consumer purchase intention through blockchain: evidences from the food supply chain. Italy.

Mazzù, M., Baccelloni, A., & Lavini, L. (2022). Injecting trust in consumer purchase intention through blockchain: evidences from the food supply chain. . *Ital. J. Mark.* , 459–482.

McKinsey & Company. (2023, June 8). Unlocking commerce in the metaverse.

Mehrabian, A., & Russell, J. A. (1974). The Basic Emotional Impact of Environments. *Perceptual and Motor Skills, 38(1)*, 283-301.

Mendizabal, E. (2022, Jannuary 20). *2021 marked the year of virtual worlds with innovations from NVIDIA Omniverse.* From NVIDIA.

Mennecke, B. E., Triplett, J. L., Hassall, L. M., Conde, Z. J., & Heer, R. (2011). An examination of a theory of embodied social presence in virtual worlds. *Decis. Sci., 42*, 413–450 .

Microsoft. . (2022, Jannuary 18). *icrosoft to acquire Activision Blizzard to bring the joy and community of gaming to everyone, across every device.* . From Microsoft News Center.

Mittal, V. K. (2001). Satisfaction, repurchase intent, and repurchase behavior: investigating the moderating effect of customer characteristics. . *Journal Marketing Research, 38*(1), 131–142 .

Morales, A. C. (2005). Giving Firms an "E" for Effort: Consumer Responses to High-Effort Firms. *Journal of Consumer Research, 31*, 806-812.

Mystakidis, S. (2022). Metaverse. *Encyclopedia*, 486-497.

Nakamoto, S. (2008, August 21). Bitcoin: A peer-to-peer electronic cash system.

Nasr, R. S., & El-Deeb, S. (2023, April 28). How customers perceive voice shopping and its potential uses. *International Journal of Technology Marketing, 17*(3), 256-275.

Ou, C. P. (2014). Swift guanxi in online marketplaces: the role of computer-mediated communication technologies. *MIS Quarterly, Vol. 38* (No. 1), pp. 209-230.

Payala, R. S. (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*.

Pellas, N. M. (2021). Immersive Virtual Reality in K-12 and Higher Education: A systematic review of the last decade scientific literature. . *Virtual Reality 25*, 835–861.

Poushneh, A. (2021). How close do we feel to virtual product to make a purchase decision? Impact of perceived proximity to virtual product and temporal purchase intention. *Journal of Retailing and Consumer Services, 63*.

Pozharliev, R., Rossi, D., & De Angelis, M. (2022). Consumers' self- reported and brain responses to advertising post on Instagram: The effect of number of followers and argument quality. *European Journal of Marketing, 56*(3), 922–948.

Pun, H., Swaminathan, J. M., & Hou, P. (2018). Blockchain adoption for combating deceptive counterfeits. . *SSRN Electronic Journal.*

Puntoni, S. R. (2021). Consumers and artificial intelligence: An experiential perspective. *Journal of Marketing, 85*(1), 131-151.

Risselada, H. V. (2014). Dynamic effects of social influence and direct marketing on the adoption of high- technology products. *Journal of Marketing, 78*(2), 52–68.

Roach, J. (2021, November 2). *Mesh for Microsoft Teams aims to make collaboration in the 'metaverse' personal and fun*. From Microsoft News Center.

Rosário, A. T., Lopes, P. R., & Rosário, F. S. (2023). Metaverse in marketing: Challenges and opportunities. In Handbook of research on AI-based technologies and applications in the era of the metaverse . *IGI Global*, pp. 204-227.

Sarmento, R. &. (2017). Comparative approaches to using R and Python for statistical data analysis.

Scholz, J., & Smith, A. (2016). Augmented Reality: Designing Immersive Experiences That Maximize Consumer Engagement. *Business Horizons, 59*, 149-161.

Shen, B., Tan, W., Guo, J., Zhao, L., & Qin, P. (2021). How to Promote User Purchase in Metaverse? A Systematic Literature Review on Consumer Behavior Research and Virtual Commerce Application Design.

Shi, S. M.-J. (2018). The impact of perceived online service quality on swift guanxi. *Internet Research,, Vol. 28* , pp. 432-455.

Silva, R. P., Macêdo, L. C., & Silva, I. L. (2013). Avaliação das Características Psicométricas dos Questionários Utilizados nos Periódicos da Area Contábil: Um Estudo Longitudinal Compreendido no Período 2003-2012 . . *In XX Congresso Brasilero de Custos*.

Singh, R. a. (2020). Why do online grocery shoppers switch? An empirical investigation of drivers of switching in online grocery. *Journal of Retailing and Consumer Services, Vol. 53,*.

Slater, M., & Sanchez-Vives, M. (2016). Enhancing Our Lives with Immersive Virtual Reality. . *Front. Robot.* , 3, 74.

Smart J, C. J. (2007). *Metaverse roadmap: pathway to the 3D web.* From (MI): Acceleration Studies Foundation: https://metaverseroadmap.org/MetaverseRoadmapOverview.pdf

Stephenson, N. (1992). *Snow crash.* New York: Bantam Books.

Tayal, S., & Rajagopal, K. (2023). Marketing Gamification in Metaverse Web 3.0 with Artificial Intelligence (AI) . *2023 7th International Conference on Intelligent Computing and Control Systems (ICICCS)*, (pp. pp. 646-652,). Madurai, India, .

Uehara, E. (1990). Dual exchange theory, social networks, and informal social support. *American Journal of Sociology*, 521-557.

Van Doorn, J. &., & C., P. (2011). Willingness to pay for organic products: Differences between virtue and vice foods,". *International Journal of Research in Marketing, vol. 28(3)*, pages 167-180.

Wang M, S. L. (2021, April 14). How Emotional Interaction Affects Purchase Intention in Social Commerce: The Role of Perceived Usefulness and Product Type. *Psychol Res Behav Manag.*, 467-481.

Wang, X., Xing, W., & Laffey, J. M. (2018). Autistic youth in 3D game-based collaborative virtual learning: associating avatar interaction patterns with embodied social presence. . *Br. J. Educ. Technol.*, 742–760.

Wasiq, M. B. (2024). Unveiling customer engagement dynamics in the metaverse: A retrospective bibliometric and topic modelling investigation. . *Computers in Human Behavior Reports*.

Waters, R. (2022). *Satya Nadella: "Being great at game building gives us permission to build the next internet."*. From Fiancial Times : https://on.ft.com/34Nubp2

Wei-Ping, Z., Lin, Y., Zheng-Ping, Y., & altr, e. (2008). Collisions of Two Spatial Solitons in Inhomogeneous Nonlinear Media. *Communications in Theoretical Physics , 50*(3).

Wilson, J. M., O'Leary, M. B., Metiu, A., & Jett, Q. (2008). Perceived Proximity in Virtual Work: Explaining the Paradox of Far-But-Close. *Organization Studies, 29*(7), 979-1002.

Wongkitrungrueng, A. a. (2020). The role of live streaming in building consumer trust and engagement with social commerce sellers. *Journal of Business Research, Vol. 117*, pp. 543-556.

Yang, J. S. (2016). Sellers versus buyers: differences in user information sharing on social commerce sites",. *Information Technology & People, Vol. 29* (2), 444-470.

Yang, X. (2018). How perceived social distance and trust influence reciprocity expectations and eWOM sharing intention in social commerce. *Industrial Management & Data Systems*, 867–880.

Yang, X. (2018). How perceived social distance and trust influence reciprocity expectations and eWOM sharing intention in social commerce. . *Industrial Management & Data Systems*, 867–880. .

Ying, T. T. (2021). Virtual reality in destination marketing: telepresence, social presence, and tourists' visit intentions. . *Journal of Travel Research*, 1-19.

Zallio, M. &. (2022). Designing the metaverse: A study on inclusion, diversity, equity, accessibility and safety for digital immersive environments. *Telematics and Informatics*.

Zhang, A. Z. (2020). Blockchain-based life cycle assessment: An implementation framework and system architecture. *Resources, Conservation and Recycling*, 152.

Appendix

Scenario 1

Q5. Imagine that you are inside an immersive virtual environment, such as the Metaverse. Here you move around as an avatar and interact with a virtual assistant, also represented by an avatar. The assistant shows you various products, answers your questions and offers recommendations based on your preferences. While exploring, you can view products in 3D, move them around and see them from different angles, as if you were physically in a store. Many giant technology companies and big brands, such as Nike and Gucci, are working to ensure that one day you will be able to shop in the metaverse, or virtual environments, where you will be able to interface with an avatar who will show you products and assist you in the buying process. Have you heard of the metaverse before?

- yes, I have heard of it, I know what it is about
- no, I haven't heard of it and I don't know what it is
- I've heard about it but I don't know muc

Q6. On a scale of 1 to 5, where 1 is "Not at all" and 7 is "Very much," how familiar are you with virtual reality or virtual environments?

- Not at all
- Slightly familiar
- Moderately familiar
- Somewhat Familiar
- Very familiar

Scenario 2

Q5. Imagine you are sitting in your living room and watching a TV channel dedicated to shopping. A television presenter shows you various products for sale, explaining their features, benefits, and prices. During the presentation, the presenter offers advice and shows how the products can be used in your daily life. The presenter may share personal anecdotes, respond to viewer questions, and highlight viewer feedback. You can purchase the products directly through the website or phone number shown on the screen.
Have you ever watched a product presentation on television, such as a segment on a shopping channel, a commercial demonstration, or an infomercial?

yes

no

Q6. Have you ever purchased a product after watching a television presentation, such as a segment on a shopping channel, a commercial demonstration, or an infomercial?

yes

no

Scenario 3

Q5. Imagine attending a conference where a presenter introduces a new product in front of an audience of attendees. The speaker introduces the product, describes its features, and demonstrates its use through a hands-on demonstration. At the end of the presentation, participants can ask questions and interact with the speaker, getting more details about the product.
Have you ever attended a conference or classroom setting where a presenter showed a product?

yes

no

Q6. Have you ever purchased a product after attending a presentation in a conference or classroom setting?

yes

no

Social presence: Scenario 1

Q19. Imagine a virtual shopping environment where you can feel the presence of other people, such as sales representatives and other customers. On a scale of 1 to 7, where 1 is "Not important at all" and 7 is "Extremely important," How important do you think this social presence would enhance your sense of personal closeness with virtual sales representatives?

- Not important at all
- Slightly important
- Somewhat important
- Moderately important
- Important
- Very important
- Extremely important

Q20. On a scale of 1 to 7, where 1 is "Not important at all" and 7 is "Extremely important," How important do you think the presence of other people in a virtual shopping environment is for enhancing your sense of physical proximity to products and representatives?

- Not important at all
- Slightly important
- Somewhat important
- Moderately important
- Important
- Very important
- Extremely important

Q21. On a scale of 1 to 7, where 1 is "Not important at all" and 7 is "Extremely important," How important do you think the presence of other people in a virtual shopping environment is for enhancing the fairness and mutuality of your interactions with virtual sales representatives?

- Not important at all
- Slightly important
- Somewhat important
- Moderately important
- Important
- Very important
- Extremely important

Social presence: Scenario 2

Q19. Imagine a television shopping presentation where you can see and hear testimonials and interactions from other viewers. On a scale of 1 to 7, where 1 is "Not important at all" and 7 is "Extremely important," how important do you think this social presence would be in enhancing your sense of personal closeness with the television presenter?

- Not important at all
- Slightly important
- Somewhat important
- Moderately important
- Important
- Very important
- Extremely important

Q20. On a scale of 1 to 7, where 1 is "Not Important at all" and 7 is "Extremely Important," How important do you think the presence of other viewers' testimonials and interactions during a television presentation is for enhancing your sense of physical proximity to the products and the presenter?

- Not important at all
- Slightly important
- Somewhat important
- Moderately important
- Important
- Very important
- Extremely important

Q21. On a scale of 1 to 7, where 1 is "Not Important at all" and 7 is "Extremely Important," How important do you think the presence of other viewers' testimonials and interactions during a television presentation is for enhancing the fairness and mutuality of your interactions with the presenter and the product?

- Not important at all
- Slightly important
- Somewhat important
- Moderately important
- Important
- Very important
- Extremely important

Social presence: Scenario 3

Q19. Imagine a conference or classroom setting where you can feel the presence of other attendees and the presenter. On a scale of 1 to 7, where 1 is "Not important at all" and 7 is "Extremely important," how important do you think this social presence is in enhancing your sense of personal closeness with the presenter?

- Not important at all
- Slightly important
- Somewhat important
- Moderately important
- Important
- Very important
- Extremely important

Q20. On a scale of 1 to 7, where 1 is "Not important at all" and 7 is "Extremely important," how important do you think the presence of other attendees in a conference or classroom setting is for enhancing your sense of physical proximity to the products and the presenter?

- Not important at all
- Slightly important
- Somewhat important
- Moderately important
- Important
- Very important
- Extremely important

Q21. On a scale of 1 to 7, where 1 is "Not important at all" and 7 is "Extremely important," how important do you think the presence of other attendees in a conference or classroom setting is for enhancing the fairness and mutuality of your interactions with the presenter?

- Not important at all
- Slightly important
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