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Michele Grillo

Sabrina Bonomi

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The metaverse and the fashion sector: new sales channel, interaction model or digital transformation?

Grillo Michelle¹ [0000-0002-8711-3205] and Bonomi Sabrina¹ [000-0003-0233-2079]

¹ Università eCampus, Via Isimbardi, 10 - 22060 Novedrate (CO)

michelle.grillo@studenti.uniecampus.it

sabrina.bonomi@uniecampus.it

Abstract. In recent years, the metaverse has been the focus of great interest; many startups were born to create and sell digital fashion, and in NFT: The Fabricant, Dematerialised, DRESSX, and the Institute of Digital Fashion [1] [2] are companies whose core business is in the metaverse and, at the same time, have partnerships with fashion houses operating in the physical market to support their entry into the digital market. These developments are changing public and academic discussion and require reconsideration of the central elements of business models [3]. This paper introduces a new perspective on the digital transformation of the fashion industry in the metaverse. It intends to look at the phenomenon following an exploratory approach that aims to understand why fashion companies invest in the metaverse, tracing three areas of investigation to be verified: is the metaverse only a new sales channel, can it be an interaction model or even a stimulus for the digital transformation of fashion industries?

Keywords: metaverse, fashion industry, digital transformation, new business model, netnography

1 Introduction

Digitalization has reshaped many traditional businesses. The fashion industry, although attentive to new trends and sensibly collecting specific movements and instances, has always been characterized by a vital classic component relating to the design and construction of fashion collections, especially within small and medium-sized enterprises, which were initially reluctant to accept change because of the craftsmanship of their products [4].

The fashion production process is highly complex and involves different sectors and targets. The fashion production chain begins in the textile and chemical yarn industry, follows the creation and production of clothing, then marketing until it reaches the

hands of the final consumer, and finally, disuse or recycling [5]. In recent years, the fashion industry has invested in new digital technologies, expected to increase investment from c.1.6% of sales in 2021 to 3.5% by 2030 [6]. These changes have complicated the very definition of Digital Fashion, understood as the totality of all processes that include marketing and communication of tangible and intangible products, the development and implementation of strategies that support the advancement of the industry, the effects of digital advances on society [7] to which has been added the increasing use of NFTs and an increasingly pervasive presence in the metaverse supported by artificial intelligence [8]. To date, the application of digital technologies has found its way into several areas that we could classify into three main areas: relational communicative type, thanks to the use of social networks that play a decisive role in engagement practices [9], in advergames [10] and thanks to the presence of fashion brands on metaverse platforms [11]; of the production type thanks to the use of 3D and VR technologies [12], which have transformed the creation and production processes, on the one hand making them more agile and, at the same time, opening up new questions concerning the 'authorship' of the collections created [13]; and finally digital technologies applied to the customer experience, specifically the use of VR technologies to support the customer shopping experience [14]. These dimensions, relational/communicative, productive, and customer experience, seem to converge in the Metaverse, which has been the subject of growing interest in recent years, especially from the fashion industry, but which, however, appears little investigated in the literature [11].

The purpose of this paper is, therefore, to explore why fashion companies invest in the metaverse, attempting to test three hypotheses and the related areas of investigation, namely whether it can represent a new form of e-commerce or rather a new area of business, creating products for the digital marketplace that goes beyond the physical dimension, both in terms of products, market and target customers; or whether it constitutes a new way of relating with its customers, current or future or potential, building a reputation, conveying its values or simply collecting data from the online communities it addresses; finally, whether we can speak of a true digital transformation, in which digital technology, skills, organizational processes and business models of the fashion industry can be aligned to create new value for stakeholders and foster the sustainability of fashion companies. After a literature review, the exploratory study examines the metaverse platforms of Roblox, Zepeto, The Sandbox, Decentraland, and the fashion companies operating within them, adopting a qualitative methodology, specifically a netnography survey with participatory observation within the online communities and on the metaverse platforms.

2 Theoretical background

The metaverse has been the focus of great interest in recent years, with Internet searches for the term 'metaverse' increasing by 7,200% in 2021 alone [15]. This attention was accompanied by enthusiasm and, much more often, skepticism and concern: again, in 2021, the *Securities Times*, the Chinese state-owned newspaper, warned against the metaverse [16].

According to Matthew Ball's definition, one could speak of the metaverse as "a

network of maximum scalability and interoperability of 3D virtual worlds redirected in real-time, which can be experienced synchronously and persistently by an effectively unlimited number of users with an individual sense of presence within them, and which guarantee the continuity of data, relating to identity, history, rights, objects, communication, and payments" [17].

The fashion industry, whose vocation is to have a reliable anticipatory power [18], is playing a central role in constructing and disseminating the metaverse, working on its development, entering the immersive spaces within existing metaverse platforms, or realizing proprietary platforms [2]. In the last year, we have witnessed an exciting increase in academic studies on fashion and the metaverse if, at the beginning of 2022, it was still an under-explored field of investigation [11]. Currently, many studies are tackling the issue, developing lines of inquiry that cover aspects of creation and production, thanks to 3D technologies using particular software such as CLO3D and Affereffect [19].

This research investigates the change in the design and realization phase [20], the social aspects and commercial possibilities, and users' perceptions, attitudes, and behavior toward 3D fashion [21]. Other studies focus on the concept of the authorship of the digital fashion product, the new technologies transforming, in fact, the very idea of the fashion designer and the skills that are no longer only linked to the ability to create, design, and know how to work fabrics, but require a broader technological knowledge [20]. Many articles address the use of NFT in the fashion industry, offering a preliminary understanding of the perception and value creation that would result [22].

[23]; [24], with a focus also on opportunities related to transparency and traceability, the elimination of intermediaries to improve sustainability, social, economic and environmental aspects, and the protection of intellectual property [25].

Periyasami and Periyasamy [26] analyze the influence of the metaverse on business models in the fashion industry, illustrating how metaverse platforms enable companies to sell, ship, and collect payments securely, engaging customers and improving sustainability by reducing waste. The issue of digital fashion in the metaverse and the use of artificial intelligence is another strand of study that focuses on data extraction to improve customer service and reduce operating costs and workload

[27] but also to get essential data on trends that can help designers create products in line with the styles that emerge from online communities [28]. Weking et al. [29] offer a general framework for exploring entrepreneurship in the metaverse, according to which it is possible to consider the metaverse as an external enabler [30] capable of carrying out a variety of entrepreneurial endeavors involving different actors and which different virtual and physical pathways can be identified.

From this perspective, it is possible to distinguish the enablers of the metaverse from complementary enablers. The enablers of the metaverse are specific to that virtual place and cannot exist without it. In contrast, complementary enablers exist without the metaverse and strongly influence the activities within it. It is possible to identify two types of metaverse enablers: those of the offer, that is, the actors that realize the metaverse world platforms (Roblox, Fortnite, Decentraland, The Sandbox) and the enablers of the demand, that is, the actors engaged in creating value in the metaverse,

giving life to a question to make feasible the very existence of the metaverse [10], through virtual events - the Metaverse Fashion Week is an example-stores for the exchange of items and highly customized digital clothing for users who want to make their avatar unique [2].

Complementary enablers, on the other hand, can be categorized into technological enablers, which concern the homonymous factors that make the metaverse possible, such as hardware (visors, graphics cards, PCs, consoles), but also 5G and the cloud, for example, and social enablers, i.e., the groups of individuals who use the metaverse and demand solutions from entrepreneurs [10].

The study is precious in understanding digital transformation paths, albeit not peculiar to the fashion industry. The present work fits into this gap, trying to connect the issues addressed by Weking et al. [29] more systematically with the specifications that emerged between fashion and metaverse.

3 Aims and methodology

This study is still at an exploratory stage. It is part of a more extensive work investigating the metaverse as the key to digital transformation in the fashion industry.

The paper aims to trace three lines of investigation concerning the relationship between the metaverse and fashion by formulating three hypotheses to be tested, namely:

Q1 The metaverse represents a new business area for the fashion industry to sell products for the digital market, clothes, accessories for avatars, and exclusive NFT, creating a market beyond the physical dimension.

Q2 The metaverse is for fashion companies a new model of interaction through which they build their reputation, transmit the values of their organizational culture, and collect data on trends and styles within online communities.

Q3 Metaverse intervenes in the digital transformation of enterprises by changing their technology, skills, and processes from real to virtual and vice versa to create new value for stakeholders and maintain the organizations' sustainability.

The methodology used is qualitative, as it was considered more appropriate for an exploratory study, possibly reserving the right to proceed to quantitative research in a second phase. In particular, a netnography analysis with participatory observation was chosen. According to Kozinets [31], "netnography" is an online marketing research technique for providing consumer insight. Netnography is ethnography adapted to the study of online communities. As a method, netnography is faster, simpler, and less expensive than traditional ethnography and more naturalistic and unobtrusive than focus groups or interviews. It provides information on online consumer groups' symbolism, meanings, and consumption patterns. Indeed, netnography, being "an ethnography adapted to the complexity of the contemporary social world," which combines various research techniques to arrive at an integrated knowledge of reality on both sides of the screen, can potentially be applied to any cognitive domain [32] and is

particularly suited to understanding the consumers and the online community under analysis [33].

With this methodology, the researchers could access and participate in user discussions within the metaverse.

Specifically, this study observed the activities carried out by fashion houses on different metaverse platforms of Roblox, Zepeto, The Sandbox, Minecraft, and Decentraland. The media were chosen based on the ease of access through PCs or smartphones; these platforms have no VR headsets. They also present specificities and different affordances that can give a wealth of content and a broader view of the metaverse. All the observations were organized in a file from which the following tables could be drawn up and highlight the business models implemented by the fashion companies in the metaverse. Specifically, Table 1 shows the type of approach, research period, platforms that are investigated, access to media, and the time spent on each forum:

Table 1. Time and approach of research (Source: Authors)

Type of approach	Covered approach
Research period	November 2022 to May 2023
Platforms	Roblox, Zepeto, The Sandbox, Minecraft, Decentraland
Access to platforms	Twice a week
Dwell time on each platform	15 minute

3.1 Analysis

Based on Wenking's model [29], a classification was made to identify the paths taken by fashion houses in the metaverse: pure virtual, virtual to physical, physical to virtual, and hybrid. This classification, shown in Table 2, can help us shed light on the three aspects of the investigation indicated (Q1, Q2, Q3).

Table 2. Paths of fashion houses in the metaverse (Source: Authors)

Name	Definition	Brand
Pure Virtual	Business is entirely in the metaverse, with no physical components of goods or services.	<ul style="list-style-type: none">• The Fabricant• DressX• The Dematerialised
Virtual to physical	Core business is in metaverse and move toward the physical world.	<ul style="list-style-type: none">• RTFKT
Physical to virtual	Core business is in the physical world and move toward the metaverse.	<ul style="list-style-type: none">• Adidas,• Bulgari,• Burberry,• Dolce & Gabbana,• Forever 21,• Gucci,• H&M,• Nike,• Tommy Hilfiger,• Prada,• Ralph Lauren• Shein.
Hybrid	Core business is in both worlds simultaneously. The hybrid offerings only work with a mix of virtual and physical components.	<ul style="list-style-type: none">• Ilona Song

Pure virtual companies have their core business in the Metaverse and are likelier to become Metaverse-focused start-ups [29]. Three companies of this type have been identified: The Fabricant, DressX, and The Dematerialised.

The Fabricant is the first virtual-only 'Digital Fashion House' that aims to build a

new fashion industry where everybody participates and profits [34]. The Fabricant intends to revolutionize the fashion industry by changing the very idea of materiality to contribute to the reduction of environmental impact by eliminating the manufacturing process [20]. Over the past year, it has shifted its mission from a 'green friendly' vocation to a more inclusive and participatory vision of fashion, focusing on co-creating digital clothes.

“We’re building a new fashion industry that belongs to creators, one where we remove history’s gatekeepers and create a new economy where our financial rewards finally equal our talent. In this new reality, a kid in Dakar stands as much chance as a kid in Paris of becoming an influential fashion force with the tools to bring their ideas to life and a network of supporters that promotes, distributes, and sells their work. Collaborations happen in real-time across the planet, making multi-creator digital collections that give each of us a chance to be recognized and monetize our efforts for the long term. In this decentralized fashion world, we make our strategies, our currency, and our structures to build an ecosystem that works in favor of us all”[34]

Last year, an online design studio launched where users can create virtual garments to exchange and wear in the metaverse. The platform, called The Fabricant Studio, was created to make fashion inclusive and accessible to anyone, anywhere. Within The Fabricant Studio, users are on par with global brands, allowing anyone to become a digital designer by creating their exclusive fashion NFTs. Within the same platform, a 12-piece collection was created for Metaverse Fashion Week, held last March on Decentraland’s platform [2].

DressX is a digital fashion store founded by Daria Shapovalova and Natalia Modenova [35]. With the company slogan, *“Don’t buy less. Shop digital fashion”*[36] launched a clear message on sustainability.

“We strongly believe that the amount of clothing produced today is way greater than humanity needs. We share the beauty and excitement that physical fashion creates, but we believe there are ways to produce less, more sustainably, and not produce at all. At the current stage of DRESSX development, we aim to show that some clothes can exist only in their digital versions. Don’t shop less; shop digital fashion” [36].

Dressx collaborated with the social gaming platforms Roblox and Decentraland to create digital clothes and partnered with Meta. The first digital collection for Meta's Avatar Store appeared on 19 July and can be purchased directly on Instagram, Facebook, and Messenger. It has also partnered with the Zepeto platform.

The Dematerialised is an experiential marketplace for fashion NFT, founded in London in 2020. The mission is *“to converge and nurture the emerging digital fashion ecosystem providing viable new revenue streams and visceral experiences with a Web3 marketplace for authenticated virtual goods. [...] yet empathic approach towards digital fashion assets aims to challenge the traditional fashion business models of production, consumption, and ownership with a more transparent, efficient and equitable approach”* [37]. On the website, it is possible to purchase NFT clothing and accessories, including AR resources, Snapchat and Instagram filters, videos, 2D collectibles, and an unlockable NFT Decentraland. Once you have purchased the NFT, you can build your digital wardrobe and display your collection through Universal

Profile, the space for storing and displaying your virtual possessions [38].

The companies that follow the virtual-to-physical path have their core business entirely in the metaverse and move into building offers and products for the physical world [29]. One of these is RTFKT [39]. In October 2020, the start-up sold digital trainers for \$90,000. In April 2021, it sold 600 NFTs in just seven minutes for a total sale of more than \$3m. At the end of 2021, it entered into an avatar partnership with artist Takashi Murakami. The company was later acquired by Nike [40]. The path from physical to virtual is taken by most companies operating in the fashion industry, whose core business is in the physical world, and they undertake initiatives and activities within the metaverse [29]. This type of route allows fashion companies to seize the opportunities the new market offers and test products in the metaverse before their launch in the physical market. For example, the fast fashion brand Forever 21 has created a collection for the physical market modeled on the digital one on Roblox [41]. In addition to metaverse enablers, this path also includes the centered role in complementary enablers, in particular social enablers, such as communities to which fashion houses turn to sell digital clothes and increase awareness around brands, but also to capture trends according to grassroots processes [42], a significant example being the Y2K aesthetic inspired by the 2000s. Spread mainly from TikTok's social platform, it invaded the aesthetics of digital clothes on Roblox [43] and was launched on high-fashion catwalks [44]. Of this, twelve fashion companies present on the metaverse platforms were analyzed: Adidas, Bulgari, Burberry, Dolce & Gabbana, Forever 21, Gucci, H&M, Nike, Tommy Hilfiger, Prada, Ralph Lauren, and Shein, and three business model sale of physical products in the metaverse, sale of digital products for avatars, and sale of luxury digital twins or exclusive products in NF (v. tab 2)

Tab 2 - Business models of fashion companies in the metaverse (Source: Authors)

A1 Brands in the metaverse to sell physical products.	H&M, Lacoste, Burberry.
A2 Brand in the metaverse to sell digital products for avatars	Adidas, Gucci, Shein, Nike, Ralph Lauren, Prada, Forever 21, Tommy Hilfiger, Bulgari.
A3 Brands in the metaverse to sell luxury digital twins or exclusive products in NFT.	Dolce & Gabbana, Bulgari, Prada, Gucci.

The A1 route includes the brands H&M, Lacoste, and Burberry, for which the metaverse represents a significant narrative territory [45]. The immersive gaming experience on the metaverse platforms is a sales gimmick in IRL, in the case of Lacoste and Burberry. For H&M, the presence in the metaverse is part of a broader storytelling

project on the sustainability goals undertaken by the company¹.

The A2 model combines brands in the metaverse to sell digital clothes and accessories to avatars. This is the case of Ralph Lauren, Tommy Hilfiger, Adidas, Nike, Forever 21, Gucci, and Shein, in which the immersive experience on the metaverse platforms becomes both a narrative device to build awareness and an opportunity to create a new business area. Ralph Lauren collaborated with several metaverse platforms (Roblox and Zepeto) to construct a narrative universe and sell digital clothes.

Tommy Hilfiger is present on Roblox with an immersive gaming experience and on Decentraland's Metaverse platform as a partner of the second edition of Metaverse Fashion Week.

Adidas focuses on multichannel positioning on different metaverse platforms and is present on Zepeto, Minecraft, and The Sandbox. It is also present on Decentraland as a partner of the MVFW. Gucci is among the most innovative brands in Web 3.0. In 2021, the virtual world Gucci Town was created in Roblox, a minigame space where players can buy Gucci virtual equipment for avatars. In 2022, it purchased the virtual lands on The Sandbox, giving way to the new metaverse project "Vault." On Zepeto is present with Gucci Garden; even here, you can play and unlock elements to dress your avatar. The A3 model aggregates brands - Bulgari, Dolce and Gabbana, and Gucci - whose presence in the metaverse becomes an opportunity to sell exclusive luxury products [26]. In this case, luxury retailers can create value through NFT [46]. The hybrid route aggregates brands that mix virtual and IRL experiences; in this type of company, the core business is in both worlds, providing hybrid offerings with a mix of virtual and physical components [29]. An example is the Ilona Song brand, which has offered digital and physical clothing since its birth. This path is particularly effective for collecting user data [28] and could lead to new forms of enterprise where the physical and virtual are increasingly connected.

4 Discussion and conclusion

The literature analysis on fashion and the metaverse, still in its early stages, shows unexplored areas in this exploratory study. According to Weking et al. [29], it first sought to understand which enablers of the fashion industry could be and which type. With a qualitative netnography survey, we reviewed fashion brands in the metaverse that make exclusive paths to the metaverse, creating a native market: those that follow

¹ H&M, having abandoned its initial shop project in the Ceek metaverse (Özkaynar, 2022), has launched on Roblox Loooptopia, a game experience in which users disgorge items that allow them to dress avatars and participate in fashion shows. The game is part of a broader project to recycle discarded clothes and textiles that the Swedish company has decided to adopt. The Swedish company has since launched a collection in IRL for the autumn-winter 2022 season inspired by the metaverse aesthetic and a series of ARFs that can be used from the H&M App and made in collaboration with the Institute of Digital Fashion in London

the virtual-to-physical path, those that follow the physical-to-virtual path, and hybrids.

It was seen how the physical, virtual route enables fashion companies to seize the opportunities that the new market offers by testing products before their launch in the physical market; three business models were identified within this route: A1 Brands present in the metaverse for the sale of physical products. A2 Brands are present in the metaverse for selling digital products for avatars. A3 Brands are present in the metaverse for selling luxury 'digital twins' or exclusive products in NFT. The outlined framework clarifies our objective, analyzes the metaverse as the key to digital transformation in the fashion industry, and explores the three research questions. Considering what has been studied, all paths lead to an affirmative answer to question Q1, i.e., whether the metaverse represents for the fashion industry a new business area in which to sell products for the digital market, clothes, and accessories for avatars, exclusive NFT, creating a call that goes beyond the physical dimension. Start-ups such as DressX, The Fabricant, and The Dematerialised, engaged in developing digital clothes, clearly show the role of the metaverse as external enablers capable of generating new challenges and entrepreneurial opportunities that did not exist before. The same applies to hybrid paths, thanks to the mix of virtual and physical offerings and physical-to-virtual courses, which show how, for companies whose core business is in the physical world, the metaverse can open up new opportunities and areas of business that did not exist before.

The *pure virtual* route also effectively answers question Q2, which investigates whether the metaverse is a new interaction model for fashion companies, thanks to which they build their reputation, transmit company values, and collect data on trends and styles within online communities. The Fabricant Studio, which allows users to create digital fashion, represents a new model of interaction and inclusiveness and an effective tool to inform about user trends and tastes; it is a platform designed to make fashion inclusive and accessible to anyone, anywhere in the world. The path "*virtual to physical*" *physical to virtual*," of which we identified the three business models A1, A2, and A3, also question Q2, showing that the metaverse represents a new model of interaction in which companies build their reputation, transmit their values and collect data on trends and styles within online communities. In the A1 model, the metaverse is declined to an interaction tool in which brands build their reputations while simultaneously, through immersive and gaming

experiences, soliciting consumer feedback and finalizing the sale of physical products. In the A2 model, brands that create a new business area with the sale of digital products can, at the same time, activate reverse processes, directing the realization of physical twins, as for the fast fashion brand Forever 21, whose physical clothing collection was inspired by the success of digital products [47]. The case of Forever 21 shows how the presence of fashion houses in the metaverse represents an opportunity to test collections before the production of physical collections [13], intercepting styles and trends within online communities according to grassroots processes [42], collect data using fashion intelligence to help designers create products in line with the preferences emerging in online communities [28]. The A3 model aggregates brands belonging to the luxury sector that intend to maintain their exclusivity [48] [49] in the digital marketplace by opening up to the new opportunities that the new native luxury market offers through selling clothes in exclusive NFT. NFTs allow perceiving group membership thanks to a model that creates an ecosystem that makes a narrative around the digital object released [50] with a roadmap that gives buyers access to the product, exclusive activities, and experiences by creating natural communities, further strengthening the sense of belonging and making consumption more desirable [51].

Finally, the *virtual-to-physical* and *physical-to-virtual* models answer question Q3, i.e., whether the metaverse can be a real stimulus for the digital transformation of businesses by changing their technology, skills, and processes from real to virtual and vice versa to create new value for stakeholders and maintain the sustainability of the organization. As noted, the virtual-to-physical path highlights the acquisition of new skills. Nike, acquiring the company RTFKT, has implemented new skills to realize shoes and digital accessories in its team. Nike had been exploring opportunities in the Metaverse with several experimental probes, including the acquisition of Datalogue, one of the leading start-ups of data integration platforms, and partnerships with game platforms Roblox and Fortnite, the creation of blockchain-based digital sneakers called CryptoKicks [52]. The experience of Dolce & Gabbana, which we find in the physical-to-virtual route, shows the efficacy of making use of collaborations with external companies, in the specific case of UNXD, a partner of Metaverse Fashion Week 2023; remaining in the path from physical - to - virtual, an exciting chance concerns the luxury brand Prada that has launched the Prada Crypted space, a space dedicated to NFTs on Prada.com that connects fashion, art and Web3 and where every first Thursday of the month a limited-edition physical object and its digital twin in NFT is released². NFTs are minted on the Ethereum blockchain, and the launch is promoted through the Aura Blockchain Consortium's NFT solution and technology³. The Aura Blockchain Consortium was created in April 2021 by Prada Group, LVMH, and Cartier, part of Richemont; it has the aim to develop the applications of blockchain technology and raise the standards of luxury⁴.

The listed cases show that the metaverse intervenes in the digital transformation of

² <https://www.prada.com/prada-crypted/>

³ <https://www.prada.com/prada-crypted/legal>.

⁴ <https://auraluxuryblockchain.com/>

fashion houses by building new competencies internally and, at the same time, initiating recent merger and acquisition processes. This perspective opens a further evolution of the investigation that pushes to reflect on the role that the platforms Roblox, Decentraland, and The Sandbox will have in the rise of fashion in the Metaverse. As emerged in the case of the physical-to-virtual pathways, Roblox, The Sandbox, and Decentraland provide an open infrastructure whose fashion houses and consumers connect and create value with information, feedback, and co-creation, according to the rules of the platforms themselves. In light of the results of this survey, it would be possible to hypothesize for the metaverse a business model comparable to the platform analyzed by Parker, Van Alstyne & Choudary [53], i.e., as an open and participatory infrastructure that connects brands and consumers in a new way, creating an ecosystem where companies and customers connect interactively, exchanging value between them, and eliminating gatekeepers. In a platform economy, the Metaverse could become, for fashion, a significant platform in which to overcome pipeline models and in which UGC content and the role of community are increasingly relevant.

The metaverse represents more than a new business area for the fashion industry, as it can reshape issues such as new entrepreneurial ecosystems and community building by creating a unique and vibrant interaction mode.

The main limitation of our work is the infancy of our study. Moreover, in the future, it would be very interesting to deepen indagate and better understand the managerial implication of these three research areas.

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