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On your marks, headset, go! Understanding the building blocks of metaverse realms

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Blockchain;
Digital economy

Abstract In 2011, *Business Horizons* published the social media honeycomb article to help managers and scholars understand what was, then, a new form of media, along with its various platforms and how to engage with and learn to use it. Today, we face similar challenges and opportunities with the metaverse as we try to discover how to attract, enable, serve, and capture value from users in the virtual world. In this article, we introduce the concept of a *metaverse realm* (i.e., a specific type of metaverse space and community) and present the *metaverse honeycomb model* to explain the functionalities and affordances for different metaverse realms. We present two applications of the honeycomb model to show how shifting attention to immersive functionalities can characterize various metaverse realms. To conclude, we outline how the model could be used to strategically evaluate metaverse realms in terms of their external fit (i.e., the who-what-how of realms), internal fit (i.e., the trade-offs and synergies of realm functionalities), and life cycles (i.e., roadmapping and directing realm evolution).

1. The rise of metaverse realms

In 1992, the metaverse emerged as a fictional construct for an immersive virtual world: a digital environment where people—via their

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avatars—interact, create, and consume information, content, and activities together (Stephenson, 1992). Novels (e.g., *Neuromancer*, *Snow Crash*, and *Ready Player One*), movies (e.g., *The Matrix*, *Tron*), and video games (e.g., *Final Fantasy*) often portray the metaverse as a dystopian nightmare (Talin, 2023).

Today, companies such as Gucci, Adidas, and Spotify are investing heavily in metaverse initiatives (Barrera & Shah, 2023). Nevertheless, in a *Financial Times* article that partly inspired the title of our article, many managers are unclear about what the metaverse is and why it prompted a $500 billion company to rename itself Meta (Roeder, 2023). Despite the voluminous journalistic and academic commentary about the metaverse (e.g., Dwivedi et al., 2023), managers lack guidance about metaverse functionalities and associated value. To address this gap—using the social media honeycomb model (Kietzmann et al., 2011)—we explain how the core functionalities of a metaverse realm (i.e., a type of metaverse) can afford different immersive experiences for users and organizations seeking to invest in this space.

Much like the singular entity we know as social media, with its diversity of platforms such as X (formerly known as Twitter), LinkedIn, and Facebook, we now have a multitude of metaverses. Companies like Meta, Tencent, Roblox, Fortnite, and Decentraland can be considered digital real estate platforms that host a metaverse presence like Spotify Island (on Roblox) or Gucci Vault Land (on The Sandbox). We call these different metaverse initiatives *metaverse realms* (i.e., a bounded digital domain and community in which people immerse themselves and interact in different VR environments). Metaverse realms use digital technologies to produce some form of virtual space and associated rules for user-generated content and activities (Berthon et al., 2007). Realms vary in how users enter, engage, and transfer between reality, augmented reality, virtual reality, mixed reality, augmented virtuality, and virtuality (Farshid et al., 2018). The interactions in these environments can be social, commercial, educational, or recreational in nature, and involve most types of service experience (Dwivedi et al., 2023; Yoo et al., 2023).

A metaverse realm builds upon and advances the traditional understanding of social media as social networks (Boyd & Ellison, 2007). Realms are the metaverse equivalent of social media platforms in that they allow users to immerse themselves into a completely virtual world, a digital twin of an existing physical world (Kaarlela et al., 2023), or a kind of digitally augmented immersion into a physical world. Companies can use the digital immersion that defines a metaverse realm to provide unique consumer experiences that can be exhilarating and petrifying (Dwivedi et al., 2023; Park et al., 2023).

To help understand the metaverse phenomenon, research has, so far, focused on its technical aspects (e.g., Dwivedi et al., 2023) while paying much less attention to how these technologies create realm functionalities and user behaviors that can support a viable business model. To address this gap, we draw upon affordance theory (Gibson, 1979; Norman, 2004) to explain the value and appeal of different metaverse immersive functionalities. Affordance theory asserts that technologies offer certain possibilities or affordances for action, which users perceive and use as cues to guide how they use the technology. For example, a flat plate on a door is a visual cue suggesting that the door should be pushed, not pulled. In the context of metaverse realms, technologies afford some type of immersion (i.e., a presence and interactivity in a virtual world). Different immersion functionalities signal to users what they can or cannot do in a metaverse realm, especially when interacting with objects and users in a realm (Shin, 2022; von der Au et al., 2023). This focus on immersive experiences afforded to users differentiates a metaverse realm from social media platforms. Immersive affordances underlie human-digital environment interactions across three levels: technological (i.e., immersion in the digital-physical realm), affective (i.e., feelings of empathy and embodiment), and actualized (i.e., outcomes emerging from the experience; Volkoff & Strong, 2013). We posit that an immersive-affordance lens is useful for understanding how metaverse realm functionality results in interactions at individual and collective levels that suggest how organizations can use a metaverse realm to create value.

2. Getting immersed in the metaverse

In addition to advances in virtual reality technology, business models for metaverse realms will evolve to utilize digital innovations such as cryptocurrencies (Yen & Cheng, 2021), blockchain ledgers (Chohan & Paschen, 2023), and non-fungible tokens (Hollensen et al., 2022). Such technologies provide the security, trust, and distinctiveness to enhance user immersion in a realm. Users can securely buy, personalize, and verify digital assets such as clothing items for an avatar (e.g., Nike Swoosh, Adidas Metaverse) and

accessories from digital agencies (e.g., DressX, ReadyPlayerMe). Recently, Adidas showcased a virtual wearable collection at Decentraland's Metaverse Fashion Week, during which virtual wearables could be purchased for avatars to wear in the Decentraland realm (Miller, 2023). In an industrial marketing context, Siemens and Nvidia are using metaverse to produce digital twins to support the design and production of products—a technological advancement that has seen increasing revenues since its inception (Kaarlela et al., 2023).

In a fascinating disruption to traditional new product development dogmatism, metaverse realms can facilitate the transfer of a user's immersive preferences for an object to a physical product equivalent. For instance, Nike's purchase of the Swoosh agency allows metaverse users to work with Nike designers to create a digital version of their sneakers that feeds into future product line development. If users like their digital sneakers, Nike offers them the option to buy a physical version of the same product (Hollensen et al., 2022). This metaverse realm experience affords companies a viable bridge between the digital and the physical (von der Au et al., 2023; Yoo et al., 2023).

Avatars are an important technology for helping users immerse in and experience a metaverse realm. However, avatars and real life tend to be quite separate identities, suggesting a disparity between the modern interpretations of the ideal and actual self (Belk, 2013). Any immersive representation of the self in a metaverse is more complex than the generation of a text and image-based social media account. Perhaps the instantiation of the self via constructing one's avatars is a unique process that encourages the user to expressively construct their ideal self with little to no regard for the actual self. As a result, users of metaverse realms have a strong relationship with their avatars (Davis et al., 2009). As such, brand interaction and engagement could take significantly different forms. For instance, more care may be afforded to one's avatar than social media feed. Arguably, broader implications and well-being effects exist for the always-on consumer and their consumer engagement practices (Hollebeek & Belk, 2021).

Immersion in a metaverse realm goes beyond being in and exploring a digital world. It involves performing activities in the realm, such as earning, buying, selling, tipping, and donating. The metaverse offers virtual interactions and engagement opportunities that exceed the present capabilities of social media and allow for the exchange of digital assets. Hence, a unique affordance of the metaverse is its function as a trading service to procure and exchange unique digital assets referred to as nonfungible tokens (NFTs; Gadekallu et al., 2023). *NFTs* are one-of-a-kind digital assets, such as a unique piece of artwork. This infrastructure presents opportunities to purchase and trade NFTs, virtual real estate, in-game items, and collectibles—all supported through a blockchain network (Chohan & Paschen, 2023). Furthermore, metaverse realms have currencies, such as Roblox's Robucks. This may be an emulation of Facebook credits, but there are key differences, as a complex network of blockchain technology that supports transactional operations lies behind the curtain. Blockchain plays a crucial role in the metaverse by moving and exchanging decentralized assets, shifting the governance and control of such assets away from single intermediaries to the network, and enabling metaverse applications. It also allows for interconnection across realms, serving as a unifying layer to metaverse experiences that support the secure exchange of assets via cryptocurrency. Another departure is the affordance of users to monetize their user-generated content via trading tokens.

3. The seven functional building blocks of metaverse realms

We advance and present the influential social media honeycomb model to understand the functionalities and affordances of different metaverse realms. While many models on social media have emerged in the previous two decades, one of the most impactful has been the honeycomb model published in *Business Horizons* (Kietzmann et al., 2011). This model has motivated and guided practitioners to use social media and helped shape our understanding of social media's bright and dark sides (Baccarella et al., 2018). Scholars and managers use the model to classify, explain, predict, and build social media reality. Example studies include user behavior on social media (Talwar et al., 2020) and the development of strategies to influence business activity (Effing & Spil, 2016).

3.1. The honeycomb model of metaverse functionalities and affordances

Like a hive built on hexagonal, prismatic wax cells by honeybees, the honeycomb model has a lattice-like structure that uses seven functional building blocks. In the model's center is the block identity. This block is shaped and surrounded by the six

other blocks: conversations, sharing, presence, relationships, reputation, and groups. The honeycomb model's logical robustness and descriptive value can also be used to understand, explain, and illustrate how the core functionalities and affordances can vary for different metaverse realms.

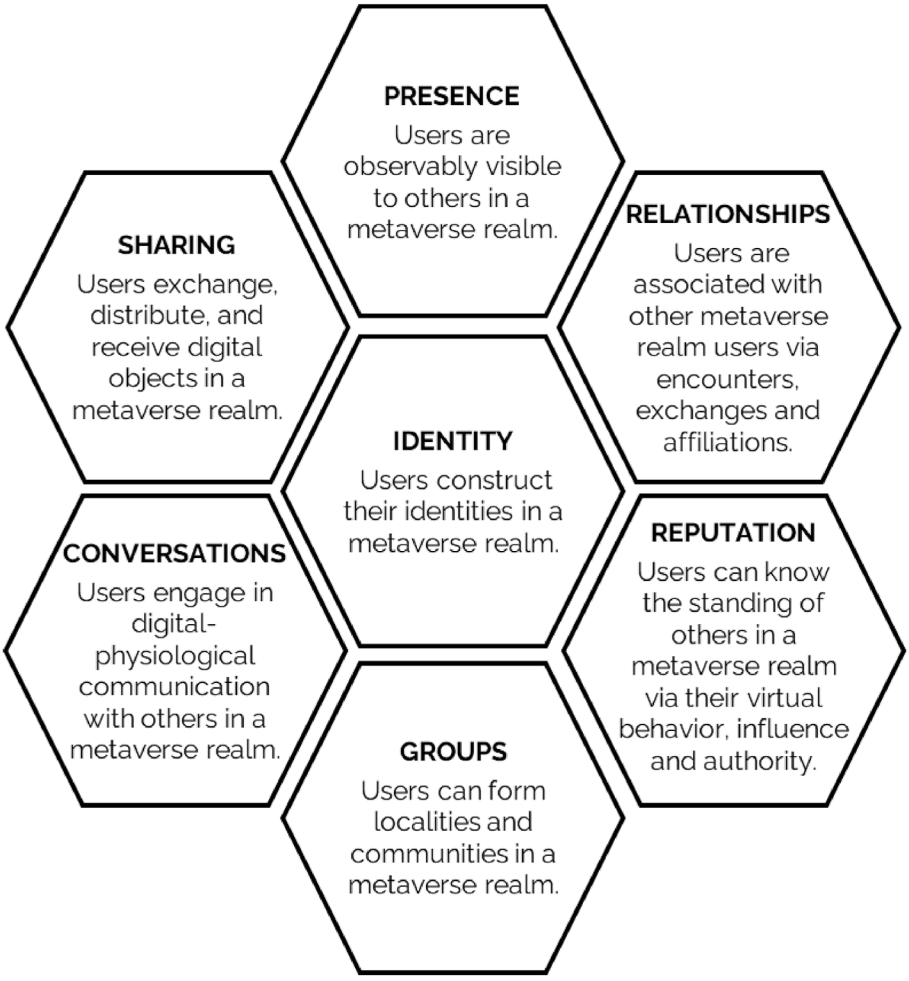
Drawing upon studies that examine virtual reality (Dwivedi et al., 2023), blockchain, NFT (Chohan & Paschen, 2023), and avatar affordances (Hollensen et al., 2022), we use the honeycomb model blocks to explain the immersive functionalities and affordances of a metaverse realm. Figure 1 presents the metaverse honeycomb. It shows how the underlying social media functionalities have progressed into more immersive functionalities and associated affordances that can be used to understand different metaverse realms. In the following section, we discuss and illustrate each of the blocks of the metaverse honeycomb.

3.1.1. Identity

Metaverse identity is more involved than a social media profile, composed of conventions for constructing digital faces and bodies with clothing and accessories. Compared to social media, users are attracted to the metaverse due to its promise of high control over their digital identity—especially via their avatars. This is a distinct advance on the traditional idea of personalization (Casciani et al., 2022), with the potential to serve a global audience via highly personalized one-to-one exchanges.

Companies can now offer digital versions of clothing brands and accessories for metaverse avatars. For example, in 2022, Nike partnered with Roblox to attract some of its 47 million active users daily to the metaverse-enabled video game Nikeland (Hollensen et al., 2022). Users expressed their identity within the Nikeland game by creating avatars and designing, creating, and buying Nike

Figure 1. The metaverse honeycomb



shoes, such as the Air Force Fontanka and the Air Max 2021. Thus, metaverse realm identity goes beyond traditional social media profile personalization to include visual (i.e., clothing, accessories, physical expressions), behavioral (i.e., interactions, skills, achievements), and social (i.e., emotional, affiliations) aspects that are linked to how services and products are consumed and codesigned.

3.1.2. Conversations

The conversations in a metaverse realm do not rely on traditional social media methods of communication, such as text-based messaging. The immersive environment affords a multiplicity of digitally produced digital-physiological cues, including speaking, facial expressions, and body language (Davis et al., 2009). Facial expressions can be captured by headsets and then conveyed as avatar expressions (Rosenberg, 2022). Body movements, gestures, and preformulated physical interactions (e.g., running, lifting, building) are the lingua franca of the metaverse (de Brito Silva et al., 2022).

3.1.3. Sharing

Metaverse affords users the opportunity to display and share achievements and digital assets collected via interaction within the realm. For example, gamers can live-stream their activities using platforms like Twitch in gaming metaverse realms such as Fortnite and Minecraft. However, other metaverse realms go beyond the simple sharing of snippets of user activities and allow for the curation and display of digitally created artifacts. For example, digital estate agents can offer you a property in the Decentraland realm, with some prices above $1 million (Menge, 2023). Undeveloped areas in the realm are now highly sought after by digital property developers (Tidy, 2022). In essence, collecting and curating digital assets on metaverse realms such as Decentraland aims to show off and share a user's prowess and stature on the platform. A recent example is the dog food producer Pedigree's FOSTERVERSE, whereby users can adopt a virtual dog. Users with a viable home on virtual land in Decentraland can choose from a pet adoption site. They can then share imagery of their new pet alongside their avatar. The campaign seeks to raise awareness of the Pedigree Foundation—which helps animals in real life—by providing opportunities to interact with virtual pets and other users to learn more about helping real-world animals via future adoption from animal shelters (PR Newswire, 2023).

3.1.4. Presence

User presence in a metaverse realm is a significant aspect of the immersive experience. When a user logs in, their avatar appears in some area of the realm, and their corporeal digital proximity is made known to other online users. Of course, there is a tangible difference between being present in a metaverse realm versus opening a social media application. The degree of presence in a metaverse realm is much greater, impacting how users experience self-presence and engagement in a metaverse realm, as well as their behaviors and beliefs outside of the realm (Szolin et al., 2022). As such, the immersive presence in metaverse realms likely reduces the temporal, spatial, and social aspects of the psychological distance of realm reality.

In contrast to social media indicators of presence, metaverse presence is more than just visibility. It involves being there and encourages interaction with stimuli and other users in the realm (von der Au et al., 2023). In some instances, this may be as simple as the digital/physical movement of the avatar through a doorway into the main area of the metaverse realm. If a user knows that someone is online, they are more likely to interact and be more engaged in the realm. This is partly why social media platforms took the initiative to signal when others are present via green symbols or Snapchat's snap maps. The metaverse provides a simplistic and irrefutable system of signaling presence on its platforms and is extremely effective in creating engagement amongst its users.

This format of signaling presence also speaks to the sociological and psychological aspects of human-computer interaction. Aside from the personal investment in sculpting a digital instance of the user, their presence becomes much more important as it is fundamental to interaction with the realm and the ability to interact with others. Interaction between the realm stimuli and other users is central to the enjoyment of the realm (de Brito Silva et al., 2022). Metaverse realms also have been reported to create AI-controlled avatars that are tasked with interacting with bona fide human users and offer virtual product placement (Wang & Chen, 2019). Although, understandably, such marketing practices should be considered very carefully, as they have received criticism for being invasive and unethical (Rosenberg, 2022). A notable example of signaling presence being used to good effect is IKEA's use of an AI-driven digital design experience called IKEA Kreativ. It offers

customers a lifelike experience to support the design and visualization of living spaces, using a combination of AI-derived avatars, spatial computing, machine learning, and 3D mixed reality technologies.

3.1.5. Relationships

Regarding social media, LinkedIn is a platform for professional networking, and Instagram is a platform for content posting and discovery. Each has its type of interaction and established norms based mainly on the conversation and sharing functionalities of the social media honeycomb. Within metaverse realms, interactions between users are much more immersive, resulting in user relationships being more multiplex than social media relationships (i.e., realm users are likely linked together by more than one functionality).

Realm relationships make users more complicit in establishing their presence and self-selecting realms and areas of realms that suit their needs and wants. To capture value from such relationship conditions, the celebrities Snoop Dogg and Ariana Grande created opportunities on the metaverse for their fans to hang out with them (Hackl et al., 2022). In such metaverse areas, a significant amount of branded content appears in the background. Hence, the relationships people establish with brands and celebrities can constitute a rich customer experience, which significantly advances traditional social media branding experiences. For example, Facebook-branded pages employ marketing efforts such as content creation, paid advertisement placements, and others to drive traffic to the page. In a metaverse realm, however, users actively seek out brand-constructed realms to interact and engage with based on personal preferences. Users would not immerse themselves in this type of realm if they were not interested in forming relationships with the brand.

Lastly, realm user relationships are also guided by the access levels provided by a realm. For example, fans of Manchester City can be granted access to drop into a Blue Moon realm and play football with each other (Baker, 2022). In another notable example, the Norwegian Tax administration ran a campaign through a virtual office on Decentraland to build relationships with young users to promote a range of services for cryptocurrency tax reporting. The campaign's intention was developed through a desire to establish a relationship with metaverse users instead of a traditional informational campaign. The virtual office offered an informational portal for users to visit, which has seen significant uptake and led to increased awareness of the tax implications for cryptocurrency—a key aspect of metaverse realms. Therefore, a firm can define the extent of its interactions, leading to a rich customer experience in a gamified setting.

3.1.6. Reputation

With social media, a user's follower count can indicate their reputation. However, in metaverse realms, user reputation is determined by what they do and how they interact in the realm (de Brito Silva et al., 2022). Arising from the gaming sphere, a metaverse user would gain points, money, or kudos for their actions, which offers a clear impetus for interacting with metaverse stimuli. The more interactions and activities you engage in, the more points or financial rewards you will receive. This leads to a higher status amongst peers and creates a pathway to further unlocked items. Alternatively, users can purchase highly valued items such as avatar clothing and accessories.

Another facet of reputation in a metaverse realm is the ability to show off bespoke digital items. This connects reputation with the sharing and conversation functions of a metaverse realm. Aside from the ability to collect and earn digital assets such as avatar adornments (von der Au et al., 2023), users are also afforded the opportunity to showcase (i.e., share) their collections of assets. Metaverse realms provide spaces for users to curate their collection of accolades, often including branded items, in a personal museum environment that is visible to other users. Like a gaming platform that showcases trophies and achievements, these tokens can provide an elevated degree of importance and reputation in metaverse realms (Gadekallu et al., 2023). These assets are now commonplace across the metaverse as NFTs, which are highly prized and, in some instances, one-off digital entities. For example, NIKE, Dolce and Gabbana, and Budweiser launched NFTs generating over $100 million in revenue as part of brand awareness campaigns (META.VRS, 2022). Hence, tokenization is a new aspect of the metaverse, which allows users to proudly display their reputations (Chohan & Paschen, 2023).

3.1.7. Groups

Metaverse realms offer specially constructed areas where users can interact with stimuli and other users. Given the immersive nature of metaverse realms, the group functionality entails more than just an online forum (e.g., a Listserv, short for "List Server") in which users with common interests are grouped together to send and receive messages. Metaverse realms can have locality-like properties and affordances, in which users are

grouped in virtual spaces with boundaries and distinguishing spatial features. This helps nurture groups with community-like identities, belonging, and social connections.

In 2022, WimbleWorld, a partnership between the Wimbledon tennis tournament and Roblox, used the group functionality to encourage younger users to interact and engage with the tournament that was celebrating its 100th year. In groups, users competed in teams with famous tennis players for avatar-branded paraphernalia and adornments (Baker, 2022). In doing so, users effectively self-select a realm space where they can interact with others who have similar goals or interests. This metaverse group self-selection can be a valuable segmentation activity for companies to match groups of identity, converse, and share specific services and brand features (Dwivedi et al., 2023).

The immersive nature of groups in metaverse realms means that users are more likely to consume an experience with others—not just in the presence of others (Lee et al., 2021). Thus, the group dynamic and rapport in a metaverse realm will be more visible and more likely to impact user-user and user-brand engagement. In addition, group maintenance will likely be more important and involved than it is for social media groups. For instance, when a user enters a group space in a metaverse and there is nobody there or users are noncommunicative (e.g., banging their heads against a wall), it creates a distinctly negative user experience.

3.2. The metaverse honeycomb model in action

We now present two applications of the metaverse honeycomb model. Figure 2 shows the honeycomb for the Roblox realm, and Figure 3 shows the honeycomb for the Decentraland realm. The top right-hand side of each figure provides introductory information about each realm. A shading system illustrates the differences between the building blocks for each realm. Three levels of shading are applied—black, grey, and white—with the black blocks with white text indicating the most noteworthy immersive functionality, associated affordances, and user behaviors for each

Figure 2. The Roblox honeycomb

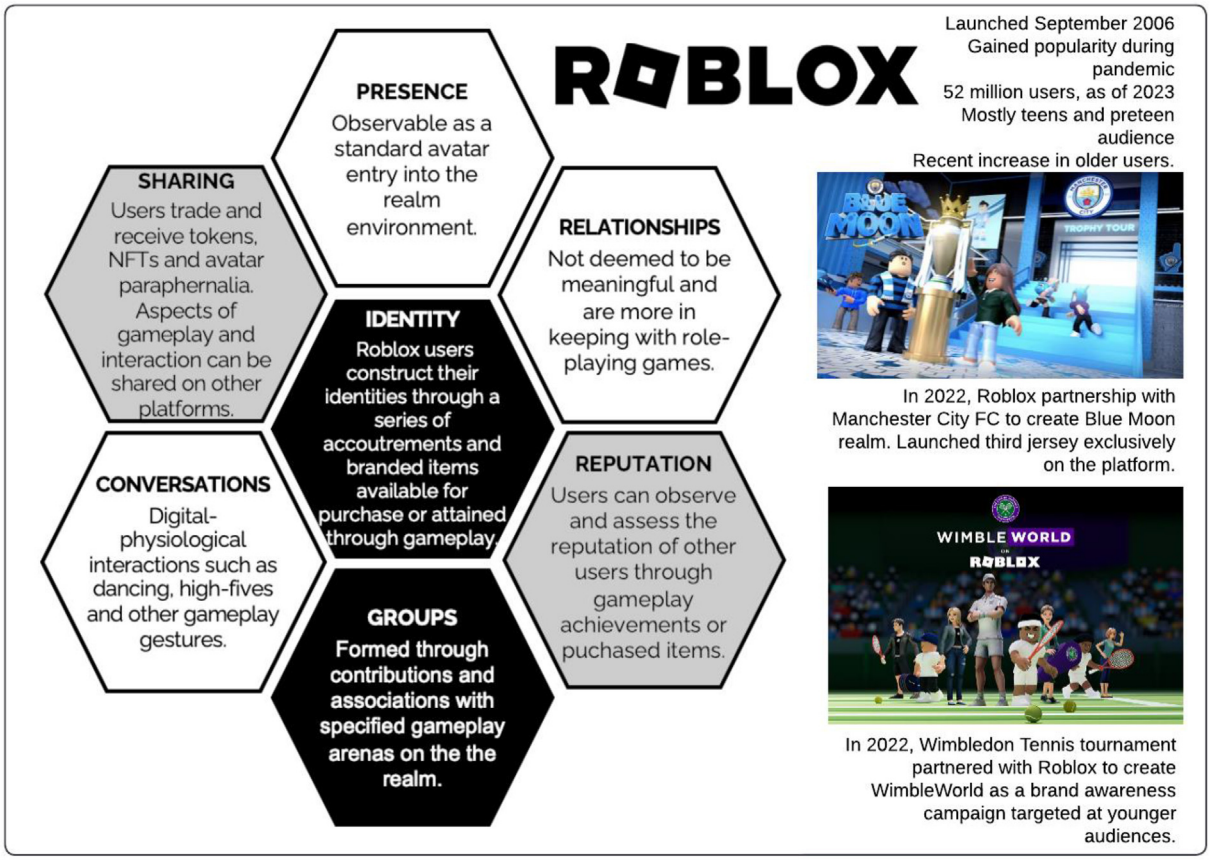
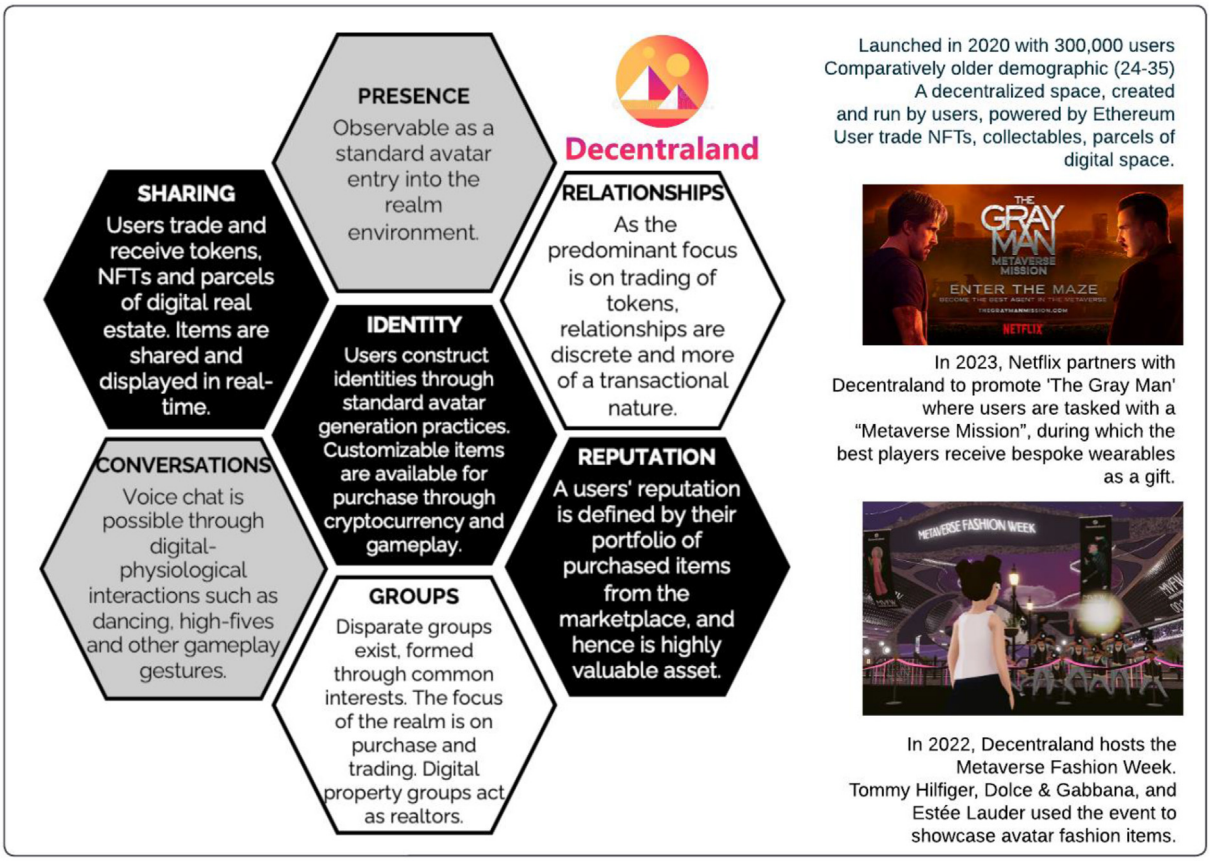


Figure 3. The Decentraland honeycomb



realm. It should also be noted that both platforms were selected to represent a typical perspective of both closed (Roblox) and open (Decentraland) forms of metaverse business models (see Lacity et al., 2023). A *closed metaverse realm* is centrally governed, with digital activities, assets, and a business model that is more predetermined by its owners (i.e., Roblox, Meta). An *open metaverse realm* has some level of self-governance by its decentralized communities of users (i.e., Decentraland, The Sandbox), which produces cocreated activities, assets, and a more emergent business model.

In Roblox (Figure 2), the functionalities of identity and group drive the metaverse realm experience. Identity is important because users are required to perform various avatar tasks in each realm—equivalent to a gaming environment. This impacts how users share and engage in groups, as team events are commonplace. For instance, when Roblox partnered with Wimbledon Tennis to create the WimbleWorld realm, users competed to win tokens via gameplay with other users or interaction with tennis professionals such as Andy Murray. Furthermore, this realm represents a highly interactive environment where user interaction and engagement lend themselves to branded campaigns focused on community development as the anticipated goal.

Figure 3 presents the honeycomb for the Decentraland realm. Identity, sharing, and reputation drive the experience in this realm. Identity is essential because users are regarded by their asset acquisitions in the realm. This impacts how users share and engage in groups, as the level of engagement with other users does not match a competitive team gameplay environment. For instance, the fashion industry widely hailed the Metaverse Fashion Week on Decentraland. However, it was essentially a platform for passively observing fashion items available for sale, with little interaction with the branded metaverse institutions such as Gucci. Furthermore, the honeycomb model reveals that this realm is more suited to a brand awareness campaign than Roblox because of the former's flexibility for asset creation.

These illustrative applications of the metaverse honeycomb model show how different attention to

immersive functionalities will characterize a metaverse realm. The models provide an informative overview of each firm's foray into the metaverse. This is useful for understanding the capabilities and technologies that other companies would need to create and operate realms focused on similar immersive functionalities. The models also provide a basis to consider how different mixes of immersive functionality can underlie firms' business models for creating and capturing value from realm users.

4. Realizing rewarding realms

To help managers prepare for a metaverse future, we outline five major challenges and opportunities that come with building and running a metaverse realm.

4.1. Tempting experiences

In the movie *The Matrix*, the rebel leader Morpheus tells the main character Neo: "Unfortunately, no one can be told what the Matrix is. You have to see it for yourself" (Wachowski & Wachowski, 1999). Morpheus then offers Neo a choice between taking a red pill and experiencing a potentially startling, life-changing truth or taking the blue pill to remain in his existing reality. This movie scene reflects an adoption reality for metaverse realms. Despite enormous investment in the metaverse by leading technology and consumer goods companies, some segments of society are reluctant to immerse themselves in a value-capturing way. So, like Morpheus in *The Matrix*, companies need to convince older, nongamer generations of users to immerse themselves in and experience a metaverse realm, such as playing tennis with Andy Murray on the center court of Wimbledon (Baker, 2022). However, it is hard to appreciate the metaverse without experiencing it, making it challenging for potential users to learn how to build and capture value.

Recent research indicates how metaverse realms effectively bridge digital and physical worlds, helping to build global audiences and related revenue streams (e.g., Yoo et al., 2023). However, most advice for doing this is overtly positive and refrains from offering a structured approach to adopting metaverse into a brand's digital footprint. The honeycomb model offers a framework for understanding the driving functionalities and associated immersions behind different metaverse realms. Understanding the link between immersive functionality and user behaviors in respective realms then clarifies developing customer experiences in the metaverse (Dwivedi et al., 2023), as illustrated by Figures 2 and 3.

We envisage that the metaverse honeycomb model will assist companies who will or have recently adopted the metaverse as part of their business strategies. For instance, the community aspect of customer engagement may be more relevant to a selected realm (Figure 2). What would follow is a process of further learning by leveraging the blocks of the model appropriately, experimenting, acquiring expertise from metaverse developer teams, and iterating on the creative idea.

4.2. Bank on blockchain

Holmes (2021) estimated that over $1.5 trillion will be invested in metaverse realms by 2030, with a significant proportion of that value involving cryptocurrency and NFT transactions. However, despite concerns about the volatility of cryptocurrencies (Yen & Cheng, 2021), the role of this technology as an alternative form of holding value is unlikely to go away. Hence, this digital economy allows companies and users to use cryptocurrency and blockchain infrastructure for secure, decentralized transactions for global audiences. Our model helps to understand the links between metaverse functionality, user behavior, and the role of blockchain monetization structures. For example, technology investment speculators have recognized the potential for a metaverse realm to represent a lucrative investment portfolio addition underpinned by improved computing power and increasingly popular blockchain infrastructures (Menge, 2023). By learning how blockchain can support a metaverse realm, companies can determine how to use NFTs, virtual assets, virtual real estate, and in-game items to build brand presence and promote customer engagement.

Lastly, Li and Chen (2022) warned that creative business models for NFTs are feasible but present a minefield regarding property rights, which would have a distinct impact on sharing and identity functional building blocks. For example, companies are currently facing challenges in appreciating digital property rights and ownership and sharing individual digital assets among communities on Decentraland (Tidy, 2022). The functionalities in the honeycomb model could be used to assess different property risks in different contexts, with the identity, sharing, and reputation functionalities being the most hazardous.

4.3. Digitally immersed marketing

Omnichannel customer experiences through the metaverse offer new customer engagement and marketing approaches, which complement our knowledge of the relationships building block. Metaverse realms already partner with some of the largest names in popular culture, such as Ariana Grande's virtual performance to a Fortnite audience (BBC, 2021). With new digital business assets and value exchange models using blockchain and NFTs as part of their offerings, a distinct opportunity exists to enhance the human-AI customer experience (Dwivedi et al., 2023). The notion of self-segmentation has emerged as a key affordance to the model's group and relationship-building blocks, whereby metaverse users make active choices to select and engage with specific realms—making them a captive audience (de Brito Silva et al., 2022). However, it is unclear how these metaverse marketing approaches will enhance and support customer acquisition, purchasing intentions, retention, and loyalty (von der Au et al., 2023).

The honeycomb model offers companies a more informed approach to understanding the types of consumer engagement a brand can expect when using metaverse as part of their marketing strategy. For instance, Yoo et al. (2023) advanced the conversation around how the metaverse has the potential to virtually—and physically—permeate all customer touchpoints in retail settings. Their work illustrates a comprehensive overview of the possibilities for metaverse application in a customer-retailer-brand paradigm. Adopting the honeycomb model to emergent research in diverse fields makes it possible to crystallize such overarching research to make impactful decisions at the managerial level. In addition, business models that drive different metaverse realms will utilize different honeycomb functionalities and corresponding types and levels of immersion. This will impact how different realms use digital analytics and communications to manage user behavior, reputation building, branding, and value cocreation (see Dwivedi et al., 2023).

4.4. Stay vigilant and agile

In October 2022, Microsoft reduced the size of its Industrial Metaverse Core team (Miller, 2023), and in March 2023, Meta, announced that it would be cutting 10,000 jobs and letting 5,000 vacancies be unfilled as it shifted resources from metaverse projects to AI projects. These actions carry a conciliatory tone by suggesting that global economic and social factors negatively affect the technology industry across the board but continue investment in the metaverse for payoff in the long run. For much of the world, there is still distrust in cryptocurrencies. While Bitcoin, Dogecoin, and Ethereum are relatively trusted, between 2013 and 2022, another 2,383 crypto coins ceased to exist for trading—with about 60% of all cryptocurrencies launched between 2013 and 2017 failing (NeoMam, 2023). However, this currency genesis-death rate has reduced significantly with less than 1% of new currencies failing since 2019. As various business models are possible, these currencies and their business models may not work until a market leader has made a foray into the space and shown a demonstrable return on investment (Menge, 2023). Amid the drive to create informed new business model generation for the less understood realms (Yoo et al., 2023), our model should encourage better decision-making by partitioning the respective functions of the metaverse and understanding the roles it will play in future marketing ventures.

Finally, we believe the honeycomb model complements the tsunami of overtly positive and somewhat shallow accounts of metaverse hype. The blocks of the model illustrate how metaverse realms not only afford immersive experiences but also can relate to a company's wider digital footprint. The metaverse honeycomb model helps advance our understanding of next-generation social media functionalities and immersive user behaviors. Many clickbait marketing strategies exist for the promise of the metaverse but with very little substance. The legitimate intuitiveness of the metaverse honeycomb model should help managers be better prepared when developing metaverse realms.

4.5. Consider the dark side

It would be remiss to ignore the dark side for users and organizations engaging with burgeoning metaverse realms. Like the internet, dark web, and social media, the metaverse has several adverse effects—some of which we are aware of and should prepare for (Baccarella et al., 2018). One of the most significant concerns is the social impacts on users who may become addicted to highly available and stimulating immersive digital environments. This may lead to social isolation, escapism, and mental health issues (e.g., anxiety and depression), which have been widely reported with social media usage (Steers et al., 2014). In addition, the highly competitive nature of the metaverse may exert pressure on younger users to

perform well in achievement-driven, game-like environments, leading to increased stress levels (Frenkel & Browning, 2021). Moreover, the anonymous nature of metaverse engagement could enable antisocial behavior such as harassment of users, strip clubs without age restrictions, gambling opportunities without regulation or moderation, and user data exploitation (Jamison & Glavish, 2022). Other areas of concern include *cyber-terrorism*, in which agents use the cloak of anonymity in virtual spaces to approach and recruit users (Elson et al., 2022). As the predominant demographic for the metaverse is younger users, there is no denying their vulnerability to nefarious forces and sexual and abusive content (Tharwani, 2022). As the metaverse flourishes, we should consider how differently abled people face accessibility issues that could foster social exclusion (Stoner, 2022). These dark side factors of the metaverse make it difficult for companies and regulators to attempt to catch up with the onslaught of issues arising from the metaverse. However, it should be noted that recent efforts are attempting to grapple with cybersecurity and privacy governance issues offering guidance, such as the EU Digital Services Act (European Union, 2024) and UK Online Safety Bill (UK Government, 2023).

From a managerial perspective, many strategic challenges face organizations hoping to hop on the metaverse bandwagon. These include the technical and infrastructural implications of a generally misunderstood tech platform and the accessibility and affordability of hardware and software that can sustain metaverse realms (Dwivedi et al., 2023). While technology advances and is likely to become more accessible and affordable, cost is still a significant barrier to entry. There is a significant concern regarding the use of NFTs based on a blockchain infrastructure. While tokenization is a key area where value is created from metaverse platforms, we have recently witnessed collapses of cryptocurrency exchanges such as FTX (Yousaf et al., 2023). As tokens become an integral part of metaverse realms, they will be subject to the same issues that plague nonmetaverse-enabled blockchain products today, such as the collapse of cryptocurrency exchanges. Hence, managers may be extremely concerned about investing in high-risk investments on metaverse platforms that lack financial and procedural regulation. The trading capabilities of NFTs on the metaverse could also empty the pockets of ordinary users, and if this were to happen in a branded metaverse realm, the implications could be disastrous.

5. Final thoughts and takeaways

Our article aims to help guide the transition to a virtual age of plugged-in personalized and prosperous services where people wear—and may have embedded into their bodies—digital technologies that allow them to become immersed in metaverse realms. We develop the social media honeycomb model (Kietzmann et al., 2011) to explain the immersive functionalities different metaverse realms afford. The metaverse honeycomb model helps readers understand the business capabilities and real-virtual world experiences needed to venture into different realms, either as a user or an organization. We now present three strategic takeaway applications of the honeycomb model.

First, the model can be used to address strategic external fit questions when building a metaverse realm. *External strategic fit* refers to the alignment of a metaverse's technologies and immersive features with market demands. The strategic questions the model helps answer are: Who is the target audience for the realm? What value and immersive experiences will attract and keep these users? How are the realm experiences delivered to and afforded by users? The honeycomb model provides a visual and systematic framework to ensure a realm invests in the required digital technologies (i.e., the how) to offer the desired blend of immersive functionalities (i.e., the what) to the targeted segment of users (i.e., the who). Companies can avoid inappropriately transposing current physical and social media functionalities into a desired virtual realm by using the model to consider these strategic fit questions.

Second, the model can help evaluate a realm's *internal fit*, which involves understanding how different realm functionalities interact and align—or fail to do so. For instance, if a realm prioritizes user privacy and anonymity in its identity functionality, it could influence the nature and extent of user sharing, relationship-building, and reputation. Trade-offs occur when focusing on one realm's functionality negatively impacts other realm functionalities. In contrast, synergies arise when different realm functionalities complement each other, leading to an enhanced immersive experience for users. The model can be used to understand these complex trade-offs and potential synergies.

Third, the honeycomb model can help companies guide the evolution of a metaverse realm's life cycle. Initially, a realm may focus on just two or three of the seven functionalities. While these starting functionalities may be central to the

initial user experience, they can also serve as foundational building blocks for future realm development. Thus, the model provides a functional roadmap to help companies scale up and enrich experiences that bridge both the physical and virtual worlds over the realm's life cycle. Moreover, the model can help companies identify when different realm functionalities might enable or hinder interoperability (i.e., the extent to which digital personas and products can be immersed and used in another). So, as realms evolve from being virtual escapes for gaming and digital exhibitionism to places for users to digitally interact and cocreate a range of service experiences, the honeycomb model can help us understand and direct this immersive evolution.

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