Metaverse technologies in product management, branding and communications: virtual and augmented reality, artificial intelligence, non-fungible tokens and brain-computer interface

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Abstract

Purpose – To examine the effects of the metaverse on firms' marketing activities.
Design/methodology/approach – A conceptual paper.
Findings – It provides evidence of the growing importance of different value capture mechanisms in the metaverse.
Originality/value – Among the first articles on this topic.

Keywords Augmented reality, Virtual reality, Metaverse
Paper type Opinion piece

1. Introduction

The digital environment has significantly affected firms' marketing activities (Kannan & Li, 2017). For instance, fast-changing digital technologies on the product front have facilitated mass customization (Kannan & Li, 2017). The metaverse, viewed as the next big thing, is rapidly emerging as a powerful marketing channel, which organizations can use to tell brand stories authentically and in an immersive environment.

Key processes in product development consist of understanding the business context and unmet customer needs (MacCormack, Crandall, & Henderson & Peter Toft, 2012). Customers that spend time and money in the metaverse have many unmet needs. To address them, some companies have launched products exclusively for the metaverse. In 2021, Nike created a metaverse called Nikeland, which features games, entertainment, virtual sneakers and other goods via non-fungible tokens (NFTs). As of September 2022, 21 million people had visited Nikeland. Nike had sold more than $185 million in NFT as of August 2022 (Bhattacharya, 2022).

To improve product management performance, firms need to improve processes for producing and delivering products and services to consumers (Rainey, 2008**)**. The metaverse is an effective channel for improving such processes, regarding both in-store and e-commerce environments. For instance, instead of a static product website, the metaverse offers 3D-modeled showrooms, through which shoppers can walk just like in real life. In this way,

shopping in the metaverse bridges the gap between immersive physical commerce and the convenience of online shopping.

Scholars have conducted little research on how this innovation is likely to affect firms' product-, branding- and marketing communication-related actions and decisions. We aimed to fill this gap by analyzing how the metaverse shapes firms' product, branding and marketing communications strategies. We highlighted the role of the metaverse in product management-, branding- and communication-related actions. We also discussed how marketers use key metaverse technologies such as virtual reality (VR), augmented reality (AR), artificial intelligence (AI), NFTs and brain-computer interface (BCI).

The article is organized as follows. We first discuss some background, concepts and facts related to the metaverse. It is followed by a section on the metaverse's effects on marketing. Then, in the discussion and implications section, we offer a commentary concerning the business context, including customer profiles, market growth and customer challenges, that drives companies to launch metaverse products. Next, we propose multiple promising directions for future research. The final section provides concluding comments.

2. A premier of the metaverse

The metaverse is the current Internet's "enhanced and upgraded" version (labsnews.com, 2022). As proposed by Kshetri (2022), the metaverse's defining features include (1) three-dimensional (3D) VR and AR applications that create an immersive and illusionary environment, (2) a decentralized functioning economy based on blockchain and cryptocurrencies, (3) interoperability to navigate across platforms, (4) digital avatars representing users and (5) real-time synchronous communication. However, many of these features are irrelevant to the metaverse's intended tasks and purposes (Dwivedi *et al.*, 2022).

In Table 1, we present a number of emerging technologies that facilitated marketing activities in the metaverse. Augmented reality superimposes computer-generated images in the real world. Moreover, AR's versatility and the capability to augment the real world are especially desirable when it can deliver higher customer value by utilizing digital content to enrich and enhance the real world (Kshetri, 2018; Schmiedinger, Petke, von Czettritz, Wohlschläger, & Adam, 2010).

Furthermore, AI's ability to make better decisions by analyzing data, learning and gaining new insights can help enhance marketing activities. The AR/VR-AI apparel e-commerce SaaS solution provider Perfitly allows customers to create their avatars for the fitting room by uploading personal photos or inputting specific measurements of their bodies (Germain, 2022). The company claims that shoppers can create their virtual avatars at an accuracy level higher than 97% (Perfitly, 2022).

Companies can use NFTs to develop a deeper connection with consumers. Prior research shows that NFTs provide utilitarian (extrinsic) and hedonic (intrinsic) benefits to consumers (Kshetri, 2022).

Brain-computer interface allows marketers to access more personalized data about customers than ever before. Marketers can track customer journeys, sentiments and preferences more accurately and deliver customized ads and experiences to their brains or wearable devices. For instance, BCI-powered smart glasses can identify customer's thoughts when she is looking at different types of lipsticks online and likes a shade but is unsure how the shade will look on her. The lipstick brand can show her a picture of her face with the shade of lipstick and allow her to complete the purchase with her thoughts if she likes it.

VR creates a simulated environment or experience that can help increase the effectiveness of marketing activities. For instance, TOMS Shoes has launched an e-commerce platform called "Marketplace" to sell goods made by social entrepreneurs (Clifford, 2013). Its A Walk in Their Shoes campaign uses VR headsets to create a positive emotion among customers

Technology	Definition	Possible use	Example
AR	Use of sensors and algorithms that help computers determine the position and orientation of a camera, which then allows for producing 3D computer-generated images, which are then superimposed into a user's view of the real world	Enabling consumers to preview products in their own environment and judge suitability	Amazon's Room Decorator: Customers use phones/tablets to see what home décor will look like in the space
AI	Machine simulation of human intelligence aiming to perform tasks that seemed to be possible only with human thinking and logic before	Using simulation that takes into account relevant factors to suggest a product and demonstrate its appropriateness	Zeekit: real-time image processing, computer vision, deep learning and other AI technology that allows consumers to virtually "try on" clothing
NFT	A one-of-a-kind digital asset that can be bought and sold but has no tangible form of its own	Launching one-of-a-kind/exclusive products	Sotheby's: virtual galleries in Decentraland
BCI	A direct communication link between a human brain's electrical activity and an external device such as a computer	Tracking consumers' intent and emotions to provide more accurate and unbiased cognitive insights	Meta (Facebook): announced that it was creating BCI in the form of wearables
VR	Technology that places the user inside an experience through a simulated environment or experience, which could be similar to or different from the real world	Recreating in-person experiences in advertising to drive empathy and have a deeper impact	TOMS Shoes, A Walk in Their Shoes campaign: VR headsets to create a positive emotion among customers

Source(s): Own elaboration

Table 1.
Key metaverse
technologies in
marketing

(Yonder, 2021). Customers can follow the adventures of a TOMS customer, who visits Colombia and interacts with a child benefiting directly from his shoe purchase.

3. Metaverse's effects on marketing
We present the metaverse's effects on product, branding and marketing communications in the four cells of Table 2. We analyzed the role of the metaverse in external and internal processes. Cell [I] and Cell [II] explain how the metaverse evolves as a key element of product strategy, and how it can help achieve deeper engagement with customers (externally). Cell [III] and Cell [IV] describe how the metaverse can improve the coordination of internal corporate functions related to product, branding and communications.

3.1 Cell [I]
3.1.1 Creating stronger brands through richer consumer experience and engagement. The metaverse can help create a richer user experience and deeper engagement, which can increase purchase conversion in online markets. In the Web2 environment, engagement can serve as a metric of marketing success. Scholars consider customer engagement as actions toward the brand that go beyond transactions. Customer engagement consists of behaviors such as WOM, blogging and providing customer ratings, which can affect marketing metrics and thus firm value (e.g. Lehmann, 2004).

	Branding and communication strategy	Product strategy
External	[I] • Creating stronger brands through richer consumer experience and engagement • Facilitating direct interaction with customers • Changing the roles of social influence tactics such as social proof	[II] • Manipulating the product mix • Serving as a new product testing venue • Improving the product management process to enhance product quality • Lowering sales costs • Increasing consumer confidence in buying a product and reducing product return rate
Internal	[III] • Facilitating onboarding, meetings and training: leadership management, sales strategy training and planning, closing a deal and role-playing • Improving the effectiveness of rewards and recognition programs	[IV] • Enhancing the effectiveness of internal teams to increase the success of new product introductions

Source(s): Own elaboration

Table 2.
Metaverse's role in
product management,
branding and
communication
strategy

van Doorn *et al.* (2010) noted that customer characteristics, firm initiatives and contextual factors such as the environment affect customer engagement behaviors. Customer engagement in the metaverse is thus likely to be different. In Web3, gamification and brand immersion are important (Hayward, 2022). Most games allow for integrating NFTs, which makes it possible to reward loyal customers with digital assets. For instance, sales teams can give live presentations and demos to prospective customers. Avatars can try on products virtually and play the game in their branded clothing that is bespoke. These activities can help grow the brand. Customers can sell, trade and buy virtual versions of products with NFTs (Macura, 2022).

Brands can partner with gaming companies to incorporate ad content into gaming experiences, which can help attract customers to retail stores. For instance, game characters could wear branded apparel and effectively use brand stories. Real-world brands serve as the display board in the game. They can also sell product versions as NFTs. Moreover, VR can serve as a channel to engage customers, especially loyal customers. Inside VR, companies can offer 3D replicas of real-world products as NFTs, which customers would legally "own." They can also act as a piece of permanent advertising and remind buyers about brands and their value. Companies such as Nike and Adidas have launched sneaker NFTs that customers can purchase and use in VR. environment.

Shopify reported that interactions with products having 3D/AR content lead to a 94% higher conversion rate than those without such features (https://twitter.com/Shopify/status/1306973590814949376?s=20). Surveys have also shown that consumers are willing to pay up to 40% more for products if they can test them in a 3D environment. Moreover, we can reasonably expect that the metaverse's advanced product visualization capabilities can help consumers make better-informed purchasing decisions (Sellers, 2020).

As noted, customer characteristics are interconnected with their engagement behaviors (van Doorn *et al.*, 2010). Especially in the case of young customers, the incorporation of the metaverse and NFTs would allow firms to create deeper engagements.

3.1.2 Facilitating direct interaction with customers. With Web1 and Web2, there are gatekeepers such as editors, publishers and producers who decide which stories to cover and which brands to promote. Web3 and the metaverse give brands direct access to their customers. The metaverse helps connect with others in a more meaningful way. For instance, like-minded customers can use shared virtual spaces, play games together and attend events and concerts (Simon, 2022).

3.1.3 Changing the roles of social influence tactics such as social proof. The metaverse is likely to change the role of social media in e-commerce. Social proofs such as Amazon reviews and other online product reviews play a key role in enhancing online shopping engagement at Web2 platforms. Signals from trusted sources are useful and effective for products that a shopper has not yet experienced (Kirmani & Rao, 2000). The metaverse takes social proof to a new level. Instead of just a star review, brands can build engaging communities that allow customers to engage with the brand itself and other customers. Brands can use NFTs for several purposes to improve the shopping experience. For instance, NFTs can help create entirely new digital products. Companies can use them as receipts, an access pass to special events or early access to new product launches. For most valuable customers, NFTs can serve in VIP opportunities.

3.2 Cell [II]
3.2.1 Manipulating the product mix: developing new products for the metaverse. The key component of product management is manipulating the product mix by adding new products, modifying the existing product lines and eliminating products that fail to contribute to the marketing goals (Banville & Pletcher, 1974). To develop and add new products, companies need to understand customers, market growth rate, unmet needs of customers and feasibility of technical solutions (MacCormack *et al.*, 2012). For the metaverse, a context that matters is the rapidly increasing purchasing power of young consumers. One estimate suggested that Gen Z and millennial consumers represented 44% of global luxury buyers in 2019, which is predicted to increase to 70% by 2025 (McMillen, 2023). Compared with older generations, this young demographic is more experience-driven (Harrison, 2022).

As noted, unsurprisingly, companies such as Nike have launched new products in the form of NFTs for metaverse customers. Luxury brands such as Ralph Lauren and Gucci are investing in the metaverse. In 2022, Ralph Lauren launched a digitized clothing and accessories line on the metaverse gaming platform Fortnight (Walk-Morris, 2022). Gucci has been creating a deeper engagement with the metaverse consumers. It sold NFTs for avatars of the limited edition "Gucci Collection" – bags, glasses and hats – in the Roblox game (Revvoredo, 2021). In May 2021, the Gucci Garden space on Roblox was open for two weeks. The platform's users spent from US$1.20 to US$9 on collectible and limited-edition Gucci accessories. Items were hidden in the virtual Gucci Garden. Some were available free of charge. During the event, Gucci sold a bee-embroidered Dionysus bag, which was only available for use on Roblox, for about $4,115. Physical versions cost only $3,400 (Ernest, 2022).

3.2.2 Using as a new product testing venue. The new product development process can be highly skill- and resource-intensive, because the product needs testing under several conditions. Key activities in new product development include in-house testing, prototype testing with the target customer, test marketing and pilot production (Kandemir, Calantone, & Garcia, 2006). Prior research shows that firms that lack testing resources face difficulties in launching a new product and a high failure probability (Calantone & Cooper, 1981). Metaverse will also allow brands to test their product penetration without manufacturing. Based on customer feedback, brands will know how much to manufacture.

3.2.3 Improving the product management process to enhance product quality. Some firms use the industrial metaverse to improve the product management process to deliver high-quality products. For instance, Kroger teamed up with NVIDIA to build an AI lab, digital twins and a demonstration center using Omniverse Enterprise, which will facilitate simulations. The lab aims to expand the retailer's freshness initiatives, improve logistics and enhance the shopping experience in stores. NVIDIA's GPU-accelerated platform for operations and logistics cuOpt will explore logistics optimizations. These aim to help

Kroger reliably deliver fresh products to customers. For instance, dynamic routing can serve in last-mile delivery to ensure that delivered products are fresh (Mitra, 2022).

3.2.4 Lowering sales costs. By improving the product management process, which is a key component of a product strategy (Rainey, 2008), firms can also lower sales costs. For instance, AR and VR can help sell products more efficiently at a lower cost. For example, a normal furniture store in Macy's required several thousand square feet and cost about half a million dollars to build. Meanwhile, AR/VR takes only 500 square feet, and building such a facility costs less than $50,000 (Boland, 2019).

3.2.5 Increasing consumer confidence in buying a product and reducing product return rate. Various product management-related activities should contribute to marketing and broader organizational goals (Banville & Pletcher, 1974). Traditional e-commerce has high return rates, which we can attribute to the difficulty of judging product's suitability. The metaverse is also likely to lower return rates. The metaverse has the potential to bridge the gap between ecommerce and in-store shopping experiences. For instance, the industry average for furniture returns is 5–7%, while Macy's use of AR reduced it to less than 2% (Boland, 2019).

3.3 Cell [III]

3.3.1 Using as a channel for onboarding, meetings and training. Internal branding is a key component of internal marketing. The key goal of internal branding is to achieve consistency with the external brand and encourage employees' commitment and involvement in building the brand. Employees play a crucial role in building the brand. It is important to enable employees to deliver on customer expectations. Moreover, a company needs to match internal and external messages (Mitchell, 2002).

The metaverse can also help effectively manage the internal brand-building process. Training, staff onboarding and meetings can take place in the metaverse with different degrees of immersion. The metaverse can help increase the effectiveness of marketing and sales training such as leadership management, sales strategy planning, closing a deal and role-playing. For instance, the insurance company ERGO's "VR Sales Training" system provides training for users to conduct sales talks using four different personality types as avatars. A virtual coach provides tips and support. The pilot for the training project launched in March 2022. By December 2022, 75 sales agents had participated in the training program (ERGO Group, 2023). Such training is dynamic and immersive and is more effective than a slide presentation or learning content from a training manual (https://mazerspace.com/vr-in-sales-training/).

3.3.2 Improving the effectiveness of rewards and recognition programs: the use of NFTs and cryptocurrency. As mentioned before, customer engagement behaviors are functions of their characteristics (van Doorn *et al.*, 2010), which increases the importance of incorporating the metaverse and NFTs to engage with young customers. A similar logic applies to the youngest members of the workforce such as Gen Z, and students that are currently in secondary school or college. Employers can use cryptocurrency and NFTs to reward and recognize successful employees (Macura, 2022).

3.4 Cell [IV]

3.4.1 Enhancing the effectiveness of internal teams to increase the success of new product introductions. Prior research has noted the important roles of internal cross-functional teams and external members in the success of new product introductions. The nature, functions and processes of the internal product development team, sources of consumer information and its sources and knowledge of the links between the organization's internal networks and external sources of information are among the key elements that influence the success of new product development (Pitta, Franzak, & Prevel Katsanis, 1996).

Especially the industrial metaverse promotes efficient and effective collaborations among internal teams involved in new product development. For instance, companies use the 3D virtual collaboration platform Omniverse in diverse industries to model reality by creating digital twins to improve operations and designs (Freund, 2022). The Omniverse's database and collaboration engine Omniverse Nucleus allows multiple users to connect live using multiple applications (nvidia.com, 2022). Nucleus enables instant editing on a shared 3D scene in a real time. There is no need to download entire scenes, reupload them and send to other users. For instance, BMW's global teams can collaborate in real time to design and reconfigure the factories using different software packages. All the changes are visible on Omniverse.

4. Discussion and implications

Key elements of the business context such as customer profiles, market growth rate and the problems faced by customers (MacCormack *et al.*, 2012) provide a compelling reason why a wide range of companies are launching products in the metaverse. A key consideration in product strategy is also the feasibility of technical solutions (MacCormack *et al.*, 2012). In this regard, key technological developments have made it feasible to launch products for the metaverse. Major emerging technologies such as AI, NFT, the Internet of things (IoT), VR and AR play critical roles in building the metaverse. For instance, with the growth in NFTs' capabilities, they are becoming a new source of information for a real-world object.

The key task of branding and marketing communications strategy is to manage a brand's relationship with consumers and provide them with opportunities to interact with the brand (Schultz *et al.*, 1993). The discussion suggests that the metaverse makes it possible to engage in more varied and richer interactions with customers and consumers. For instance, firms can partner with gaming companies and integrate their NFTs with the games. The metaverse can help brands directly interact with their customers without any intermediaries. The metaverse also provides opportunities for like-minded customers to use shared virtual spaces, play games together and attend events and concerts (Simon, 2022). Especially young consumers value such opportunities. Cryptocurrencies, NFTs, avatars and immersive gaming experiences help consumers in the metaverse develop a deeper connection and a stronger relationship with the digital world. These consumers build their digital identities in the metaverse and platforms such as Roblox, which have provided a home for the community.

Some marketers utilize the metaverse as an opportunity to provide consumers with passive advertising exposure, meaning that consumers' interaction with brands takes place as an outcome of engaging in certain activities in the metaverse. In this way, brands can play a role in the digital lives that people build for themselves in the metaverse, which can help create relevance and buzz (DeAcetis, 2021). Moreover, the metaverse provides important opportunities for brands to draw engaged eyeballs and interactions. In the context of the metaverse, young consumers are such a group. Companies are realizing that marketing to Gen Z and millennials requires new technologies such as the metaverse (Hetler, 2022). A related issue is that hedonic benefits – which are intangible benefits associated with experiences such as fun and pleasure – are more subjective compared to utilitarian benefits (Hellén & Sääksjärvi, 2011). Such benefits associated with the metaverse are likely to be higher for the young population.

5. Future research

Before concluding, we want to suggest several potentially fruitful avenues for future research. First, this article looked at different value capture mechanisms adopted by firms active in the metaverse. Prior research suggests that companies across different industries

and technological contexts vary in the way they use various mechanisms to capture value from their innovations (James, Leiblein, & Lu, 2013). Thus, future research needs to analyze the effectiveness of the value capture mechanisms used by different companies. Various mechanisms to capture value from the metaverse by firms in different industries merit further study.

Moreover, future research needs to encompass other areas of marketing. One promising area is the role of the metaverse in strategic customer integration, which involves a firm's acquisition of information about customers aimed to generate customer value (Swink, Narasimhan, & Wang, 2007). The metaverse can help generate better customer insights. Another intriguing avenue for future research is thus to examine how firms use customer insights generated from the metaverse to create customer value.

The third area of future research concerns the metaverse's effects on different components of brand equity. The three major dimensions of brand equity include perceived quality, brand loyalty and brand awareness. Perceived quality is a measurement of consumers' subjective assessment of a brand's overall superiority. As discussed before, consumers have reported that AR gives them more confidence in product quality. The metaverse can likely help promote brand loyalty. In Web2 e-commerce, companies use personalization mainly for product recommendations or discounts. The metaverse makes it possible for brands to offer their customers products with a higher level of personalization. Thanks to it, companies can create exclusive products specifically for customers who become core community members (Ebiekutan, 2022).

Finally, future research might also explore the metaverse's effects on brand perception across consumers of different demographic characteristics. For instance, consumers who identify with a product are more likely to be loyal to the product (Butcher, Sparks, & O'Callaghan, 2001). Some evidence indicates that young consumers are more likely to identify themselves with the metaverse. For instance, to celebrate International Friendship Day on July 30, 2021, Coca-Cola threw a virtual "rooftop" party on Decentraland metaverse. The party featured surprise music guests. Those attendees had a first look at the Friendship Box items and received a chance to win mythical Coca-Cola T-shirts (https://wersm.com/coca-cola-launches-its-first-nfts-on-international-friendship-day/). Via the OpenSea marketplace, Coca-Cola auctioned a single "loot box" consisting of four items, that is, a vintage Coca-Cola cooler with dynamic motion and illumination, a custom-designed Coca-Cola Bubble Jacket to be worn in the Decentraland platform, a Sound Visualizer illustrating the recognizable sonics of enjoying a Coca-Cola and a Coca-Cola Friendship Card with refreshed artwork from 1948. The proceeds from the NFT auction went to Special Olympics International. Coca-Cola noted that the activations helped create a strong buzz and brought new, young audiences to the company's social media channels (https://www.coca-colacompany.com/news/coca-cola-nft-auction-fetches-more-than-575000). The behaviors of young and old consumers may also differ in terms of brand awareness. The metaverse is largely populated by young people (Kshetri, 2022). Due to young consumers' higher degree of familiarity with the metaverse and associated brands, they are likely to have a better brand perception. Besides age, scholars should also explore how other demographic variables mediate the impact of the metaverse on brand perception.

6. Conclusions

In this article, we provided an overview of the metaverse's roles in innovation-related activities, such as product development and marketing instruments such as branding and communications. We also looked at the diverse roles of metaverse technologies in activities related to product management, branding and communications. Some companies are developing new products such as NFTs specifically for sale in the metaverse, which has helped them generate substantial

revenues. Digital products such as NFTs can extract higher margins, because they are cheaper to make and sell compared to physical goods. This article provided insights into different value-capture mechanisms adopted by companies in the metaverse. For instance, AR and AI can help increase consumer confidence in purchasing decisions. The metaverse can thus help address post-purchase behavior, such as product returns.

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