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Understanding the Role of Virtual Influencers and Reference Groups in Shaping Purchase Behavior in the Mataverse

by

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This research thesis is wholeheartedly dedicated to my parents whose support and continued encouragement have been my strength and source of inspiration in all of my endeavors. To my beloved husband, for believing in me and standing by me through thick and thin. In addition, my deepest gratitude goes to Dr. Lakhi Muhammad for his constant guidance, motivation, and immense academic knowledge throughout this research. His expertise and excellence have illuminated this intellectual journey.

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Marketing in the Metaverse: The Role of Virtual Influencers and Reference Groups in Shaping Purchase Behavior

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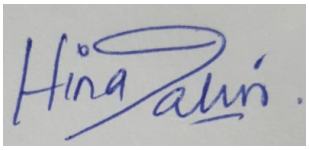

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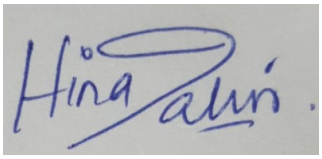

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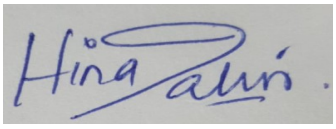

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Abstract

This research investigated the influence of virtual influencers and reference groups on consumer purchase behaviors in the metaverse, particularly within the luxury fashion industry context. The empirical data was collected through an online survey of 226 metaverse users. The study utilized Structural Equation Modeling (SEM) through SmartPLS 4, for data analysis. The results illustrated that virtual influencers significantly impact consumers' purchase intentions within the metaverse. Additionally, the role of normative influence was found to be significant in shaping these purchase behaviors. However, there was no relationship between Virtual influencers as informative influencers and actual purchase behaviors. These outcomes emphasized the crucial role of refined marketing strategies in the metaverse, considering the influence of various factors. The research contributes valuable insights to understanding consumer behavior in the metaverse, offering important implications for marketers and enterprises in unique 3D virtual environments.

Keywords: Metaverse, Virtual Influencers, Reference Groups, Normative Influence, Informative Influence, Luxury Brands, Consumer Behavior.

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Abbreviations

AVE	Average Variance Extract
CR	Composite Reliabilitye
CA	Cronbach Alpha
ELM	Elaboration Likelihood Model
HTMT	Heterotrait-Monotrait Ratio
II	Informative Influence
NI	Normative Influence
PB	Purchase Behavior
PI	Purchase Intention
VI	Virtual Influencer

Chapter 1

Introduction

1.1 Background of the Study

Emerging from the world of science fiction (1982), the metaverse has surpassed virtual reality headsets and pixelated avatars to become a growing digital realm where brands are establishing innovative connections with consumers. This immersive environment, characterized by interconnected virtual communities and real-time interactions, goes beyond the limitations of traditional marketing channels, providing brands with an unlimited platform to engage audiences in captivating and interactive experience (Dwivedi et al., 2022; Conti et al., 2022). Driven by the explosive growth of platforms like Roblox, Fortnite, and Decentraland, and powered by advancements in virtual reality and blockchain technology, the metaverse is swiftly developing into a fertile ground for metaverse marketing - a shift in paradigm where brands can cultivate deeper connections, influence purchasing behavior (Dwivedi et al., 2022).

The metaverse has gained prominence as companies build platforms to engage with consumers in novel digital domains (Dwivedi et al., 2022). It is a new world of interconnected virtual communities where people can interact without leaving their homes (Darbinyan, 2022). As virtual environments become more immersive and influential, it is imperative to investigate the factors that shape the consumer decision process in the metaverse. Moreover, the rise of virtual influencers in influencer marketing (Jhawar et al., 2023) and the emergence of the metaverse

challenges traditional settings (e.g. web.2 social media platforms), there arises a need for more studies on virtual influencers in the metaverse marketing literature (Dwivedi et al., 2022). This thesis contributes to the literature by identifying deviant behavior in this relatively new and significant construct. The study focuses on the unexplored realm of the metaverse and examines the behavioral outcomes of influencer marketing.

Influencer marketing is a form of marketing that involves endorsement or product placement by influential individuals or organizations (Breves et al., 2019). Its market size has doubled since 2019 globally and is foreseen to arrive at an exceptional 21.1 billion US dollars by 2023 (Statista, 2023). In recent times, it has become a popular means for brands to connect with their desired audience. Influencers on social media platforms such as Instagram, TikTok, and YouTube, have gained great popularity and exert a significant impact on consumer behavior. However, with the advancement of technology, the future of influencer marketing is predicted to shift towards the metaverse (Cheah and Shimul, 2023). This study aims to explore how influencers will connect with their followers in an innovative and immersive digital world.

The notion of metaverse originally emerged in science fiction during the 1950s and was later popularized by works such as William Gibson's novel Neuromancer and the movie Tron in 1982. The term "Metaverse" was coined by Neal Stephenson in his novel 'Snow Crash', where he envisioned "a virtual" multiverse in a dystopian future (Joshua, 2017; Dwivedi et al., 2022). Furthermore, the expression was employed by game designer Richard Garriott to define the internet-based game Ultima Online, which is widely regarded as an inaugural massively multiplayer online game (MMO). The emergence of Second Life in 2003 and Roblox in 2006 further expanded the concept of user-created virtual worlds. Roblox has since become one of the most popular online gaming platforms, with millions of users worldwide (Ludlow and Wallace, 2007; Damar, 2021). In 2009, Bitcoin, the first cryptocurrency, was launched, followed by the advent of non-fungible tokens, pushing the boundaries of digital economies further. The growth from 2009-2023 saw a boom in the development and monetization of content via platforms like Decentraland and blockchain-based games like Axie Infinity. It also witnessed the

rebranding of Facebook to Meta in October 2021 as an expression of its commitment to the metaverse.

Technology companies, venture capitalists, and corporations have made considerable investments in metaverse-related ventures. Facebook, renamed Meta, and Microsoft's ambitious acquisition of Activision Blizzard for $70 billion demonstrates the significance of the metaverse in future technological developments (Microsoft, 2022). Google has invested a noteworthy $39.5 million in private equity firms to further foster metaverse expansions. The surge in corporate interest in the metaverse sector is exemplified by a reported $120 billion investment in 2022, double the amount invested in 2021 (James, 2022).

Furthermore, Metaverse encompasses various platforms such as Roblox, Fortnite, Meta Horizon, Second Life, Minecraft, The Sandbox, and Decentraland (Dwivedi et al., 2022). These platforms offer a unique avenue for digital marketing and e-commerce, allowing businesses to engage with customers in new and immersive ways. Implications of these marketing strategies are substantial and may profoundly influence how companies approach their marketing endeavors in the future (Cheah and Shimul, 2023).

It also permits users to produce virtual identities that can be tailored and individualized based on their preferences. Additionally, these platforms have the potential to establish virtual economies where users can engage in the buying, selling, and trading of virtual goods and services (WEC, 2023). To quantify the future impact of the metaverse, it is projected to be worth $ 6-13 trillion by 2030, with global revenues anticipated to reach $ 800 billion by 2024 (WEC, 2023). In response to the revolutionizing digital landscape, consumer brands are also leveraging metaverse platforms to bolster their presence. Coca-Cola is selling its NFTs in Metaverse gaming platforms (News, 2022), and Hyundai allowed young customers to explore advanced mobility solutions on Roblox (hyundai.com). Cruises CX launched the first virtual cruise ship with a 360-degree tour feature (celebrity cruises.com the Israeli company Treedis effectively utilized the capacities of the metaverse during the Covid-19 lockdown creating a complete virtual twin of the city of Jerusalem for consumers (Treedis, 2022) while fashion brand Charli Cohen collaborated with Pokémon for limited physical and metaverse clothing editions.

Successfully tapping into the metaverse, fashion brands like Vans and Gucci have utilized platforms, such as Roblox, to create immersive experiences for their customers. Vans created a virtual skatepark where players could showcase their avatars adorned in Vans products (Bloom, 2021) on the other hand Gucci introduced exclusive digital sneakers wearable in augmented reality which were sold for $12.99 on Metaverse platforms (Gorman, 2021). Finally, in May 2021, Gucci created Gucci Garden in Roblox, an interactive virtual experience that reimagined advertising campaigns from the company's creative director Alessandro Michele's tenure to target Gen.Z (Faridani, 2021a) and it drew 19.9 million visitors in two weeks (James, 2022).

Similarly, other brands such as Nike, Samsung, and Wendy's have hosted unique events, games, and virtual showrooms on metaverse platforms, further reinforcing the potential of the metaverse in brand marketing (Mileva, 2022). The well-known fashion brand, Balenciaga, ventured into the metaverse by collaborating with the popular virtual game Fortnite to offer exclusive collection items as avatar skins and accessories. This integration is a strategic move to capitalize on the increasing consumer interest in the metaverse. Also, in March 2023 Metaverse Fashion Week 2023 drawing a significant audience confirmed the growing interest and influence of the Metaverse in the fashion industry (Hirschmiller, 2023).

In the context of marketing influence, virtual influencers are gaining increased attention. They command significant influence over social media platforms and effectively, customer behaviors and purchasing decisions (Koay et al., 2023). According to a survey conducted in 2022 by an influencer marketing factory, it was found that 58% of respondents followed at least one virtual influencer, with 35% purchasing a promoted product. However, research in this area is still sparse (Kim et al., 2023).

Furthermore, both normative and informative reference groups play a vital role in shaping consumer behavior in this digital realm. Normative reference groups, represented by virtual communities or fandoms, establish social norms and expectations, thereby shaping informational reference groups, such as influencers, celebrities, and opinion leaders, to provide consumers with knowledge and guidance in the metaverse (Ding et al., 2020). This study aims to examine the impact of

normative reference groups on consumer purchase intention and explore how consumers seek information from informational reference sources in the metaverse. By addressing the research gap in understanding the impact of virtual influencers, normative reference groups, and informational reference groups, our investigation contributes to the comprehension of consumer behavior in the metaverse.

1.2 Research Gap

Despite the hype surrounding the metaverse, there are significant research gaps in metaverse marketing that require attention from scholars. Firstly, in virtual commerce, there is a transformative impact on the way consumers make decisions. Shen et al. (2021) have examined influential factors that drive consumer purchase behavior in different virtual application designs. The study further suggested exploring the influential factors that impact on consumer purchase behavior in the metaverse trends. This study seeks to elucidate the influential factors driving consumer purchase behavior amid the burgeoning trends within the metaverse. Secondly, prominent brands have jumped into innovative metaverse campaigns, NFTs, and engaging experiences, but a comprehensive grasp of their impact on consumer buying remains unexplored (Sung et al., 2023; Gerlich, 2023). This study bridges this gap by investigating the efficacy of diverse marketing strategies in influencing consumer purchase behaviors within the metaverse.

Thirdly, in the metaverse, users share virtual spaces. Their experiences are subject to social influence, which is a crucial determinant of consumer behavior. Hadi et al. (2023) highlight social influence in the metaverse will continue to manifest in both passive and interactive forms. It may differ from traditional online settings. Therefore, reference groups are considered a social influence in influencing consumer purchase behavior.

Reference groups have been extensively studied in traditional marketing contexts (Ding et al., 2020; Burnkrant and Cousineau, 1975). This study aims to examine their specific impact on purchase behavior within this novel environment. Fourthly, the same study also concluded that although many existing academic theories and findings are expected to remain valid in the metaverse, they still represent a new

environment that has the potential to challenge the traditional understanding of consumer purchase behavior. Therefore, we will critically examine influence theories to understand their applicability in the metaverse. Finally, with the metaverse beckoning, researchers like Cheah and Shimul (2023) argue that it's time to scrutinize the impact of virtual influencers within this virtual world (Dwivedi et al., 2022; Donthu et al., 2021; Kim et al., 2023). This study addresses this gap by investigating the effectiveness and unique dynamics of influencer marketing in the metaverse.

By examining these research gaps, we can illuminate the impact of virtual influencers and reference groups on consumer purchase behavior in the metaverse. This knowledge will empower brands and marketers to unlock the transformative potential of this virtual frontier, guiding them to craft truly persuasive experiences for the consumers of tomorrow.

1.3 Problem Statement

Amidst the global expansion of luxury fashion into the metaverse, there is still a need for more research, especially when it comes to the markets in the Middle East and South Asia (Rana, 2022; Serralvo et al., 2019a). Even though there have been heavy investments in Metaverse and Artificial Intelligence (AI) in these regions. However, there hasn't been enough scholarly investigation into luxury fashion marketing in the metaverse.

The luxury market in Southeast Asia, including countries like Thailand, Vietnam, Indonesia, and Malaysia, is experiencing steady growth, and luxury brands are actively engaging with consumers in the region through the metaverse and blockchain technologies. It generated $14.38 billion in revenue in 2022 and is expected to continue to grow (Ming, 2023).

This lack of research makes it challenging for luxury brands to create effective marketing strategies that resonate with the diverse consumers in the Middle East and South Asia. The current study aims to explore influencer marketing strategies in the metaverse, with a focus on the unique contexts of Asian markets. By

understanding the consumer purchasing behavior patterns in these markets, luxury brands can unlock their potential and create meaningful connections with consumers.

This study not only contributes to the academic discourse on luxury fashion marketing but also provides practical insights for luxury brands to navigate the metaverse in a culturally sensitive way, allowing them to connect with consumers in the growing markets of the Middle East and South Asia.

1.4 Research Question

RQ:1 What is the impact of virtual influencers on purchase intention in the metaverse?

RQ:2 What is the relationship between normativeeference group influence and purchase intention in the metaverse?

RQ:3 What is the relationship between informative influence and purchase intention in the metaverse?

RQ:4 What is the nature of the interaction effect between Virtual influencers and normative influence from reference groups and informative influence from reference groups?

RQ:5 What is the relationship between virtual influencers and purchase behavior in the metaverse?

RQ:6 What is the relationship between normative influence and purchase behavior?

RQ:7 What is the relationship between informative influence and purchase behavior in the metaverse?

RQ:8 To what extent does purchase intention mediate the relationship between virtual influencers and purchase behavior in the metaverse?

RQ:9 In the context of metaverse, how does purchase intention mediates the relationship between reference groups and purchase behavior?

1.5 Research Objectives

Research Objective 1

To examine the relationship between virtual influencers and purchase intention in the metaverse.

Research Objective 2

To find out the influence of normative reference groups on purchase intention in the metaverse.

Research Objective 3

To investigate the impact of informational reference group influence on purchase intention in the metaverse.

Research Objective 4

To examine the interaction effect between virtual influencers, normative influence from reference groups, and informative influence from reference groups on purchase intention in the metaverse.

Research Objective 5

To find out the relationship between virtual influencers and purchase behavior in the metaverse.

Research Objective 6

To explore the relationship between normative influence and purchase behavior in the metaverse.

Research Objective 7

To examine the relationship between informative influence and purchase behavior in the metaverse.

Research Objective 8

To find out the extent to which purchase intention mediates the relationship between virtual influencers and consumer purchase behavior within the metaverse.

Research Objective 9

To analyze how purchase intention acts as a mediator between the influence of reference groups and consumer purchase behavior in the metaverse context.

1.6 Significance of the study

1.6.1 Theoretical Significance

From a theoretical perspective, this study expands the existing literature on virtual influencer marketing and purchase intentions within the metaverse. This study examines the crucial attributes that stimulate purchasing behavior in relation to virtual influencers. The present literature adopted the Elaboration likelihood model for understanding how persuasive communication can affect consumer behavior, as demonstrated by Moradi and Zihagh (2022). According to ELM, consumers in the metaverse tend to engage in two distinct routes while making purchase decisions. The central route is associated with the influence of informative reference groups and the peripheral route involves the influence of virtual influencers. The consumers will consider both routes before making purchase decisions. In this literature, examining these distinct paths to persuasion might help businesses tailor their marketing strategies to effectively engage with customers and encourage purchase intentions and behavior within the modern digital landscape.

1.6.2 Managerial Significance

Consumer behavior has experienced a significant shift, with an increasing number of individuals placing greater value on their digital personas rather than their physical personas. This trend highlights the importance of showcasing one's identity and personality in the digital realm (James, 2022). The metaverse has emerged as a prominent platform, projected to generate $5 trillion in value by 2030. The potential for businesses to tap into this market is immense. According to a McKinsey survey, 79% of consumers actively engage in the metaverse and make purchases, emphasizing the impact and influence of this digital landscape on consumer behavior.

Moreover, the rise of the metaverse has led to a significant increase in metaverse marketing. Many huge brands and businesses have already recognized the potential and are actively participating in the metaverse. In order to grow and thrive in this evolving digital landscape, it is crucial for businesses to adopt effective

metaverse marketing strategies. By embracing this new frontier, businesses can leverage the metaverse's expansive reach and immersive experiences to engage with their target audience in innovative and impactful ways.

Additionally, the market size of virtual influencers has been experiencing notable growth, with a substantial 25% increase in 2023 alone. This upward trend emphasizes the rising significance of virtual influencers as powerful marketing tools. Literature highlights that humanlike virtual influencers have a more positive impact on consumers' purchase intentions (Kim et al., 2023). This study offers several insights for brands using virtual influencer marketing within the metaverse. Firstly, brands can leverage virtual influencers to effectively communicate their message and target their specific demographic and Gen.Z in the metaverse. The immersive and interactive nature of the metaverse provides a distinct platform for brands to create meaningful experiences and build authentic connections with consumers.

Secondly, by using virtual influencers, brands can employ peripheral cues to persuade consumers within the metaverse. These cues can include attributes such as attractiveness and the use of repetitive messages. By leveraging the visual appeal and charisma of virtual influencers, brands can capture the consumer's attention and interests, increasing the likelihood of persuasion and positive brand perception.

Thirdly, brands can tap into the power of informative reference groups to influence consumer purchasing behavior using central cues within the metaverse. These reference groups provide detailed knowledge and insights about products or services, helping consumers make informed decisions. By aligning with these groups and leveraging their expertise, brands can establish themselves as trusted sources of information and enhance their credibility within the metaverse.

Finally, by embracing the normative reference groups into their marketing strategies within the metaverse, brands can tap into the inherent desire of consumers to conform and be part of a larger community. This approach not only increases the persuasiveness of brand messages but also impacts positive purchase intentions.

Hence, to understand and leverage these dynamics, businesses can effectively navigate the metaverse and use the power of virtual influencer marketing to drive growth and success.

1.7 Theoretical Underpinning

The theoretical framework of the present research is based on Elaboration Likelihood Model (ELM). Petty et al. (1986) presented this theory that explains how consumers process persuasive messages and make decisions. The ELM model postulates two distinct routes to persuasion: the central and peripheral routes. The central route contains cognitive elaboration, where consumers engage in a thoughtful analysis of the persuasive message and are more likely to be taken when consumers have high motivation and the ability to process information. This involves central cues such as argument, quality, and detailed information. According to this view, if the message arguments are found cogent and compelling, favorable thoughts will be obtained that will result in changing purchase behavior in the direction of advocacy. In the Metaverse, motivated and informed consumers, especially when engaging with informational virtual communities, might take this route. Businesses can create detailed content and leverage knowledgeable community members to appeal to this segment. On the contrary, the peripheral route contains affective processing that involves less cognitive elaboration and relies more on peripheral cues such as the attractiveness of the source, visuals, repetition of the message, or group pressure (Asch, S. E. (1951). This route is more likely to be taken when consumers have low motivation or less ability to process information (Petty et al., 1986). In the metaverse, consumers who are easily distracted or overwhelmed by repeated information may be more likely to take the peripheral route when considering the influence of sources (i-e virtual influencers and other normative reference groups) on their purchasing behavior. Businesses can utilize attractive virtual influencers and repeated messages to reach this segment.

Additionally, the relevance of ELM to the impact of virtual influencers and reference communities in the metaverse lies in the ability to guide businesses in developing more effective marketing strategies. For instance, businesses may use virtual influencers with high attractiveness to appeal to consumers who are more likely to take the peripheral route to persuasion. This may involve leveraging the influencer's popularity or reputation and repeating persuasion messages to shape consumer's behavior towards brands or products.

Alternatively, businesses may use informational virtual communities to provide more detailed and thoughtful content to consumers who are more likely to take the central route to persuasion. This may involve leveraging the expertise and knowledge of community members to provide compressive and informative content that can help consumers make informed purchase decisions. In a nutshell, the ELM is a crucial theoretical framework that illustrates the psychological intricacies that underpin consumer purchase behavior in the metaverse. By considering two different routes to persuasion, businesses can modify their marketing tactics to enhance purchase intention and behavior in this nascent virtual space.

1.8 Operational Definitions of Constructs

1.8.1 Virtual Influencers

Virtual influencers are computer-generated characters that are designed to resemble human influencers and post content like photos, and videos, write captions, and interact with their followers via social media platforms (Celestino, 2023). There has been limited literature on the positive impact of VIs on the purchase intention of consumers. However, according to ELM, individuals are influenced or persuade by messages dilivered by others. Virtual influencers, despite being digital entities, are perceived as influential individuals who provide recommendations and endorsements (Kim et al., 2023). Consumers are likely to be influenced in the metaverse by these virtual influencers' recommendations, leading to positive purchase intentions.

1.8.2 Normative Influence

Normative influence happens when reference groups impact an individual's behavior through the individual's desire to conform to the norms and values of the group (Ding et al., 2020). Bearden et al. (1989) highlight the significance of normative reference groups in shaping consumers' purchase intentions and behaviors, particularly in the context of socially visible products.

1.8.3 Informational Influence

Informational influence occurs when reference groups exert an impact on an individual's behavior due to the individual's aspiration to obtain accurate and dependable information from these groups (Ding et al., 2020). According to Serralvo et al. (2019b) Consumer who relies on expert opinions and recommendations from informational reference groups were more likely to make informed purchase decisions and manifest favorable behaviors.

1.8.4 Purchase Intention

Purchase intention is a crucial construct widely used in marketing research and marketing practice many areas. These areas includes new product testing (Silk and Urban, 1978), forecasting (Infosino, 1986), advertising research (MacKenzie, 1986), and market Segmentation (Sewell, 1978) (Fishbein and Ajzen, 1975) wrote that "the single best predictor of an individuals behavior will be a measure of his intention to perform that behavior". According to the universal marketing dictionary, purchase intention can be defined as the subjective likelihood or willingness of an individual to engage in a future purchase of a particular product or service. In the context of the metaverse, purchase intentions refer to the intention of individuals to make purchases within the virtual environment. However, the impact of metaverse experiences on purchase intentions is a topic that is still being explored in the marketing literature (Jafar et al., 2023).

1.8.5 Purchase Behavior

According to Stallworth (2008), purchase behavior is a set of activities which consist of purchasing and use of goods and services that result from customers' emotional and mental needs, and behavioral responses. It can be influenced by various factors, including personal preferences, social influences, perceived value, and situational factors. Literature shows that purchase behavior is a process of continual change over time as the purchase characteristics of the customer change due to their physical and psychological needs.

Chapter 2

Literature Review

2.1 The Metaverse

Metaverse is a novel digital 3D space that uses virtual reality (VR), augmented reality (AR), and other advanced technologies (James, 2022) to enable user connectivity, interaction, experience, and user-generated content in an immersive, scalable, synchronous, and persistent environment, and partly overlaps with and enhances the physical world Weinberger (2022); Barrera and Shah (2023); Dwivedi et al. (2022). In addition to that Matthew Ball defines the metaverse in his book ' The Metaverse' as; " A massively scaled and interoperable network of real-time rendered 3D virtual worlds that can be experienced synchronously and persistently by an effectively unlimited number of users with an individual sense of presence and with continuity of data, such as identity, history, entitlements, objects, communications and payments". The vastness, diversity, and user-generated content of the metaverse offer users endless opportunities for exploration, communication, and participation in various activities (Pratt, 2022) ranging from virtual gaming and social networking to virtual marketplaces and virtual events (James, 2022). Recently, there has been a substantial increase in the prevalence and acceptance of the metaverse. Huge tech companies, such as Meta (formerly Facebook), Microsoft, Google (Kaj Leroy, 2023), and the gaming industry are investing heavily in the development and expansion of the metaverse (Rees, 2022).

Moreover, most luxury brands see the metaverse as a new opportunity to rebrand themselves to attract the younger generation of customers from online communities. For instance, Gucci, Ck, Nike, Prada, and Clinique are already venturing into Metaverse, seeking new ways to engage with users (Faridani, 2021b; Mileva, 2022). The notion of unique digital ownership in the metaverse presents great implications for customer-brand relationships. Although consumers form weaker brand connections with digital products than physical ones (Atasoy and Morewedge, 2018). This distinctive digital ownership has the potential to yield meaningful brand engagement.

Furthermore, the study of consumer behavior in the metaverse has become increasingly imperative because of its transformative impact on the way individuals make decisions and preferences and engage with brands (Trunfio and Rossi, 2022). Metaverse provides an innovative platform where individuals can assume virtual entities, interact with virtual entities and participate in virtual communities. Thus, the metaverse beclouds the boundaries between the physical and virtual world and influences individual's behaviors (Du et al., 2023).

Additionally, the metaverse provides high consumer immersion enabled by technologies such as Meta's AR/VR headset, Quest Pro, and Apple Vision Pro. This immersion allows consumers to replicate real-world interactions within the digital environment. (Meta, 2022; Apple, 2023). This high level of environmental immersion and responsive feedback profoundly influences consumer behavior. This study investigates the role of these influential factors while shedding light on the mechanisms that drive consumer decision-making and shape consumer behavior within this novel virtual world.

2.2 Virtual Influencers in the Metaverse

The virtual influencer has emerged as an innovative and fascinating phenomenon which are capturing digital users' attention and engagement (Cascio Rizzo et al., 2023). These virtual influencers are often computer-generated avatars, which possess human-like characteristics. They are often engaged in various activities such as content creation, brand endorsements, and social interaction and their brand

endorsements on social media are found to positively influence customer brand engagement (Zhong, 2022). With growing popularity virtual influencers become a vital feature of marketing strategies in the metaverse (Dwivedi et al., 2022). Virtual influencers have not only scaled heights of popularity but also have the potential to reshape the landscape of influencer marketing (Jhawar et al., 2023). Moreover, virtual influencers use the power of technology and creativity to build strong connections with their audiences via their visibility, interactivity, creativity, and brand storytelling in the advertising content on social media platforms and virtual communities within t he metaverse (Zhong, 2022).

Additionally, virtual influencers differ from traditional influencers in terms of their marketing potential because they are AI-generated characters that mimic humans and are controlled entirely by the brand, and their photos in social media advertisements are managed to align with the brand's interests (Drenten and Brooks, 2020). They are not constrained by physical limitations (Appel et al., 2020; Hadi et al., 2023) and are capable of operating 24/7, making them an exceedingly impactful and authentic means of connecting brands with consumers on social media. Therefore, companies may perceive virtual influencers as more attractive to collaborate with than human influencers (Thomas and Fowler, 2021). However, there is little known about individual's perceptions of virtual influencers' effectiveness as brand endorsers than human influencers. More study is required to grasp the particular elements that contribute to the persuasive power of virtual influencers in the metaverse.

2.3 Virtual Influencers and their Influence on Purchase Intentions

Virtual influencers are computer-generated entities primarily utilized in marketing, especially for social media purposes, and have the potential to significantly impact consumer's purchase intentions within the metaverse. They are specifically designed to emulate human characteristics, possess traits, and can be customized to align with a brand's values. These digital entities exist solely on digital media platforms and offer a distinctive way for brands to connect with their consumers.

Virtual influencers can be categorized into two groups: brand-owned and independent influencers. Brand-owned virtual influencers, created to fit a brand's image and values, give complete control over their image. Conversely, independent virtual influencers are owned by individuals or agencies and collaborate with brands for sponsored posts or campaigns, tailored to meet their specific needs and requirements (Molenaar, 2022). Many prominent brands and large corporations are embracing digitalization by collaborating or partnering with virtual influencers. For example, Lil Miquela, one of the most prominent virtual influencers, was listed among Time's 25 Most Influential People on the Internet in 2018 (Outside, 2022), and has collaborated with brands such as Prada and Calvin Klein. Lu, the spokesperson for Magazine Luiza, has also worked with Zattini, a fashion store, for their winter collection of clothing. Additionally, during the COVID-19 pandemic, when human influencers were at a standstill, some major brands collaborated with virtual influencers. IKEA, with Imma's assistance, inaugurated a new store in Tokyo. Imma has also collaborated with numerous well-known brands, including Magnum, Porsche, and Amazon Fashion (Conti et al., 2022). India has also created its first metaverse influencer named Kyra with 100k followers on Instagram (IndiaToday, 2022). The success of these virtual influencers underlines the significant influence digital avatars can wield, particularly among younger consumers. Additionally, the influence of virtual influencers on consumer behavior can be clarified by using the Elaboration Likelihood Model (ELM), which suggests that consumers process persuasive messages through two routes, either the central or peripheral route. It depends on their purchase involvement, motivation, and ability to process information. Virtual influencers can serve as peripheral cues that affect consumer behavior through their credibility or other characteristics. Several factors, such as source credibility, authenticity (Um, 2023), and anthropomorphism design affect the effectiveness of virtual influencers in brand endorsement (Dabiran et al., 2022). The choice of social media platform also plays a critical role, as different platforms attract distinct demographics and user behaviors (Chopra et al., 2021; Traynor et al., 2016). Furthermore, there is a study that states that virtual influencers' attractiveness and the level of brand attachment influence consumers' behavioral intentions and purchase decisions (Kim and Park, 2023; Torres et al., 2019; Almasri et al., 2023). Previous studies suggest that virtual influencers have

a positive relationship with purchase intention (ATLI and Can, 2015). According to a study conducted by Rew T. Stephen, virtual influencers have the potential to operate 24/7 and provide a resonant and continuous presence on social media platforms, allowing them to establish strong connections and build trust with their followers.

H1a: *Virtual influencers have a positive influence on purchase intention in the metaverse.*

2.4 Reference Groups and their Influence on Purchase Intentions

Reference groups are individuals or groups that are compared to and imitated by others, often regarded as reliable authorities in a specific field (Ding et al., 2020). The influence of reference groups can be categorized into normative and informational. Normative influence occurs when reference groups impact an individual's behavior through the individual's desire to conform to the norms and values of the group. Informational influence, on the other hand, occurs when reference groups influence an individual's behavior due to the individual's aspiration to obtain accurate and dependable information from the group (Ding et al., 2020). Reference groups also play a critical role in shaping purchasing decisions. These groups can influence individuals by establishing lifestyle standards, shaping buying patterns, and nurturing aspirations within the group. The degree of influence exerted by a reference group depends on the proximity and frequency of exposure to the group; hence, understanding the significance of reference groups is of utmost importance in shaping consumer behavior (Englis and Solomon, 1995). Moreover, Solomon Asch developed a theory of conformity that suggests that individuals possess an innate inclination to conform to the behavior of others. Consumers may align their purchase intentions and behaviors with reference groups to attain social approval or to avoid social rejection. Several studies have examined the influence of reference groups on consumers' purchase intentions and behaviors. A study by Hoonsopon and Puriwat (2016) found that consumers who perceived high group relevance and identification were more likely to adopt the purchase behavior of

their reference groups. The influence of reference groups encompasses two types of effects: normative and informational. Moreover, Ding et al. (2020) found that both informative and normative influences from reference groups have a positive effect on users' trial purchase intentions, and informative influence has a positive effect on users' upgrade intention.

H1b: *Normative influence from reference groups has a positive influence on purchase intention in the metaverse.*

H1c: *Informative influence from reference groups has a positive influence on purchase intention in the metaverse.*

2.5 The Relationship Between Normative Influence and Informative Influence

Burnkrant and Cousineau (1975) provided a definition of normative influence as the inclination to conform to the expectations of others. In the field of consumer research, normative influence has been divided into two categories: value-expressive influence and utilitarian influence (Bearden and Etzel, 1982; Park and Lessig, 1977; **?**) (Feick, and Higie 1987). The influence exerted by normative reference groups arises from the desire for social acceptance, recognition, and a sense of belonging. On the other hand, Deutsch and Gerard (1955) defined informational influence as the tendency to accept information from others as evidence of reality. Individuals may either seek information from knowledgeable individuals or make inferences based on observations of others' behavior (Park and Lessig, 1977). Informational influence operates through the process of internalization, which occurs when information from others enhances an individual's knowledge about certain aspects of the environment. Research has shown that informational influence impacts consumer decision-making processes with regard to product evaluations (Burnkrant and Cousineau, 1975; Cohen and Golden, 1972; Park and Lessig, 1977; Bearden et al., 1989). Similarly, Bearden et al. (1989) highlight the significance of normative reference groups in shaping consumers' purchase intentions and behaviors, particularly in the context of socially visible products. Consumers who relied on

expert opinions and recommendations from informational reference groups were more likely to make informed purchase decisions and exhibit desired behaviors (Serralvo et al., 2019c). Moreover, these influences have often been treated separately, but numerous empirical studies have revealed intricate connections between them (Burnkrant and Cousineau, 1975; Bearden et al., 1989; Childers and Rao, 1992; LaTour and Manrai, 1989). One of the studies by Childers and Rao (1992) found that for luxury items, our friends heavily influence our choices, as we often want what they have normative influence. However, for everyday necessities, our family's opinions and recommendations carry more weight, especially across generations of intergenerational familial influence. They didn't separate this influence into being based on information or social conformity. Additionally, the presence of both normative and informational influence can lead to a synergistic effect, where consumers are more likely to adopt a certain behavior or product choice when they perceive both social approval (normative) and credible information (informational) supporting it (LaTour and Manrai, 1989). However, while existing research has explored the effect of reference groups on consumer behavior, there is a research gap in understanding the specific dynamics of reference groups in the metaverse. Understanding the interplay of reference group influences in virtual and 3D environments is pivotal for navigating the evolving landscape of consumer decision-making in an increasingly digitized world.

H2: *There is a significant relationship between the normative reference group's influence and the informational reference group's influence.*

2.6 The Relationship Between Virtual Influencers and Normative Reference Groups Influence

The relationship between virtual influencers and normative influence is a crucial aspect to examine within the context of consumer behavior in the metaverse. Normative influence refers to the impact of reference groups on an individual's behavior, driven by the desire to conform to group norms and values (Ding et al., 2020). In metaverse terms, virtual influencers have the potential to exert a normative influence on their audience. Virtual influencers can be effective brand endorsers

and influence consumers' purchase intentions (Kim and Park, 2023). Their effectiveness as brand endorsers depends on their visibility, authenticity of appearance, brand fit, interactivity, creativity, and message credibility (Lee and Park, 2022). Virtual influencers can be as effective as human influencers in generating a positive brand attitude when they use rational endorsement language (Ozdemir et al., 2023). As brands venture deeper into the metaverse, the prevalence of virtual influencers is likely to increase, and they can serve as an important bridge between brands and consumers. Several examples of virtual influencers successfully use normative influences in their marketing campaigns. Virtual influencers maintain para-social relationships with netizens, which implies intimate relationships between audiences and celebrities through virtual media (Horton and Richard Wohl, 1956). For instance, Lil Miquela is a well-known virtual influencer, boasting 2.6 million followers on Instagram (Drenten and Brooks, 2020). The metaverse provides a unique platform for virtual influencers to shape social norms and values, as well as influence consumer choices and purchase decisions. Therefore, investigating the relationship between virtual influencers and normative influences within the metaverse contributes to our understanding of the evolving dynamics of consumer behavior in the digital age.

H3a: *Virtual influencers have a positive relationship with Normative group Influence.*

H3b: *There is a significant interaction effect between virtual influencers and normative influence from reference groups on purchase intention in the metaverse.*

2.7 The Relationship Between Virtual Influencers and Informational Reference Group Influence

The relationship between virtual influencers and informational influence is vital within the realm of consumer behavior in the digital era. Informational influence refers to the impact of reference groups on an individual's behavior based on their aspirations to acquire reliable and precise information from the group (Ding et al., 2020). Virtual influencers have emerged as significant sources of

information, shaping consumer perceptions, purchase intentions, and behaviors (Ding et al., 2020; Ozdemir et al., 2023). The informational influence of virtual influencers contributes to increased trust and loyalty towards brands. Virtual influencers are identified as experts in their domains and are updated with the latest trends and knowledge. This expertise enhances their credibility, leading consumers to consider their recommendations and opinions as reliable sources of information (Xiao et al., 2018; Hovland et al., 1953). Therefore, consumers are more inclined to trust virtual influencers and rely on their guidance when making purchase decisions. Moreover, virtual influencers often have great and engaged following on social digital platforms, making them a powerful means of disseminating information, which further leads to increased awareness of products and services among consumers and can ultimately drive sales and revenue (Conti et al., 2022). However, it is important to highlight that the relationship between virtual influencers and informational influences is not always straightforward. Some study has suggested that virtual influencers may not always provide accurate or reliable information (Lou et al., 2023). Moreover, virtual influencers may prioritize commercial interests over informational accuracy, leading to potential conflicts of interest, and virtual influencers are likely to continue to play an important role in shaping consumer behavior through informational influence. The literature examines how in-metaverse platform virtual influencers provide information and potentially engage customers with increased trust and loyalty.

H4a: *Virtual influencers and informative group influence have a positive relationship.*

H4b: *There is a significant interaction effect between virtual influencers and informative influence from reference groups on purchase intention in the metaverse.*

2.8 Virtual Influencers and their Influence on Purchase Behavior

Virtual influencers have emerged as influential figures in shaping purchase behavior. One aspect of this relationship is the persuasive power of virtual influencers,

as explained in Petty et al. (1986) ELM model. Statista 2023 reveals that 18.6% follow virtual influencers of their storytelling and 26.6% do so because of engaging content. Their charismatic personalities, combined with their expertise in specific domains, allow them to communicate the benefits and features of products or services effectively. As a result, consumers may develop a favorable attitude toward endorsed offerings, which can ultimately lead to increased purchase behavior (Cheung and Leung, 2021).

In a nutshell, it should be noted that none of this existing literature has specifically examined the influence of virtual influencers, normative and informative influences on purchase intention and behavior within the metaverse. However, considering the rising performance of virtual influencers and the increasing adoption of influencer marketing strategies within the metaverse, further research in this domain is highly needed. This study aims to examine the research gap by investigating the impact of virtual influencers, and reference group influences on purchase intention and behavior.

Moreover, the current research seeks to contribute to a deeper and detailed understanding of consumer behavior within this emerging digital realm.

H5: *Virtual influencers have a positive relation with purchase behavior.*

2.9 Informative Reference Groups and their Influence on Purchase Behavior

Informational reference groups can be comprised of experts, opinion leaders, virtual influencers, and knowledgeable individuals, which can shape consumer purchase behavior (Bearden and Etzel, 1982) . Consumers often seek information, reviews, and recommendations from these groups to make an informed purchase decision.

The study found there's a positive impact of informative reference groups on consumer purchase behavior (Bearden and Etzel, 1982). Trusting the expertise, and credibility of these groups, consumers are more likely to purchase the recommended

products, leading to changes in the behaviour. However, there is a significant research gap in the metaverse context.

Furthermore, informative reference groups are important to the process of social networking-apps influencing, where virtual influencers play a key role in affecting purchase behavior. A seminal study by Jin and Phua (2014) highlights the influence of VIs as informational sources that often shape consumer purchase behavior.

According to the study, consumers perceive influencers as knowledgeable and trust their recommendations, often integrating this information into their purchasing decisions. Thus, this study aims to examine the mediating role of the informative group influence of virtual influencers on purchase behavior.

H6a: *Informational reference groups have a positive influence on purchase behavior.*

H6b: *There is a positive influence of Virtual influencers as an informative reference group on purchase behavior.*

2.10 Normative Reference Groups and their Influence on Purchase Behaviour

The impact of normative influence on purchase behavior has gathered significant attention within the field of consumer psychology. Normative influence is a concept rooted in social psychology. It is an individual perception of the "norm". These "norms" influence a person's behavior based on their perception of social pressure, varying from strong to weak. The normative influence suggests that if consumers do not follow these norms they will be rejected by peers (Schiffman et al., 2011).

Numerous studies have elucidated the tendency of peer influence in shaping consumers' buying decisions. One of the studies explained that individuals often turn to the opinions and recommendations of their peers when making purchases, particularly in domains such as fashion, technology, and entertainment (Pyo et al., 2022).

Peer pressure positively impacts attitudinal elements, such as brand consciousness, attitude toward fashion, and novelty and purchase behavior (Mishra and Maity,

2021). Moreover, the rise of online social networks has further expanded the impact of normative influence. Li et al. (2022) highlight the persuasive nature of digital peer influence in the adoption and engagement of digital goods. Furthermore, the results of the study show that peer influence has significantly influenced platform users' adoption behaviors (i.e., a gamer or user tends to adopt a video game that has been purchased by his peers).

Additionally, in the realm of virtual influencing, normative reference groups possess quite a significant impact on consumer purchase behaviors. Through the endorsement of products, these groups can influence what consumers perceive as socially acceptable or desirable. A previous study examined the influence of Instagram influencers, concluding that followers often perceive the products promoted by influencers as 'popular' and 'desired by many'. This induces a sense of normative pressure to purchase and use the same products (Djafarova and Rushworth, 2017).

Moreover, Lou et al. (2023)Lou and Yuan investigated how peer communication about products on social media platforms creates a normative social influence that informs purchase intentions. Their study indicated that consumers are heavily influenced by the consumption choices of those within their social sphere, further evidencing the power of normative reference groups.

Traditionally, there has been extensive literature conducted to grasp the effects of normative influence on consumer behavior. These studies provide evidence of the substantial impact normative reference groups, as facilitated through virtual influencing, have on shaping purchase behaviors However, this research aims to address the gap by scrutinizing the specific dynamics of normative reference groups in shaping consumer choices within the metaverse, offering a novel perspective on the evolving landscape of consumer decision-making in digitally immersive environments.

H7a: *There is a significant positive influence of normative influence and purchase behavior.*

H7b: *There is a positive influence of Virtual influencers as a normative reference group on purchase behavior.*

2.11 The Relationship Between Purchase Intentions and Purchase Behaviour

According to the literature, purchase intention and purchase behavior are closely linked constructs within the context of consumer decision-making. Purchase intention is considered a cognitive representation of an individual's inclination or predisposition to engage in a specific purchase, reflecting their subjective likelihood or willingness to make a purchase in the future. On the contrary, purchase behavior is defined as the observable actions and decisions individuals take when acquiring goods or services. It represents the actual manifestation of their intentions in the form of purchase transactions.

The research highlighted that purchase intention is a strong predictor of behavior. It allows individuals to incorporate various factors influencing their purchase decisions (Fishbein and Ajzen, 1975). Purchase intentions indicate the willingness and effort individuals are willing to invest in a specific behavior. Previous studies (He et al., 2008; Pavlou and Fygenson, 2006; Ajzen, 1991) have consistently shown that purchase intention substantially predicts actual purchase behavior, particularly in the online context. Thus, purchase intention serves as a crucial indicator of individuals' readiness to engage in specific purchase behavior, and it has been widely acknowledged as a salient predictor of actual behavior, as evidenced by previous research.

H8: *Consumer purchase intention has a significantly positive impact on purchase behavior.*

2.12 The Mediating Role of Purchase Intention on VI, NI, II, and Purchase Behavior

Purchase intention might play a mediating role in the relationships between Virtual Influencers, Normative Influence, Informative Influence, and Purchase Behavior. Firstly, the mediating relationship of purchase intention between Virtual Influencers and purchase behavior. In previous research De Veirman et al. (2020)

found that influencers, specifically those with higher perceived authenticity, significantly affect the purchase intentions of their fans and followers. However, this study was conducted on a traditional online platform, not in the Metaverse context. Thus, we hypothesize that this relationship holds true in the metaverse context. According to ELM, Virtual Influencers' messages received through the central route might directly affect a viewer's attitude (or intention to purchase), thus establishing the direct relationship between Virtual Influencers and Purchase Intention. This happens when the audience is motivated and able to process the detailed information provided by the influencers.

Similarly, the mediating role of PI between VI and PB is operationalized via ELM theory. According to the peripheral route is also crucial, as it indicates how Virtual Influencers, by virtue of their attractiveness or popularity (peripheral cues), can indirectly affect Purchase Intention. This typically happens when audiences are unable or not motivated enough to scrutinize the message in detail, therefore relying on peripheral cues.

Therefore, the Purchase Behavior is ultimately influenced by the established Purchase Intention, depending on the degree to which the consumer considers the message received. In this way, we can understand Purchase Intention as a mediating role between Virtual Influencers and Purchase Behavior.

H9a: *The PI mediates the relationship between Virtual Influencers and Purchase Behavior.*

Secondly, there are several studies that underscore the impact of normative influences on purchase intentions. For instance, Bearden and Etzel (1982) indicated that social pressure, or normative influence, has the power to change consumers' purchase decisions. Moreover, Park and Lessig (1977), suggested that normative social influence significantly affects purchase intention.

These studies were, once again, carried out outside the metaverse. This thesis aims to investigate whether these relationships persist within the metaverse. Similarly, the mediating role of PI on the relationship between NI and PB is operationalized through ELM theory. According to ELM to the context of Normative Influence and purchase intention, social norms formed through normative influence may affect purchase intention via the central route. When individuals carefully consider

social norms (normative influence) and their implications, this process aligns with central route processing. They develop attitudes or intentions (e.g., purchase intentions) based on the merit of the arguments, resulting in more enduring and predictive behaviors. The peripheral route, on the other hand, may relate to how individuals conform to social norms, not necessarily due to thoughtful consideration, but because they observe others following those norms. This could indirectly influence purchase intention, with users adopting preferences or buying behaviors under the influence of social norms without extensive deliberation. The ELM suggests behavior likelihood (e.g., actual purchasing behavior), is consequently contingent upon the degree of consideration given to the message or context at hand. Therefore, purchase intention, formed via central or peripheral routes created by normative influences, mediates between Normative Influence and purchase behavior's relationship.

H9b: *The PI mediates the relationship between the normative group's influence and Purchase Behavior.*

Thirdly, prior research, such as Park and Lessig (1977); Moschis (1976) demonstrated the significant role of informative influence in shaping purchase intentions. Individuals often rely on others to provide information about products or services. The informants could be friends, family members, or experts, and their suggestions can significantly impact a person's purchase intention. However, these were considered in offline or traditional online contexts, and it is not clear if the same relationship exists within the metaverse. In conclusion, previous studies on traditional platforms suggest direct relationships between informative reference group's influence and purchase intentions.

Furthermore, the indirect effects of PI between informative influence and purchase behavior is hypothsised through ELM theory. In the context of ELM, this falls under the Central route, where consumers processing the detailed and quality information provided by a credible source, form a Purchase Intention. Purchase Intention, in ELM terms, can be viewed as an outcome of consumer's central processing. Intricate details or substantial information about a product delivered by an influencer can shape a consumer's intention to indeed purchase the product. Finally, Purchase Behavior is the action taken post-intention, which also has

connections with the ELM. The preexisting intention (mediator) and the actual purchase (outcome behavior) are tightly linked in accordance with a consumer's ability and motivation to elaborate. Thus, this shows that there is mediating relationship of purchase intention (PI) between Informative Influence and Purchase Behavior, being shaped by the Informative influence (as per the Central Route of ELM) and subsequently leading to Purchase Behavior. This research aims to verify if these relationships hold true in the metaverse context.

H9c: *Purchase Intention (PI) mediates the relationship between Informative reference group influence (II) and Purchase Behavior (PB).*

2.13 Research Model

2.13.1 Theoretical Framework

This is the theoretical framework's model of virtual influencers (VI), normative reference groups' influence (NI), informative reference groups' influence (II), purchase intentions (PI), and purchase behavior (PB).

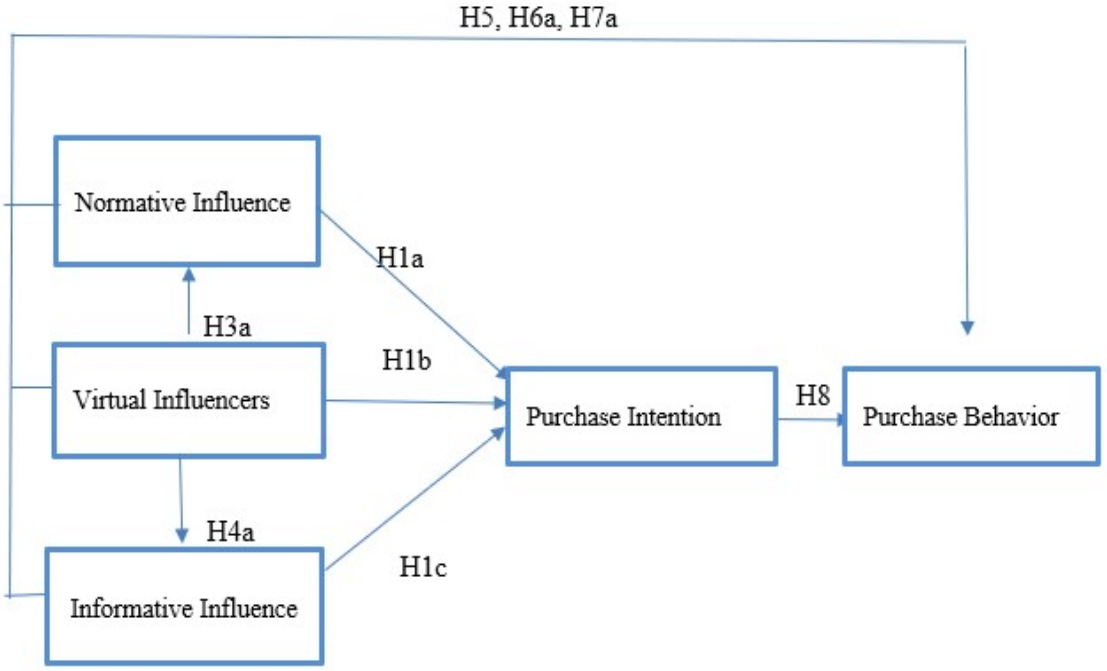

FIGURE 2.1: Theoretical Framework

H3b: $VirtualInfluencers \rightarrow NormativeInfluence \rightarrow PurchaseIntention$

H4b: $VirtualInfluencers \rightarrow InformativeInfluence \rightarrow PurchaseIntention$

H6b: $NormativeInfluence \rightarrow VirtualInfluencers \rightarrow PurchaseBehaviour$

H7b: $InformativeInfluence \rightarrow VirtualInfluencers \rightarrow PurchaseBehaviour$

H9a: $VirtualInfluencers \rightarrow PurchaseIntention \rightarrow PurchaseBehaviour$

H9b: $NormativeInfluence \rightarrow PurchaseIntention \rightarrow Purchasebehaviour$

H9c: $InformativeInfluence \rightarrow> PurchaseIntention \rightarrow PurchaseBehaviour$

2.13.2 Summary of Research Hypothesis

H1a: Virtual influencers (VI) have a significantly positive influence on purchase intention in the metaverse.

H1b: Normative influence (NI) from reference groups has a significantly positive influence on purchase intention in the metaverse.

H1c: Informative influence (II) from reference groups has a significantly positive influence on purchase intention in the metaverse.

H2: There is a significant relationship between the normative reference group's influence and the informational reference group's influence.

H3a: Virtual influencers have a positive relationship with normative group influence.

H3b: There is a significant interaction effect between virtual influencers and normative group influence on purchase intention in the metaverse.

H4a: Virtual influencers have a positive relationship with informative group influence.

H4b: There is a significant interaction effect between Virtual Influencers and Informative Influence from reference groups on Purchase Intention in the Metaverse.

H5: Virtual Influencers have a positive relation with Purchase Behavior.

H6a: Informational reference groups have a positive influence on Purchase Behavior.

H6b: There is a positive influence of Virtual influencers as an Informative reference group on Purchase Behavior.

H7a: Normative Reference groups have a positive influence on Purchase Behavior.

H7b: There is a positive influence of Virtual influencers as a normative reference group on purchase behavior.

H8: Purchase Intention of consumer has a positive impact on Purchase Behavior.

H9a: Purchase Intention mediates the relationship between Virtual Influencers and Purchase Behavior.

H9b: Purchase Intention mediates the relationship between Normative groups' influence and Purchase Behavior.

H9c: Purchase Intention mediates the relationship between Informative group influence and Purchase Behavior.

Chapter 3

Methodology

3.1 Research Philosophy

The present study uses a positivist research philosophy that is in line with quantitative research methods. Its fundamental premise is to determine the validity of knowledge through empirical evidence.

This philosophical approach was first introduced in the 19th century by the notable French philosopher, Auguste Comte. Positivism emphasizes objectivity, empirical evidence, and rigorous scientific methods to study and explain social phenomena (Turner, 2001). Positivists believe that the social world processes according to regularities and can be examined using similar methods as those employed in natural sciences.

3.2 Research Approach

There are two types of approaches used in research i-e Deductive and Inductive approaches. This study will adopt a deductive approach lining up with the positivist philosophy, to systematically examine purchase intention within the metaverse. Moreover, building upon theories and conceptual frameworks, specific hypotheses will be formulated and tested using quantitative data collected through surveys.

3.3 Research Design

The current investigation employs a research methodology that utilizes quantitative analysis in order to explore the causal connection between virtual influencers, the influence of normative reference groups, the influence of informational reference groups, purchase intentions, and behavior within the metaverse. The data collection will be carried out using a survey method that involves using questionnaires covering various categories such as age, gender, income, involvement in the metaverse, engagement frequency, platforms used, and virtual activities. Multiple types of surveys can be employed, such as online surveys, self-administered questionnaires, and phone interviews (Creswell and Creswell, 2017). For the purposes of this study, self-administered questionnaires will be employed due to their numerous advantages, including a more expedited data collection process.

3.3.1 Type of Study

The classification of research studies in social science reveals two types, namely qualitative research and quantitative research. This particular study adopts a quantitative approach, which is regarded as more dependable, consistent, and effective, and is commonly preferred due to its ability to quantify the nature and strength of various proposed relationships within a theoretical framework (De Vaus and de Vaus, 2013). Furthermore, Chase et al. (2016) assert that a quantitative research design assists in obtaining more credible results.

3.3.2 Study Settings

The study settings represent the conditions under which the research was conducted. There are two types of study settings: contrived and non-contrived. In a contrived setting, the investigator makes some changes to the environment to obtain certain results and test the effect of some

conditions. On the other hand, a non-contrived setting is one in which no changes are introduced in the environment from where the respondents are sought. In the current study, a non-contrived setting is required in which the respondents will

answer questions in the natural environment where routine activities occur. The survey will target participants across different age groups and demographics to capture a diverse range of perspectives and experiences within the metaverse.

3.4 Unit of Analysis

The examination of various entities or distinct entities is the essence of the analytical unit; scholars scrutinize their attributes to obtain findings. The analytical unit covers a wide range of entities, including individuals, groups, industries, countries, and societies, where scholars accumulate data. The unit of analysis for the study comprises individuals and consumers who actively participate in the Metaverse. Individuals, often represented through avatars, engage in diverse activities within this virtual environment.

3.5 Time Horizon

This research utilized a research designa known as cross-sectional study. A cross-sectional study represents a particular type of research design in which data is gathered from a multitude of individuals at a singular moment in time (Xiao et al., 2018). The present study was conducted over 4 months to capture the current state of purchase intention and behavior about virtual influencers and reference groups' influence.

3.6 Sample

Sampling is the method in which a subset of cases are selected to draw conclusions regarding the particular population of concern, in this instance, comprising luxury enthusiasts in the metaverse (Singleton et al., 2005). We selected a representative sample from metaverse users to generalize our results. The current study focused on understanding the infkuence of virtual influencers and reference groups on purchase intention and behavior within the metaverse luxury industry.

Our sample included a total of 355 respondents, of which 234 were metaverse users immersed in luxury-related virtual platforms. In addition, we expanded our data collection process to include students of O levels and A levels reaching out to this demographic through social media platforms to capture a diverse perspective on luxury consumption in the metaverse. Furthermore, we tapped into the vibrant communities within the metaverse platforms like Roblox, and Fortnite by engaging with respondents in discord servers related to these virtual worlds.

Our data collection was collaborative, including students, jobbers, and gamers from diverse platforms and backgrounds. Questionnaires were distributed via various channels, ensuring a wide reach and engagement. The survey had a cover letter explaining the study's scope and ensuring confidentiality of respondents.

3.7 Instrumentation

3.7.1 Data Collection Instruments

Online questionnaires will be used to collect data on variables. These questionnaires can be developed based on existing validated scales and adapted to the specific context of the metaverse. We obtained responses by using a 5-point Likert scale having anchors $1 = StronglyDisagree, 2 = Disagree, 3 = NeitherAgree\ norDisagree, 4 = Agree, 5 = StronglyAgree$ for Virtual influencers, Normative influence, Informative influence, and Purchase intention. Additionally, the responses about Purchase behavior were also obtained on a 5-point Likert scale having anchors 1 to 5 include; Almost never, Rarely, Sometimes, Often, and Always.

Regarding gender, this study used 1 for males and 2 for females, for age (in Years) coding of $1 = Below16, 2 = 16 - 20, 3 = 21 - 25, 4 = 26 - 30, 5 = 31 - 35, 6 = 36 - 40, 7 = 40\&above$ were used. For income level coding of $1 = StilldependentonParents/Guardians, 2 = below50,000PKR, 3 = 50,001 - 100,000PKR, 4 = 100,001 - 150,000PKR, 5 = 150,001 - 200,000PKR, 6 = 200,001 - 250,00PKR, 7 = 250,001PKR\&above$. Moreover, three filtered questions were added to our questionnaire i.e.,

1- Are you using or experiencing metaverse platforms? (Roblox, Fortnite, Minecraft, or Decentraland). Coding of 1 for Yes and 2 for No is used.

2- Which platform do you use? Coding of 1 for Roblox, 2 for Fortnite, 3 for Minecraft, 4 for Sandbox, 5 for Decentraland, and 6 for others is used.

3- Have you ever purchased branded virtual products for your avatars in the Metaverse platform you use? Coding 1 for Yes, and 2 for No is used. See the Appendix at the end for all the scales with references.

3.7.2 Virtual Influencers

To measure virtual influencers, 5 items were adopted from Johnstone and Lindh (2022). The respondents were provided with a series of statements about virtual influencers. The same scale was utilized in old literature with high reliability (Krishen et al. (2019) and Johnstone and Lindh (2022). Furthermore, all the items were measured on a Likert scale ranging from 1 to 5 (Strongly Disagree = 1 to Strongly Agree = 5).

3.7.3 Normative Influence

To measure normative influence, 8 items were adopted from a study by Bearden et al. (1989). All the responses were noted on a 5-point Likert scale (Strongly Disagree = 1 to Strongly Agree = 5).

3.7.4 Informative Influence

To measure informative influence, 4 items were adopted from the same study by Bearden et al. (1989). The responses were recorded on a 5-point Likert scale (Strongly Disagree = 1 to Strongly Agree = 5).

3.7.5 Purchase Intention

To measure purchase intention, 2 items were adopted from Hoonsopon and Puriwat (2016) 2 items were taken from the study by Bian and Forsythe (2012), and 2 more

items were adopted from Sokolova and Kefi (2020). Furthermore, all items were measured on a 5-point Likert scale (Strongly Disagree =1 to Strongly Agree =5).

3.7.6 Purchase Behavior

To measure purchase behavior, 3 items were taken from the study Oumayma and Ez-Zohra (2023). The respondents filled questions on a Likert scale ranging from 1 to 5 (Almost Never = 1 to Always = 5).

Chapter 4

Results

4.1 Descriptive Analysis

Descriptive techniques determine the presentation of univariate summary statistics for various variables. This involves calculating and tabulating different statistical values. Descriptive statistics provide essential details, including sample size (S), mean (M), standard deviation (σ) and the range between minimum (Min) and maximum (Max) values. The mean value shows the average of each variable in the data. The minimum value shows the minimum recorded response,, while the maximum value shows the maximum recorded response of the sample. Standard deviation is the measure of the dispersion and shows how distant the values are from a mean value. Table 4.1 in this study presents the descriptive statistics for the current dataset. The first column lists the variables of the study, while the next column provide information on sample size, and the next give minimum and maximum values, mean, and standard deviation, respectively.

Table 4.1: Descriptive Analysis

Variables	**Sample**	**Min**	**Max**	**Mean**	**STD.dev**
PI	226	1	5	3.826	0.085023
II	226	1	5	4.552	0.069179
NI	226	1	5	3.733	0.025017
VI	226	1	5	3.656	0.037884
PB	226	1	5	3.143	0.038664

4.2 Participants Characteristics

The research sample consisted of a total of 355 respondents, of which 234 were active metaverse users. Eight respondents were excluded from the analysis because of the same responses across all questionnaire constructs.

Furthermore, those who completed the survey were first passed by the initial screening questions (i.e., Metaverse users, purchasing collectibles for their avatars, and familiarity with VIs). Consequently, the data of 226 respondents were used for data analysis.

Most of the respondents are active on multiple gaming platforms. The respondents were actual metaverse platform users who used Roblox (35.5%), Fortnite (32%), Minecraft (11%), Sandbox (2.2%), Horizon (0.4%), and various other gaming and virtual social platforms (18.9%).

Among the 226 respondents, 71.5% were men, and 28.5% were females as shown in table 4.2. Age-wise, the sample was predominantly concentrated in the 16 to 20 years age bracket (47.6%), followed by the 21 to 25 years group (22.8%), and the 26 to 30 years category (17.2%) as shown in table 4.3.

In terms of financial independence, a significant proportion of respondents relied on parental or guardian support (57.7%), with some reporting monthly incomes below 50,000 PKR (14.1%). Additionally, a portion of respondents earned monthly incomes ranging from 50,000 PKR to 100,000 PKR (16.1%), while others had monthly earnings exceeding 100,000 PKR (12.1%) as shown in the Table 4.4SS.

Table 4.2: Participants Characteristics - Gender

Gender	**Frequency**	**Percentage**	**Cumulative Percentage**
Male	173	71.5	71.5
Female	53	28.5	100
Total	226		

Table 4.3: Participants Characteristics - Age

Age	Frequency	Percentage	Cumulative Percentage
Below 16	12	5.31	5.31
16-20	147	65.0	70.31
21-25	49	21.7	92.01
26-30	11	4.87	96.9
31-35	4	1.77	98.7
36-40	3	1.32	99.9
40 & above	0	0	100

Table 4.4: Participants Characteristics - Income Level

Income Level	Frequency	Percentage	Cumulative Percentage
Still dependent on Parents/Guardians	172	76.11	76.11
Below 50,000PKR	28	12.38	88.49
50,001-100,000PKR	13	5.75	94.24
100,001-150,000PKR	7	3.09	97.33
150,001-200,000PKR	4	1.76	99.09
200,0001-250,000PKR	1	0.44	99.53
250,001 & above	1	0.44	100

4.3 Data Analysis

Upon the completion of the data cleansing process, the study progressed to the initial analysis phase, utilizing partial least structural equation modeling (PLS-SEM) in conjunction with SmartPLS version 4 to perform the data analysis. PLS-SEM has emerged as a substantial tool for analyzing data. This specific tool is beneficial for research frameworks that emphasize exploration, especially when trying to assess new connections among various constructs (Hair Jr et al., 2014). In addition, it is significant to review the predictive aspect of PLS-SEM (Hair et al., 2017). Therefore, given the exploratory nature of the research framework, PLS-SEM was considered a suitable data analysis tool for this study.

To investigate the direct relationships of virtual influencers (VIs) on purchase intention and purchase behavior, PLS-SEM was employed. Furthermore, this analysis examines the correlation between VIs and normative influence as well as informative influence. Additionally, the study investigates the direct influence of normative and informational factors on purchase intention and purchase behavior. Furthermore, it explores the indirect effects of various constructs.

PLS-SEM is extensively applied in various disciplines within the social sciences. The areas of inquiry encompassed in the academic literature include management information systems (Hair et al., 2017; Ringle et al., 2012), marketing (Hair et al., 2012b), strategic management (Hair et al., 2012a), organizational management (Sosik et al., 2009), human resource management (Ringle et al., 2012), operations management (Peng and Lai, 2012), international management (Richter et al., 2015), management accounting (Nitzl, 2016), and hospitality (Ali et al., 2018).

This methodology provides researchers with the ability to estimate intricate models that encompass numerous constructs, indicators, and structural paths. Therefore, smartPLS4 was employed to evaluate both measurement and structural models. The analysis of structural equation modeling (SEM) consists of two essential components, namely the measurement model and the structural model. The PLS path model encompasses these two elements, which are outlined below.

i. Measurement Model (Outer Model)

ii. Structural Model (Inner Model)

4.3.1 Measurement Model

The measurement model is the first step to evaluate the results of PLS-SEM. Once the measurement model meets the necessary criteria, researchers proceed to evaluate the structural model. To evaluate the measurement model, the reliability and validity of the scale were assessed.

4.3.1.1 Reliability

The reliability in a measurement model is a crucial aspect of the quality of research, as it guarantees that the indicators of the latent constructs consistently and accurately depict the underlying theoretical concept. To determine the reliability of the measurements, both Cronbach alpha (CA) and composite reliability (CR) were examined.

4.3.1.2 Cronbach Alpha (CA)

The internal consistency of each latent construct was evaluated using Cronbach's Alpha. The values of Cronbach's Alpha if exceeding the acceptable threshold of 0.7 (Nunnally, 1978) it indicate strong internal reliability.

In this study, the composite reliability scores ranged from 0.963 to 0.978, surpassing the 0.70 benchmark as shown in table 4.5. Hence, construct reliability was established for each construct.

4.3.1.3 Composite Reliability (CR)

The Composite Reliability values, another measure of internal consistency, were examined. All constructs demonstrated CR values above the recommended threshold of 0.70 (Dijkstra and Henseler, 2015; Gefen et al., 2000) affirming their internal consistency and reliability.

The findings in table 4.5 demonstrate that the values of Cronbach alpha (CA), and composite reliability (CR) exceeded the threshold values (Hair Jr et al., 2014; Nunnally, 1978; Gefen et al., 2000).

TABLE 4.5: Measure Reliability

Measure	CA	CR
II	0.962	0.964
NI	0.972	0.978
PB	0.963	0.964
PI	0.962	0.963
VI	0.935	0.966

4.3.2 Validity

It can be defined as, how correlated the items of a latent construct are. For validity, convergent and discriminant validity were evaluated.

4.3.3 Convergent Validity

Convergent validity was assessed by outer loadings (OL) and average variance extracted (AVE). The values of AVE exceeded 0.5, a recognized benchmark for strong convergent validity (Fornell and Larcker, 1981) underscoring the constructs' ability to measure the underlying latent traits accurately.

4.3.3.1 Factor Loadings (outer loadings)

The Outer loadings required a minimum value of 0.707 (Hair Jr et al., 2014). This indicates that the construct elucidates more than 50 percent of the variances in the indicators. This also ensures a satisfactory level of reliability for the items in the model. Our current study's loadings are higher than the set standard as shown in Table 4.6.

4.3.3.2 Average Variance Extracted (AVE)

The average variance extracted (AVE) was also assessed to establish convergent validity (Hair et al., 2017). AVE was more than the minimum required value

Table 4.6: Convergent Validity (OL)

Construct Items	**II**	**NI**	PB	PI	VI
II1	0.953				
II2	0.946				
II3	0.934				
II4	0.949				
NI1		0.868			
NI2		0.893			
NI3		0.940			
NI4		0.933			
NI5		0.921			
NI6		0.934			
NI7		0.921			
NI8		0.903			
PB1			0.956		
PB2			0.979		
PB3			0.961		
PI1				0.890	
PI2				0.911	
PI3				0.922	
PI4				0.946	
PI5				0.914	
PI6				0.912	
VI1					0.709
VI2					0.930
VI3					0.937
VI4					0.936
VI5					0.925

i.e. 0.50. The AVE value of all constructs is greater than 0.50 shown in Table 4.7. This affirms strong convergent validity and affirms the constructs' capacity to accurately measure the underlying latent traits.

TABLE 4.7: Convergent Validity (AVE)

Constructs	AVE
II	0.894
NI	0.836
PB	0.932
PI	0.839
VI	0.795

4.3.4 Discriminant Validity

Discriminant validity is assessed to determine the distinctiveness of each construct within the structural model, evaluating the extent to which one construct is independent of others. It is evaluated by the Fornell-Larcker criterion, where the square root of AVE of each construct is compared with correlations among constructs Fornell and Larcker (1981) and the Heterotrait-Monotrait (HTMT) ratio, ensuring values remain below the recommended threshold of 0.85 (Henseler et al., 2015).

4.3.4.1 The Square Root of AVE is Greater Than the Inter-Construct Correlation

To assess discriminant validity, the square root of Average Variance Extracted (AVE) is compared with the correlations between all constructs in the model. The results in the table indicate that the square root of AVE consistently exceeds the correlations between constructs when they are compared with each other. This comprehensive assessment affirms the measurement model's acceptable validity. Furthermore, Fornell and Larcker (1981) suggest that it is essential to compare the Average Variance Extracted (AVE) of each construct not only with the squared inter-construct but also with other constructs present within the structural model. This rigorous evaluation underscores the measurement model's robust validity. Moreover, according to Fornell and Larcker (1981) it is necessary for the square root of AVE for each construct to be greater than the correlations with the other constructs.

TABLE 4.8: Discriminant Validity via (Fornell Larcker Criterion)

	II	NI	**PB**	**PI**	**VI**
II	0.945				
NI	0.274	0.915			
PB	0.274	0.34	0.965		
PI	0.304	0.287	0.536	0.916	
VI	0.195	0.311	0.341	0.396	0.892

4.3.4.2 Heterotrait-Monotrait Ratio (HTMT)

The evaluation of discriminant validity in the measurement model was carried out by using the Heterotrait-Monotrait (HTMT) ratio. This method is widely acknowledged in the field (Henseler et al., 2015). This criterion proposes that an HTMT value below 0.90 is considered acceptable, as it ensures that the constructs being examined were indeed distinct (Gold et al., 2001). It is important to highlight that in the present study, all constructs that were investigated show HTMT values that fell below this established threshold, thereby confirming the presence of discriminant validity. The findings are shown in table 4.9.

TABLE 4.9: Discriminant Validity via Heterotrait-Monotrait Ratio (HTMT)

Construct	**II**	**NI**	**PB**	**PI**	**VI**
II					
NI	0.277				
PB	0.284	0.345			
PI	0.312	0.292	0.556		
VI	0.197	0.313	0.353	0.408	

Hence, the results of the Fornell-Larcker and HTMT ratio exhibited good discriminant validity, assuring that the measurement model had adequate validity. After satisfactory results of the measurement model through reliability and validity, the next step of the structural model is to assess if hypothesis validation has been done.

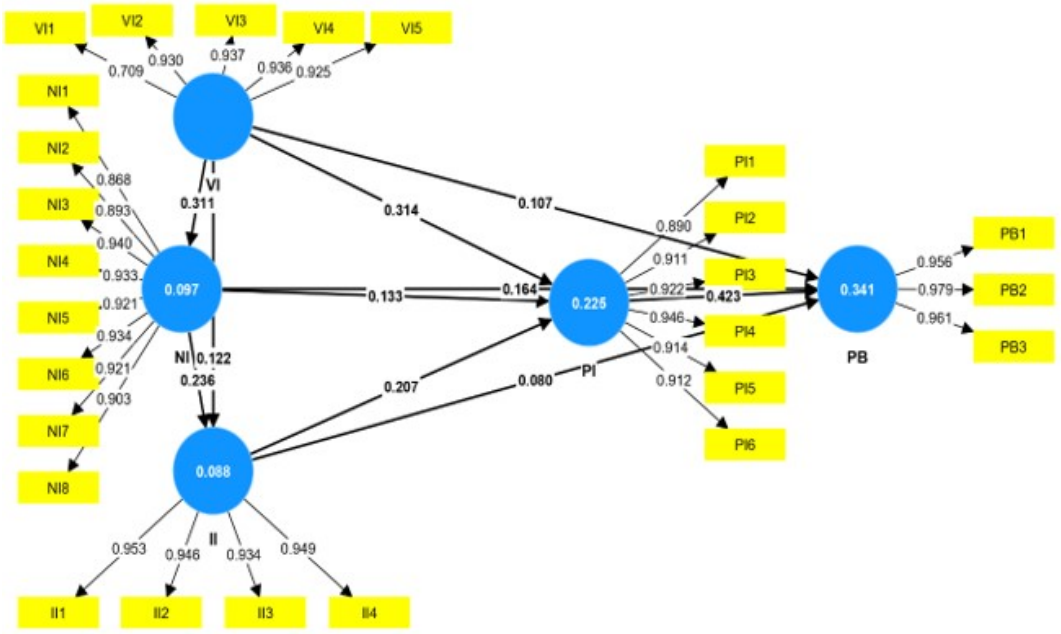

FIGURE 4.1: PLS-SEM with t- values

4.3.5 Structural Model and Hypothesis Testing

The structural model represents the relationship between latent variables that are hypothesized in the research model. Table 4.8 shows the results of the structural model analysis. Which basically shows the results of the inner model. The structural model was examined for all its relationships. To assess the structural model, various metrics including beta coefficients, t-values, coefficient of determination (R^2), effect size, and predictive relevance were scrutinized (Hair Jr et al., 2014). For t-values bootstrapping procedure (with 5000 resamples) was employed. Moreover, a beta value over 0.10 means a significant relationship between the variables. However, with the beta, we have to look for the t-value and p-value for the significance of relationships. A value greater than the value of 1.96 and 0.05 for t and p respectively shows significant relationships of variables. Fig. 4.1, PLS-SEM is shown with t-values.

The hypotheses were evaluated to examine the relationships between different constructs in the study. First, the hypothesis (H1) suggesting a link between Virtual Influencers and Purchase Intention was strongly supported, with $\beta = 0.314$ and a $p \leq 0$, confirming its acceptance. Hypothesis (H2) proposing a relationship between Normative Influence and Purchase Intention found not supported, with $\beta = 0.133$ and $p \leq 0.057$, resulting in its rejection. However, hypothesis

(H3) proposing a link between Informative Influence and Purchase Intention was supported, with a statistically significant $\beta = 0.207$ and a $p \leq 0.005$, indicating acceptance.

Furthermore, the study explored the influence of Normative Influence on informative influence (H4), which was found to be positively significant, with a $\beta = 0.236$ and a $p \leq 0.003$, supporting acceptance. Virtual Influence significantly influenced Normative Influence (H5), with a substantial $\beta = 0.311$ and a $p \leq 0$, supporting acceptance. However, Virtual Influence was examined for its effect on Informative Influence (H6), which was not supported, with a $\beta = 0.122$ and a $p \leq 0.109$ leading to rejection.

Moreover, the hypothesis (H7) proposing a relationship between Virtual Influence and Purchase Behavior was not supported, as indicated by a $\beta = 0.107$ and a $p \leq 0.115$, leading to its rejection. (H8) suggesting a relationship between Informative Influence and Purchase Behavior was tested.

The results indicated that this relationship was not statistically significant, as evidenced by a $\beta = 0.080$ and a $p \leq 0.175$ leading to its rejection. However, Normative Influence also had a significant impact on Purchase Behavior (H9), as indicated by a $\beta = 0.164$ and a $p \leq 0.01$, leading to acceptance.

Lastly, the study investigated the impact of Purchase Intention on Purchase Behavior (H10), which yielded highly significant results, with a $\beta = 0.423$ and a $p \leq 0$, confirming acceptance. Results are shown in Table 4.11.

4.4 Explanatory Power (R square & F Square) and Q Square

R square statistics explains the variance in the endogenous variable explained by the exogenous variable(s). It means how much change in the dependent variable can be accounted for by one or more independent variable (s). The R^2 represents the variance explained in each of the endogenous constructs and is a measure of the model's explanatory power (Shmueli and Koppius, 2011).

The range of R^2 extends from 0 to 1, with a higher value indicating a greater degree of explanatory power. Additionally, values of 0.25, 0.50, and 0.75 are classified as weak, moderate, and substantial respectively (Henseler et al., 2015).

The results in table 4.10 show that R2 for one endogenous construct is over 0.26 which further indicates that model exploratory power is substantial. Whereas one construct has moderate power which is 0.13.

Lastly, two variables show weak (0.02) exploratory power (Cohen, 1992). Moreover, Q square is predictive relevance, which measures whether a model has predictive relevance or not. It should be greater than zero. It is for endogenous construct. Q^2 values above zero indicate that it is well reconstructed and the model has predictive relevance.

If it is 0.02, 0.15, or 0.35 for a weak, moderate, or strong degree of predictive relevance of each effect (Hair et al., 2019). The Q^2 values of PB, PI, II, and NI are positive and greater than zero. Hence the proposed relations in the model have exhibited predictive relevance (Hair et al., 2019).

Meanwhile, the effect size (F^2) is the change in the R^2 when the exogenous is removed from the model. If its value is $\geq$ 0.02 is small, $\geq$ 0.15 is medium, and $\geq$ 0.35 is large (Cohen, 1992). In this study, the effect size is a maximum of 0.21.

TABLE 4.10: Fitness Model

Relationships	**Decision**	**f-square**	**R-square**	**Q-square**
II ->PB	Rejected	0.008	0.341	0.105
II ->PI	Accepted	0.05	0.225	0.139
NI ->II	Accepted	0.055	0.088	0.018
NI ->PB	Accepted	0.034		
NI ->PI	Rejected	0.019		
PI ->PB	Accepted	0.21		
VI ->II	Rejected	0.015		
VI ->NI	Accepted	0.107	0.097	0.083
VI ->PB	Rejected	0.014		
VI ->PI	Accepted	0.114		

Table 4.11: Results of Structural Model Analysis

Relationships	**Hypothesis**	**Path-coefficient**	**Std. Deviation**	**T Statistics**	**P values**	**Decision**
II ->PB	H6a	0.08	0.059	1.356	0.175	Not Supported
II ->PI	H1c	0.207	0.074	2.781	0.005	Supported
NI ->II	H2	0.236	0.079	2.969	0.003	Supported
NI ->PB	H7a	0.164	0.064	2.58	0.01	Supported
NI ->PI	H1b	0.133	0.07	1.906	0.057	Not Supported
PI ->PB	H8	0.423	0.069	6.111	0	Supported
VI ->II	H4a	0.122	0.076	1.602	0.109	Not Supported
VI ->NI	H3a	0.311	0.075	4.146	0	Supported
VI ->PB	H5	0.107	0.068	1.577	0.115	Not Supported
VI ->PI	H1a	0.314	0.077	4.1	0	Supported

4.5 Prediction Analysis

Predictive relevance Q^2 assesses the model's ability to predict future outcomes. A Q^2 value above zero shows that the model has predictive relevance. To find q-square PLS predict is run in the smart pls4.

Moreover, R-square measures the goodness of fit of a regression model but primarily reflects its explanatory power within the sample data. To comprehensively evaluate a model's predictive ability, it's recommended to use techniques like cross-validation and out-of-sample testing, as suggested by Shmueli et al. (2019).

These methods provide a more realistic assessment of a model's predictive power by testing it on data not used in the model's training. Many researchers employ various predictive statistics, which are root mean squared error (RMSE) and mean absolute error (MAE), to quantify predictive errors in endogenous constructs. The choice between RMSE and MAE depends on the distribution of prediction errors. If the prediction error distribution is highly non-symmetric, as shown in the long left or right tail in the distribution of prediction error (Danks and Ray, 2018).

Comparing these indicators to a linear regression model benchmark helps determine the model's prediction relevance. If all the indicators in the PLS-SEM analysis have lower RMSE (or MAE) values compared to the LM benchmark, the model has high predictive power. If the majority of indicators in the PLS-SEM analysis have smaller prediction errors than the LM benchmark, this indicates medium predictive power.

Further, if the minority of indicators have a smaller PLS-SEM-MAE predictive error than the LM benchmark, this shows low predictive power. Moreover, if the predictive errors in RMSE (or MAE) are higher than the LM benchmark, then this shows a lack of predictive power.

Hence, in the present study, we compared PLS-SEM-MAE values with LM- MAE because the prediction error distribution is highly non-symmetric having long and short tails on the left and right sides Danks and Ray (2018); Shmueli et al. (2019). Table 4.12 shows majority of MAE indicators have lower values compared to LM benchmark values. So, our model has moderate predictive power. Shmueli et al. (2019).

Table 4.12: Predictive Relevance

Items	Q^2predict	PLS-SEM MAE	LM MAE	Results
II1	0.005	0.522	0.505	0.017
II2	0.026	0.5	0.485	0.015
II3	0.005	0.535	0.531	0.004
II4	0.011	0.49	0.48	0.01
NI1	0.071	0.689	0.698	-0.009
NI2	0.083	0.657	0.68	-0.023
NI3	0.083	0.652	0.678	-0.026
NI4	0.086	0.671	0.695	-0.024
NI5	0.055	0.659	0.674	-0.015
NI6	0.039	0.669	0.689	-0.02
NI7	0.044	0.715	0.738	-0.023
NI8	0.077	0.693	0.71	-0.017
PB1	0.091	1.001	1.009	-0.008
PB2	0.101	0.964	0.973	-0.009
PB3	0.099	0.993	0.998	-0.005
PI1	0.086	0.434	0.447	-0.013
PI2	0.093	0.397	0.41	0.013
PI3	0.095	0.527	0.521	-0.006
PI4	0.119	0.527	0.541	-0.014
PI5	0.15	0.514	0.531	-0.017
PI6	0.141	0.509	0.517	-0.008

4.6 Mediation Analysis

In this study, we examined the mediation effects of purchase intention on the relationship between Virtual influencers and purchase behavior. The mediation analysis was conducted to evaluate the mediating role of purchase intention in the association between Virtual influencers and purchase behavior. The results in Table 4.10 revealed a significant indirect effect of VI on PB through PI (H9a:$\beta = 0.133, t = 3.56, p \leq 0.001$).

The total effects of VI on PB were significant ($\beta = 0.341, t = 5.04, p \leq 0.001$). Although with the inclusion of a mediator, the direct effects of VI on PB were not

significant ($\beta = 0.107, t = 1.577, p \leq 0.115$). This shows the full mediating role of PI in the relationship between VI and PB. Hence, H9a ($VI- > PI- > PB$) was supported.

Also, we investigated the mediating effects of purchase intention on the relationship between different reference groups and purchase behavior. The mediation analysis was performed to assess the mediating role of purchase intention in the relationship between normative influence and purchase behavior.

The results in Table 4.13 revealed an insignificant indirect effect of NI on PB through PI (H9b: $\beta = 0.056, t = 1.753, p \leq 0.080$). The total effects of NI on PB were significant ($\beta = 0.259, t = 4.087, p \leq 0.001$). With the inclusion of a mediator, the direct effects of NI on PB were significant ($\beta = 0.164, t = 2.580, p \leq 0.010$). This shows no mediating role of PI in the relationship between NI and PB. Hence, H9b ($NI- > PI- > PB$) was not supported.

Moreover, we examined the mediating effects of purchase intention on the relationship between informative reference groups and purchase behavior. The mediation analysis was performed to assess the mediating role of purchase intention in the relationship between informative influence and purchase behavior.

The results in Table 4.10 revealed a significant indirect effect of II on PB through PI ($H9c; \beta = 0133, t = 3.560 p \leq 0.001$). The total effects of II on PB were significant ($\beta = 0.095 t = 2.669, p \leq 0.008$).

With the inclusion of a mediator, the direct effects of II on PB were significant ($\beta = 0.087, t = 2.492 p \leq 0.013$). This shows the partial mediating role of PI in the relationship between II and PB. Hence, H9c ($II- > PI- > PB$) was supported.

Furthermore, H7b having indirect effects of VI on PB through NI ($\beta = 0.051, t = 2.042, p \leq 0.041$) were significant. The total effects of VI on PB through NI ($\beta = 0.234, t = 4.776, p \leq 0.001$) were significant.

While the direct effects of VI on PB ($\beta = 0.107, t = 1.577, p \leq 0.0115$) were insignificant. Hence, H7b ($VI- > NI- > PB$) was supported. Whereas, H3b, H4b, and H6b, were not supported.

Table 4.13: Indirect Effects Bootstrapping Results

	Specific Indirect Effects	β	**STDEV**	**T-values**	**P-values**	**2.5%**	**CL97.5**	**Decision**
H9b	NI ->PI ->PB	0.056	0.032	1.753	0.08	-0.003	0.123	Rejected
H4b	VI ->II ->PI	0.025	0.02	1.268	0.205	-0.007	0.070	Rejected
H9a	VI ->PI ->PB	0.133	0.037	3.56	0	0.066	0.213	Accepted
H7b	VI ->NI ->PB	0.051	0.025	2.042	0.041	0.010	0.108	Accepted
H6b	VI ->II ->PB	0.01	0.01	0.998	0.318	-0.006	0.032	Rejected
H3b	VI ->NI ->PI	0.041	0.025	1.656	0.098	-0.002	0.096	Rejected
H9c	II ->PI ->PB	0.087	0.035	2.492	0.013	0.023	0.161	Accepted

TABLE 4.14: Results Summary

Hyp.	Statements	Results
H1a	Virtual influencers have a positive influence on purchase intention in the metaverse.	Supported
H1b	Normative influence reference groups have a positive influence on purchase intention in the metaverse.	Not Supported
H1c	Informative influence reference groups have a positive influence on purchase intention in the metaverse.	Supported
H2	There is a significant relationship between the normative reference groups and the informational reference groups	Supported
H3a	Virtual influencers have a positive relationship with Normative Group Influence	Supported
H3b	There is a significant interaction effect between virtual influencers and normative influence from reference groups on purchase intention in the metaverse.	Not Supported
H4a	Virtual influencers have a positive relationship with informative group influence.	Not Supported
H4b	There is a significant interaction effect between virtual influencers and informative influence from reference groups on purchase intention in the metaverse.	Not Supported

TABLE 4.15: Results Summary

Hyp.	Statements	Results
H5	Virtual influencers have a positive significant impact on purchase behavior.	Not Supported
H6a	Informative reference groups have a positive influence on purchase behavior.	Not Supported
H6b	There is a positive influence of Virtual influencers as an Informative reference group on Purchase Behavior.	Not Supported
H7a	Normative reference groups have a positive influence on purchase behavior.	Supported
H7b	There is a positive influence of Virtual influencers as a normative reference group on purchase behavior.	Supported
H8	Consumer purchase intention has a positive effect on purchase behavior.	Supported
H9a	Purchase Intention serves as a mediator between Virtual Influencers and Purchase Behavior.	Supported
H9b	Purchase Intention serves as a mediator between Normative groups' influence and Purchase Behavior.	Not Supported
H9c	Purchase Intention serves as a mediator between Informative group influence and Purchase Behavior	Supported

Chapter 5

Discussion, Implications, and Future Research

5.1 Discussion

This present research's contribution is to examine and measure the influence of virtual influencers and reference groups on purchase behavior, particularly for luxury brands. The current study demonstrates the effects on the Middle East and Asia's luxury fashion industry.

5.1.1 Influence of Virtual Influencers on Purchase Intention

Based on our research findings, it is evident that virtual influencers have a positive influence on purchase intention within the metaverse. This finding supports previous literature that has shown the impact of virtual influencers on consumer purchase intention (ATLI and Can, 2015). The presence and endorsement of virtual influencers in the metaverse can significantly impact consumers' purchase intentions. Virtual influencers, with their large followings and engaging content, have the ability to persuade consumers and influence their purchasing intentions. This aligns with the Elaboration Likelihood Model, highlighting the dual influence stemming from central and peripheral routes of information processing (Petty et al., 1986).

The central route sees consumers evaluating the credibility and relevance of the influencers' messages. On the other hand, the peripheral route points out the influence of the influencers' attractiveness or popularity. These virtual influencers are perceived as more relatable and trustworthy compared to traditional celebrities, as they are seen as authentic and genuine individuals who are immersed in the metaverse.

Moreover, shifts in consumer behavior and attitudes toward purchase decisions can be attributed to the increasing presence of virtual influencers in the metaverse. Among the influential factors, the prime one is the influential presence and credibility virtual influencers have built through their continuous engagement with followers. According to Rew T. Stephen, these influencers enhance their audience's trust by building familiarity and regularly sharing personal experiences.

In addition, these virtual influencers bring products or services to life in the metaverse using interactive methods like virtual tours, and virtual product tryouts. This interaction improves consumer understanding and perception of the product, encouraging purchases. Virtual influencers often set trends within the metaverse, which further strengthens their influence on consumer purchase decisions.

This experiential marketing approach allows consumers to comprehend the product realistically, increasing their confidence in the recommended products or services and enhancing their overall experience. Furthermore, influencers can vividly showcase luxury brands in an immersive manner, helping consumers better envision using or owning these brands, (Forbes, 2022) thereby enhancing trust and credibility. Hence, H1a is supported.

5.1.2 Influence of Normative Influence on Purchase Intention

It is found that normative influence from reference groups has been shown to significantly influence purchase intention in previous studies, our findings contradict these results within the metaverse context (Hoonsopon and Puriwat, 2016; Rahmawati et al., 2022).

Moreover, interactions within the metaverse primarily occur between consumers and virtual entities, rather than physical individuals, possibly diminishing the effect of normative reference groups on purchase intention in this unique environment. The metaverse allows consumers to form new reference groups by interacting with virtual entities/avatars and creating their own online personas. This alternative form of social interaction leads consumers to seek validation and approval from these virtual communities, instead of from traditional reference groups such as family and friends.

Consequently, our hypothesis (H1b) stating that normative influence from reference groups significantly affects purchase intention in the metaverse is not supported by the research data. This brings to light a significant finding within the virtual world of the metaverse, normative influence from traditional reference groups may not be as impactful on consumer purchase intention as previously assumed.

5.1.3 Influence of Informative Influence on Purchase Intentions

Our study suggests that informative influence from reference groups has a significant influence on purchase intention in the metaverse. These results support previous research by Ding et al. (2020) that has suggested the positive impact of informative influence from reference groups on purchase intention in traditional settings. This finding suggests that consumers in the metaverse are more likely to rely on the information and recommendations provided by virtual influencers and other virtual entities when making purchasing decisions. These virtual entities serve as trusted sources of information and their recommendations carry weight in the decision-making process.

Furthermore, Virtual influencers not only provide real-time feedback and address consumer queries, (Conti et al., 2022) thus offering a personalized interactive experience, but also enhance consumer experiences and trust in endorsed products or services, influencing purchase intentions. The ease of information dissemination and access within the metaverse enhances its value, enabling consumers to

collate luxury-related details from a multitude of sources. According to Surucu et al brand trust and reference groups greatly affect the purchasing intentions of young adults, with reference groups being a key influencing factor.

Contrary to the limited impact of normative influence from reference groups on purchase intentions identified in this study, informative influence is found to significantly affect consumer intentions. Therefore, H1c is supported, indicating that informative reference groups possess a substantial influence on purchase intentions in the metaverse.

5.1.4 Relationship of Normative and Informative Influences of Reference Groups

The research finds that there is a significant relationship between normative and informative reference groups in the metaverse. This suggests that both types of reference groups play a role in influencing consumer behavior in the metaverse, as shown in (LaTour and Manrai, 1989).

Specifically, normative reference groups are influential in establishing social norms and standards within the metaverse. These norms and standards can shape consumers' perceptions of what is socially acceptable or desirable in purchasing decisions. Normative reference groups hold the ability to benchmark acceptable social behavior and create a sense of communal identity among metaverse consumers.

On the other hand, informative reference groups provide consumers with valuable information and insights about products or services in the metaverse. Their influence lies in their ability to educate consumers, guiding them in identifying the best product or service choices tailored to their specific preferences or needs.

These groups are pivotal in consumers' decision-making processes due to their capacity to provide relevant, up-to-date information, as well as reviews and assessments of various products or services. Both reference group types complement each other, shaping norms while providing necessary information for informed consumer purchase decisions in the metaverse landscape. Hence, H2 is supported.

5.1.5 Virtual Influencers as a Normative Influence of Reference Groups

Virtual influencers in the metaverse serve as a normative influence of reference groups, influencing consumers' perceptions of what is socially acceptable or desirable in purchasing decisions. Their pervasive online presence and engagement with followers contribute to shaping the social norms and standards governing metaverse transactions. Beyond the norm-setting role, influencers often adopt the position of role models or trend-setters.

Consequently, their followers are likely to emulate their purchasing behaviors, especially concerning luxury brands, aligning their choices with those endorsed by the influencer of same social class.

In addition to that, Virtual influencers forge a societal consensus on values, tastes, and preferences within the metaverse community, ultimately establishing a shared set of standards that consumers seek to conform to. This conformity contributes to the influencers' social impact, shaping not only the material consumption but also the social identity and self-concept of their followers (Cialdini and Trost, 1998).

Moreover, empirical evidence underscores the positive correlation between the endorsements and opinions of virtual influencers and consumers' purchasing intentions in the metaverse, reinforcing the influencers' normative role. Therefore, the normative influence of virtual influencers, as a key constituent of normative reference groups, bears significant weight on consumers' intentions and purchasing decisions in the metaverse. Thus, Hypothesis H3a is supported by these findings.

5.1.6 Virtual Influencers as an Informative Influence of Reference Groups

Our research findings do not support the hypothesis that virtual influencers in the metaverse serve as an informative influence of reference groups. There is limited evidence to suggest that virtual influencers in the metaverse provide consumers with valuable insights into luxury brands, consumers often prefer to obtain information from alternative sources. These sources include online reviews, expert

opinions, and user-generated content, rather than relying solely on recommendations from virtual influencers.

Moreover, in the case of luxury brands, consumers tend to place greater trust in domain experts when making well-informed purchasing decisions. This preference arises from the realization that virtual influencers in the metaverse may lack the expertise and knowledge possessed by real-world professionals or critics.

Consequently, consumers often turn to experts who can provide authentic insights into product quality, features, and value, ultimately diminishing the influence of virtual influencers in the context of luxury brand purchases. Future research should be considered to investigate the credibility of virtual influencers.

Hence, virtual influencers in the metaverse may not have a significant informative influence on consumers' purchasing behaviors. This means H4a is not supported. However, it is concluded that virtual influencers in the metaverse primarily serve as a normative influence of reference groups, shaping consumers' perceptions of social norms and standards rather than providing informative guidance for purchase decisions.

5.1.7 Influence of Virtual Influencers on Purchase Behavior

This study suggests that virtual influencers in the metaverse do not have a significant influence on consumers' purchase behaviors. Virtual influencers in the metaverse may have a positive influence on consumers' intentions to make purchases in the metaverse, yet these heightened intentions do not invariably manifest as statistically significant influences on actual purchase behaviors.

Moreover, when considering luxury brands, consumers may intend to make a purchase within the metaverse, inspired by consistent messaging from influencers. However, the translation of this intention into actual buying behavior isn't conclusively proven. This discordance may arise due to several influencing factors. One such factor may be financial constraints which may limit buyers from actualizing their purchase intentions. In addition, the purchasing ecosystem within the metaverse, which primarily operates on virtual currency, may pose as a barrier

for some consumers. Lastly, the lack of physical interaction with luxury items, a critical aspect in traditional buying behavior, may inhibit actual purchasing.

As a result, in the complexities of the metaverse environment, the influence of virtual influencers on purchase behaviors is not substantiated with empirical certainty. Therefore, hypothesis H5, which states an influential relationship between virtual influencers and purchasing behavior in the metaverse, is not supported by the present data. Constraints such as financial limitations and the limits of virtual interactions may serve as notable barriers in translating purchase intention into real behavior in the metaverse.

5.1.8 Influence of Informative Reference Groups on Purchase Behavior

The present findings do not support the notion that informative reference groups have a significant influence on consumers' purchasing behaviors in the metaverse. While consumers may seek information from reference groups and compare themselves to these groups, it does not necessarily translate into a direct impact on their purchase decisions within the metaverse.

Consumers' intention to purchase is supported but actual purchasing behavior is not significant for several reasons. First and foremost, the virtual reality of the metaverse lacks the element of physical interactions with products. This lack can be significant as physical interaction often serves as a crucial factor for consumers when making informed purchase decisions, offering a tangible evaluation of the product's look, feel, and quality.

Secondly, the credibility and authority of informative reference groups in the metaverse can be a factor, as their expertise may potentially be under question. Consumers might doubt the veracity of the information provided by these groups, thereby inhibiting any substantial influence on their purchasing actions.

Lastly, consumers may have a greater dependence on alternate sources of information such as online reviews or expert opinions when deciding on purchases in the metaverse. This preference for alternative information channels underlines the

diminished role of informative reference groups in shaping actual consumer buying behaviors in this context. Hence, H6a is not supported.

5.1.9 Influence of Normative Reference Groups on Purchase Behavior

This research demonstrates that normative reference groups have a significant impact on consumers' purchasing behaviors in the metaverse. Consumers are influenced by the social norms and expectations set by their reference groups, leading to a higher likelihood of purchasing behavior in line with these norms (Zhuo et al., 2022). Consumers purchase luxury brands in the metaverse which can often be spurred by factors like peer acceptance and social validation.

However, it is important to note that the influence of normative reference groups may vary depending on the specific context and characteristics of the metaverse environment. For example, in a metaverse environment where consumers are given strong control over their virtual representation, such as customization of avatars or personalization of virtual living spaces, the influence of normative reference groups might be toned down. This is because, in these settings, consumers may prioritize their unique preferences and self-expression over normative conformity. That is why consumer purchase intentions are less significant.

Furthermore, reference groups, both normative and informative, play a crucial role in influencing consumers' purchase behaviors in the metaverse. In a study by Lee and Park (2022) it was found that normative reference groups have a significant impact on consumers' purchasing behaviors in the metaverse. The study revealed that consumers tend to conform to social norms and expectations set by their reference groups when making purchase decisions in the metaverse. Similarly, there is another research that highlights consumers, particularly for hedonic goods (Jin and Phua, 2014), favor recommendations from their peers over critiques from professionals. This inclination further foregrounds the influence of normative reference groups on consumer decisions in the metaverse.

Therefore, hypothesis H7a, proposing a significant influence of normative reference groups on purchase behavior in the metaverse, surprisingly finds strong support

in these observations. The collective weight of empirical evidence showcases the intricate role these groups play in shaping consumer decisions in digital environments.

5.1.10 Impact of Purchase Intention on Purchase Behavior

The study's research hypothesis establishes a significant effect of purchase intention on the actual purchasing behavior within the metaverse environment. It indicates that consumers with a high level of purchase intention are more inclined to manifest this into actual purchasing behavior within the metaverse. This observation aligns with empirical evidence that underscores a positive correlation between purchase intention and actual purchase behavior in the metaverse.

This causal relationship could be attributed to several reasons. For instance, within the metaverse, users may feel more immersed and involved with the products or services due to the virtual environment's unique characteristics. The high level of interactivity and personalization offered often enhances the consumers' intent to purchase and may push them towards making an actual purchase. Hence, H8 is supported.

5.1.11 Mediation Effects

Mediation analysis is a statistical tool used to explore the relationship between an independent variable (X) and a dependent variable (Y)- while considering the mediating variable (M) that may explain the relationship between X and Y. In the present study, we examined the mediation effects of purchase intention on the relationship between different reference groups and purchase behavior. Also, we investigated the mediating role of purchase intention (PI) on the relationship between virtual influencers (VI) and purchase behavior (PB).

Traditionally, an approach of mediation analysis proposed by Baron and Kenny suggests that the mediation effect occurs when the independent variable influences the mediator which in turn influences the dependent variable.

Our study found that H9a and H9c were supported. H9a and H9c hypotheses are supported according to ELM theory.

H9a ($VirtualInfluencers- > PurchaseIntention- > PurchaseBehavior$), support for this hypothesis could imply that in the metaverse, virtual influencers play a critical role in influencing their purchasing decisions. Collaborating with virtual influencers significantly enhances the purchase intention, which subsequently reflects in the final purchase behavior. The metaverse allows for immersive interactions and experiences, possibly intensifying the effect of influential factors on the decision-making process. This influencial-related interaction could serve as a powerful determinant of both purchase intention and final behavior.

H9c ($InformativeInfluence- > PurchaseIntention- > PurchaseBehavior$) suggests that when an influencer provides detailed and reliable information about a product or a service, it will impact the Purchase Intention of consumers, which will consequently affect Purchase Behavior. This support could be because, in the realm of the metaverse, consumers highly value transparency and in-depth knowledge. Informative influence from reliable sources, such as virtual influencers, plays a significant role in guiding consumer behavior in this context. The influence becomes more potent if the information shared is relevant and useful for the consumer. The cognitive involvement fostered by detailed, high-quality information directly contributes to a strong purchase intention which subsequently translates into actual purchasing behavior.

However, the hypothesis H9b ($NormativeInfluence- > PurchaseIntention- > PurchaseBehavior$) not being supported in your study could be due to a few reasons. Firstly, Normative Influence generally involves social pressure from reference groups or influencers, leading to conformity in purchase behavior. However, in the metaverse, which is a digital space, these traditional societal pressures may not apply or may be reduced. The anonymous and digital nature of the metaverse could make consumers less susceptible to normative influences compared to the physical world. Additionally, consumers in the metaverse may form their unique virtual identities and communities, which means they may seek validation from these new reference groups rather than traditional ones. Hence, traditional normative influences may have a lesser impact on their purchase decisions. Finally, it's also possible that the Metaverse's consumers value informative content (evidenced by support for H9a) more than normative cues. They might be more interested

in detailed product information or personal relevance, rather than what's deemed socially acceptable or popular. Further research will be required to fully understand why the normative influence didn't play a mediating role in this context as hypothesized.

Moreover, we examined the mediation effects of normative and informative reference groups' influences on the relationships between virtual influencers and purchase intentions such as H3b ($VI- > NI- > PI$), and H4b ($VI- > II- > PI$). After analysis, we found that both hypotheses H3b & H4b were not supported. There are several reasons why these hypotheses are not supported. Firstly, there may be a disconnection between the virtual influencers and the normative or informative reference groups, resulting in the influence not being passed on effectively to the consumer. Secondly, consumer skepticism can also play a significant role. Individuals might be doubtful about the credibility of virtual influencers (Jhawar et al., 2023), reducing the impact of the normative and informative influences on their purchasing intentions. Thirdly, the existence of other more influential factors, such as personal preference, can also overshadow the impact of the normative and informative influences on purchase intention. Fourthly, the novelty of the metaverse may also be affecting these results. As people navigate and adjust to this new immersive digital world, their behaviors might not yet mirror those in traditional marketing environments. Lastly, the effectiveness of virtual influencers might depend on the psychographic characteristics of the consumer. Such groups might respond differently, and the variation wasn't examined in the present study. It's important to conduct further in-depth analysis and research to determine the specifics of why these two hypotheses were not supported. This will aid in better conceptualizing and applying the effects of virtual influencers on consumer behavior in the metaverse.

In addition to that, our study also investigated the mediating effects of normative and informative influences on the relationship between virtual influencers and purchase behavior such as H6b ($VI- > NI- > PB$), and H7b ($VI- > II- > PB$). It was evident from analysis that the hypothesis H6b was not supported while H7b was supported. The lack of support for H6b suggests that, within the metaverse framework, consumers may not primarily rely on social approval or conformity

derived from normative influences advocated by virtual influencers when making purchase decisions. On the contrary, the support for H7b indicates that the processes of seeking information and making decisions, facilitated by informative influences, assume a more prominent position in mediating the relationship between virtual influencers and purchase behavior in the metaverse. Consumers may give priority to gathering information from various sources, including virtual influencers, experts, and other references, to guide their purchasing decisions.

5.2 Theoretical Implications

This study makes various significant contributions to the existing body of literature. Firstly, this study highlights the importance of virtual influencers and reference groups in the metaverse. The lack of knowledge of virtual influencers' marketing in the metaverse has been pointed out recently in a study Kim and Park (2023). This study underscores the unique influence these digital personas (VIs) and reference groups wield in this emergent virtual space.

Secondly, the incorporation of the Elaboration Likelihood Model (ELM) into the study enriches the theoretical framework, showcasing its applicability in elucidating how consumers process persuasive messages (Petty et al., 1986) within the metaverse. This extends the ELM's utility to the unique dynamics of virtual environments.

Thirdly, according to ELM, the study introduces the concepts of central and peripheral routes in the metaverse. It clarifies how consumers engage with information, whether through thoughtful analysis (central route) or reliance on social cues and influencers (peripheral route), contributing to a more detailed understanding of consumer processing.

Fourthly, the current research significantly contributes to unraveling the psychological and behavioral influences within the Metaverse. It explains the intricate decision-making processes consumers employ in this interconnected digital realm, emphasizing the pivotal role of social norms, influencers, and reference groups. Consumers hold the perception that luxury NFT items possess social value due to the significance they attach to the presence of representative avatars or game

characters (Kapferer and Valette-Florence, 2016). Importantly, these behavioral intentions also manifest in the tangible realm. For instance, consumers who value appearance and social status in the metaverse may also prioritize these factors when making purchasing decisions in the real world. It is evident that social norms and reference groups significantly impact purchase behavior in various contexts, including metaverse.

Fifthly, this study refers to a transformative shift in marketing approaches, suggesting that traditional models may not fully capture the complexities of consumer behaviors in the Metaverse. This prompts a reevaluation and adaptation of existing marketing theories to effectively navigate the digital landscape of the Metaverse.

Finally, the present study sheds light on consumers' willingness to buy luxury brands in the Metaverse. A detailed understanding of their interest, willingness, and probability provides a comprehensive view of the factors influencing purchase decisions in this digital space.

5.3 Practical Implications

The results of this study also have important practical implications for businesses operating in the metaverse. Understanding the influence of virtual influencers and reference groups on consumer purchase behaviors can help businesses in the metaverse develop effective marketing strategies. Businesses are advised to strategically align with virtual influencers who demonstrate dependability, honesty, reliability, and sincerity. By understanding the qualities valued by followers, marketers can build strong relationships to maximize their impact on consumer purchase intentions within the metaverse. Additionally, marketers can design campaigns that align with social norms set by virtual influencers (normative influence) and engage with informative reference groups to provide detailed content for consumers to make informed decisions.

Moreover, many industries, especially tourism and fashion, have faced significant challenges and financial losses during COVID-19. To rebound, these industries are becoming increasingly moving towards the metaverse to engage with consumers

through immersive brand experiences (Ampountolas et al., 2023; Silvestri, 2022). Therefore, collaborating with virtual influencers in the metaverse emerges as a strategic approach for these sectors to regain their footing and influence consumer purchase intentions. This shift underscores the metaverse's growing significance, not just as a digital realm but as a crucial arena for business recovery and transformation. Future research in this realm should further explore the metaverse's potential to revitalize pandemic-impacted industries, unveiling fresh dimensions of consumer behavior and brand-consumer interactions in this dynamic digital environment.

By collaborating with virtual influencers, they can amplify these experiences and further influence consumer purchase intentions. Moreover, these brands don't have to worry about the negative impact of Virtual influencers has significant advantages because brands have greater control over their advertisers' image and compliance (Fauser et al., 2023). Virtual influencers can interact with consumers on a more personal level, fostering a close connection between brands and their audience (Andrén, 2022). Furthermore, there is a significant influence of virtual influencers as a normative influence source in shaping consumer behavior and purchase intentions. Businesses can leverage this finding by strategically partnering with virtual influencers who align with their brand values and norms and target audiences through social norms and shared interests.

In addition to that, there is a substantial impact of informative reference groups on purchase intentions in the metaverse. Consumers often rely on informative reference groups in the metaverse to seek advice, recommendations, and product information before making a purchase. These reference groups can include online communities, social media influencers, and experts in specific fields. Research has shown that consumers place a high value on the opinions and recommendations of these informative reference groups in the metaverse. Businesses can leverage this influence by actively engaging with and establishing partnerships with relevant informative reference groups. This can be done through collaborations, sponsorships, and providing exclusive discounts to members of these groups.

Furthermore, there is a significant relationship between VIs and normative reference groups. Luxury Brands should leverage this relationship to maximize their

impact on consumer purchase behaviors in the metaverse. By partnering with virtual influencers who are also recognized as normative reference groups, brands can create a powerful influence on consumer purchasing intentions. These virtual influencers can act as role models and set social norms for their followers. VIs motivate their followers to purchase luxury items in the 3D gaming platforms. Additionally, there is not a significant relationship between VIs and informative reference groups. Brands should explore the potential of collaborating with both virtual influencers and informative reference groups simultaneously to maximize their impact on consumer purchase behaviors in the metaverse. Informative reference groups can be professional organizations or experts in a specific field who provide valuable information and recommendations to consumers. While VIs lack trust and credibility, informative reference groups are often perceived as reliable and trustworthy sources of information (Bearden and Etzel, 1982). Thus, businesses are encouraged to understand the dynamics of trust and credibility concerning virtual influencers. The study suggests careful consideration of the reliability and honesty of virtual influencers, guiding businesses in making informed decisions about which influencers to collaborate with based on their impact and audience trust.

Furthermore, this study recognizes the influence of both virtual influencers and reference groups on consumer behavior, so businesses may explore coordinated campaigns involving dependable virtual influencers and influential reference groups. By combining these strategies, marketers can enhance consumer engagement and foster positive purchase intentions.

5.4 Limitations and Future Research

Although the findings of this research add to the current knowledge, nonetheless, certain limitations are also acknowledged that highlight the avenue for future research. First, this study primarily focused on luxury brands within the fashion industry. One limitation is that the findings may not be directly applicable to other industries, such as beauty, technology, tourism, or automotive. Future research should explore how the impact of virtual influencers and reference groups

differs across these industries. Second, this research adopted a cross-sectional approach, collecting data at a specific point in time. Future research should consider longitudinal designs to examine the long-term effects of virtual influencers and reference groups on purchase behaviors in the metaverse. Third, the current study predominantly examined consumer behavior within a Middle Eastern and Asian cultural context (collectivism), potentially focusing on the diverse metaverse experiences of users from different cultural backgrounds (Hofstede, 1983). These countries are collectivist. People often prioritize the needs of the community or family over individual desires and values. Future research should explore how virtual influencers and reference groups influence purchase behaviors in individualistic cultures, such as Western societies, where individual autonomy and self-expression are valued (Sung et al., 2023). Fourth, we focus on general Virtual influencers. However, future research should consider investigating the differential impact of specific types of virtual influencers (e.g., simplest avatar, digital human avatar, etc) on purchase behaviors (Miao et al., 2022). Fifth, this study is focusing on general metaverse platforms. Future research should consider examining the unique characteristics, trends, and dynamics of different metaverse platforms (e.g., virtual reality, augmented reality, mixed reality), and how they contribute to consumer purchase behaviors in the metaverse.

Lastly, this study shows an insignificant impact of II on purchase behaviors, and VIs as an Informative reference group influence shows insignificance as well. The reason behind this is a lack of trust and credibility of virtual influencers in the metaverse. Considering the limitations mentioned, future research should aim to measure the source credibility of VIs in the metaverse.

5.5 Conclusion

Metaverse has emerged as a new frontier for consumer behavior research. Various research highlights the need for studying consumer behavior in the Metaverse from a different perspective. One of the key aspects to explore in this context is the influence of virtual influencers and reference groups on purchase intentions and behavior. Understanding the extent to which existing theories and models of

consumer behavior and psychology apply to avatars in the Metaverse presents a significant research challenge (Hadi et al., 2023; Koohang et al., 2023). The current study sheds light on the relationship between virtual influencers and reference groups in the metaverse. This study identifies a significant understanding of the impact of virtual influencers and reference groups on purchasing behaviors in the metaverse. It specifically highlights the interactions between virtual influencers, normative influence, and informative influence from reference groups in impacting purchase intentions and behaviors.

Moreover, the key findings of our study include the positive influence of virtual influencers on purchase intention, the critical role of normative influence, and the confirmation of a relationship between normative and informative influences from reference groups in the metaverse. However, it was observed that despite this combined influential effect of informative references along with virtual influencers, there is not a significant increase in actual purchasing behavior within this unique environment. This examines the importance of considering several factors when devising marketing strategies in the metaverse. Virtual influencers, despite their growing prominence, do not hold absolute control over consumer purchasing behaviors, and traditional influencers (Patmawati and Miswanto, 2022) and reference groups continue to play a substantial role (Zhuo et al., 2022). Additionally, Informative influence from reliable sources, such as virtual influencers, plays a significant role in guiding consumer behavior in this context. The influence becomes more potent if the information shared is relevant and useful for the consumer (as evidenced by H9c).

Furthermore, exploration of the unique characteristics, trends, and dynamics of different metaverse platforms are identified as avenues for future research, particularly concerning the differential impact of specific types of virtual influencers and ongoing evaluation of their credibility and trustworthiness. In addition to that, this research adds valuable insights into consumer behavior in the metaverse and has implications for both academia and businesses. It also reinforces the importance of further work in the evolving digital environment. By acknowledging the interplay between various influences in the metaverse, marketers and businesses

can better leverage strategies to maximize their impact on consumer purchase behaviors within this increasingly prominent virtual space.

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Appendix A

Appendix A

CAPITAL UNIVERSITY OF SCIENCE & TECHNOLOGY ISLAMABAD

Dear respondent,

I am a research degree student at the Capital University of Science and Technology Islamabad. Currently, I am pursuing research on "Metaverse Marketing". This survey takes approximately 08-10 minutes. All information provided will remain confidential and will be used solely for educational purposes. Please choose the most appropriate option. I will be grateful for your time and participation.

Regards,

Hinna Tahir

Department of Management Sciences

Gender:

- Male
- Female

Age(Years):

- Below 16
- 16-20
- 21-25
- 26-30
- 31-35
- 36-40
- 41 & above

Income level:

- Still dependent on parents/guardians
- Below 50,000 PKR
- 50,001-100,000 PKR
- 100,001-150,000 PKR
- 150,001-200,000 PKR
- 200,001-250,000 PKR
- 250,001 & above

1- Are you using or experiencing Metaverse platforms? (Roblox, Fortnite, Minecraft, or Decentraland).
   - Yes
   - No

2- Which Metaverse platform do you use?
   - Roblox
   - Fortnite
   - Minecraft
   - Sandbox
   - Decentraland
   - Other_____

3- Have you ever purchased branded virtual products for your avatar in the Metaverse platform you use?
   - Yes
   - No

Please select the number showing the degree to which you agree or disagree for each of the subsequent statements on Purchase Intention.

	Strongly Disagree	**Disagree**	**Neither Agree Nor Disagree**	**Agree**	**Strongly Agree**
PI1: I am interested in buying on Metaverse.	1	2	3	4	5
PI2: I will consider buying on Metaverse.	1	2	3	4	5
PI3: My willingness to buy a luxury brand would be high if I	1	2	3	4	5

were shopping for a luxury brand on Metaverse.					
PI4: The probability I would consider buying a Luxury brand is high on Metaverse.	1	2	3	4	5
PI5: I would purchase Luxury brands promoted by Metaverse influencers in the future.	1	2	3	4	5
PI6: I would encourage people close to me to buy Luxury brands promoted by Metaverse influencers.	1	2	3	4	5

Please select the number showing the degree to which you agree or disagree for each of the subsequent statements on Virtual Influencers

	Strongly Disagree	**Disagree**	**Neither Agree Nor Disagree**	**Agree**	**Strongly Agree**
VI1: I follow various virtual influencers online.	1	2	3	4	5
VI2: The relationship I have with influencers informs my fashion choices.	1	2	3	4	5
VI3: The ability to exchange information on Luxury brands with an influencer is important to me.	1	2	3	4	5
VI4: I am more likely to buy a Luxury brand if an online influencer reviews it positively.	1	2	3	4	5
VI5: I am more likely to like a Luxury brand if a virtual influencer reviews it positively.	1	2	3	4	5

Please select the number showing the degree to which you agree or disagree with each of the subsequent statements on Informational Influence.

	Strongly Disagree	**Disagree**	**Neither Agree Nor Disagree**	**Agree**	**Strongly Agree**
II1: To make sure I purchase the right Luxury brand, I often seek information from various sources. (experts, virtual influencers, etc).	1	2	3	4	5

II2: If I have little experience with a Luxury fashion brand, I often consult different sources to gather information.	1	2	3	4	5
II3: I Often consult other sources to help choose the best Luxury fashion brands.	1	2	3	4	5
II4: I frequently gather Information from multiple sources about a Luxury brand before making a purchase.	1	2	3	4	5

Please select the number showing the degree to which you agree or disagree with each of the subsequent statements on Normative Influence.

	Strongly Disagree	**Disagree**	**Neither Agree Nor Disagree**	**Agree**	**Strongly Agree**
NI1: I rarely purchase the latest fashion styles until I am sure my friends approve of them.	1	2	3	4	5
NI2: It's important to me that the luxury brands I buy are approved or liked by people I consider influential.	1	2	3	4	5
NI3: When buying Luxury brands, I generally purchase those brands that I think others will approve of.	1	2	3	4	5
NI4: If other people can see me using a Luxury brand, I often purchase the brand they expect me to purchase.	1	2	3	4	5
NI5: I like to know which Luxury brands make good impressions on others.	1	2	3	4	5
NI6: I achieve a sense of belonging by purchasing the same luxury brands that others purchase.	1	2	3	4	5
NI7: If I want to be like someone, I often try to purchase the same Luxury brands that they purchase.	1	2	3	4	5

NI8: I often identify with other people by purchasing the same Luxury brands they Purchase.	1	2	3	4	5

Please select the number showing the degree to which you agree or disagree with each of the subsequent statements on Purchase Behaviour.

	Almost Never	**Rarely**	**Sometimes**	**Often**	**Always**
PB1: I have been purchasing a luxury brand from Metaverse.	1	2	3	4	5
PB2: I have been purchasing a Luxury brand from Metaverse Regularly.	1	2	3	4	5
PB3: I have purchased a Luxury brand using Metaverse over the past six months.	1	2	3	4	5