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Exploring Opportunities for Fashion Brands in the Metaverse: Embracing Emerging Technologies in the Retail Industry

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Abstract: The fashion retail industry has experienced significant changes in recent years due to various factors, such as technological advancements, globalization, and evolving consumer preferences. The advent of e-commerce and social media has transformed the way fashion products are marketed and sold. To stay competitive, fashion retailers are exploring the potential of emerging technologies like virtual reality, augmented reality, mixed reality, and the metaverse to enhance the shopping experience. Metaverse and NFTs offer new opportunities for fashion brands to engage with customers and create value for their products.

However, the necessary technology for metaverse and NFTs is not yet widely adopted. Despite this, the fashion retail industry should be open to innovation and experiment with new technologies and business models. This paper aims to analyze the opportunities that metaverse platforms present for fashion brands.

Keywords: NFT(Non-Fungible Token), Metaverse, Fashion Retail, Digitalization

1. Introduction

The fashion retail industry is a vast and diverse sector that encompasses the production, distribution, and sale of clothing, footwear, and accessories. With the advancement of technology, globalization, and shifting consumer preferences, the industry has undergone significant changes in recent years [1]. The rise of e-commerce has revolutionized the way fashion products are marketed, sold, and delivered to customers, offering a more personalized shopping experience [2]. Additionally, social media and influencer marketing have disrupted traditional marketing strategies and enabled brands to engage with their target customers more effectively [3].

To further enhance the shopping experience, the fashion industry is exploring the potential of emerging technologies such as virtual reality, augmented reality, mixed reality and metaverse [4].

Virtual reality (VR) is a simulated experience that employs pose tracking and 3D near-eye displays to give the user an immersive feel of a virtual world. Augmented reality (AR) is an interactive experience that combines the real world and computer-generated content. The content can span multiple sensory modalities, including visual, auditory, haptic, and etc. Mixed Reality (MR) is a technology that blends digital and physical worlds to create a new, hybrid environment. It combines aspects of virtual reality (VR) and augmented reality (AR) to enhance the user's real-world experience with digital information and interactions.

A metaverse is a shared, online 3D space where users can interact with each other and with computer-generated objects and avatars. It can also be used to buy and sell goods and services. It is a virtual world that uses the Internet as its underlying network. These digital technologies offer a more immersive and engaging shopping experience by enabling customers to visualize how clothing and accessories would look and fit before making a purchase.

The impact of digital technology on fashion retail

The emergence of digital technology has caused a significant transformation in the fashion retail industry. With the help of social media platforms, brands can now reach a global audience and provide personalized shopping experiences and it also changed the way fashion brands market and promote their products. Fashion retailers are utilizing advanced technologies such as AI, AR, and VR to provide innovative and immersive shopping experiences [5]. Digital technology is expected to continue to shape the future of fashion retail, with brands adapting to new technologies and changing consumer behaviour to stay competitive in the market [6].

The emergence of metaverse and NFTs in the fashion industry

Metaverse, in particular, is a new platform that enables users to interact with virtual objects and each other in a highly realistic environment. Fashion brands are using non-fungible tokens (NFTs) in the metaverse to create unique and limited edition digital fashion products that are authenticated and verified on a Blockchain network. NFTs also offer a new way for fashion retailers to engage with their customers and add value to their products, as they can represent one-of-a-kind virtual fashion items or authenticate the ownership of limited edition items[7]. This provides an opportunity for fashion retailers to create exclusive virtual fashion collections or offer personalized virtual fashion items to customers.

2. The concept of metaverse and its potential for fashion retail

Fashion retail refers to the process of selling clothing, footwear, accessories, and other fashion-related products to consumers. It involves various activities such as buying, merchandising, marketing, and selling fashion items through different channels, including brick-and-mortar stores, e-commerce websites, mobile apps, and social media platforms[7].

Physical retail stores are typically only open for a certain number of hours each day, which can be inconvenient for customers who have busy schedules. This can also limit the amount of time that brands have to attract and engage customers, which can impact their ability to generate sales[8].

In the physical world, fashion retail stores face several challenges that impact their ability to attract and retain customers. One of the primary challenges is limited physical space. With a limited amount of space to display products, fashion brands may struggle to showcase their full range of products, which can limit the selection available to customers. Another significant challenge is geographical constraints. Physical retail stores are limited to a specific geographic location, which can make it challenging for brands to expand their customer base and reach customers outside of their local area. Another challenge of physical retail stores is the high overhead costs associated with running a brick-and-mortar store[10]. Rent, utilities, and other overhead costs can be a significant investment

for small and emerging fashion brands, which can make it challenging for them to offer competitive pricing and discounts to customers.

Finally, physical retail stores have limited ways to track and analyse customer behaviour [10]. This can make it challenging for brands to understand their customers and tailor their offerings to meet their needs. Without access to this data, it can also be difficult to measure the success of marketing campaigns and other initiatives.

From a consumer's point of view, physical retail stores have challenges, such as limited selection, inconvenience, higher prices, limited access, limited information, crowded stores, limited hours, travelling; traffic jams, parking facility and limited payment options.

Overall, fashion retail stores face several challenges that can impact their ability to compete in a crowded marketplace[11]. By understanding these challenges, brands can work to find new and innovative ways to reach and engage customers, and ultimately drive growth for their business.

Whereas, the metaverse offers a number of potential solutions to the challenges faced by traditional fashion retail stores.

The metaverse is a virtual world that is rapidly growing in popularity, and it offers retailers several benefits. A store in the metaverse increases a retailer's reach as it allows them to reach a global audience. This can be particularly advantageous for retailers who may not have the resources to open a physical store in every country they wish to target. Creating a store in the metaverse is cost-effective as it eliminates the need to pay for rent, utilities, or staffing expenses. This makes it an attractive option for smaller retailers who want to enter the market without incurring high costs. A store in the metaverse offers a unique shopping experience for users, with immersive 3D environments, interactive displays, and personalized recommendations [12][Figure 1]. This enhances the shopping experience and increases customer engagement, leading to higher customer satisfaction and loyalty. The metaverse provides retailers with better analytics and insights into customer behaviour. Retailers can analyse user data, such as shopping habits, preferences, and feedback, to optimize their store layout, product selection, and marketing strategies. Additionally, the metaverse offers retailers the opportunity to showcase their brand in an innovative way. By creating an immersive and interactive store environment, retailers can enhance their brand image and engage with customers in new ways. This can lead to increased brand awareness and customer loyalty.

Finally, a store in the metaverse can help retailers increase sales by reaching a wider audience, providing a unique shopping experience, and offering personalized recommendations.



Figure 1. Shopping experience in metaverse, Source: PANCHAME/SHUTTERSTOCK.CO

3. The technology behind NFTs and their applications in the fashion industry

NFTs, or non-fungible tokens, are a new type of digital asset that have become increasingly popular in the fashion industry due to their unique properties. NFTs use Blockchain technology, which is a decentralized and secure ledger system that allows for the verification of authenticity and ownership. Each NFT is unique and cannot be replicated, which makes it valuable as a collectible item[13].

Blockchain technology and smart contracts are used to verify ownership and enable secure transactions, while digital imaging and scanning technology and virtual reality and augmented reality technology are used to create unique digital assets and enhance the customer experience.

In the fashion industry, NFTs have various applications, including authenticity verification, limited edition collectibles, supply chain management, and virtual fashion. NFTs can be used to verify the authenticity and provenance of fashion products, reducing the risk of counterfeit items entering the supply chain. They can also be sold as limited edition collectibles, creating a new revenue stream for fashion brands and increasing the value of their products[14]. NFTs can be used to track the entire supply chain of fashion products, from sourcing to production to sale, enabling more sustainable and transparent practices. Additionally, NFTs can be used to create virtual fashion items, such as digital sneakers or accessories, that are sold as unique and valuable digital assets[15].

4. Fashion Week in Metaverse

In recent years, the fashion industry has been exploring new ways to showcase their collections and engage with consumers. One of the emerging trends in the industry is the concept of "Fashion Week in the Metaverse. Fashion Week in the Metaverse brings the traditional fashion week experience into a virtual space, allowing designers to showcase their collections in a new and innovative way [16].

In the Metaverse, designers can create virtual runways and showrooms, allowing users to experience their collections in a fully immersive way. Attendees can view the collections using virtual reality headsets, or through their computer or mobile devices. This allows for a broader audience to experience the event, as physical location is no longer a barrier.

Fashion Week in the Metaverse also provides an opportunity for designers to experiment with new technologies and designs [18][Figure 2]. They can incorporate virtual clothing and accessories into their collections, creating pieces that can only exist in the digital realm. This opens up new possibilities for creativity and innovation in the industry [20]. In 2021, a virtual fashion show was held in the Metaverse, featuring collections from well-known fashion brands like Louis Vuitton and Marc Jacobs [27]. The event was well-received, and many industry experts believe that it is the future of fashion shows.

Source: <https://cointelegraph.com/news/the-first-ever-metaverse-fashion-week-digital-fashion-is-here-to-stay>



Figure 2. Fashion week in metaverse

5. Case studies of brands using NFTs in marketing, sales, and supply chain management

Non-fungible tokens, or NFTs, have become increasingly popular in the fashion industry, with many brands experimenting with their use in marketing, sales, and supply chain management. Here are some case studies of brands that have successfully implemented NFTs in their operations:

RTFKT Studios: A digital fashion company based in Los Angeles was the first fashion brand to launch an NFT collection[Figure 3]. In early 2020, the company released its limited edition CryptoKicks

collection, consisting of 621 virtual sneakers that were stored on the Ethereum Blockchain and sold through the OpenSea marketplace (marketplace for NFTs and crypto collectibles). Each virtual sneaker was a unique, one-of-a-kind design inspired by real-life sneakers, and buyers received a digital certificate of ownership and a 3D model of their purchase [27].

The CryptoKicks collection was a huge success, with all the virtual sneakers selling out within just seven minutes of release, generating over \$3 million in sales. Following this success, other fashion brands, such as Gucci, Burberry, and Louis Vuitton, entered the NFT market, offering customers a new way to collect and showcase their digital designs.

Source: <https://images.app.goo.gl/mbGz8BSz5BME2uXUA>



Figure 3. RTFKT brand's NFT(CryptoKicks)

Through NFTs, fashion brands can tap into the growing trend of digital fashion, allowing customers to display their virtual products in games, virtual worlds, and social media platforms. This offers a unique opportunity for brands to experiment with new business models and revenue streams in the digital space. By providing customers with a digital representation of their products, fashion brands can engage with a wider audience and expand their reach beyond physical stores.

Burberry: It is a renowned luxury fashion brand from London, entered the world of NFTs with its "B Series" collection in August 2021. The collection included digital accessories designed for use in virtual worlds and online games. The collection was made up of three different NFTs: a futuristic deerstalker hat, a metallic puffer jacket, and a pixelated bag[30][Figure 4]. Only one copy of each NFT was available for purchase, making them truly unique.

Source: <https://www.nftgators.com/burberry-dives-deeper-into-digital-fashion-with-virtual-handbag-collection-on-roblox/>



Figure 4. Burberry's fashion bag NFT

To purchase the NFTs, customers had to use cryptocurrency on the OpenSea marketplace during a limited 24-hour period. The release of the NFT collection was part of Burberry's strategy to engage with younger audiences and explore new digital revenue streams.

Burberry also offered an augmented reality (AR) experience for its customers, allowing them to view the digital accessories in an immersive way [38]. The customers could use their smartphones to place the virtual accessories onto real-world objects and take pictures to share on social media.

The B Series NFT collection was an innovative move for Burberry, indicating the brand's expansion into the digital space. With the growing interest in digital fashion and virtual worlds, NFTs offer luxury brands like Burberry a unique opportunity to reach new customers and create bespoke, one-of-a-kind products.

Louis Vuitton: The French luxury fashion house has recently entered the world of NFTs with its "Louis Vuitton X Urs Fischer" collection [Figure 5]. The collection features a range of unique digital sculptures, each inspired by Louis Vuitton's iconic "LV" monogram, and was created in collaboration with the Swiss artist Urs Fischer [38].

The "Louis Vuitton X Urs Fischer" collection consists of nine different NFTs, each with a distinctive design and title. The pieces were sold in a timed auction on the online marketplace Art Blocks Curated, with starting bids ranging from 10 to 25 Ethereum (approximately \$26,000 to \$65,000 USD at the time of sale).

Source: <https://poshmark.com/listing/Alma-PM-studded-limited-edition-2016-5f04a8433cda880bfa7d63cb>



Figure 5. Louis Vuitton bag as a NFT

One of the collection's most notable pieces is titled "Alive," a three-dimensional digital sculpture that features a melting Louis Vuitton monogram. Another piece, titled "Pocket Size Tiger," features a miniature tiger made entirely out of the Louis Vuitton monogram. These pieces highlight the growing intersection of art, fashion, and technology in the digital age [38].

The Louis Vuitton X Urs Fischer collection marks the luxury fashion brand's entrance into the world of NFTs and demonstrates its continued commitment to innovative collaborations with contemporary artists. Louis Vuitton is not the only luxury fashion brand exploring NFTs, and it likely won't be the last, as NFTs offer a new opportunity for luxury brands to engage with customers in exciting and innovative ways [39].

Gucci: The renowned Italian luxury fashion brand, has joined the NFT world with its latest NFT collection, called "Aria"[Figure 6].The collection, which celebrates the brand's 100th anniversary, comprises a range of unique digital artworks inspired by Gucci's past and present designs. The collection features four different NFTs, each with its own distinct design and name. The pieces were auctioned through a partnership with Christie's auction house, with bidding starting at \$2,000[8]. One of the most notable pieces in the collection is a short film called "Aria di Gucci," showcasing a digital version of the brand's new collection, and narrated by actress and singer Billie Eilish. Other pieces in the collection include digital paintings and animations inspired by Gucci's iconic designs. The "Aria" NFT collection underscores Gucci's on-going dedication to innovation and creativity in the fashion industry[40]. It represents a novel way for the brand to connect with its fans and customers, allowing them to own a piece of Gucci's history and heritage in digital form. The "Aria" NFT collection demonstrates the growing convergence of fashion, art, and technology in the digital era. As more fashion brands explore the potential of NFTs, it will be fascinating to see how this technology shapes the future of the fashion industry[40].

Source: <https://youtu.be/H14DatRx0Uo>



Figure6: Gucci NFT collection – Aria di Gucci

Adidas: Adidas has made a strong entry into the NFT market with its own collection of non-fungible tokens[Figure 7]. The brand's NFT collection is a collaboration with the French artist and musician, Yacine Aït Kaci, also known as YAK[41]. The collection features a series of 3D animations inspired by Adidas' iconic sneakers, including the Superstar and the Stan Smith. Each NFT is unique, with its own design and soundtrack, making them a highly sought-after item for sneaker heads and collectors alike.

Source: <https://www.forbes.com/sites/stephaniehirschmiller/2022/11/16/adidas-launches-first-nft-wearables-collection/?sh=2535c16c37fe>



Figure7: Adidas 1st NFT sneaker collection

Adidas launched its NFT collection with a limited edition drop of 10,000 tokens, which sold out within minutes of release. The sale generated a lot of buzz in the NFT community, with some tokens selling for as much as \$1,000. The success of the initial drop has led to the announcement of future drops, with Adidas planning to release additional NFTs featuring different sneaker designs.

The Adidas NFT collection has been praised for its high-quality animations and attention to detail, as well as its integration with the brand's existing sneaker line[41]. The collaboration with YAK has resulted in a unique and visually stunning collection that appeals to both sneaker enthusiasts and art collectors.

In addition to the limited edition drops, Adidas has also hinted at the possibility of using NFTs for other purposes, such as ticketing and exclusive access to events [42].

Nike: Nike, one of the world's most recognizable sports brands, has recently entered the world of non-fungible tokens (NFTs). Nike's first foray into the NFT market was with its CryptoKicks line of virtual shoes, which were launched in 2019[Figure 8]. Since then, the company has been exploring the potential of NFTs and has now announced plans to create its own line of NFTs. Nike's NFTs are expected to be based on the company's most popular sneaker designs. The NFTs will be sold as digital collectibles [42], with each NFT representing a unique and one-of-a-kind version of a specific sneaker. With its vast collection of iconic sneaker designs, Nike is well-positioned to capitalize on the NFT market.

Source: New York Times



Figure8: Nike Sneaker NFT

Forever 21: Forever 21 is a fashion brand that has established itself as a leader in both the physical and digital fashion market. In addition to its physical storefronts, the brand has also made significant inroads in the metaverse market through its innovative use of non-fungible tokens (NFTs).

In 2021, Forever 21 launched a dynamic storefront in the metaverse, featuring Forever 21 avatars and a range of 21 fashion NFTs [Figure 9]. These NFTs were inspired by physical pieces available in Forever 21 stores, allowing customers to collect and showcase unique digital versions of their favourite fashion items [41].

In addition to its NFTs, Forever 21 has also launched the "Forever 21 Shop City" on Roblox, a popular online gaming platform. This virtual city allows users, fashion influencers, and creative to build, own, and manage their own virtual stores, providing a unique and engaging way for customers to interact with the brand.

By embracing the potential of the metaverse and non-fungible tokens, Forever 21 has demonstrated its commitment to innovation and creativity in the fashion industry. Through its virtual storefronts and NFTs, the brand has created new opportunities for customers to engage with its products and brand, as well as established itself as a leader in the digital fashion space.

Overall, Forever 21's use of NFTs and virtual storefronts represents a significant evolution of the fashion industry, as brands look to new technologies and platforms to connect with their customers and provide unique and engaging experiences.

Source: <https://www.ledgerinsights.com/forever-21-estee-lauder-part-of-decentralands-metaverse-fashion-week/>

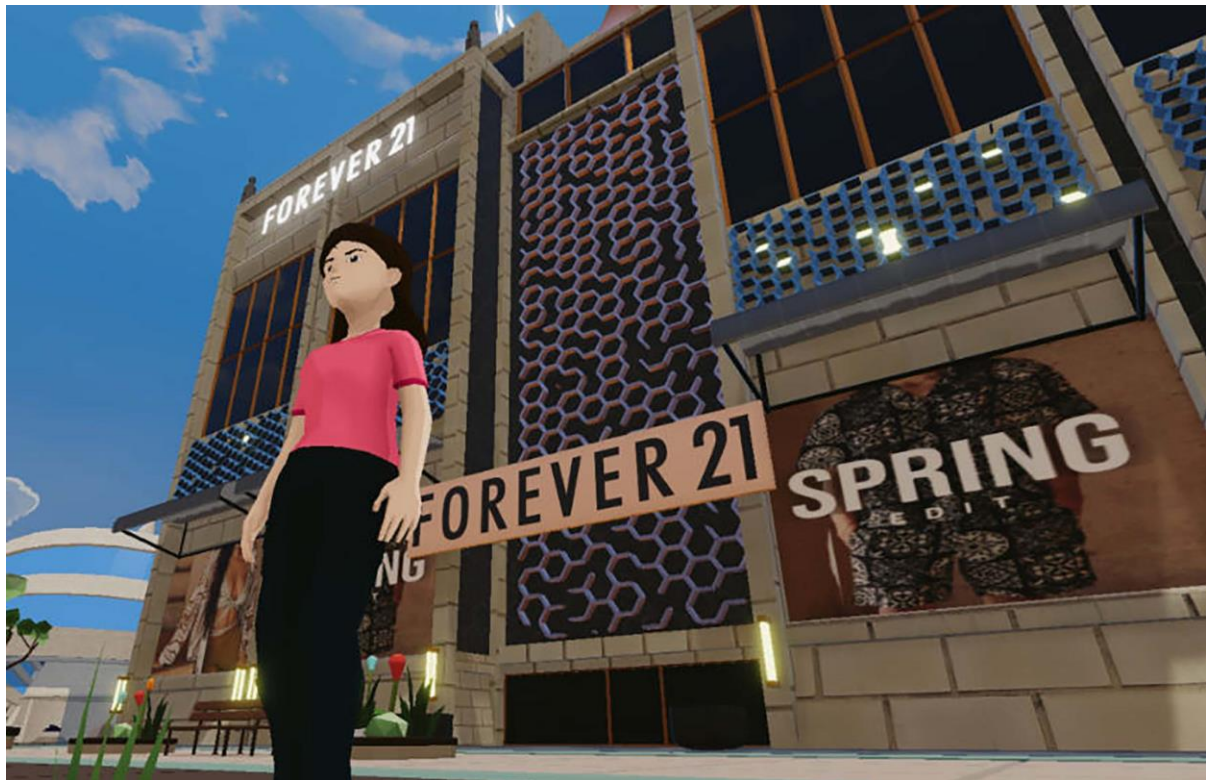


Figure 9. Forever 21 dynamic storefront in the metaverse

Prada: Prada is one of the world's most iconic luxury fashion brands, known for its high-quality products and innovative designs. The brand has recently made a foray into the world of non-fungible tokens (NFTs) with its "Prada Timecapsule" collection.

The "Prada Timecapsule" collection features a series of NFTs inspired by the brand's iconic Nylon backpacks. Each NFT represents a unique and one-of-a-kind version of the backpack, providing a digital collectible for fans of the brand [41][Figure 10]. The NFTs were created in collaboration with digital artist duo The Lousy Livin' Company and were made available for sale through an auction on the Sotheby's online platform.

The Prada NFT auction was a huge success, with the collection selling for a total of \$562,000. The highest bid was placed on the "Black Nylon Backpack 2005" NFT, which sold for \$52,500. The success of the auction highlights the growing demand for digital collectibles and the potential for luxury fashion brands to capitalize on the NFT market.

Prada's entry into the NFT market is a reflection of the brand's commitment to innovation and creativity. The fashion industry is evolving rapidly, and brands must adapt to stay relevant and connect with their customers in new and engaging ways. Through its NFT collection, Prada has demonstrated its willingness to explore new technologies and platforms to engage with its customers and provide unique experiences.

In conclusion, Prada's "Prada Timecapsule" NFT collection represents a significant development for the brand and the wider NFT market. With the success of the auction, it is clear that there is a significant demand for digital collectibles, and luxury fashion brands like Prada are well-positioned to capitalize on this trend. As the fashion industry continues to evolve, it will be exciting to see how brands like Prada continue to innovate and embrace new technologies to engage with their customers and drive growth[42].

Source: <https://nftevening.com/prada-drops-its-9th-exclusive-timecapsule-nft/>



Figure10. PRADA brand NFT

These case studies demonstrate the various applications of NFTs in the fashion industry, including as unique and valuable collectibles, for authenticity and traceability verification, and for enhancing the customer experience[43].

While there are some challenges and drawbacks associated with using NFTs, such as the complexity and cost of implementation, the benefits of using NFTs in fashion retail are significant and have the potential to revolutionize the industry.

6. Opportunities for fashion brands in metaverse

The metaverse presents a range of opportunities for fashion brands to engage with their audience in new and innovative ways.

Virtual fashion shows, virtual try-ons, and virtual styling consultations offer a unique and immersive experience for users to interact with the brand.

The customization and personalization features of the metaverse enable users to experiment with different styles and designs.

Fashion brands can also establish a strong presence in the metaverse through virtual pop-up stores, events, and experiences, and explore new revenue streams by selling virtual products such as digital clothing, accessories, and virtual fashion consultations [44].

Collaborations and partnerships with other brands and creators can also create unique and immersive experiences for users. Social media is another strategy for brands to connect with consumers and create a community around the brand. Overall, the metaverse offers fashion brands a new platform to build their brand and connect with their audience in meaningful ways.

Conclusion

Fashion in the metaverse is a growing market with significant potential for fashion brands [46]. Although virtual fashion presents some challenges, major brands such as Adidas, Nike, and Gucci have already generated substantial profits [48]. As the market continues to evolve, fashion brands will need to find innovative ways to engage with customers in the virtual world and take advantage of the metaverse's potential. In conclusion, the fashion industry's role in shaping the metaverse's future will only continue to grow [49].

Limitations

Fashion retail in the metaverse presents challenges such as the lack of physical interaction with products, high costs for creating 3D models, the need for effective marketing strategies, and the importance of trust and security. However, the market offers exciting opportunities for retailers and customers. As the market evolves, retailers will need to adapt and find innovative ways to engage with customers in the virtual world.

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