


Integrating GAI in Metaverse: Positive and Ethical Use of Neo-NPCs in Branding Strategies

Integración de IAG en el Metaverso: uso positivo y ético de los Neo-PNJs en estrategias de marca

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ABSTRACT

This study examines the use of non-player characters (NPCs) in metaverse marketing strategies, emphasizing their potential for immersive persuasion and user interaction, especially by brands and companies. This paper highlights how generative and multimodal artificial intelligence can transform NPCs into more sophisticated and adaptive tools (Neo-NPCs), enhancing the user experience by offering personalized and contextual interactions. Furthermore, it reviews technical and social challenges like data privacy and platform interoperability. It proposes future research on personalizing the user experience and the ethical implications of using advanced NPCs in marketing.

Keywords: metaverse; NPC; generative artificial intelligence; virtuality; branding; marketing; avatars.

RESUMEN

Este estudio analiza el uso de personajes no jugadores (PNJ) en estrategias de marketing en el metaverso, resaltando su potencial para la persuasión inmersiva y la interacción con el usuario, especialmente por parte de marcas y empresas. Este trabajo destaca cómo la inteligencia artificial generativa y multimodal puede transformar a los PNJs en herramientas más sofisticadas y adaptables (Neo-PNJs), mejorando la experiencia del usuario al ofrecer interacciones personalizadas y contextualizadas. Además, se analizan retos

técnicos y sociales como la privacidad de los datos y la interoperabilidad de las plataformas. Se proponen futuras investigaciones sobre la personalización de la experiencia del usuario y las implicaciones éticas del uso de PNJs avanzados en marketing.

Palabras clave: metaverso; PNJ; inteligencia artificial generativa; virtualidad; branding; marketing; avatares.

1. Introduction

The Internet is evolving, and it is necessary to consider several concepts such as Web 3.0 or *Web3*, semantic Internet, multimodal generative artificial intelligence, or metaverse. These elements are symptoms of the same process, although they are considered.

Web3, as described by Vernando et al. (2022), refers to a new iteration of the World Wide Web based on decentralized blockchain technology and Artificial Intelligence, significantly affecting various sectors, including Industry 4.0. It is characterized by 21 essential factors: decentralization, trust, security, and efficiency.

On the other hand, the Semantic Web is a component of the broader Web3 vision, which aims to transform the Internet into a distributed reasoning machine capable of executing precise searches and generating new knowledge from analyzed data (Goddard & Byrne, 2010). It involves technologies that enable the creation of a machine-processable global graph of knowledge despite challenges such as semantic heterogeneity and efficient access (Łuszpaj & Dobrowolsky, 2019).

While Web3 and the Semantic Web aim to enhance the Internet's capabilities, they also focus on different aspects. Web3 emphasizes a decentralized structure and integration of blockchain, whereas the Semantic Web is more concerned with data interoperability and intelligent data processing (Shkempi et al., 2023). Furthermore, applying the Semantic Web in various domains, such as Cultural Heritage, demonstrates its potential for managing semantically rich and interlinked data (Hyvönen, 2012).

In a much simpler manner, Web3 represents the next generation of the Internet, focusing on decentralization and AI. In contrast, the Semantic Web, as part of this vision, seeks to create a more intelligent and semantically structured web. Both are integral to the evolution of the Internet, with Web3 providing the framework for a decentralized online ecosystem and the Semantic Web enhancing data connectivity and intelligence (Goddard & Byrne, 2010; Vernando et al., 2022).

2. Theoretical framework

2.1. The metaverse: A comprehensive overview of its meaning and status

The term *metaverse* combines *meta* (beyond) and *verse* (universe), referring to a

three-dimensional virtual world where avatars participate in political, economic, social, and cultural activities (Park & Kim, 2022). It represents interconnected virtual spaces integrating physical reality with digital virtuality, considered an advanced Internet version or innovative immersive video game development (Simon, 2023).

Castronova (2001) states a virtual environment is metaverse if it meets three conditions: real-time interactivity, user embodiment through an avatar, and persistence. However, any digital platform offering interaction and an open-world experience can be called a metaverse (Sidorenko & Herranz, 2023).

The metaverse is not homogeneous but a collection of immersive or semi-immersive virtual experiences. Immersive experiences require virtual reality viewers, while semi-immersive ones can be accessed through computers, mobile devices, or video game consoles (Sidorenko & Cabezuelo, 2022).

Advanced technologies like extended reality (XR), smart objects, and edge computing are crucial in the metaverse. It encompasses purely virtual environments and those combining physical and virtual elements (Accenture, 2022).

Blockchain technology has led to decentralized metaverses, such as *Decentraland*, *The Sandbox*, and *Cryptovoxels*, allowing users to regulate and control these environments.

Metaverse narratives extend across applications, including entertainment, education, digital economy, and public diplomacy. Platforms like *Fortnite* and *Roblox* offer virtual events and digital goods in entertainment. The metaverse presents new teaching and interactive learning possibilities, as seen in *Minecraft*. The digital economy is bolstered by buying and selling virtual assets and cryptocurrencies.

Despite promising prospects, the metaverse presents technical and social challenges. A key difficulty is the lack of interoperability between platforms, hindering users from traversing metaverses with a single avatar (Simon, 2023). Concerns regarding user data privacy, cybersecurity, and regulation of digital spaces abound (Kshetri, 2022).

Geopolitically, the metaverse could impact propaganda and state control, with risks of authoritarian governments centralizing and manipulating technology (Moynihan et al., 2022). It also presents opportunities for innovation in public diplomacy and soft power strategies by fostering new forms of institutional interaction (Sidorenko et al., 2024).

Despite challenges, the metaverse is a significant evolution of the digital environment, incorporating advanced technologies to deliver immersive, semi-immersive, and interactive experiences. Its potential to transform multiple areas of human life is immense, opening new possibilities in education, entertainment, the digital economy, and geopolitics.

2.2. Avatars: user interaction in the metaverse

An avatar is a customizable anthropomorphic digital representation that symbolizes the user's presence in a digital space, such as a metaverse space (Han et al., 2023). These representations are essential for interaction within virtual

environments, allowing users to exist and interact with others and the digital environment.

The main characteristics of avatars are their high capacity for movement, complete communication possibilities with other avatars (text, vox, and gesture), and ability to manipulate objects within that environment. These features facilitate an immersive experience in which the avatar can emulate the user's physical movements and gestures.

User's interactions with avatars in the metaverse range from communication to collaboration on complex tasks. These digital representations allow users to project ideal or alternative identities, influencing behavior inside and outside the virtual environment and enhancing the "Proteus effect" (Henz, 2022; Martin et al., 2024).

Users may adopt an avatar with physical characteristics that differ from their own, affecting their self-esteem and behavior in the real world. Generation Alpha sees these possibilities as a way to be "another person" or represent their alter ego.

Social interactions in the metaverse are significant, as avatars enable the formation of virtual communities, participation in collaborative activities, and sharing real-time experiences. However, these virtual interactions can fully replicate feelings of belonging, trust, and empathy experienced in physical face-to-face interactions (Davis, 2009; Han et al., 2023).

Using avatars in metaverse settings raises social and ethical considerations (Chester, 2022; Hadi & Block, 2023). The ability of avatars to act like users in the real world is debatable, potentially leading to behavioral problems and abuse in the virtual environment.

Additionally, regulating avatar rights and responsibilities is an emerging legal issue, with ongoing debates about conferring legal personality on digital representations to manage their rights and obligations within the metaverse (Tenkhoff et al., 2022).

According to Gao et al. (2023), metaverse narrative allows users to create and share content, transforming the virtual environment into a collaborative and participatory space. This extends to diverse activities, from commerce to education and entertainment, reflecting a microcosm of real society within the virtual environment.

The evolution of underlying technologies and social and legal considerations continues to shape the role of avatars in the metaverse, offering opportunities and challenges in this new digital realm, especially with the irruption and rapid development of generative and multimodal artificial intelligence.

2.3. Generative and multimodal artificial intelligence: a new dimension

for NPCs

The metaverse's interaction possibilities extend beyond user avatars. It can interact with users through avatar-like representations, enhance experiences, provide specific elements, or serve as an assistant or guide, as seen in *Roblox*, *Fortnite*, or *Minecraft* experiences. These are NPCs.

Non-player characters (NPCs) in the metaverse are autonomous, computer-generated entities designed to interact with users within a virtual environment. They perform various roles, from providing information to simulating social interactions (Agrati, 2023; Aydin et al., 2023) and are integral to the metaverse. By simulating real-life interactions and behaviors, they contribute to a more dynamic and engaging user experience (Galih et al., 2014).

NPC development in the metaverse has evolved to include sophisticated behaviors, such as social learning and reputation formation, as evidenced by their ability to disseminate information and form opinions about players in virtual communities (Aydin et al., 2023). This indicates a shift towards more complex and human-like NPCs that can adapt and respond to user actions more realistically.

How does artificial intelligence relate to this? It's worth briefly reviewing its integration into the metaverse to specify how it changes or will dramatically change the function and possibilities of NPCs.

AI has been used to enhance interactivity and immersion. Generative AI is fundamental to creating new content in the metaverse, such as text, images, audio, and video. It enables autonomous production of scenarios and virtual objects, reducing cost and development time.

Another focus is improving user experience. Integrating tools like ChatGPT can create more interactive and personalized experiences, respond naturally to user interactions, and improve information search and presentation.

AI also plays a crucial role in metaverse security and privacy. Its use through blockchain networks ensures user data protection and efficient management through digital assets like smart contracts and nonfungible tokens (NFTs), guaranteeing authenticity and ownership of digital content. AI models can generate detailed 3D environments and customizable avatars, enriching the metaverse's diversity and dynamism.

Currently, active machine learning and deep learning algorithms enable the development of intelligent avatars, personalization of experiences, and the creation of generative content that enhances virtual environments.

Despite the number of steps that must be completed, this is a simple process in which artificial intelligence is constantly involved.

- User data collection: Facial features, body measurements, preferences, and movement patterns.
- Training of generative models: The model is trained using generative adversarial networks or autoencoders (GAN or VAE), using high-resolution images of people and three-dimensional volumetric models, styles, and behaviors.
- Avatar generation: compilation and analysis of data for creating a 3D representation of an individual.

Thus, generative artificial intelligence applies human-like movement and behavior patterns to the model design, allowing it to perform naturally. Despite obeying pre-established aspects based on AI data analysis and processing, this digital representation's behavior is largely determined by the development of situations in the virtual context. Here, artificial intelligence helps to constantly interpret the environment and its variables to adapt the avatar accordingly.

AI's ability to analyze large data volumes enables personalization of user experience. AI systems can adapt content and interactions in real-time by understanding and predicting user preferences and behaviors, offering unique and relevant experiences.

Fortnite, *Roblox*, or *Minecraft* are platforms that offer gamified experiences under the metaverse logic (according to Castronova's postulates, 2001). Artificial intelligence has been integrated into these digital environments to improve user experience through enhanced gameplay, personalized content, matchmaking systems, content creation and moderation, recommendation systems, and situation analysis.

Fortnite introduced AI-controlled bots in matches to help balance them, focusing on new players' experience. These bots adapt to participants' skill levels and provide adequate challenges. AI algorithms were also used in *Fortnite* to improve user matchmaking, ensuring those with similar skills participate together.

AI is valuable in *Fortnite* for recommending game modes, events, and challenges based on player behavior and preferences.

In *Roblox*, AI monitors and moderates user-generated content, helping identify and remove inappropriate content efficiently. It also helps content creators provide richer content by suggesting design elements, structures, and components that developers can incorporate into their games.

Personalized experiences are essential for *Roblox*. On the one hand, AI oversees analyzing user behavior to recommend games and experiences that may interest them, as well as analyzing gameplay patterns and providing developers with valuable data that can be used to improve their published experiences.

Meanwhile, in *Minecraft*, the mobs (in-game creatures, NPCs) can use AI to behave in more complex and realistic ways, improving interaction and challenge for players. AI is also responsible for procedurally generating terrain and structures in varied, detailed worlds.

Specifically, in *Minecraft's* educational edition, AI is vital in creating interactive learning environments for students to learn programming, mathematics, and other subjects in a fun, hands-on manner. AI can "bring to life" new 'Mods' and NPCs in the interactive experience through generative capabilities.

However, AI is not the only important attribute of gamified metaverse platforms. This technology is increasingly present in other popular virtual platforms like *Decentraland*, *The Sandbox*, *Spatial*, and *Horizon Worlds*.

In Meta's *Horizon Worlds*, AI is used through tools like the "Builder Bot," allowing users to create virtual worlds using voice commands, simplifying the design process. Users can verbally describe environments for AI to generate corresponding landscapes and sounds. This technology is part of Project CAIRaoke, which aims to integrate conversational AI to create and navigate virtual worlds in Meta's environment.

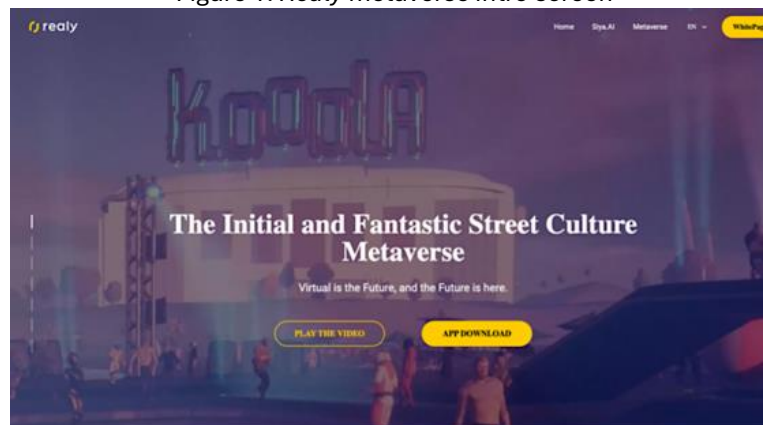
Spatial uses artificial intelligence to enhance collaboration and content creation through 3D avatars. These avatars can better reflect users' facial expressions and gestures in real-time, improving communication in this virtual environment. AI also aids in optimizing platform performance for a smoother user experience.

In *The Sandbox*, AI moderates and improves platform security. AI algorithms detect inappropriate behaviors and unpermitted content, ensuring a safe user environment. AI also assists in content generation, enabling creators to develop richer experiences without advanced programming or 3D design skills.

In *Decentraland*, AI is a resource for content moderation and fraud detection, maintaining a secure environment for transactions and interactions. Developers use this technology to create experiences and events within the virtual world, allowing for greater personalization and dynamism in user activities.

The Realy metaverse demonstrates AI's versatility in virtual worlds. Here, AI-based self-discipline systems manage avatars when users are offline, ensuring the virtual environment's persistent and realistic operation.

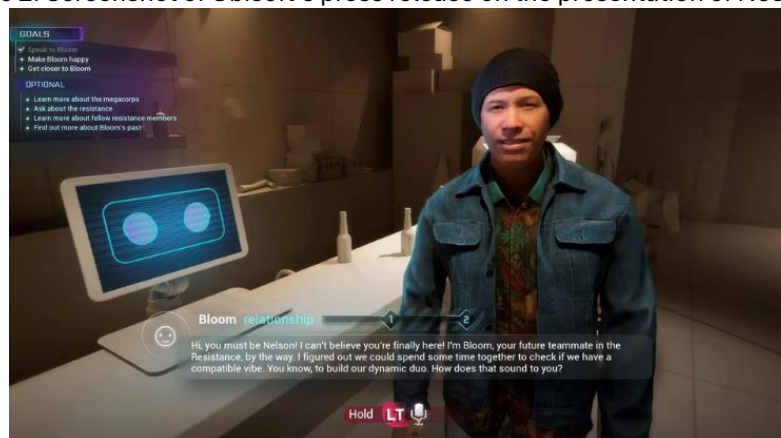
Figure 1. *Realy* metaverse intro screen



Source: Realy Metaverse.

Based on these possibilities, the video game company Ubisoft presented the evolution of NPCs operated by artificial intelligence in the first quarter of 2024, thus coining the term 'Neo-NPC'.

Figure 2. Screenshot of Ubisoft's press release on the presentation of Neo-NPCs



Source: O'Brien (2024).

While NPCs respond to human programming and design work that later, artificial intelligence may or may not manage or may or may not assist in their design, in the case of Neo-NPCs, generative artificial intelligence is the backbone of the creative process and interaction in the virtual world through specific digital characters.

3. Objectives

The main objective of this study is to determine the future possibilities, eventually negative or positive, of generative artificial intelligence in conjunction with non-player characters, now called by the digital industry 'Neo-NPCs,' by reviewing the current use of NPCs in communication, marketing, and branding strategies of brands and companies through the metaverse.

4. Materials and methods

To achieve the established research objective, the review has been limited to a sample conditioned by the most popular gamified and non-gamified metaverses for branding and marketing strategies of brands and companies on a global scale, according to the criteria of Glenn (2023), Ibrahim (2023) and Sidorenko (2022).

Based on this, the sample design consisted of *Fortnite*, *Roblox*, *Minecraft*, *Meta Horizon Worlds*, *Decentraland*, *The Sandbox*, *Spatial*, and *Animal Crossing*.

Zepeto, a metaverse platform developed by Naver Z, has also been added and has seen significant success in Asia, especially in South Korea, Japan, and China. With over 300 million registered users globally, *Zepeto* has positioned itself as Asia's largest metaverse platform. The platform boasts around 20 million monthly active users (MAU), with a substantial 95% of its international user base. This widespread adoption highlights its popularity beyond South Korea's home market (Davies & Song, 2022; Naver Z, 2023).

The platform's success can be attributed to its strong engagement with Gen Z users and its strategic collaboration with prominent brands and entertainment companies. *Zepeto* has partnered with fashion giants such as Christian Dior, Gucci, and Nike and K-pop agencies such as HYBE, JYP, and YG Entertainment. These collaborations created unique virtual experiences and merchandise, further driving user engagement and growth.

Zepeto's growth is also fueled by its partnerships with major fashion and entertainment brands like Inditex (Zara), Samsung, Christian Dior, Gucci, and Nike, which provide exclusive virtual items and experiences on the platform. Overall, *Zepeto*'s innovative features and strategic collaboration have positioned it as a leading metaverse platform in Asia, driving its rapid growth and popularity among young people.

Internet searches on the most successful or popular branding strategies in the digital sphere have been conducted on these platforms, where NPCs have been extensively used. Based on these results, the following analysis table was designed (Table 1).

Table 1. Sample analysis table

Metaverse	Brand	Name of Strategy	Actions by NPCs	Country	Category

Forty-seven virtual experiences met these criteria were obtained, and the corresponding analysis was carried out.

This is a sample and, consequently, an exploratory study based on a mixed approach, combining qualitative and quantitative techniques, up to the first semester of 2024, on which it has been directly experienced to determine the mechanics of action between user and virtual environment.

That said, it should be clarified that other virtual experiences and examples have undoubtedly been unintentionally excluded. However, this proposal, far from claiming to be exhaustive, aims to pave the way for analysis and more detailed and specific research on the evolution of generative artificial intelligence within the metaverse, especially in corporate and brand communication actions.

5. Results

An analysis of metaverse communication strategies reveals several emerging trends and practices (Table 2). The results focus on the most common functions of NPCs (non-playable characters), the categories of companies that use these strategies most frequently, and the countries where they are most frequently implemented.

Table 2. Marketing and branding strategies in the metaverse with NPC intervention until the first half of 2024.

Metaverse	Brand	Name of Strategy	Actions by NPCs	Country	Category
<i>Fortnite</i>	Travis Scott	Astronomical Concert	Guided concert, interactive elements	USA	Entertainment
<i>Fortnite</i>	Marvel	Marvel Integration	Themed missions, interactive characters	USA	Entertainment
<i>Fortnite</i>	Star Wars	Star Wars Event	Exclusive clip, lightsaber battles	USA	Entertainment
<i>Fortnite</i>	NFL	NFL Virtual Stadium	Football activities, live events	USA	Sports
<i>Fortnite</i>	John Wick	John Wick Event	Themed challenges, skins	USA	Entertainment
<i>Roblox</i>	Vans	Vans World	Skateboarding challenges, customization	USA	Fashion
<i>Roblox</i>	Walmart	Virtual Shopping	Virtual shopping assistance	USA	Retail
<i>Roblox</i>	Gucci	Gucci Garden	Exhibition guides	Italy	Fashion
<i>Roblox</i>	O2	O2 Virtual Arena	Virtual concerts, mini-games	UK	Telecommunications
<i>Roblox</i>	Chipotle	Burrito Builder	Burrito-making game	USA	Food

Metaverse	Brand	Name of Strategy	Actions by NPCs	Country	Category
<i>Roblox</i>	Easy Life	Concert in O2 Arena	Virtual concert, engagement activities	UK	Music
<i>Roblox</i>	Carrefour	Healthy Map	Interactive healthy eating promotion	France	Retail
<i>Minecraft</i>	Burberry	Burberry: Freedom to Go Beyond	Guided exploration, interactive fashion	UK	Fashion
<i>Minecraft</i>	Lacoste	Croco Island	Tennis matches, mini-games	France	Fashion
<i>Minecraft</i>	Angry Birds	Angry Birds DLC	Flinging birds, unlocking characters	Finland	Entertainment
<i>Minecraft</i>	Puma	Puma Collaboration	Virtual builds, social media interaction	Germany	Fashion
<i>Minecraft</i>	Carrefour	The Healthy Map	Promoting healthy eating	France	Retail
<i>Zepeto</i>	Gucci	Gucci Collaboration	Fashion guidance	Italy	Fashion
<i>Zepeto</i>	Ralph Lauren	Ralph Lauren Virtual Fashion	Virtual fashion shows	USA	Fashion
<i>Zepeto</i>	Nike	Nike Virtual Experience	Mini-games, challenges	USA	Fashion
<i>Zepeto</i>	Samsung	Samsung Campaign	Interaction with virtual influencers	South Korea	Technology
<i>Zepeto</i>	The North Face	Virtual Outdoor Adventures	Guided outdoor quests	USA	Fashion
<i>Meta Horizon Worlds</i>	Wendy's	Wendyverse	Virtual restaurant, mini-games	USA	Food
<i>Meta Horizon Worlds</i>	J Balvin	Futurum Concert	Virtual concert with interactions	Colombia	Entertainment
<i>Meta Horizon Worlds</i>	Nike	Nike Interactive	Guiding through virtual stores	USA	Fashion
<i>Meta Horizon Worlds</i>	Meta	<i>Horizon Worlds</i> Tools	Creator tools, interactive environments	USA	Technology
<i>Meta Horizon Worlds</i>	FitXR	Virtual Fitness Classes	Virtual workout guidance	USA	Health
<i>Spatial</i>	Gucci	Gucci Garden Archetypes	Guided tours, interactive fashion	Italy	Fashion

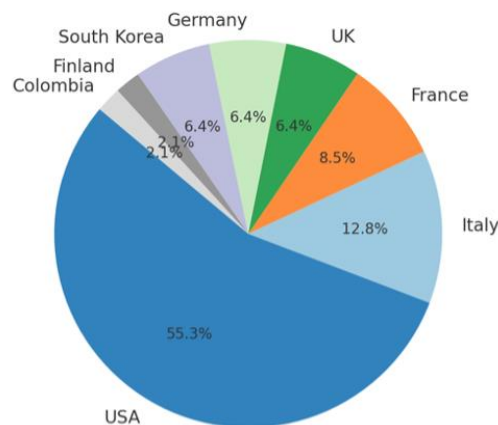
Metaverse	Brand	Name of Strategy	Actions by NPCs	Country	Category
<i>Spatial</i>	Balenciaga	Balenciaga Fashion Show	Modeling outfits, providing fashion info	France	Fashion
<i>Spatial</i>	Adidas	Adidas Virtual Store	Guiding through store, product info	Germany	Fashion
<i>Spatial</i>	Tommy Hilfiger	Tommy Hilfiger Hub	Fashion displays, virtual shopping	USA	Fashion
<i>Spatial</i>	Hyundai	Hyundai Mobility Adventure	Guiding through virtual city	South Korea	Automotive
<i>Decentraland</i>	Dolce & Gabbana	Metaverse Fashion Week	Guiding through fashion show	Italy	Fashion
<i>Decentraland</i>	Atari	Virtual Arcade	Guiding through games	USA	Entertainment
<i>Decentraland</i>	Gucci	Gucci Vault	Treasure hunt guidance	Italy	Fashion
<i>Decentraland</i>	Samsung	Samsung 837X	Product demonstration	South Korea	Technology
<i>Decentraland</i>	<i>Decentraland</i>	Metaverse Music Festival	Event management	USA	Entertainment
<i>The Sandbox</i>	Gucci	Gucci Treasure Hunt	Guiding through treasure hunt	Italy	Fashion
<i>The Sandbox</i>	Adidas	Adidas Originals	Guiding through virtual activities	Germany	Fashion
<i>The Sandbox</i>	The Walking Dead	The Walking Dead Experience	Survival scenarios	USA	Entertainment
<i>The Sandbox</i>	Snoop Dogg	Snoopverse	Concerts, interactive events	USA	Entertainment
<i>The Sandbox</i>	Atari	Atari Theme Park	Guiding through theme park	USA	Entertainment
<i>Animal Crossing</i>	Marc Jacobs & Valentino	Virtual Fashion	Custom fashion displays	USA	Fashion
<i>Animal Crossing</i>	Hellmann's	Food Waste Reduction	Collecting spoiled turnips	USA	Food
<i>Animal Crossing</i>	Monterey Bay Aquarium	Virtual Museum Tour	Museum tours	USA	Education
<i>Animal Crossing</i>	Gary Whitta	Animal Talking Show	Hosting a talk show	USA	Entertainment

Metaverse	Brand	Name of Strategy	Actions by NPCs	Country	Category
<i>Animal Crossing</i>	Gillette Venus	Body Positivity Campaign	Custom fashion designs	USA	Fashion

Source: Own Elaboration

As shown in Figure 3, of the 47 virtual experiences found (Table 2), the United States is the country where the most progress has been made in branding and marketing strategies in the metaverse with the use of NPCs (55,3%).

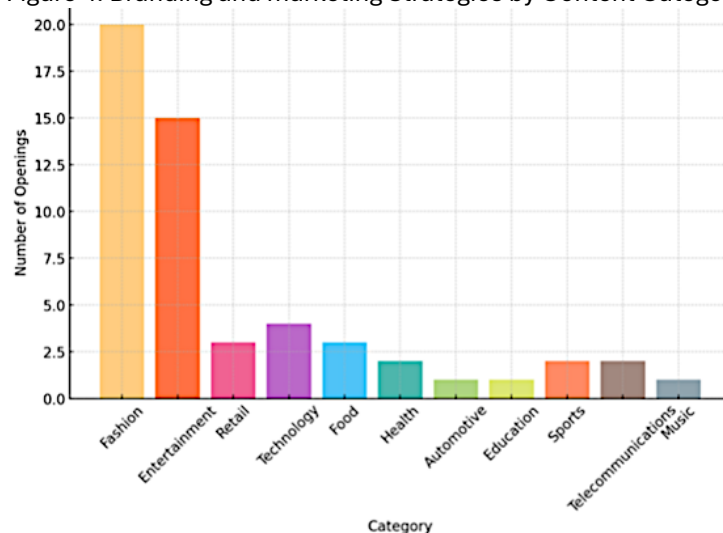
Figure 3. Distribution of Marketing Strategies in Metaverse by Country



Source: Own Elaboration

Another piece of evidence (see Figure 4) shows that fashion is the main category in which these strategies are designed, followed by entertainment.

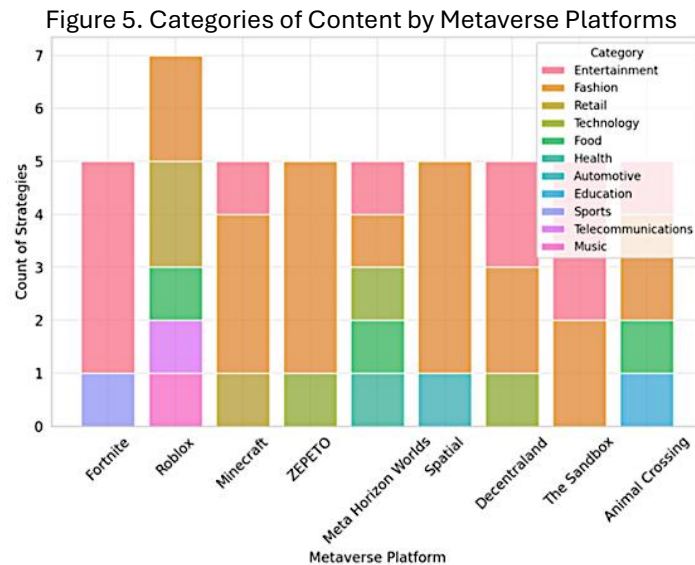
Figure 4. Branding and marketing Strategies by Content Category



Source: Own Elaboration

Based on the above data, it is exciting to see that the fashion category is present in practically all metaverses, except *Fortnite*, as with entertainment. Based on the worked sample, the content categories are pretty present on all platforms, although

with different intensities, indicating no niche platforms in these cases (see Figure 5).



Source: Own Elaboration

Gucci has used NPCs the most in its communication strategies through the metaverse, such as display guides, fashion advisors, interactive guides, easter egg hunt guides, or rewards.

As is evident, especially in this last graph, NPCs have played a fundamental role in communication strategies in the metaverse, facilitating interaction and enhancing the user experience.

In the role of guides or virtual assistants, in Travis Scott's "Astronomical Concert" event in *Fortnite*, NPCs helped enhance the concert experience with visual elements and guided activities. Meanwhile, NPCs served as exhibit guides at the "Gucci Garden" in *Roblox*, offering visitors an immersive narrative about the brand and its products.

Thematic and mission interactions also stand out as the functions of these interactive elements. For example, Marvel's *Fortnite* integration includes NPCs offering themed missions and interactive characters, thus creating an immersive gameplay experience that links users to the Marvel brand. Another example is Walmart in *Roblox*, which implements NPCs as user assistants to provide a better virtual shopping experience, simulate a physical store, and offer a personalized customer experience.

Challenges and personalization, which are valued in other digital platforms closely related to Centennials, such as TikTok and Instagram, are also attributes of these virtual experiences. In "Vans World" (*Roblox*), NPCs stood out for offering skateboarding challenges and product customization options to users, allowing them to interact dynamically and entertainingly with the brand.

Finally, current efforts to incorporate NPCs in branding and marketing strategies in the metaverse seem mainly based on resources with advisory and support functions, acting as guides or assistants in a context where fashion and entertainment companies and brands outperform other actors (see Figure 6).

only appeared in the game but also advertising campaigns and live events, attracting the attention of fans and the media, thus drawing the attention of the actor's fandom.

- Resident Evil video game franchises have repeatedly used NPCs in their marketing campaigns. For example, at the launch of *Resident Evil Village*, interactive experiences were created in which players could interact with the game's characters through social networks and promotional websites. This increased anticipation and engagement with the gaming community, reinforcing the community around them.

In the case of Neo-NPCs, their personalities are created by a machine but by a writer; that is, a group of programmers and designers are responsible for the creation of these characters, providing them with history, aspirations, and particular behavioral characteristics, adjusting their dialogues and actions to a language model (AI) that later, based on this, will be responsible for giving them automatic interaction and the ability to improvise and react according to circumstances (O'Brien, 2024). Ultimately, the aim is for these synthetic characters to have the same social performance as human beings so they can enter direct action with them.

Finally, AI works like a big box full of concepts and statistics that generates words based on the common coexistence of specific terms. Thus, if the model is essential, the result is a dull and robotic response when there is an interaction. However, suppose this model is conditioned by a particular history, specific behavioral traits, and a particular dialogue style conceived by a human. In that case, it will not only begin to understand what is expected, but its performance will be natural and uninhibited.

With all this evidence, the integration of NPCs in branding and marketing strategies by companies and organizations can be summarized as follows:

- Creating personalized brand experiences: NPCs can create personalized brand experiences for users by providing information about a product or service or offering personalized recommendations.
- Lead Acquisition and Generation: NPCs can generate leads for companies. For example, an NPC can collect contact information from users or invite them to sign a new letter.
- Call to Action Catalysts: NPCs can encourage interactions between users and brands. For example, an NPC can play a game with users or participate in conversations.

Figures 7 and 8. Chipotle experience NPC on Roblox



Source: Roblox (2025)

With Neo-NPCs, AI is expected to assume that it must imitate humans, which is decisive for its interrelationships. Therefore, according to O'Brien (2024), the following must be considered.

- **Concepts and Statistics:** AI generates responses based on word patterns. Without personalization, these responses may be generic or unattractive.
- **Personalization:** For AI to act like a specific character, it is necessary to condition the internal statistics of its language model, which means adjusting responses to reflect the preset attributes.
- **Character Authenticity:** AI must speak and act like the designed character, which implies a process of constant testing and adjustment to ensure that the synthetic responses are consistent with the original vision of the character.
- **Iterative Process:** If the model deviates from the character's personality, it must be reviewed and adjusted to correct errors and align its responses with initial expectations.

Given the rapid evolution of artificial intelligence in all areas, especially within the metaverse, it is understandable that this type of NPCs will soon enter interaction through the platforms referred to here and others that have not been considered in this study.

It is thus urgent to determine some hot rules so as not to wait for the technology to be fully deployed and to act accordingly when younger users are already in direct dialogue with the AI, having become aware of it. The following are some ideas in this regard for integrating this type of resource into branding and marketing strategies:

- **Authenticity and Personalization:** NPCs should reflect brand identity, with personalities and behaviors that align with the company's values and messages.
- **Interactivity and User Value:** NPCs must provide real value to users, facilitating meaningful and personalized interactions that enhance the user experience.
- **Content Monitoring and Control:** Security systems must be implemented to filter out inappropriate content and ensure that interactions remain safe and appropriate.
- **Iteration and Continuous Improvement:** A constant feedback loop must be maintained to adjust and improve the NPC's behavior based on user interaction and feedback. The insights must be constantly monitored.
- **Sensitivity and Bias Correction:** NPCs should be inclusive and avoid biases and stereotypes, which warrants adjusting the model as needed.
- **Transparency and Ethics** ensure that NPCs operate ethically, respecting the privacy and rights of the users.

To this should be added the concerns and proposals on accessibility in the metaverse, derived from the round table of experts organized by the International Academic Observatory of Communication, Branding, and Marketing in the Metaverse - 'Brandingverse' and the International University of La Rioja (see https://www.youtube.com/watch?v=SZNt_MBzvPU&t=10981s).

This boils down to the need for companies to respect user privacy and ensure that data collected through NPCs is used responsibly. They must also ensure transparency about the use of AI-operated NPCs and provide users with information about how these characters work. Companies must guarantee the responsible and ethical use of NPCs so that no synthetic character can be used to discriminate or harass users.

It should be considered that relationships between humans and machines in the metaverse will be more common, and humans may not differentiate between an avatar belonging to another user or an AI, especially as AI's multimodal nature will allow natural and fluid interaction.

The metaverse, powered by AI, promises to revolutionize the entertainment, education, and commerce sectors. One of the main goals of the metaverse is to create a closed social and economic space where socio-economic activities can flourish.

Recently, ITV studios, responsible for producing reality shows such as *The Voice*, *Love Island*, *I'm a Celebrity*, and many others, announced their foray into *The Sandbox* metaverse with the "ShowCity" project, stating the following reasons:

This movement fosters fandom, drives interactivity, and creates relevance in the digital age. *ShowCity* offers fans an exciting opportunity to connect with their favorite celebrities and TV stars in an entirely new way within the community. I look forward to seeing how our creators will transform the neighborhood into a hub of creativity, competition, and entertainment within *The Sandbox*. (ITV Studios, 2024).

Figure 9. Word Cloud of Actions by NPCs



Source: Own Elaboration

As technology advances, balancing innovation and protecting user privacy is crucial. AI must be implemented in a manner that respects the confidentiality of personal data and ensures the security of transactions. Ensuring that the metaverse is an inclusive and diverse environment is equally essential, and this involves the development of accessible technologies that people with different abilities in various regions of the world can use.

Strengthening the development of explainable and transparent AI models is essential to ensuring that these systems' decisions are understandable and reliable.

In addition, these technologies continue to face significant technical challenges, such as the success of real-time immersive experiences, which depend on reducing data transmission latency and improving AI systems' performance.

Likewise, cloud computing can help distribute the processing load and improve efficiency, but this also requires the deployment of high-speed networks to report greater global penetration than currently seen.

Digital literacy is still debated as a final pending issue. Without a meeting between governmental actors, academia, the technology industry, and society, it is impossible to think about the proper functioning of this whole system, not to mention the reduction of the social gap through technology (World Economic Forum, 2024).

Artificial intelligence in the metaverse is transforming the way we interact with virtual environments, offering more immersive, personalized, and secure experiences. It is also posing a major revolution in social relations, opening the stage for joint conversations and activities between humans and synthetic technologies.

As these technologies continue to evolve, addressing ethical, private, and technical challenges is crucial to ensure that the metaverse is an inclusive and accessible environment for all. Future research and development should focus on improving transparency, reducing latency, increasing the efficiency of AI and blockchain systems, and strengthening education and outreach to meet user expectations and ensure sustainable growth of the metaverse and Web3.

It should be considered that proposals such as Neo-NPCs even force consideration of human relationships, thus posing a still uncertain scenario regarding communication and interaction between humans and machines in a more immersive and interactive way.

7. Future lines of research

Integrating Neo-NPCs in the branding and marketing strategies of brands, companies, and organizations offers an emerging and promising field, and with it, there is a need to deepen the corresponding research.

Potential directions for future studies are as follows:

- Explore how Neo-NPCs can personalize the user experience on digital platforms and how this personalization affects brand perception and loyalty.
- Analyze in more detail, and as they occur, specific cases where Neo-NPCs have been implemented to evaluate their effectiveness in eventually improving user experience and marketing strategy results and to determine how these Neo-NPCs can be adapted to different industries and product types.
- Examine how users interact with Neo-NPCs and how these interactions can increase engagement and customer retention.
- Further investigation of the psychological effects produced by interacting with virtual characters compared to other forms of branded content (and comparing this to current interactions with more conventional NPCs).
- Evaluate how Neo-NPCs can effectively communicate brand values, products, and advertising messages compared to traditional methods.
- Research on new marketing strategies that incorporate AI and Neo-NPCs, such as interactive experiences in social networks, games, and apps.

- Investigate the ethical implications of using Neo-NPCs in marketing, including issues of privacy, consent, and transparency. Conduct further study and propose a current regulatory framework that integrates virtual characters in advertising and marketing.
- Evaluating how new technologies (AI, augmented reality, virtual reality) can enhance the capabilities and applications of Neo-NPCs in marketing and investigating how Neo-NPCs can be effectively integrated into multichannel and omnichannel marketing strategies.

These, as well as many other lines of research, can provide a framework of analysis and a solid basis for better understanding the potential of Neo-NPCs in modern marketing and offer valuable elements for developing more effective and ethical advertising and marketing strategies.

As Zhihan (2023) advances AI, including natural language processing, gesture detection, and avatar animation, next-generation digital assistants within vehicles are fostered. These AI assistants can perform tasks such as reservations and accessing vehicle controls using natural language understanding. They also employed internal cameras, deep neural networks, and multimodal interactions to keep the driver focused on the road and ensure no passengers or pets were left behind. Moreover, large language models and structured data will be applied to unstructured data, such as photos, recordings, and tweets, to reveal hidden patterns, supporting breakthroughs in healthcare, scientific advances, customer engagement, and autonomous traffic. Integrating unstructured data will aid in developing neural networks, such as creating synthetic profiles to mimic healthy records and making unsupervised machine learning as vital as supervised learning.

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