

Scientific Report

Avatars: Shaping Digital Identity in the Metaverse



Source: The Sandbox

Avatars are a building block of the metaverse. This report explores the central role avatars play in digital identity, providing users with infinite possibilities for expression, communication and representation. It explores how users can create and control their digital identities through avatars, enabling them to use the metaverse across different platforms and applications. The report also examines avatar markets and their size, including the use of 3D avatars in virtual worlds and the emergence of digital asset emotes as new forms of expression. Finally, it considers the important role that avatars and digital identities will play in the development of an open, inclusive and interoperable metaverse of the future.

Table of Contents

3	Executive Summary
5	Key Takeaways
10	The Pillars of the Metaverse
14	Introduction to Virtual Worlds and Avatars
20	The Meaning and Relevance of Avatars
29	The Avatar Economy and Market Size
34	The Success of 3D Avatars in The Sandbox
43	Self-expression in the Metaverse: The Case of Kinetix
48	Survey Results: Do People Actually Want Emotes?
57	How Avatars Shape Digital Identities
62	Conclusion and Outlook
65	References
69	About / Authors
70	Disclaimer



**“We know what we are,
but not what we may be.”**

— William Shakespeare

Executive Summary

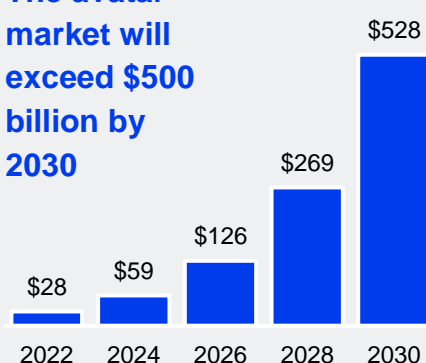
Avatars are one of the essential building blocks of the metaverse and are the theme of this report. While this is by no means an entirely new topic—avatars having been used in virtual worlds as early as the 1970s—the emergence of Web 3.0 and blockchain-based digital economies enables new ways of creating and using avatars and enjoying the economic benefits of digital creations.

Content of this report

This report investigates avatars and their role for the digital identities of metaverse users. Following a brief exposition of the thematic pillars of the metaverse, we introduce avatars, their history and their different types. Next, we provide an overview of the meaning and relevance of avatars, discussing motivational patterns of avatar creation, **how avatars influence user behavior and how avatars in Web 2.0 compare to those in Web 3.0.**

We provide an **overview of Web 2.0 avatar markets to gain an impression of the phenomenon's current economic significance.** Avatar markets exist on a variety of online platforms, including social media sites, online games, and virtual worlds. These markets allow users to purchase virtual items such as clothing, accessories, and other assets to customize and personalize their avatars. Examples of avatar markets include online games like Fortnite and Roblox, which offer virtual items for purchase to customize avatars and enhance gameplay. These markets have proven to be highly lucrative, with Fortnite alone generating billions in revenue from in-game purchases.² The entire avatar market is predicted to exceed \$500 billion by 2030.¹

The avatar market will exceed \$500 billion by 2030



Projected growth of the avatar market in billion USD¹

In the following, we pursue a **data-driven approach to explore the success and relevance of 3D avatars in The Sandbox**—a major virtual world—and show example how the creator economy in Web 3.0 shows promising growth potential, e.g., as royalties are offered to creators. Next, **we analyze how emotes, the expression of emotions via animations, may be particularly relevant for the expression of digital identity** by allowing users to convey their emotions and personality in a way that goes beyond the visual

representation of their avatar. For example, a user may choose to use a specific emote to convey a particular emotion or attitude, such as joy, anger, or sarcasm. These emotes can be used in a variety of contexts, including in-game chat or by using special emote animations that allow the avatar to physically express emotions. Based on survey data and the example of *Kinetix*, **we analyze the role that emotes may play for the digital identity of metaverse users.**

Finally, **we discuss how avatars shape digital identities, experiences and empowerment in the open metaverse**, including topics such as (ease of) avatar creation, multi-avatar usage, cross-platform portability, and economic participation.

Methods and data

This study employs a **multivocal methodological approach, utilizing a combination of academic and non-academic literature** as sources. This approach is deemed necessary as avatars are a rapidly evolving field, where academic literature may not always keep pace with current developments. However, it is also crucial to acknowledge and evaluate the academic contributions to the field over the past decades. By incorporating both academic and non-academic sources, this study aims to **integrate validated theories and models with the latest developments in the field of avatars.**

For the data-driven results presented in this report, we rely on data provided by The Sandbox and Kinetix, as well as public blockchain data collected from NFTport, Covalent, OpenSea, Etherscan and Flipside Crypto.

Acknowledgements

We would like to thank *The Sandbox* for funding this study and providing us with graphics to include in this report. Apart from the specification that the report should evaluate avatars and their role in an open metaverse, the sponsor did not influence the design or content of the study. In addition, we would like to thank *Kinetix* and *Ready Player Me* for helpful comments, data and intellectual exchange.



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Key Takeaways

1) Avatars are a major pillar of the metaverse

The (open) metaverse is a complex and ever-changing environment that consists of various layers, technologies and ecosystem aspects. One of the six major pillars of the metaverse ecosystem are avatars, i.e., the way that users represent themselves and their desired identity in the metaverse.

2) Web 2.0 avatar applications are billion-dollar markets

The market size of avatars, as demonstrated by Web 2.0 virtual worlds and avatars, is significant. For example, Roblox reported 200 million monthly active users in Q3 2021, of which, on average, 20% update their avatar daily. The more than 2.7 million creators received payouts of \$538 million in 2021.^{3,4} This shows the demand and potential for avatar markets in Web 3.0, which incentivize creators even more.

3) We are in the fourth generation of virtual worlds

Fourth generation virtual worlds are massive, interoperable worlds that include 3D, VR, and AR components. They may be decentralized or owned by a community, and they allow all stakeholders to create content. They also allow for portable, cross-platform identities and assets such as cryptocurrency or NFTs.

4) Psychological factors influence avatar selection

Three groups of theories explore the psychological factors that influence the choice of avatars in virtual environments: self-expression and identity, social comparison and group dynamics, and self-esteem and self-regulation. These theories suggest that people choose avatars that reflect their own identities, values, and social status, as well as those that help them navigate and fit in with the social dynamics of virtual environments.



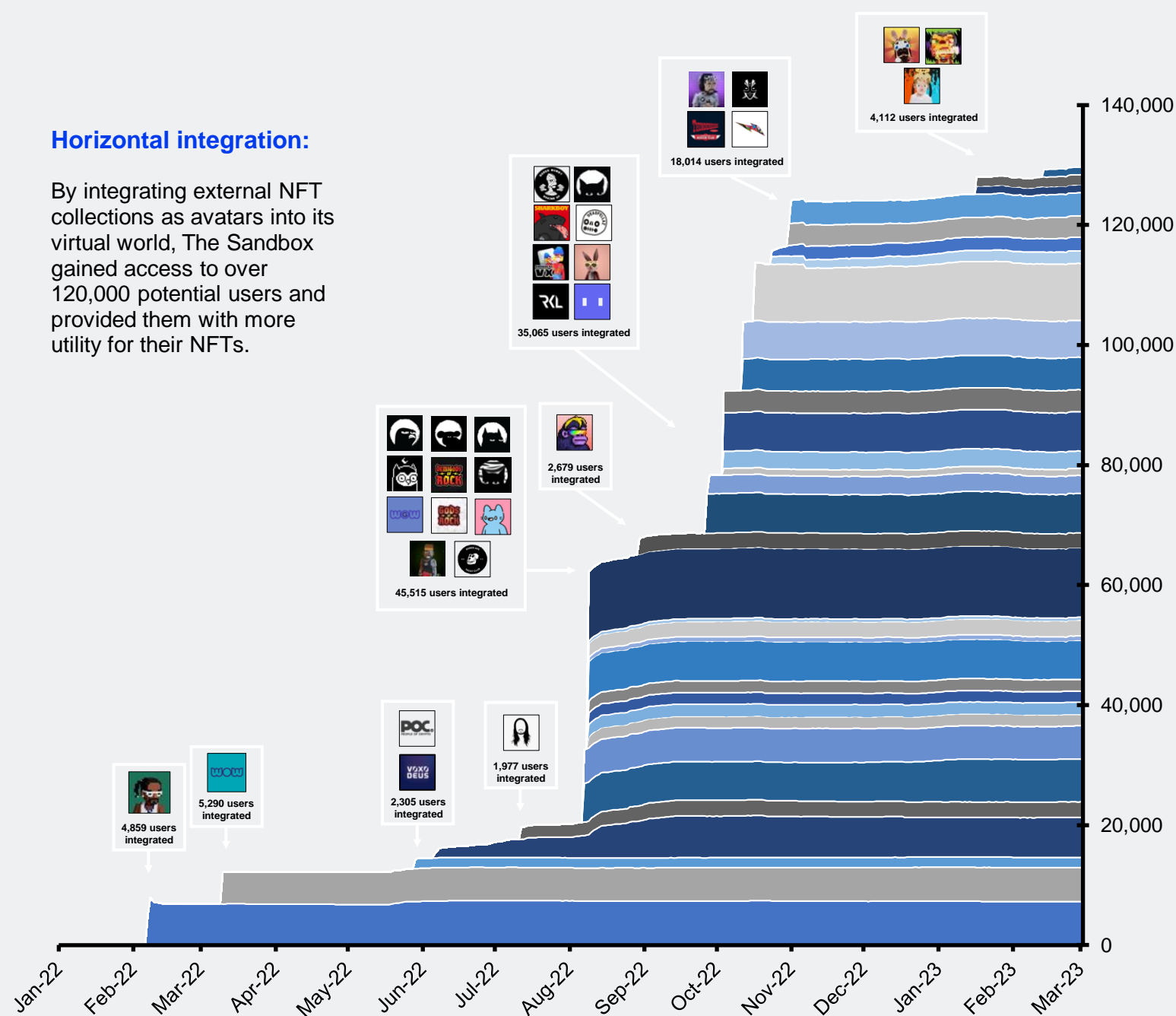
Source: The Sandbox

5) Horizontal integration fosters the growth of the open metaverse

Horizontally integrating the skills, value or users of projects working towards similar goals can be a major aspect for the vision of an open and inclusive metaverse. Collaboration can be mutually beneficial, as demonstrated by the integration of 3D avatars from collections of non-fungible tokens (NFTs) into The Sandbox.

Horizontal integration:

By integrating external NFT collections as avatars into its virtual world, The Sandbox gained access to over 120,000 potential users and provided them with more utility for their NFTs.



6) Digital self-expression is rapidly evolving

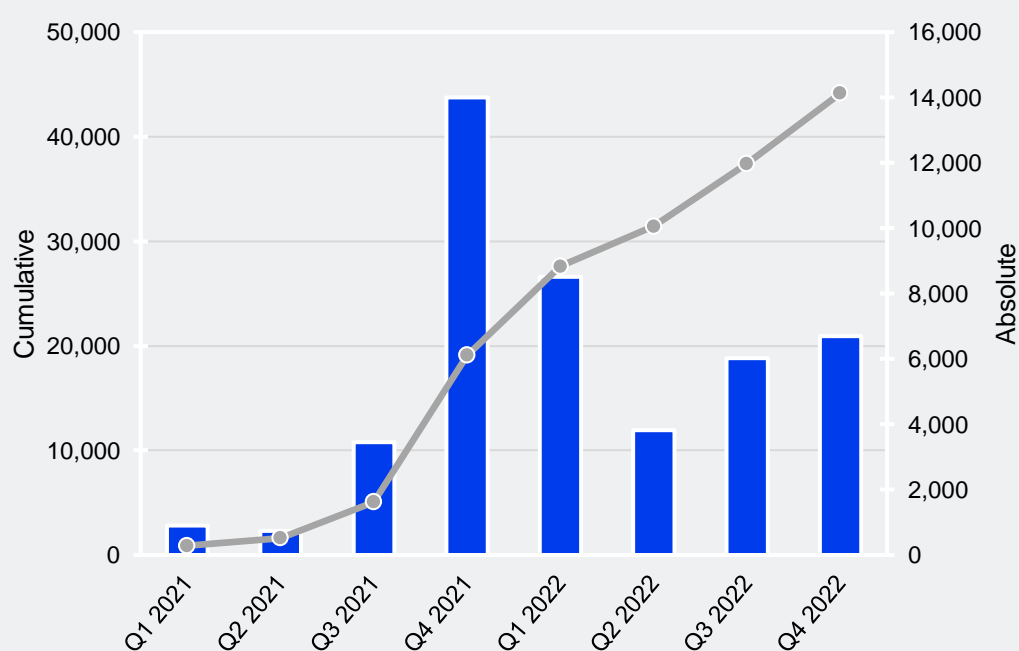
The current state of the art in VR and computer vision to some extent allows users to transfer their emotions, behavior and interaction to their digital avatars. Technological advances have in particular been achieved in letting avatars in virtual worlds display emotions, as we describe using the case study of metaverse firm Kinetix.

7) Web 3.0 avatars show great potential for growth

The demand for avatars in virtual worlds is evident and has significant growth potential. However, current virtual world experiences have room for improvement in terms of developer and creator incentives, in-app currencies, user empowerment, and collectible digital items. Web 3.0 technology can transform these aspects of metaverse ecosystems, creating a decentralized and community-owned open metaverse. Web 3.0 avatar markets are just beginning to emerge, with many avatars already existing as NFTs owned by users and paying royalties to creators, such as in The Sandbox virtual world.

Number of secondary market sales of The Sandbox ASSETS on OpenSea:

While most sales occurred during the “NFT bull market” in Q4 2021, a clear upward trend in trading over time can be observed. The data suggests that market consolidation took place until Q2 2022 and that the market started to pick up again from then on.



8) Not one but multiple digital identities

The quasi-anonymous options to use and own multiple avatars and to customize them allows users to be who they like, when they like. They can be an evil villain or the hero of their dreams, or both at the same time, to simultaneously reflect any aspect of their (digital) personality. They can be a “real-looking” person or a mythical being. Avatars allow people to look and behave in ways they would never dare in the real world.

9) There is more to avatars and identity than meets the eye

Besides visuals, factors such as expression, emotions, behavior, history and (social) networks also contribute to the concept of avatars in the metaverse. Accordingly, avatars should not be reduced to their appearance. Furthermore, avatars can provide their users with various other utilities, including social, educational, psychological, commercial and entertainment aspects.



NFT gating and early access:

Source: The Sandbox

Owners of the “Snoopverse Early Access Pass” NFT had the chance to purchase avatars of the Snoop Dogg-themed avatar collection “The Doggies” before other interested parties. Furthermore, they gained early access to the digital experience “Snoopverse”.

10) Users of virtual worlds and games have distinct profiles

We identify multiple user groups in virtual worlds in terms of their use of emotes. One group actively uses emotes and perceives their impact on gameplay, another one considers emotes a part of their social identity, and a third one altogether rejects the idea of paying for emotes. Each user group requires dedicated avenues of self-expression.

11) Avatars are the gateway to the metaverse

When entering the metaverse via a virtual world or a game, users typically first choose or create an avatar that represents them in the virtual world. Avatars can be customized to reflect the user's style, interests, and personality, so they communicate information about the user to other dwellers in the virtual world.

12) Digital fashion has huge market potential

The digital fashion market is expected to grow rapidly in the coming years, as more people use digital platforms for entertainment and commerce. Digital fashion and assets can shape an individual's digital identity, and many people purchase digital goods for this reason.

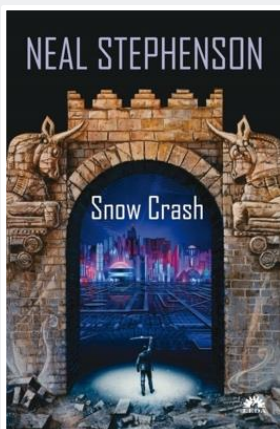


Source: The Sandbox

The ATARI SNEAKER OG are NFT shoes that can be used in virtual worlds like The Sandbox.⁵

Section 1

The Pillars of the Metaverse



The cover of the book *Snow Crash* shows the gate to a virtual reality-based society

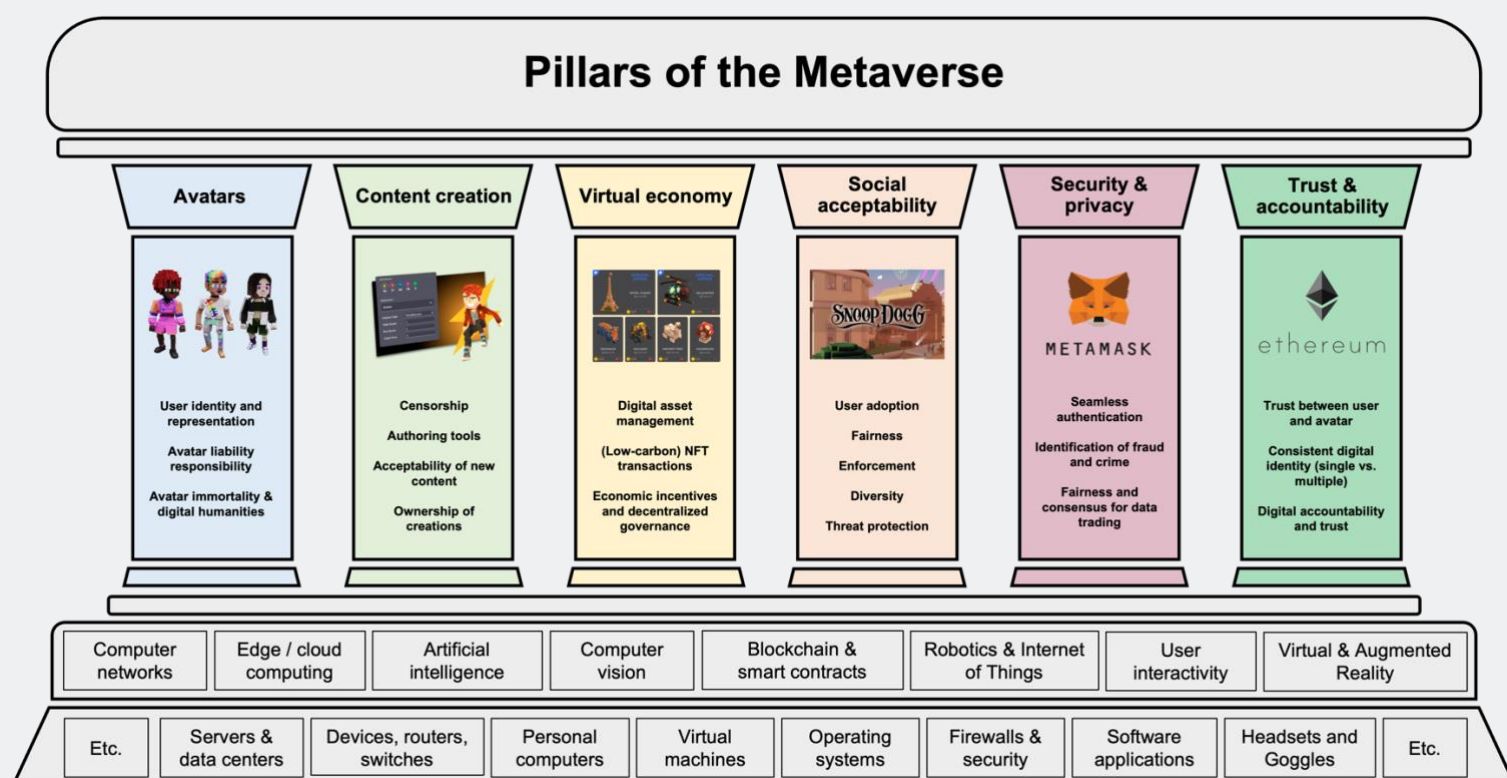
The Metaverse

The metaverse is often described as a collective virtual shared space that arises from the convergence of virtually enhanced physical reality and physically persistent virtual space, including the sum of all virtual worlds, augmented reality, and the internet.⁶

The term "metaverse" was coined by science fiction author Neal Stephenson in his 1992 novel *Snow Crash*, where it refers to a virtual reality-based global society. In the novel, the metaverse is a global network of computer-generated environments that people can enter and interact with in real time. The concept has since been popularized and expanded upon in various media, such as video games, virtual reality, and online communities. The metaverse is often seen as a potential future platform for communication, commerce, entertainment, and social interaction, as well as for immersive and interactive education, training, and other forms of learning. Some experts believe that **the metaverse has the potential to transform the way we live and work, with significant societal and cultural impacts**.^{6–10}

Six pillars of the metaverse ecosystem

The metaverse is a highly complex and multifaceted phenomenon and construct, as illustrated by the pillar structure shown below—an adaptation of the original pillars developed by Lee *et al.* (2021)⁶. The base layer consists of hardware and software infrastructures, which form the basis for technology enablers such as *artificial intelligence (AI)*, blockchain or *virtual reality (VR)*. Above these are the six pillars of the metaverse ecosystem, which we will briefly describe in the following.

Adapted from Lee *et al.* (2021)

Pillar I: Avatars



A 3D avatar in the virtual world of *The Sandbox* that wears a Gucci cap

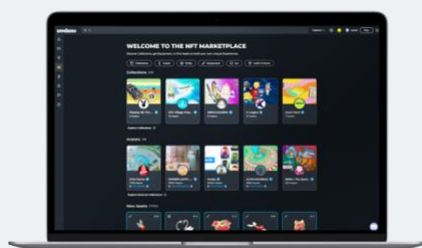
The first ecosystem pillar represents avatars, which, regardless of their size, shape, or precise purpose, allow metaverse users to have **one or more digital representations of themselves in the digital world**. These can be “simple” static 2D profile pictures in chatrooms and social networks (e.g., *Facebook*) or complex 3D animations in traditional games (e.g., *Fortnite*) or blockchain-based virtual worlds (e.g., *The Sandbox*) that are in constant flux. In some cases, avatars may also refer to physically embodied agents, such as social robots or non-playable characters (NPCs) in games. Metaverse users can generally control their avatars regarding their appearance and actions.

Pillar II: Content creation

The second metaverse ecosystem pillar refers to content creation, which means that **users can create digital assets and experiences within virtual worlds**. This includes authoring and collaboration tools that allow the (somewhat standardized, non-code) creation of avatars and other digital assets.



The VoxEdit system enables the creation of assets and experiences for The Sandbox as NFTs



Internal or public (external) marketplaces enable the exchange of virtual land, assets or avatars of The Sandbox

This can for example include regular software programs or approaches, where users apply smart wearables to design virtual assets. For example, users can wear smart gloves to draw or design directly in a virtual 3D world.

There are still many challenges in bringing user-generated content into the metaverse by various approaches. Developments such as the economic participation in NFT-based creations on public blockchain infrastructures serve to **empower creative users and allow them to profit from their effort in the long term** (due to commissions on resales).

Pillar III: Virtual economy

The third pillar—the virtual economy—can be divided into **two strands: economic governance of virtual worlds** and **the market structure and design of the metaverse**. The governance of an economy in the metaverse is a significant challenge, as **short-term and long-term incentives and goals have to be aligned**. For example, it may make sense to introduce special cryptocurrency as a unit of account or means of payment. However, classic incentive conflicts arise here, for example between the users' desire for a stable means of payment investors' desire for a deflationary asset. This makes specifying who can establish and enforce such economic principles a delicate matter.

Regarding the market structure, the question arises as to how trading and markets are developed and operated, i.e. **how metaverse users can trade and transfer digital objects**. The markets can be centralized, decentralized, or anything in between. For example, centralized markets may be operated by large companies such as *Facebook / Meta*, while decentralized, open markets such as *SudoSwap* operate on the Ethereum blockchain via smart contracts.

Pillar IV: Social acceptance

Social acceptance is the fourth pillar of the metaverse ecosystem. Lee *et al.* (2021)⁶ describe several design



A variety of celebrities and brands have entered open worlds of The Sandbox, providing signals of confidence to users

factors in this regard, including **privacy threats, diversity, fairness, risk of addiction, and avatar acceptance**. Metaverse users need to be guided, supported, and protected in their digital lives and behaviors, just as in the real world. The metaverse or an aspect of it, such as a virtual world, should offer users a sufficient degree of privacy so that they can truly live out their lives in their avatars. The metaverse should provide users with a diverse and fair ecosystem in which they are happy to participate. Ideally, potentially critical aspects such as addiction or cyberbullying should also be subject to control or governance. In other words, **the digital space may require a proper debate on judicial, executive and legislative power**.

Pillar V: Security and privacy



METAMASK

Login options such as Metamask enable secure and direct interaction with the digital world of The Sandbox

The **protection of the data and the privacy of metaverse users** represents the fifth pillar of the metaverse ecosystem. Participation in the metaverse must be easy and secure, which can be ensured through **trustless login features such as the Metamask wallet for blockchain-enabled metaverse applications**.

To create an avatar, real personal data such as name, age, and gender can be used, or the data can be entirely fictional (e.g. an avatar based on a real-world picture via Ready Player Me or a Doggies avatar via The Sandbox). Regardless of the input, user content in the metaverse is potentially sensitive data. Furthermore, adherence to ethical principles and (local) laws must be ensured.

Pillar VI: Trust and accountability



ethereum

The Sandbox runs on public blockchain infrastructures such as Ethereum and Polygon

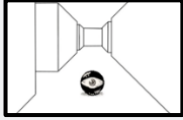

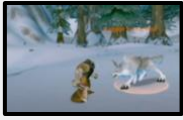

The sixth pillar covers the **users' trust in and the accountability of the metaverse and the technology, infrastructure and operators of its applications**. Users want assurance that their creations will not be deleted or changed (overnight). **Blockchain technology provides that trust and accountability**.

Section 2

Introduction to Virtual Worlds and Avatars

Introduction to virtual worlds

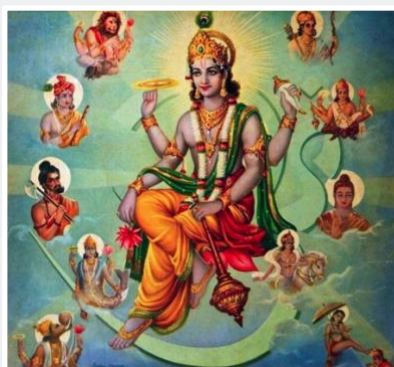
Virtual worlds are computer-simulated environments that can be used for a variety of purposes, such as education, gaming, interaction and more.¹¹ These shared graphical spaces on the web are populated by users who are represented by avatars. They can explore the digital world, participate in activities (e.g., games) or interact with other avatars or parts of the world.

	First generation (1974 – 1984)	Second generation (1985 – 1996)	Third Generation (1997 – 2013)	Fourth generation (2014 – present)
Example	 <i>Maze War</i> , a 3D shooter, incorporates avatars as eyeballs in the game, where players navigate a virtual maze	 In the game <i>Ultima IV: Quest of the Avatar</i> , players see themselves as the digital avatar that undertakes the quests	 The MMO <i>World of Warcraft</i> enables millions of players to create, equip and level-up avatars and explore an open world	 <i>The Sandbox</i> empowers users by letting them design and own digital land and experiences, and supports portable 3D avatars
Persistence of memory	During session	During session / save game	Over game lifetime	Fully persistent
Systems	Small-scale systems	Larger-scale systems	Massive worlds	Interoperable massive worlds
Displays	Text-based	Graphical	3D graphical	3D / VR / AR graphical
Organizational structure	Centralized	Centralized	Centralized	Centralized and/or community-owned
Digital asset ownership	Centralized with game	Centralized with game	Centralized with game	With decentralized platform / community
Digital asset portability	Only within the game	Only within the game	Only within the game	Transferable across worlds
Content creation	Game developer	Game developer	Game developer	All stakeholders
Identity	In-game avatar	In-game avatar	In-game account and avatars	Portable, cross-platform identity and avatars
Payments	In-game currency / fiat	In-game currency / fiat	In-game currency / fiat	Cryptocurrency and crypto assets
Number of users	up to 250	1,000+	10,000+	10,000+

The table provides a summary **comparison of four generations of computer-simulated virtual worlds** since 1974. Evidently, they have evolved enormously, from text-based role-playing games that allow a single user to interact with a virtual environment, to 3D animated games such as massively multiplayer online games (MMOs) that may comprise millions of players, with thousands of them playing simultaneously. For example, in 2022, **about about 52.2 million users played Roblox on a daily basis**—21% more than in 2021.³

The table shows that virtual worlds are becoming larger and more complex, while at the same time offering users more content. The fourth generation of virtual worlds for the first time includes aspects of **user empowerment and interoperability**, which leads to **users actually owning their creations**. This will enable them to sell or rent created contents such as avatars, assets, or experiences, and to transfer them across games.

What are avatars?

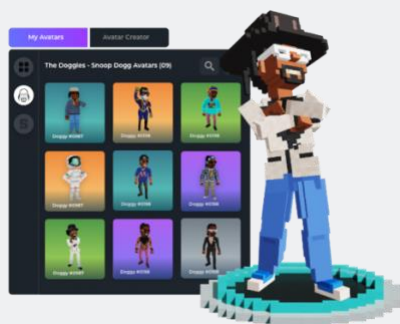


**Hindu god Vishnu
surrounded by his ten
major avatars**

The concept of avatars originates from Hinduism and means “descent”, describing the image or appearance of a deity or spirit on earth. In today’s context of digital worlds and the metaverse, an avatar is more like an “ascent”: **the digital image of a user’s presence in a virtual world**.

Avatars are the central means by which users can express and present themselves, which makes them a key element of digital environments. They are by no means limited to computer games or virtual worlds but also feature in a variety of other digital (and even analog) applications, such as social media, web blogs, mail programs, chat programs, forums or other online places where people interact and express themselves.

As the embodiment of users of digital spaces, an avatar does not have to be humanoid but can just as well be a symbol, a textual description or a certain gesture or action—or of course combinations of these aspects. Avatar names can help to distinguish similar or identical looking avatars or to clearly assign



Avatars in The Sandbox can be boosted with equipment and customized



Example of the self-representational avatar of Sébastien Borget, COO of The Sandbox

an identity to a constantly evolving avatar (e.g., in a computer game where equipment is regularly changed).¹²

Types of avatars

There are many different types of avatars, and the specific characteristics of an avatar may vary depending on the context in which it is used. Some common types of avatars include:

- **Customizable avatars:** Avatars that users can modify to reflect their personal style by selecting from a range of options, such as different clothing, hairstyles, and facial features, to create a unique representation of themselves.¹³
- **Non-customizable avatars:** Unalterable avatars, typically used to represent a specific character, persona or role, e.g. in video games or other types of interactive media.¹³
- **Self-representational avatars:** Avatars that are intended to closely resemble the user in terms of physical appearance, personality, or other characteristics. They may be used in virtual or augmented reality environments to create a more immersive experience.¹⁴
- **Non-human avatars:** Avatars designed to represent non-human beings, such as animals, robots, or mythical creatures, e.g. in video games or other interactive media.¹⁵
- **Abstract avatars:** Avatars that are not intended to represent any specific person or character but are instead designed to be more abstract or symbolic in nature. They may be used in virtual or augmented reality environments to create a more immersive experience or to represent certain concepts or ideas.¹⁶

Note that this overview is inevitably incomplete and the different types of avatars may overlap.

Representation, presence and immersion

As evidenced by the above types, avatars differ widely, ranging for example from realistic representations of people (e.g., a mirrored self), animals, or objects to completely imaginative phenomena or beings, or they may even have no physical form but represent only a certain name or emote.⁷ However, **the current state of the art in VR and computer vision cannot yet “fully” transfer the users’ emotions, behavior and interaction in real time to digital avatars**.⁶ An avatar comprises not just visuals but also its behavior and interaction with avatars.⁷ Scientific evidence suggests that the appearance and behavior of avatars, as well as their environment, influences how people perceive their presence in the metaverse.^{19,20}

‘Presence’ refers to the feeling of being within a certain environment. Derived from this is the term telepresence, which means the extent to which people feel present in a digital rather than a physical environment.²¹ Technology plays an essential role in how present people feel in a digital environment, as it helps to convey an illusion of **“non-mediation”: due to the intensity of their interaction, the users no longer perceive the system’s technical components**. They think of the virtual world with the avatar not as a technical application but as a social entity and ecosystem.²²

The concept and understanding of presence in virtual worlds have evolved with increasing technological progress to include the feeling of gathering and interacting with other people and their avatars in a virtual place. Biocca and Harms (2002)²³ developed **the concept of social presence, which is defined as the feeling of being with others in a mediated environment**. In social presence, individuals are aware of the presence of others (so-called copresence). Alternatively, social presence can also be described in terms of the actual being together with others (technical dimension) and the feeling of being together (social dimension).²⁴

Immersion is the degree to which people perceive to be in a virtual environment, rather than being with their physical surroundings. The technological progress of virtual worlds is allowing its users to feel ever higher degrees of presence and immersion.²⁵

Representation through avatars

Participants in virtual worlds can usually control how an avatar looks.^{26,27} **By adjusting the physique and clothing, players can make their avatars reflect themselves and their personalities.**

The virtual realm is often characterized by a high level of anonymity as users can assign unique names to their avatars or even switch between multiple avatars. Some individuals use methods such as scripting or graphics tools to create or customize their avatars in great detail²⁷, including importing objects from external sources for further customization.²⁸

Degree of realism and presence

The degree to which avatars, interactions, and virtual environments are perceived as 'real'—in the sense that they correspond to the participants' expectations—influences the feeling of presence in virtual worlds. **Realism refers to the ability to create a convincing and engaging experience for users** of a virtual world. This encompasses features like physical attributes, movements, and actions (such as an emote wheel) that imitate real life. However, **the level of realism must be viewed within the context of a virtual world.** For instance, in a voxel-based world like The Sandbox, a highly photorealistic avatar may seem unrealistic and decrease the overall sense of presence for users



In early 2023, The Sandbox announced their Game Maker 0.8, which includes an emote wheel. Through the wheel, users are able to express themselves more diversely, individually and realistically, which consequently increases the level of realism.¹⁷

While the visual dimension is obviously important, verbal and non-verbal forms of behavior, and the other avatars' responses to that behavior, are likewise crucial to presence in virtual worlds.^{21,22} **Greater (lower) realism leads to a higher (lower) sense of user presence.**²⁸ This makes the consistency of an avatar's appearance and its

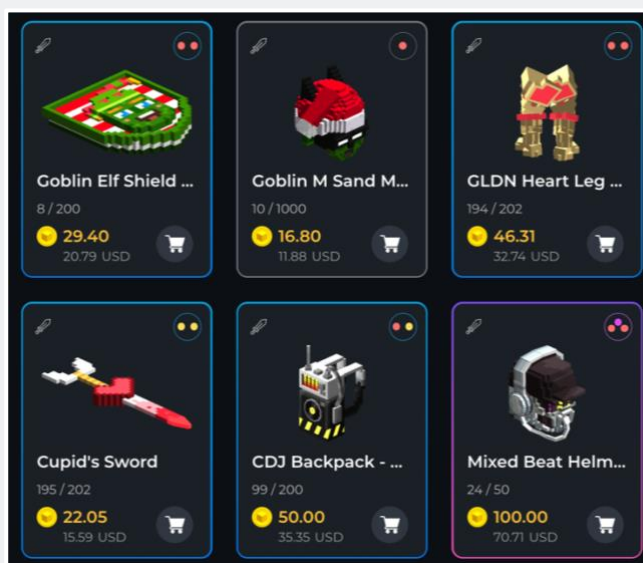
interactions with the purpose and idea of the virtual world an important attribute.

Avatar interaction and presence

Allowing players or avatars to interact with a virtual world in a lively and engaging way promotes presence.^{21,22} This, for example, includes interaction with other avatars, how information is presented and interpreted in the virtual world, and the extent to which decisions and actions follow logical processes akin to those in the real world.^{22,29} The breadth and depth of avatar behaviors in particular are key for enabling vivid virtual experiences. Virtual worlds with a broad range of communication options create rich social environments, which also fosters user presence.^{22,29} Available channels of avatar communication and interaction include chats (text), voice chats (audio), and "seeing" each other, i.e. the perception of static appearance, temporary features such as clothing, and more recently, emotions.

An individual's sense of presence in a virtual environment is thus influenced by a variety of elements that jointly contribute to the degree of immersion. By comprehending these elements and the manner in which they interact within a specific virtual world to either enhance or detract from its intended function, designers and users can optimize their experience and creations.

The Sandbox users can personalize their avatars by purchasing digital items on the marketplace. They can also create their own items and sell them to other players via the marketplace.¹⁸



Section 3

The Meaning and Relevance of Avatars

Avatar design – beyond looks

Avatars are a significant form of expression that allows individuals to represent their identity and communicate in virtual environments. These digital representations can also be used to construct and shape multiple identities.³⁰ Research has demonstrated that a person's avatar can affect her emotions and behavior, as well as how others interact with it.³¹

One of the most crucial aspects of avatars is their appearance and design. Avatars in virtual environments serve as digital representations of real-world users, and their design and appearance can influence how users perceive their interactions with others. Factors such as the avatar's facial features³², body³³, style³⁴, gestures³⁵, and behavior³⁶ can affect user trust³⁶, body ownership³⁷, group satisfaction³⁸, and sense of realism³⁹ and presence³³. According to Aljaroodi et al. (2019)⁴⁰, various psychological constructs can be used to evaluate avatar appearance (see the table below).

Anthropomorphism	how human-like the user perceives the avatar to be
Attractiveness	how attractive the users finds the avatar
Credibility	how believable the user thinks the avatar is
Enjoyment	how much the user enjoys interacting with the avatar
Identification	how much the user identifies with the avatar
Immersion	how much the user is immersed in the virtual world using the avatar
Intention to use	how the user intends to use the avatar
Likeability	how much the user likes the avatar
Presence	how much the user feels present in the virtual world with the avatar
Similarity	how much the user perceives the avatar to be similar to her
Trust	how much the user trusts the avatar

The table lists various factors that may influence a user's experience when interacting with an avatar. These factors may be used to evaluate the effectiveness of an avatar in a virtual environment, or to identify areas for improvement in the design and

use of avatars. The constructs clearly show that appearance is but one aspect of avatar design.

Why do people choose certain avatars?

Several theories can help to identify the psychological factors that influence the choice of an avatar in virtual environments. They can be grouped in **three main categories**: **(1) Self-expression and identity theories** focus on how people use avatars to express their personal identity and values, and to identify with and differentiate themselves from particular social groups or communities. **(2) Social comparison and group dynamics theories** look at how people use avatars to compare themselves to others and how they are influenced by the norms and expectations of their social group or community. **(3) Self-esteem and self-regulation theories** focus on how people use avatars to protect and boost their self-esteem, self-worth and confidence, and to satisfy their basic psychological needs for autonomy, competence, and relatedness. Overall, these theories suggest that people choose avatars that reflect their own (desired) identity, values, and social status, as well as those that help them navigate and fit in with the social dynamics of virtual environments.

By using a Bored Ape Yacht Club profile picture as avatar for social media channels, people can identify themselves with their peers and social group(s).⁴¹



The following table provides an overview of theories that can help to explain why people use certain avatars.

Theory	Interpretation
Self-expression theory	People use avatars to express their personal identity and to communicate their values, attitudes, and beliefs. ⁴²
Social identity theory	People use avatars to identify with a particular social group or community and to differentiate themselves from other groups. ⁴³
Social comparison theory	People use avatars to compare themselves to others. ⁴⁴
Social identity threat theory	People use avatars to protect their self-esteem and self-worth in virtual environments. ⁴⁵
Self-image / ideal self	People choose avatars that are similar to their own self-image or ideal self. ³¹
Desired identity or status	People choose avatars that reflect their desired identity or social status. ⁴⁶
Social leaning theory	People use avatars to observe and learn from the actions of others in virtual environments. ⁴⁷
Self-perception theory	People use avatars to form their self-concept and identity based on the feedback they receive from others in virtual environments. ⁴⁸
Social influence theory	People use avatars to conform to the norms and expectations of their social group or community. ⁴⁹
Self-efficacy theory	People use avatars to boost their self-confidence and self-esteem in virtual environments. ⁵⁰
Self-determination theory	People use avatars to satisfy their basic psychological needs for autonomy, competence, and relatedness in virtual environments. ⁵¹

Supplementing this body of theory, Lin and Wang (2014)³⁰ identified four core patterns of motivation to create avatars in virtual worlds such as in online games or social media platforms:

1. **Self-expression:** Avatars can serve as a medium for self-expression, allowing users to present their desired image or identity to others.

2. **Socialization**: Avatars can facilitate socialization and relationship-building by enabling users to interact with others in virtual environments.
3. **Role-playing**: Avatars can allow users to explore and experiment with different roles and identities in a safe and controlled environment.
4. **Identity exploration**: Avatars can provide a space for users to explore and understand their own identities, as well as the identities of others.

The authors argue that these motivations also play an important role in shaping the way that users interact with and use their avatars.

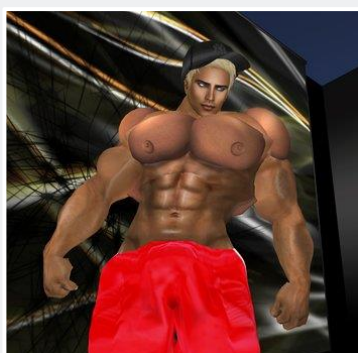
The Proteus effect

The Proteus effect refers to the idea that people's digital avatars or identities can influence their offline behavior. The term was coined by Yee and Bailenson in 2007³¹, based on the Greek myth of Proteus, who could change his appearance at will. The concept has been applied to the way people present themselves digital through their avatars.

- According to **self-perception theory**, people can derive their identity and attitudes from their analysis of their own past behavior and circumstances, which can lead to self-attribution.
- Classical **deindividuation theory** suggests that in group situations, there is an increase in impulsive behavior that deviates from the norm because anonymity in the group reduces the individual's fear of being judged negatively.
- The **SIDE model**, on the other hand, proposes that deindividuation is a process of depersonalization in which the individual's personal identity is suppressed in favor of the group norm.

Research has shown that the Proteus effect can have a variety of impacts on people's behavior, self-perception, self-esteem, and social interactions. For example:

- Persons behave more confidently when they use taller avatars.³¹



Example of a body builder avatar in Second Life. According to the Proteus effect, people may feel stronger in real life when they play with this avatar.⁵²

- Individuals act more friendly if their avatars are more attractive.^{31,55}
- Individuals may report more negative and aggressive thoughts if their avatars are dressed in black or Ku Klux Klan outfits.⁵⁶
- Individuals may report less aggression if their avatars are males facing a female in battle.⁵⁷
- Users with more sexualized avatars tend to internalize the appearance of the avatar and self-objectify, reporting more body-related thoughts.⁵⁸
- People with more dominant or confident avatars also tend to be more assertive and confident in real life.⁵⁹

The use of avatars can thus influence perception and attitude, and the form and degree of embodiment can affect behavior. While avatars can be used to promote altruistic behavior and tolerance, they can also reinforce prejudices and hostility. Both in laboratory settings and in online communities, **the Proteus effect has been found to affect self-disclosure, confidence, game performance, and aggressive behavior.** However, self-perception theory has been criticized for its lack of consistent empirical support, and further research is needed to fully understand the Proteus effect.⁶⁰

It is also important to note that the relationship between avatar and offline behavior is complex, and very likely not a one-way street, as the Proteus effect, considered in isolation, suggests: As argued above, people's offline behavior and personality are reflected in the way they create and interact with their avatars, so the influence between the individual and the avatar is mutual. Additionally, the magnitude of the Proteus effect will vary depending on the context and the specific characteristics of the avatar.

Self-perception of avatar users

The self-perception of avatar users can be affected by a variety of factors, of which we will briefly discuss the three most important ones. First, avatar design and presentation: Avatars can be customized to reflect the user's physical appearance, personal style,



Example of an avatar called “Alex Hot Guy” in Second Life that comes with a complete outfit.⁵³

and other characteristics, and these choices may impact how users perceive themselves. For example, an avatar that is designed to be highly attractive or fashionable may lead the user to **attribute the same qualities to herself in real life**.

Second, interactions with others in the virtual world: If an avatar user consistently receives positive feedback and attention from others in the virtual world, they may **develop a more positive self-perception** as a result. On the other hand, **negative or dismissive interactions can hurt the person’s self-perception**.

Finally, the intention behind the avatar use: Some may use avatars to escape from their real lives and try out different identities or roles, while others may use them to connect with others and form virtual communities. The intention behind an avatar can influence how the user perceives herself and her place in the virtual world.

It is important to be aware of these factors and to consider the potential impact on one’s self-perception when using avatars in online environments.

Deindividuation

Deindividuation theory suggests that **people may behave differently when they are part of a group or when their individual identity is not clearly visible**, as they may feel less self-conscious and more anonymous. This can lead to a dissolution of normal social restraints and a greater willingness to engage in behaviors that they would normally avoid.

In the context of online avatars, deindividuation theory can help explain **how people behave differently when using avatars** compared to their real-world identity. For example, a person might be more likely to engage in risky or aggressive behavior when using an avatar, as they may feel less self-conscious and more anonymous. There is some evidence to support the idea that deindividuation can affect behavior in online environments.^{55,61,62}

Yet deindividuation is not a universally negative force; it **can also promote positive behaviors like increased teamwork and cooperation**. Overall, deindividuation theory can provide a useful framework for understanding how the use of avatars and anonymity can affect behavior in online environments. Its actual impact will of course depend on the specific context and the individual user.

Avatar creation

Interest in the creation of avatars within the metaverse has grown along with the use of virtual worlds and online platforms. Next, we will explore various options for creating avatars within the metaverse and consider the pros and cons of each approach.

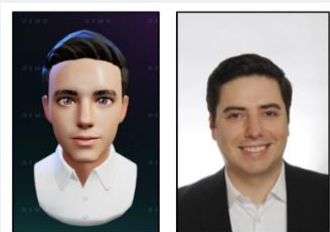
One option for avatar creation is to use **predefined avatars**, which are created and provided by the metaverse platform and are typically available to users upon registration or account creation. Users will often be given a choice of predefined avatars, which they may be able to customize to some extent by selecting clothing and accessories. While predefined avatars offer a convenient and quick solution for users to begin participating in the metaverse, the scope for customization is usually limited, so the avatar will not reflect the user's desired self-presentation very well.

Another option is to use **custom avatars**, which are created and designed by the user, often drawing on avatar creation tools provided by the metaverse platform or by third-party developers. These tools allow users to design their avatars from scratch, selecting various features such as the avatar's appearance, body shape, and clothing. Custom avatars allow users a more targeted self-presentation within the metaverse. However, creating custom avatars may require considerable effort and technical expertise.

Finally, the platform may also allow **avatars to be imported from external sources**. These avatars may have been previously created in another virtual world or game or designed using 3D modeling software. Importing avatars can be a convenient way



When entering the virtual world of Second Life, users can choose their initial appearance from a variety of avatars⁵⁴



This avatar was created from a picture in a matter of seconds using the Ready Player Me demo. It can be used in a variety of metaverse applications.

for users to bring their existing avatars into the metaverse, saving time and effort. Further, they can use the same avatar in multiple virtual worlds. However, this option is not available on all metaverse platforms and may require some technical expertise.

Ultimately, the choice of avatar creation method depends on what the platform offers and on individual user preferences.

Avatar utility

Avatars can offer a wide range of utilities for their users, ranging from social interaction and education to therapy and entertainment. The table provides a high-level summary of five different types of utility that avatars can bring to their users.

Utility	Description
Social	Enables social interaction and communication.
Educational	Provides virtual simulations for hands-on learning.
Psychological	Offers therapeutic benefits and a safe space for expression.
Commercial	Facilitates virtual business transactions and advertising.
Entertainment	Provides immersive virtual experiences for gaming and entertainment.

The different types of utility that avatars can bring to users are diverse and wide-ranging. **Social utility** refers to the capacity of avatars to provide a virtual environment for social interaction and communication among users. For example, this can include features such as voice and text chat, emoticons, and customizable appearance.

Educational utility pertains to the use of avatars as a tool for education and training. Avatars can provide virtual simulations of real-life scenarios, allowing users to experience hands-on learning in a safe and controlled environment. For example, this can include virtual medical procedures or safety drills.

Psychological utility encompasses the therapeutic effect that avatars can have on users by allowing them



The MiCDA exhibitions in The Sandbox are a collaboration with The Museum of Contemporary Digital Art (MiCDA).⁶³

to express emotions and explore their personal identity in a virtual space. They can also provide a safe space for individuals with social anxiety to practice social skills.

Commercial utility refers to the use of avatars for conducting business transactions and advertising in virtual environments. This includes virtual stores, virtual tours of real estate, and virtual product demonstrations.

Entertainment utility encompasses the use of avatars as a platform for gaming and entertainment, allowing users to participate in immersive virtual experiences. For example, this includes virtual reality games, virtual concerts, and interactive events.

Overall, the different types of utility that avatars can bring are a testament to the versatility and potential of virtual representations in enhancing human experiences and activities.

Avatars as digital gatekeepers

Avatars can be used as a form of gating, where **only the owners of specific avatar NFTs can access exclusive experiences or rewards**. By tying access to avatar (or NFT) ownership, organizers can ensure that only those who possess the NFTs can participate, thereby creating scarcity and exclusivity. This has applications in various industries, such as gaming, finance, art, and music, where NFTs can be used to offer special access to in-game items, collectible artworks, or ticketed events, among others. Gating with NFTs provides **a new way for creators and businesses to monetize their offerings and engage with their communities**.

Avatars provide their owners and communities with unique opportunities and utility.

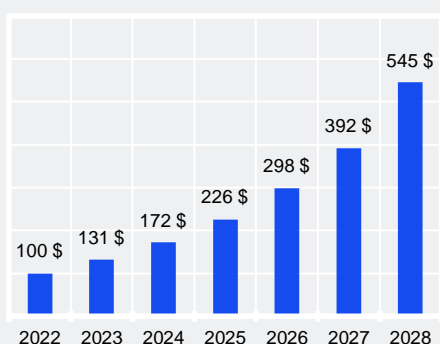
Only owners of Steve Aoki avatars were able to access a unique NFT giveaway hosted by The Sandbox.⁶⁴

Another example includes owners of Bored Ape Yacht Club NFTs receiving a claim in the APE cryptocurrency, which by January 2023 has a market capitalization of over \$2 billion.⁶⁵



Section 4

The Avatar Economy and Market Size



Projected growth of the 3D avatar solutions market in million USD⁶⁶

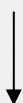
Avatar markets are expected to grow exponentially

Market research institutes are expecting significant growth in the market for avatars. One institute forecasts **the global market for digital human avatars to reach \$527 billion by 2030**. They mention that digital human avatars are especially effective for promoting products through subtle, relatable messaging, and their actions can be fully controlled by the organizations that use them.¹ Another study **projects the 3D avatar solutions market to reach \$544.87 million by 2028**, which implies a **compound annual growth rate of 31.3% from 2022 to 2028**. The adoption of 3D body scanners in various industries, including healthcare, fashion, and modern art, is driving the growth in the market for 3D avatar solutions as they are used to create 3D replicas of the human body for various purposes such as measurements, treatment plans, and art development.

The increasing adoption of 3D avatars in various industries is likely to promote familiarity and comfort levels with the use of avatars among the general population. This **increased familiarity is expected to drive user adoption of virtual worlds and games that utilize 3D avatars**, resulting in an increase in traffic and revenue for these platforms. The development of new virtual worlds and games that are specifically designed for industries that have adopted 3D avatars, such as the media and entertainment, fashion, and healthcare industries, may also contribute to an increase in traffic and revenue for virtual worlds and games. Overall, the widespread adoption of 3D avatars is expected to have a positive impact on the virtual world and gaming industry by bringing in more users, traffic, and revenue.

Avatars in Web 2.0

Virtual worlds allow users to share digital experiences while creating a sense of physical reality. In most digital worlds, **creating and using avatars is a prerequisite for users to play, interact and represent their digital selves**. Yet avatars are also of utmost importance for game developers looking to



Casey shirt ⁶⁹	Casey pants ⁷⁰	Casey's shades ⁷¹	Casey's hair ⁷²	Casey's face ⁷³
				
Left leg ⁷⁴	Right leg ⁷⁵	Torso ⁷⁶	Right arm ⁷⁷	Left arm ⁷⁸
				






The “Casey” avatar bundle consists of ten items. Users can for example alter their appearance by choosing another free-to-use avatar or items, or by purchasing avatars or items in the avatar shop.

Major virtual worlds in Web 2.0

Among the best-known Web 2.0 virtual world applications are Minecraft, Fortnite, Roblox, Zepeto and Second Life. Each incorporates gaming, social media and social commerce in some way, yet they differ in terms of their game design, game modes and the roles of in-game avatars and items. While Fortnite is a battle royale game, Roblox is more of a platform (or storefront) which allows players to enjoy user-created games and connect in virtual hangouts. Since many platforms are free-to-play, their operators generate revenues by selling avatars and items or by reaping a percentage of the sales of user-generated content. Recent figures indicate that this works quite well: For 2021, **Roblox** reported that 5.8 billion free

and paid items changed hands in the game and that users had created more than 25 million virtual items.⁷⁹ The South Korean mobile chat app **Zepeto**, where users create and interact as 3D avatars in public or private digital worlds, sold 2.4 billion items between 2018 and 2021.⁸⁰

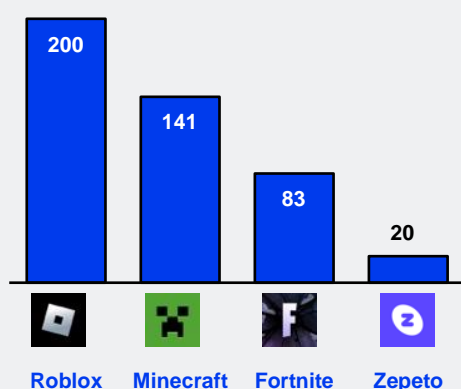
Major Virtual World / Avatar Players in Web 2.0

		Total users (mio)	MAUs (mio)	Number of avatars/ items traded (bn)	No. of creators	Revenue (\$bn)	In-game currency
	Roblox	>230	200	5.8	4mio	1.92	Robux
	Minecraft	600	141	1.7	12,000*	0.32	Minecoins
	Fortnite	>400	83	n/a	n/a**	5.8	V-Bucks
	Zepeto	>300	20	2.4	2mio	n/a	Coin/ZEM
	Second Life	>70	~1	n/a	n/a	0.6	Linden Dollar

* Content creators active on marketplace; ** Epic Games recently initiated a creator program

In **Minecraft**, 67% of all users have customized their avatars, generating over \$350 million in Marketplace revenue for creators since 2021. Another source reports \$500 million in Minecraft Marketplace revenue from the sale of 1.7 billion items.⁸¹

The potential for monetization depends on the intention of the buyers, the role and nature of avatars in the game, and the availability of complementary items with aesthetic or functional appeal. For example, in Fortnite players choose skins for their avatar's appearance, cosmetic items and weapons. In a battle game, weapons clearly play a greater role than for example in Zepeto, where fashion items are crucial for the user-avatars' appearance. Nevertheless, Fortnite's collaboration with the American National Football League (NFL), which reportedly generated \$50 million from the sale of 3.3 million NFL-branded skins⁸², illustrates the demand for customized avatars even in a combat game.



Monthly active users of major virtual worlds / games in millions (2021)

A great **variety and quality of items and activities attracts more users**. According to recent figures, Roblox takes the lead with 200 million MAUs (Q3/2021)⁸³, followed by Minecraft (141 million,

August 2021)⁸⁴, Fortnite (83 million, 2021)² and Zepeto (20 million, Q1 2022) (see the figure on the left).

Because many operators of digital worlds generate revenue from sales of user-generated content, they incentivize developers and creators with support funds, which for example amount to \$100 million in the case of Zepeto. **Roblox paid out \$538 million to creators in 2021 alone** (2020: \$329m; 2019: \$100).⁴ Across platforms, developers are equipped with incentives, learning programs and extensive documentation – Zepeto even set up a learning program with official Udemy courses for aspiring creators.⁸⁵ Roblox has attracted a quite international developer community, with most coming from the United States, followed by Brazil, Russia and the Philippines.⁷⁹ Such diversity is important as individual creators will bring in local trends and culture and thereby make the virtual experience appealing for broad, international audiences.

Along with other income streams, the proceeds from sales of avatars and other items add up to remarkable revenues for the companies analyzed: Fortnite generated north of \$5 billion in 2021²; Minecraft has earned approximately \$3 billion since its inception in 2009 in game sales alone⁸⁶; Roblox reported revenues of \$1.9 billion in 2021.⁸⁷ With over 50 million daily active users (DAUs)⁸⁷, **Roblox is one of the most prominent and successful Web 2.0 virtual worlds** and therefore deserves closer analysis.

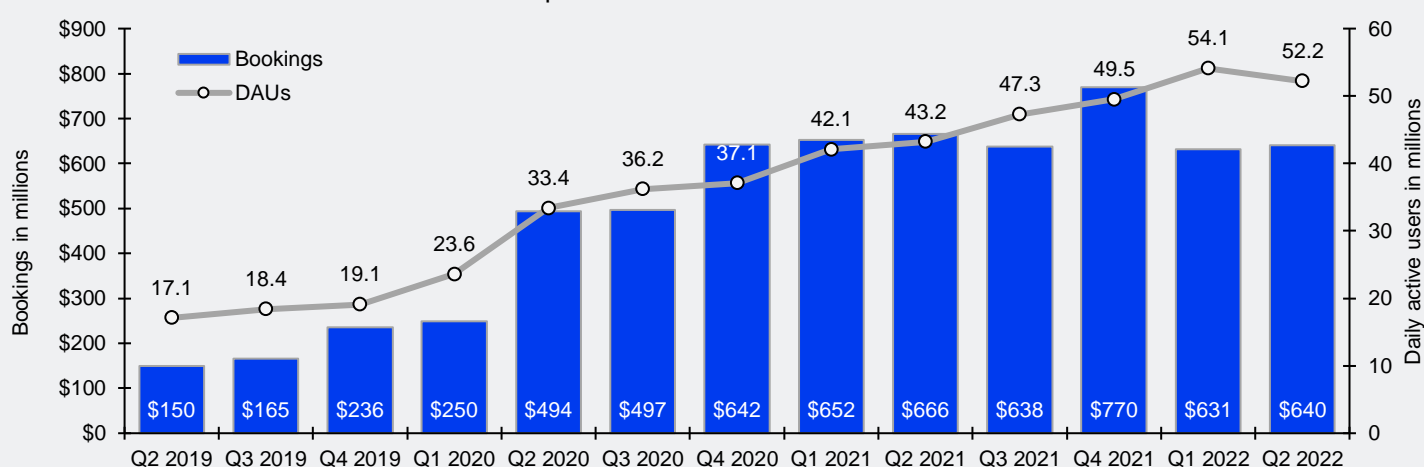
Spotlight on Roblox

Roblox is a particularly interesting example of a Web 2.0 virtual world because it resembles current market leaders of Web 3.0 metaverse in terms of game play and in the sense that its avatars are fundamental to the user experience.⁸¹ **20% of the Roblox DAUs update their avatar on a daily basis**, for example by changing its outward appearance with accessories or even adding simulated gestures and emotes. In total, more than 165 billion Roblox avatar updates were performed in 2021.⁷⁹ **In June 2022 alone, 2.7 million creators and developers** added to the vast volume of content and ‘experiences’ on Roblox, earning

Robux, the dedicated platform currency. The success of Roblox and similar digital worlds depends on the operators' ability to attract developer and creator talent to produce appealing and entertaining activities and content. Roblox has evidently been successful in attracting and incentivizing developers and creators who build experiences that elicit user engagement and spending.

Roblox Bookings and Daily Active Users (DAUs) over time

Bookings refer to the USD amount exchanged for the in-game currency Robux, which can be used to purchase avatars and items³.



The future of avatars in Web 3.0

Our analysis of the Web 2.0 avatar market indicates strong demand for these virtual world experiences. Yet the current virtual world applications and virtual experiences leave **plenty of potential to improve not just playing experience but also stakeholder and contributor benefits**. Developer and creator incentives, (in-app) currencies, user empowerment, collectible digital items, gear, clothing, etc. – all of these Web 2.0 components can be transformed by Web 3.0 primitives and technology. Ultimately, **Web 3.0 could help to create a fair, decentralized and community-/creator-owned metaverse**.

In Web 3.0, avatar markets are only just emerging. However, a large number of different avatars already exist which users can own in the form of NFTs. A prime example of this is the virtual world of The Sandbox with its multitude of different avatars, which will be discussed in detail in the next section.

Section 5

The Success of 3D Avatars in The Sandbox

3D avatars in The Sandbox

The virtual world of *The Sandbox* comprises 166,464 blockchain-based LAND parcels that are anchored as NFTs on public blockchains such as Ethereum or Polygon. LAND owners can build digital real estate or experiences such as games on the parcels or trade them on marketplaces such as *OpenSea* or *LooksRare*. In Q4 2022, over 22,000 people owned LAND in *The Sandbox* and the project's *Alpha Season 3* involved over 39,000 daily users and over 4.1 million blockchain wallets.

Examples of 3D avatars in The Sandbox



Source: The Sandbox

The Sandbox users interact with the digital world in the form of avatars, which are also mapped as NFTs or NFT collections on public blockchains, so the users can truly own their avatars. Technical integration ensures that only **owners of an avatar NFT can be sure that only they can use this avatar, shape its behavior and thus its history, development, appearance and reputation**. Furthermore, they can transfer their avatar to other digital worlds or applications or sell the avatar. Users can also monetize direct activities (e.g., creations) and indirect activities (e.g., building the long-term reputation of an avatar) or draw from the "system"—all of these possibilities, which centralized games or virtual worlds lack, are evidence of user empowerment.

Native and integrated avatars

The Sandbox universe features two different forms of avatars: native and integrated avatars.



Example: Traits of Doggy #0004 include eyes, hair, hat, head, mouth, pants, shoes, type and upper body clothing types.⁸⁸

- **Native avatars are NFT collections released directly by the Sandbox** company, sometimes in collaboration with other projects or high-profile individuals. An example of such a collection is *The Doggies*, a collection of 10,000 *Snoop Dogg*-themed avatars, distinguished by over 150 different traits curated by Snoop Dogg himself. Owners of *The Doggies* NFT automatically have access to a playable avatar in The Sandbox.
- **Integrated avatars are NFT collections that have been released externally and are integrated by The Sandbox**, potentially having existed for a long time outside of The Sandbox. An example of this is the *Bored Ape Yacht Club (BAYC)* NFT collection. In August 2022, The Sandbox announced that owners of BAYC NFTs now have access to playable BAYC avatars in The Sandbox. The Sandbox thus added value to an external project, giving the BAYC owners and community the additional option of becoming users of The Sandbox.

The following table shows an overview of the variety of NFT-based avatar collections that are available in The Sandbox. The top nine are avatars issued by Sandbox itself; the others are external projects that were integrated into the virtual world as avatars by The Sandbox.

Creator fees

Creator fees are an important aspect of NFT-based avatars in The Sandbox: **Creators receive a fixed fee each time “their” avatars change hands at any point in the future.** While in traditional analog markets, creators can usually only monetize their work at the first sale, an NFT-based avatar or avatar collection that only grows popular after several trades can still make money for the creator.

3D avatar collections in The Sandbox

as of March 2023

		Launch	All-time sales in Ether	Number of owners	Floor price (\$)	Implied minimum valuation (\$mio)
	The Doggies (native)	Feb 22	7,654	7,280	114	1.14
	People of Crypto (native)	Jun 22	263	6,678	34	0.29
	Steve Aoki (native)	Jul 22	287	2,574	52	0.17
	Olive Gym A Club (native)	Aug 22	35	469	47	0.03
	Care Bears (native)	Nov 22	62	2,204	31	0.28
	Kuniverse Avatars (native)	Nov 22	14	2,261	41	0.11
	Mad Balls (native)	Feb 23	116	1,340	73	0.15
	Rabbids (native)	Feb 23	44	1,689	52	0.11
	Hell's Kitchen (native)	Mar 23	10	1,259	67	0.16
	World of Women	Mar 22	78,511	5,605	2,607	26.07
	VoxoDeus	Jun 22	864	1,729	34	0.22
	Bored Ape Yacht Club	Aug 22	937,263	5,791	116,651	1,166.28
	Cool Cats	Aug 22	137,039	5,523	2921	29.10
	Gutter Cat Gang	Aug 22	26,345	1,726	2,345	7.03
	Gutter Dogs	Aug 22	7,019	1,972	494	1.46
	Gutter Pigeons	Aug 22	4,950	1,865	350	1.03
	Gutter Rats	Aug 22	7,392	1,874	315	0.94
	Moonbirds	Aug 22	290,875	6,495	6,790	67.90
	DemiGods of Rock	Aug 22	33	721	70	0.07
	Gods of Rock	Aug 22	249	2,651	26	0.18
	World of Women Galaxy	Aug 22	30,787	11,597	251	5.37
	CyberKongz VX	Sep 22	34,889	4,037	770	11.46
	Rumble Kong League	Oct 22	18,890	3,021	612	6.12
	Meebits	Oct 22	156,582	6,599	5,337	106.74
	Playboy Babbitars	Oct 22	2,798	5,406	124	1.48
	SupDucksVX	Oct 22	6	1,133	32	0.12
	Shark Boy Fight Club	Oct 22	523	2,927	38	0.34
	Deadfellaz	Oct 22	32,732	6,520	700	7.00
	Bored Mummy Waking Up	Oct 22	3,740	3,700	30	0.27
	Gutter Clones	Oct 22	4,098	6,127	75	1.45
	CloneX	Nov 22	358,576	9,632	6,037	117.50
	Thunderbirds International Rescue Club	Nov 22	76	3,572	20	0.11
	Omnimorphs	Nov 22	3,475	3,841	31	0.28

The example of the native The Doggies avatar from The Sandbox illustrates the significance of this arrangement very well. Since The Doggies was launched in February 2022, avatars worth 7,654 ETH have been traded on the OpenSea platform. Based on the underlying creator fees of 5%, the account *TheSandboxCollections* was able to generate about 382 ETH in fees, which corresponds to about \$670,000 at the March 2023 ETH price. Most of the volume, and therefore the fees, accrued at the beginning of the launch. By November 2022, the daily volume of the collection had declined to between 0.5 and 1 ETH, which only corresponds to a (passive) income of \$30 - \$58 for the creator.

Creator fees also play a significant role for other projects, which is why an offer by The Sandbox to add value to a project through "avatarization" is likely to be highly appreciated, promising higher demand and higher fees.

Case study: Sports Land NFT sales

Sports Land, a LAND within The Sandbox metaverse created by Hermit Crab Game Studio, is inspired by Brazilian culture and the passion for sports. The Sports Land Stadium is particularly focused on football and allows users to participate in a virtual version of the world's most popular event.⁸⁹

The game studio's NFT sales represent a **suitable example how creators in The Sandbox are able to generate relevant revenues from selling specific apparel or digital fashion** to (avatar) users. As of January 2023, 74 different sports-branded NFTs have been issued, some of which are shown in the table below.

A key piece of information is that the sale of NFTs started shortly before the start of the FIFA World Cup 2022 and thus the great interest in football at that time was used as momentum for the NFT launch. The "Sports Land - Soccer Pack #1" includes 64 hats for avatars, each designed in the style of the 32 clubs participating in the World Cup and released once in a normal form and in a rarer "epic" variant.



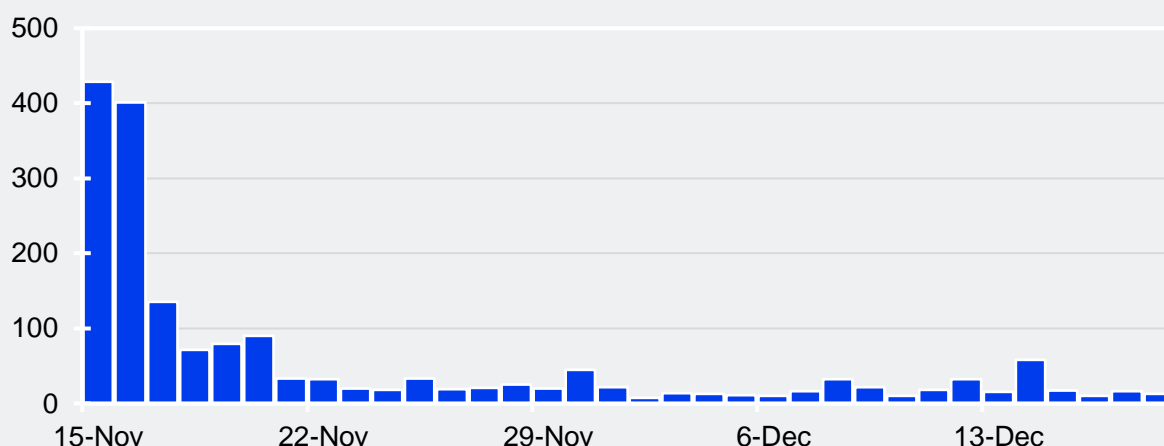
Sports Land is a digital experience in The Sandbox⁸⁹

		Number of sales	Price per asset (USD)
	Divino Captain Armband	1	527.81
	Epic United States Soccer Fan Hat	40	12.47
	Epic Argentina Soccer Fan Hat	42	11.20
	Epic Brazil Soccer Fan Hat	44	10.63
	Epic England Soccer Fan Hat	50	9.34
	Epic France Soccer Fan Hat	53	8.27
	Epic Netherlands Soccer Fan Hat	27	14.97
	Epic Croatia Soccer Fan Hat	56	7.13
	Epic Canada Soccer Fan Hat	41	9.04
	Epic Senegal Soccer Fan Hat	48	7.62
...	
All sales (N = 74)		1,808	8.69

Metrics refer to publicly accessible data on the Ethereum blockchain between Nov and Dec 2022.

Within one day, 429 NFTs with an equivalent value of over \$4,000 were sold. On day two, the numbers were similar and then leveled off over time. After a period of 34 days, the particular sale on the primary market ended, so that **further NFTs can only be purchased on the secondary markets** or whenever new collections may be issued. However, it is highly unlikely the same NFTs will be reissued in the future and in fact, there were also already 77 resales of the NFTs on marketplaces such as OpenSea.

Sports Land NFT sales over time



In total, over 1,721 NFTs were sold for over \$15,000 – excluding the 5% marketplace fee. The NFTs were sold to 1,265 unique addresses, meaning that the average user bought “only” 1.4 NFTs. In fact, only one single address purchased more than 25 NFTs (65).

The creator economy is no quick route to wealth, but requires persistence to achieve long-lasting success. Building a brand and establishing a loyal following takes time, effort, and creativity. While there are certainly creators who have found success quickly, this is not the norm and should not be expected. Survey data shows that “only” 51% of individual creators working for over four years make a livable wage of over \$50,000 per year.⁹¹ Another survey found that “only” 12% of full-time creators earn over \$50,000 per year.⁹²

As previously described, creators in Web 2.0 virtual worlds are making significant profits by selling their creations. Thanks to the increased popularity of virtual worlds and the growth of the creator economy, many creators are able to monetize their skills and talents by offering unique virtual items, experiences, and services to the community. From virtual fashion and accessories to customized avatar designs and in-world events, there is a growing market for creative content within these virtual worlds. With the right combination of talent, marketing, and customer engagement, creators are able to build a lucrative



Examples of digital assets offered on NFT marketplace OpenSea for the virtual world of The Sandbox.⁹⁰

business, earning large amounts of money from their virtual creations.

The sale of NFTs from the Sports Land experience in The Sandbox can be seen as **a successful example of how creators can distribute or sell many digital assets to interested users** in a short time using clever strategies. It shows that the creator economy in metaverse applications in Web 3 may not yet be able to match the Web 2 economies in terms of volume, but that the first successful examples can already be found, suggesting that the creator economy in virtual worlds such as The Sandbox can become just as (economically) significant.

Another indication of this is that the **more than 6.250 different assets in The Sandbox are held by over 134,000 wallets and have been traded for over 9,684 ETH on secondary markets alone**. It should be noted, however, that these are not only digital fashion for avatars but also assets for other aspects of the virtual world.

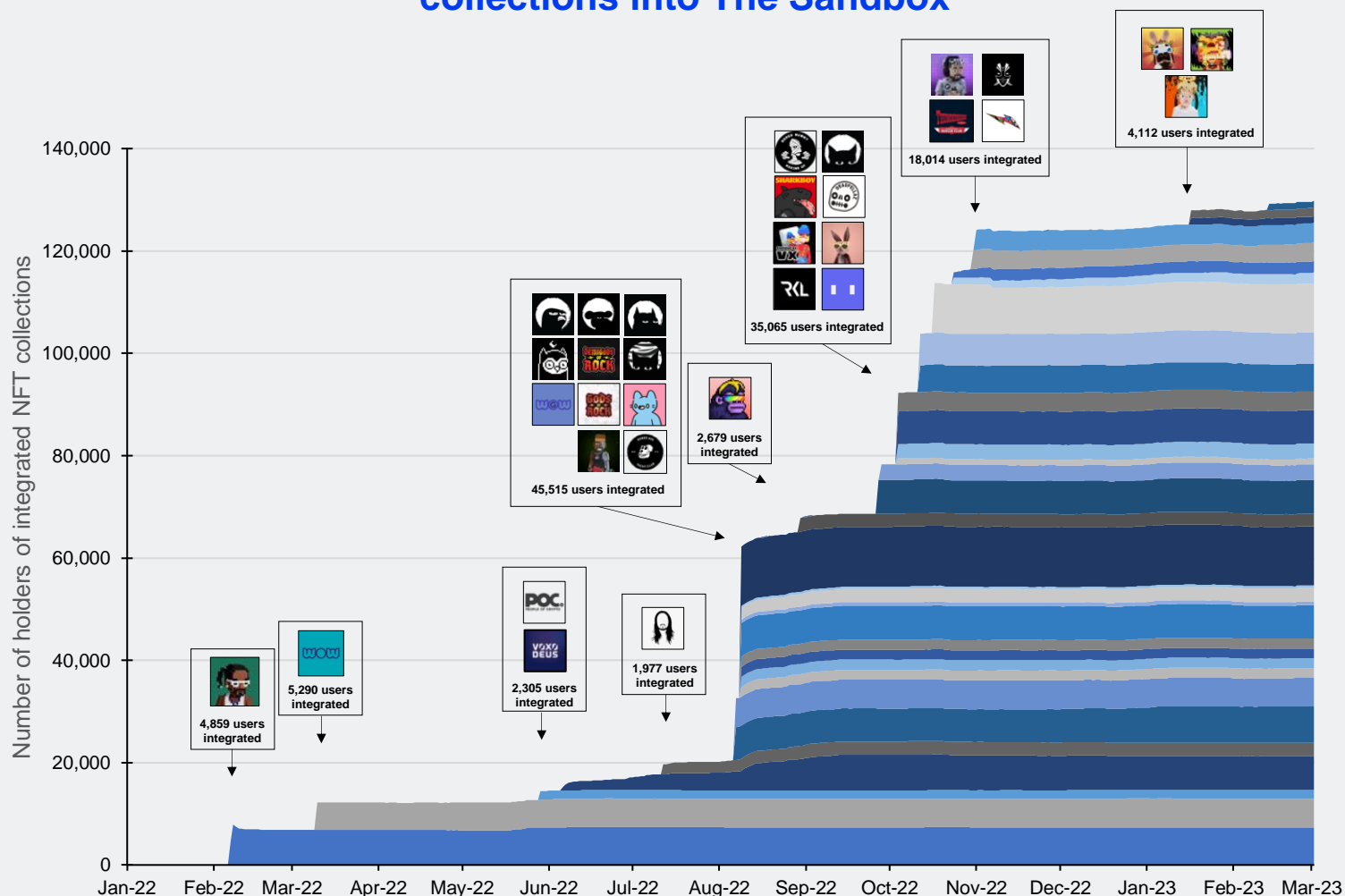
The value of horizontal integration

One of the key features of The Sandbox is the use of NFTs to represent unique in-game assets, such as avatars or items. These NFTs can be traded on the open market, and they are often collected by users who are interested in the virtual world's lore, aesthetics, and gameplay mechanics.

One way in which The Sandbox leverages the power of NFT collections and their users is through horizontal integration, where **different parts of the value chain** (in this case external NFTs collections and their users) **are integrated into a single platform or ecosystem**. That way, The Sandbox creates a smoother and more convenient and rewarding experience for its (newly acquired) users, while also capturing their additional willingness to pay. The figure below shows dates of NFT collection integration and how many unique token holders each

collection had at the time, i.e., how many “new users”
The Sandbox acquired.

User acquisition via horizontal integration of avatar collections into The Sandbox



By March 2023, The Sandbox had integrated previously external NFT collections with a total of over 120,000 users. However, some of these may have already been Sandbox users before the integration and not all of these individuals will have become truly active "users" of The Sandbox. However, even a small share will make integration beneficial. Furthermore, the **NFT collections have a strong incentive to be integrated into the virtual world, as this adds utility to their NFTs**. This makes the integration a win-win partnership.

One of the benefits of horizontal integration is that it can **promote user engagement and loyalty**. By



**Partnership announcement of
World of Women and The
Sandbox⁹³**

providing users with more opportunities to collect, trade, and use NFTs, The Sandbox can create a stronger sense of ownership, community, and purpose among its users. This can raise the level of retention, participation, and monetization, as users are more likely to spend time and money on the platform if they feel more invested in its content and culture.

Another potential benefit of horizontal integration is that it can **increase the overall value of NFT collections**. By integrating NFTs into various aspects of The Sandbox's virtual world, such as its games, experiences, and events, The Sandbox can create more utility and demand for these assets. This can drive up their market value and make them more attractive to collectors and investors. Moreover, by integrating NFTs into its business model, The Sandbox can create more value for itself and its stakeholders, such as its developers, partners, and investors.

Overall, horizontal integration of NFT collections brings additional users and purchasing power to the virtual world of The Sandbox. By creating a more engaging and rewarding experience, The Sandbox can attract and retain more users, capture more purchasing power, and create more value for itself and its stakeholders. This can be a **key driver of growth and innovation for The Sandbox and the wider virtual world economy**.

Section 6

Self-expression in the Metaverse: The Case of Kinetix

Self-expression for realistic and engaging virtual experiences

Expressions and communication are crucial for the metaverse because they allow people to interact with each other and form relationships, similarly to the real world. In virtual worlds, avatars are the main vehicles of representation and interaction. **Their ability to express emotions and communicate is therefore a key aspect of social interaction** in these environments. Without these abilities, avatars would seem dull and unengaging, and virtual social interaction would be much less rich and immersive. By allowing avatars to express themselves and communicate with others in a variety of ways, virtual worlds can provide a **more realistic and engaging social experience for their users.**

Limits to self-expression

The ability of avatars to communicate and express themselves can be subject to several types of limitations:

- First, the capabilities of **the avatar itself may be limited** in some way. For example, an avatar may not have command of certain facial expressions, body language, sounds or gestures.
- Second, the communication and expression of **the avatar may be limited by the rules of the virtual environment** in which it exists. For example, some virtual worlds or games impose restrictions on permitted types of behavior, and their moderation systems may prevent certain types of communication or expression.
- Finally, the avatar's ability to communicate and express itself may also be **limited by the technical capabilities of the platform** that hosts the virtual world. For example, with poor bandwidth or computational power, the platform may not be able to support certain avatar functions.

9.5%

of spending in Fortnite
was on emotes (dance
moves)⁹⁴

90%

of MMO players spend
money on cosmetic items
such as emotes⁹⁵

44%

of metaverse users have
purchased emotes and
other in-game
personalization content⁹⁶

The Kinetix logo features a stylized red 'X' icon to the left of the word 'Kinetix' in a white, sans-serif font, all set against a dark blue rectangular background.

The market for emotes

The market of emotes has been growing at an astonishing rate, especially in games like Fortnite. In 2018, **9.5% of the \$2.4 billion USD spending in Fortnite was on emotes (or dance moves)**, which translates to \$228 million. This indicates that players are willing to spend a significant amount of money on cosmetic items that do not have direct or limited impact on the gameplay. In the survey across Fortnite users, thus translated to a \$8.06 spending towards emotes.⁹⁴

Moreover, a recent study has shown that **only 9.7% of MMO players have not spent any money on cosmetic items such as emotes**, skins, or clothing. This demonstrates that a vast majority of players are willing to invest in the personalization of their gaming experience.⁹⁵ In fact, a survey of 4,018 US citizens has revealed that **44% of metaverse users have purchased skins, emotes, or other in-game personalization content**. This indicates that the market of emotes and other cosmetic items is not limited to a particular game or genre but extends to various virtual worlds and environments.⁹⁶ Thus, the market for emotes and other cosmetic items is a significant one, and game developers can benefit significantly by developing this aspect of the game.

Case study: Kinetix

Kinetix aims to make the Metaverse more inclusive by enabling the creation of 3D User-Generated Content (UGC) in virtual worlds using self-expression and emotes. The company employs advanced AI algorithms to **convert videos into 3D animated avatars and provide an intuitive, no-code platform for anyone to become a 3D creator**. The revenue-sharing model of Kinetix is based on monetization for creators and compatible with various virtual worlds.

Kinetix focuses on the "science of motion", **enabling creators to shape their virtual identities through movement recognition**. The company launched a collective library of AI-generated emotes, potentially secured in the blockchain as NFTs, which can be used in any virtual world. The goal is to **create a standard for emote assets** that can be used to express oneself,

socialize, play games, and earn rewards across multiple virtual worlds. These assets can be NFTs or non-blockchain-based assets.⁹⁷

The Kinetix approach

The company's whitepaper outlines **four major problems that Kinetix aims to solve**⁹⁷:

- 1. Obstacles to 3D creation:** The proliferation of virtual environments has led to a need for more efficient and easier methods of generating 3D content as the number of skilled 3D professionals is limited. It is therefore necessary to make 3D animation more accessible to inexperienced creators by providing a comprehensive set of tools that eliminates obstacles to creation. With a larger pool of 3D creators, virtual worlds can be enriched with more varied experiences, making the metaverse as a whole a more enjoyable place.
- 2. Insufficient rewards for creators.** The current business models of the major social media and gaming platforms do not provide sufficient financial support for creators. Data shows that only a small portion of the creators' revenue comes from advertising, forcing them to seek alternative income streams such as brand partnerships or building their own brands.⁹⁷ While the platforms claim to fund creators, the payouts have been decreasing. The situation is exacerbated in the realm of 3D assets, which are spread across various marketplaces, websites, and stores that often have incompatible software and offer low visibility for the content. A core benefit of Web 3 is the stronger creator ecosystem. For example, creators receive royalties of 5% using the example of The Sandbox.
- 3. Self-expression is poorly addressed in today's virtual worlds:** While they often feature visually appealing environments, many virtual worlds are seeking to increase their level of interactivity to attract more users. Leading industry players are utilizing new technologies such as virtual reality headsets and augmented reality glasses to enhance the immersive experience of virtual

worlds. However, besides immersion, there remains a need for solutions that allow users to also express themselves within these digital spaces. One potential solution is to incorporate features that allow for the creation and dissemination of memes, which have proven effective in fostering inclusivity and engagement on social media platforms. Kinetix may facilitate self-expression in the metaverse.

4. **Lack of asset interoperability:** Kinetix defines the metaverse as a connected network of virtual experiences across various virtual worlds. For this vision to be realized, a high level of interoperability must be achieved between these virtual worlds, allowing users to transfer assets such as avatars and in-game items across multiple worlds. Currently, this is not widely possible due to technical and economic barriers, as each virtual world has its own unique terms, features, and infrastructure. This creates a need for standardized tools that facilitate native compatibility between these disparate systems and can be easily integrated into all virtual worlds.

Self-expression has come a long way from the days of hieroglyphs. With the advent of the digital age, new forms of communication have emerged, from emojis and emoticons to memojos. With the development of emotes, custom rendered 3D animations have now become possible, enabling gamers to express themselves in virtual worlds like never before.



Source: Kinetix

The Kinetix platform solution

Kinetix is a no-code web platform that utilizes AI motion capture and a library of ready-to-use animations to streamline the traditional process of avatar design and motion capture. **The platform empowers creators to easily generate high-quality animation from any**

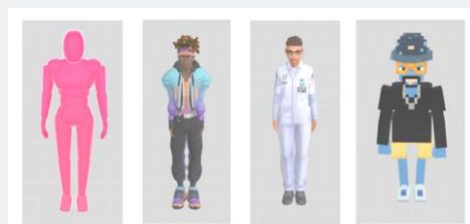
video source, allowing them to focus on the creative process of designing emotes that reflect their personalities.

State-of-the-art emotes versus Kinetix emotes⁹⁷

	Current emotes	Kinetix emotes
Type	Standard emotes	Unique animations
Content creation	Game developer	All stakeholders
Customization	None	Fully customizable
Ownership	Centralized within application	With platform / user
Portability	Locked within application	Transferable across experiences
Pricing	Defined by application developer	Defined by creators and market demand
Trading	Not available or centralized	Tradeable anywhere
Characteristics	Defined by application developer	Defined by creators and market demand
Utility	Only within each application	Cross-application and expandable

In addition, **Kinetix allows creators to export their creations (e.g., as NFTs), giving them ownership and the chance to earn royalties** from secondary sales. Kinetix also provides a solution for intellectual property holders looking to create their own emote collections featuring iconic moves. The company develops plug-and-play technology that will enable emotes to be smoothly integrated into virtual experiences, increasing their utility and driving engagement across multiple games and virtual worlds.

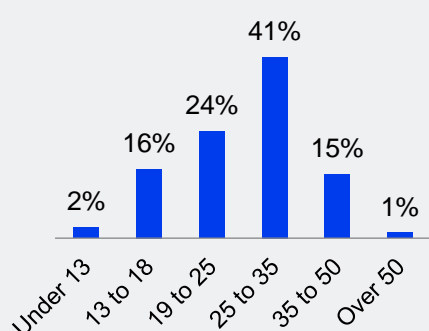
In the NFT marketplace OpenSea, users can look at animations of Kinetix user-generated emotes for avatars of (left to right) Kinetix, Next Dancer, Ready Player Me and The Sandbox⁹⁸



Kinetix's marketplace serves as a **platform for creators to offer their emotes**, while also providing them **with perpetual royalties from secondary sales**. The company is currently working on a software that will provide a standard for emotes within various virtual environments, including built-in applications and a store that can be integrated into any virtual world.⁹⁷

Section 7

Survey Results: Do People Actually Want Emotes?



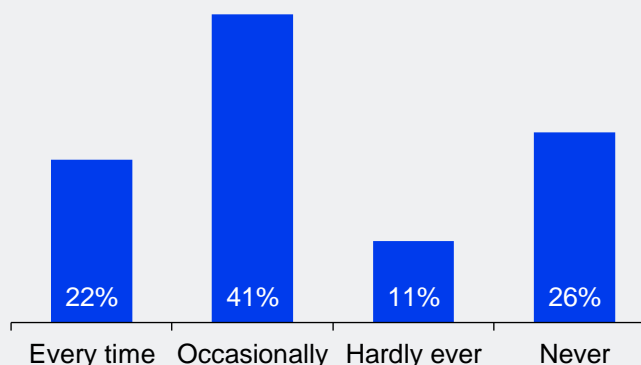
Age distribution of respondents

Do people care about emotes and self-expression in games and virtual worlds?

As described earlier, today's avatars, virtual applications and technical applications are limited in their ability to portray emotions or express themselves in games and virtual worlds. Companies like Kinetix seek to improve these capabilities. But do users actually want this? And would they be willing to pay for it?

To investigate these questions, Kinetix conducted an online survey on the topic of emotes among gamers between November 25th and December 8th, 2022. The data was provided to us in anonymized form. In the following, **we present some insights from the survey data on emotes.** Of the 82 respondents, the largest group is aged between 25 and 35, followed by the group aged 19 to 25.

Emote usage prevalence

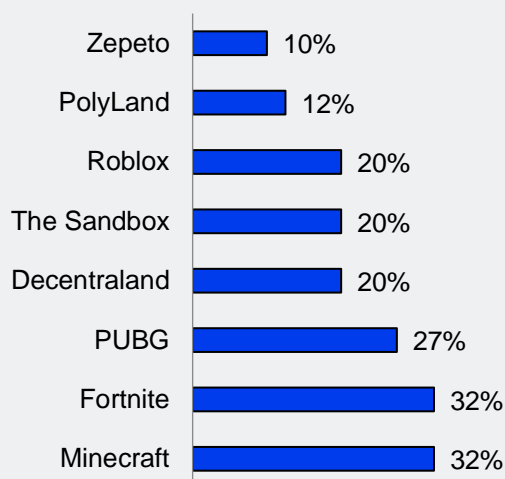


A proportion of 74% of participants said they either use emotes in games and only 26% said they never do. 22% of the respondents wrote that they would use emotes every time.

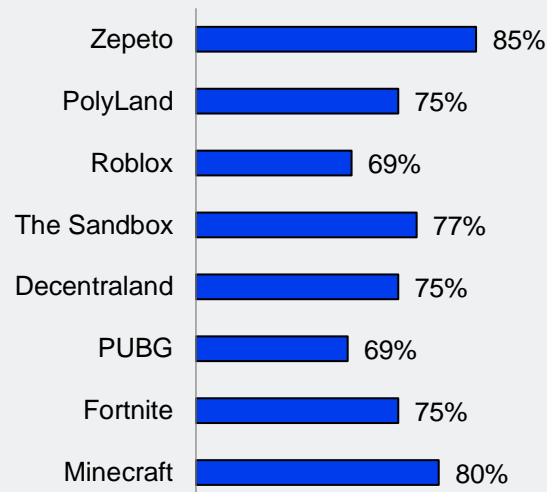
The survey asked the participants about their use of eight specific games and virtual worlds (see the figure below). The most popular virtual environments were Minecraft and Fortnite, each of which was used by 32% of the respondents. The virtual worlds with a Web 3.0 approach, Decentraland and The Sandbox, were used by 20% of the respondents each. On

average, the respondents participated in 1.7 of the eight available virtual environments. The largest number of virtual environments used by any one participant was 5.

Virtual environment usage prevalence



Share of emote users per virtual environment



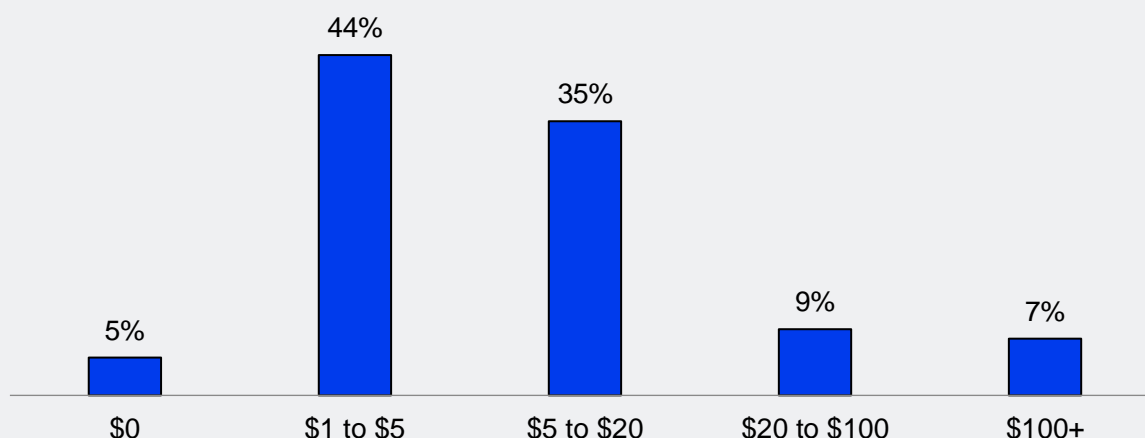
Zepeto (85%) and Minecraft (80%) have the highest share of users that use emotes; Roblox and PUBG have the lowest share (69% each). However, it should be noted that this evaluation is based on small sample (N=82), which makes it difficult to make generalizable statements. Given that this is the first ever “emote survey study”, it can be argued that the sample represents a suitable basis for initially exploring the field and for supplementing and validating the results in follow-up studies.

Are people willing to pay for special emotes?

The respondents were asked to what extent they would be willing to pay for premium emotes, with four possible answers (plus the “other” category, i.e., no willingness to pay). Premium emotes are offers to give avatars additional, branded or individualized forms of expression, such as the Kinetix NFTs. Most respondents said they were willing to spend money for premium emotes. As in many other markets, the distribution of the responses confirms the economic

principle of concentration of demand, where a small number of individuals account for the largest share of sales: Most respondents have modest spending willingness, while a few of them would be prepared to spend much larger sums.

Willingness to spend for premium emotes



However, the survey did not account for the frequency of demand, leaving open whether the respondents would be prepared to spend a certain amount once a month, once week, etc. It may well be the case that someone who is willing to spend \$1 to \$5 would do so much more often than someone who will spend larger amounts, so that the first person may actually generate higher volume than the second.

**The average
“emote spending
willingness” is
\$18.2.**

For some further insights, we converted the categories into numerical values: the ‘other’ category was assigned a value of 0, the ‘\$1 to \$5’ category received the average amount of \$3, followed by \$12.5, \$60 and \$100. That way, we obtained an average value of \$18.2 that people are willing to pay for premium emotes.

The reported frequencies of using emotes were similarly converted into values ranging from 0 (‘never’) to 3 (‘every time’). Finally, the categories for the respondents’ age were also converted into numerical values. These conversions allowed us to calculate Pearson correlations between emote usage, spending willingness and age, with the latter being used both as the numerical variable and as the

original age categories. The resulting correlation coefficients are displayed in the table below.

Correlations between age, emote use and spending willingness

	Frequency of use	Spending willingness
Age (values of 1 to 6)	-0.18	0.12
Under 13	0.09	-0.06
13 to 18	0.03	-0.08
19 to 25	0.20	0.04
25 to 35	-0.13	-0.07
35 to 50	-0.15	0.19
50 and older	0.06	-0.02

The Pearson correlation coefficient (r) is a measure of the strength and direction of the linear relationship between two variables. It ranges from -1 (strong negative relationship) to 1 (strong positive relationship). A value of 0 indicates no relationship.⁹⁹

The correlation between the frequency of emote use and age is weakly negative ($r = -0.18$), suggesting that there is some **tendency for emote usage to decline with age**. Similarly, the correlation between spending willingness and age is weakly positive ($r = 0.12$), which implies a weak **tendency for spending willingness to increase with age**.

The table also shows the correlation coefficients between the individual age groups and the other two variables. For example, the correlation coefficient between the frequency of emote use and the "under 13" age group is weakly positive (0.09). This means that **frequent users have a higher likelihood of being in the "under 13" age category than people who use emotes less often**.

It is important to interpret these correlation coefficients with caution, as they only derive from a relatively small sample that moreover may not be representative of all gamers and metaverse user. However, the results are quite plausible:

Age	USD
Under 13	\$6.2
13 to 18	\$12.5
19 to 25	\$19.9
25 to 35	\$15.5
35 to 50	\$30.8
Over 50	\$12.5

Willingness to spend in USD
per age category

- **Older people**, many of whom joined the scene a long time ago, **are used to games and digital experiences with less scope for self-expression** and are therefore less affine to using emotes.
- **Disposable income tends to increase with age**, which may explain the positive correlation between age and spending willingness. A follow-up study with a larger sample could directly test the association between spending willingness and disposable income (as well as the frequency of use) for more detailed insights.

Why do people use emotes?

Respondents who had previously used emotes were asked why they did so. The table below shows the relative frequencies of the responses. 59% of the respondents said that they use emotes to socialize with other players, 37% said they wanted to show off their skills, 27% want to express their identity, and 8% use emotes to improve their game tactics.

The fact that socializing with other players is the primary motive to use emotes suggests that they are an important tool for communication and interaction within the gaming community.

I use emotes to...	Share
socialize with other players	59%
show off my skills	37%
express my identity	27%
improve my game tactics	8%

A smaller share of the respondents said they use emotes to express their identity, so **emotes may also serve as a way for individuals to express themselves within the gaming world**. Finally, a relatively small percentage of respondents said they use emotes to improve their game tactic, suggesting that emotes may not be seen as a significant factor in strategy or gameplay by players.

Why do some people not use emotes?

The survey also asked respondents who had not previously used emotes about their motivation. The table below shows the relative frequencies of the reasons not to use emotes in games and virtual worlds.

I do not use emotes because...	Share
I prefer other modes of communication (voice or chat)	59%
they are not integrated in the games I play	37%
the available emotes do not look great	27%
I do not see the point of emotes	8%

The most common reason (59%) is a preference for other modes of communication, such as voice or chat. 37% of the respondents said that emotes are not integrated in the games they play, while 27% said they were unhappy with the available emotes. Only 8% of the respondents said they do not see the point of using emotes in games.

According to the findings, **the main reason not to use emotes in games is the preference for other forms of communication such as voice or chat.** Additionally, the fact that 37% of the non-emote-user respondents said that emotes are not integrated in the games they play means there is room for improving the **availability or support for emotes in some games.** The dissatisfaction, by 27% of the respondents, with the appeal of the available emotes suggests a **lack of quality or diversity in the emotes that are available** in certain games. Finally, 8% of the respondents not seeing the point of using emotes means that the value of emotes for in-game communication may require more advertising.

How to encourage greater use of emotes?

When asked, “What would drive to you use emotes more?”, the most frequent responses concerned the ability to use the same emotes across multiple virtual worlds (50%) and the users’ ability to create and customize emotes themselves (47%).

Answer option	Share
Possibility to use the same emotes across multiple virtual worlds	50%
Ability to create and customize emotes myself	47%
More inclusive emotes that better represent my identity	31%
Greater impact of emotes on the gameplay	29%

Additionally, 31% of the respondents would like to see emotes that better represent their identity. Finally, a greater impact of emotes on gameplay might motivate 29% of the respondents. Overall, it seems that the convenience and personalization of emotes play a crucial role in driving their use.

Exploring emote user profiles

For a final analysis of the survey data, we employ factor analysis to **identify underlying patterns or factors that may be driving certain behaviors or characteristics among a group of users**. Exploratory factor analysis is a statistical technique to identify data patterns that are indicative of underlying latent variables, also known as factors. This method is often employed in psychology but also in other social and behavioral sciences, as well as in marketing and finance. The primary goal of exploratory factor analysis is to reduce the dimensionality of a dataset by identifying a smaller number of underlying factors that account for the variability in the data. This is accomplished by examining the correlations between the observed variables and constructing a set of orthogonal

(uncorrelated) factors that represent the relationships among the variables.^{99–102}

For the survey data, the analysis identified three factors, or user groups, as shown in the table below:

1. The first factor, "**Emote users**," is strongly correlated with emote usage (hence the name) and desired impact on gameplay, and moderately correlated with emote creation and interoperable emotes. It correlates negatively with age but – as the only factor – positively with spending willingness. In sum, this group use emotes often, would like for them to have a bigger role, and also appear to be interested in emote creation and interoperability across different platforms.

Factor analysis identifying different emote user groups

	Factor 1: Emote users	Factor 2: Social identity	Factor 3: Non-payers
Emote frequency of use	0.64	0.33	0.07
Emote impact on gameplay	-0.61	-0.03	0.41
Age	-0.50	0.13	-0.07
Emote creation	0.48	-0.23	0.33
Emote identity representation	0.23	0.80	-0.01
Emote interoperability	0.31	-0.65	0.02
Spending willingness	0.13	-0.30	-0.80
Variance explained	21%	18%	17%

2. The second factor, "**Social identity**", comprises respondents who value the ability of emotes to represent their identity (strong positive correlation). By contrast, emote interoperability is of no concern to them (strong negative correlation).
3. The third factor, "**Non-payers**", is named for its strong negative correlation with spending willingness. It also features moderate positive correlation coefficients with emote impact on

gameplay and emote creation. This group is least likely to purchase in-game items or content, including emotes. However, they do have a certain interest in creating their own emotes and for the emotes to have a stronger impact on gameplay, so they may still value emotes as an important aspect of their gaming experience.

Understanding the characteristics and behaviors of users is crucial for anyone who creates or sells emotes in order to effectively target their marketing and product development efforts. The results of this factor analysis suggest that there are **distinct groups of emote users with different motivations and behaviors**. Market participants may want to consider creating tailored marketing campaigns or developing new emotes that appeal to specific user groups. For example, a company may want to focus on creating emotes that are particularly well suited to represent the users' social identity. New emote creation tools for users who are interested in creating custom emotes may also be an avenue worth exploring.

Further research is needed

The small sample size of this very first emote survey limits the generalizability of the results presented above, in particular those of the factor analysis. This must be borne in mind before drawing any conclusions or even deriving any business strategies. **Further research with a larger sample size is required** to confirm or expand upon the findings of this analysis. Given that emotes are expected to increase in importance, it is foreseeable that future research will take place and sample sizes will also increase.

Section 8

How Avatars Shape Digital Identities

36%

of survey respondents had bought an avatar – the same share as digital currencies.¹⁰³

26%

of survey respondents want to pretend to be someone else or create an alter ego in the metaverse.¹⁰⁴

54%

of survey respondents state that they would design an avatar that doesn't look like them.¹⁰⁴

19%

of German citizens want their avatars to look like themselves¹⁰⁵

Avatars are a gateway to the metaverse

When users enter the metaverse, they typically choose or create an avatar that represents them in the virtual world. This **avatar selection process is one of the very first steps a user takes when entering the metaverse.**¹⁰³

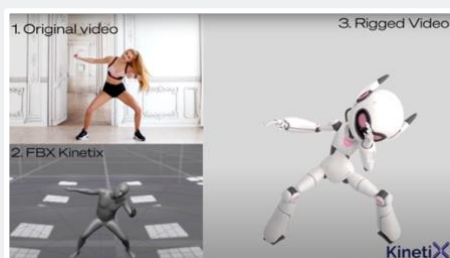
It is mainly through the selection of their avatar that users express themselves and their identities within the metaverse. **Avatars can be customized to reflect the user's personal style, interests, and personality**, and they can communicate information about the user to others in the virtual world.

The appearance and behavior of the avatar can affect how other users perceive and interact with the user, and it can also influence the user's own sense of immersion and presence in the virtual world. These factors make avatar selection a key aspect of the metaverse experience and a major topic of interest for many users and developers within the virtual reality community.

The metaverse is seeing an increase in spending on related technology and services. **Many users are willing to spend money on virtual goods and avatar customization**, at times over \$500 per month. Many also spend heavily on high-quality virtual reality equipment, with prices for high-end headsets easily exceeding \$1,000. Overall, participation in the metaverse can significantly affect the financial habits of ordinary people.¹⁰⁴

The path towards customizable, no-code digital identity creation and management

One aspect of avatar creation that has gained significant attention in recent years is the use of **NFTs to give users ownership and control over their digital creations, assets, and digital identities**, and to monetize their creations. For example, if a user creates an avatar using an avatar creation tool such



Kinetix allows users to simply upload a video and convert it into a 3D animation for avatar customization, ownership and more¹⁰⁶

as Ready Player Me or Kinetix, which require very little technical skill, they can mint an NFT of their avatar and sell it on a marketplace, potentially also earning creator fees from future resales. With these tools, **users can create and customize avatars that reflect their own personal identities and interests**, and they can use these avatars to explore and interact with other users in virtual worlds and online communities.

Not a single digital identity but many digital identities!

Using multiple avatars in the metaverse gives users **more flexibility and control over their digital identity and how they present themselves** to others. It can allow them to experiment with different identities, or to tailor their appearance and behavior to fit different situations or communities. For example, users may have one avatar for socializing with friends and another one for professional networking. Avatars with different appearances or characteristics may suit different aspects of their personality or allow them to participate in different communities and explore different interests **without having to commit to a single identity**. That way, multiple avatars can enhance a user's experiences in the metaverse. NFT collections (i.e., different avatars) can thus transform user interaction and engagement.

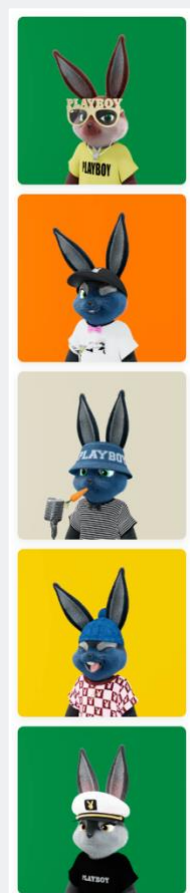


Having integrated a multitude of different avatars and a creation tool, users of The Sandbox are able to change their appearance as often as they like. This way, they can stand out from the crowd or express their identity differently.¹⁰⁷

What motivates users to change their digital appearance?

Although avatars are available for free in all virtual worlds and games, users regularly choose to purchase premium avatars, assets, emotes or virtual fashion for a variety of reasons:

- **Personal customization and expression:** Premium avatars, assets, and virtual fashion may offer more options and features for users to personalize and differentiate their avatar from others, allowing them to express their unique identity and style in the virtual world.



Playboy Bunnies are profile picture NFTs that can be used as avatars in The Sandbox.

While it may be intriguing to use a Rabbitar to socialize or interact with friends, it may not be the best choice for a business meeting.

- **Social status or exclusivity:** Premium avatars, assets, and virtual fashion may be perceived as higher quality or more exclusive, and owning them may serve as a symbol of social status within the virtual community.
- **Access to certain in-game or in-world benefits:** For example, premium avatars may have special abilities that are not available to free avatars, or premium assets may provide a functional advantage in gameplay.
- Simply **enjoying the experience of purchasing and owning premium avatars**, assets, and virtual fashion as a form of entertainment or leisure activity: Users may find the process of selecting and purchasing these items rewarding in itself, regardless of any functional or social benefits they may provide.

Digital fashion and assets show huge potential

The digital fashion and digital asset markets have significant growth potential due to the increasing prevalence of digital platforms for entertainment and commerce. The digital fashion market alone is expected to grow at an annual rate of over 100% over the next years.¹⁰⁸

Digital fashion and items can play a significant role in shaping and presenting an individual's digital identity. In the virtual world, users can curate their appearance and possessions in a way that may not be possible in the physical world, allowing them to express themselves and present a desired image to the online community. In fact, **identity was the primary reason for purchasing digital goods**, being stated by 57% of 3,000 survey respondents (or 70% of those who had previously bought digital fashion). Other motives included utility (55%), earning potential (40%), access (36%) and belongings (33%).¹⁰³

Digital fashion and items can help individuals to form and maintain their digital identity over time. By consistently using certain avatars, virtual clothing and

82%

of survey respondents have already purchased a virtual good – and only 53% of the buyers are crypto users.¹⁰³

5%

of global respondents will never enter digital asset market – that leaves 95%.¹⁰⁴

34%

of survey respondents have purchased digital fashion or skins.¹⁰³

28%

of respondents have bought powers / power-ups in the past.¹⁰³

94%

of respondents expect digital fashion to become mainstream.¹⁰³



The famous **Mona Lisa** is considered one of the most well-known and valuable paintings in the world. However, this is most likely not only due to its visual appeal but rather to its history and myth.¹⁰⁹

accessories, users can establish a recognizable personal brand or style. This can be especially useful for individuals who are looking to **establish a presence within a particular online community or industry**.

The ability to constantly update one's digital fashion and items can **allow users to keep their digital identity current and relevant**. This can be especially important as online trends and standards change rapidly.

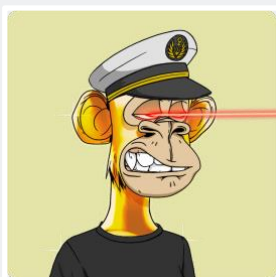
There is more to avatars and identity than appearance

Avatars in the metaverse can be characterized by more than just their visual appearance. Expressions, emotions, behaviors, and (social) networks all play important roles in shaping the identity and character of avatars and thus the individuals behind them.

One aspect that characterizes avatars is their **expressions**, as discussed in Sections 6 and 7. Avatars can be designed and upgraded to show a wide range of emotions through facial expressions, body language, and gestures. For example, an avatar may be able to express happiness through a smile, anger through a furrowed brow, or sadness through a downturned mouth. These expressions can be triggered by events or inputs in the metaverse, or they can be manually controlled by the avatar's user (e.g., via an emote wheel⁹⁷).

Avatars are also characterized by their **behavior**. They can be programmed to exhibit certain behaviors or habits, such as pacing back and forth, fidgeting, or many other options. These behaviors can reflect the personality or background of the avatar, or they can be used to convey a specific mood or emotion.

The NFT technology in principle allows users to **purchase, earn and own emotes or behaviors of their role models** (e.g., a dunk by LeBron James or a touchdown by Tom Brady). They could use them as emotes for their avatars, allowing them to express

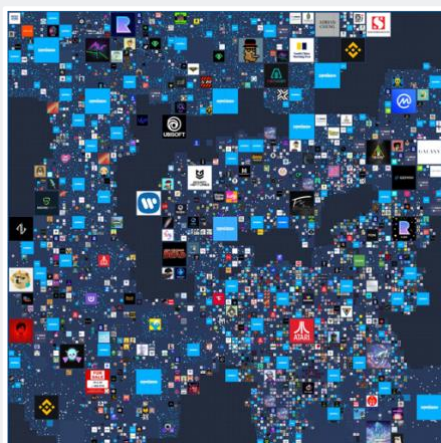


The Bored Ape #3749 NFT sold for 740 ETH (\$2.9m) in 2021. This value is probably largely attributable to non-visuals, such as the network effect of the Bored Ape Yacht Club community.¹¹⁰

their admiration for their favorite athletes and demonstrate their interests to online communities. For example, users of the NFT collectible game NBA Top Shot can buy special moments from basketball games.¹¹² However, transfer to the metaverse is not yet possible.

Avatars are furthermore characterized by their **history**, i.e. their past experiences, relationships, and achievements within the metaverse. For example, an avatar that has a long history of participating in virtual events or competitions may be seen as more experienced, valuable or skilled than an avatar with a shorter history. This aspect may not yet have much significance in the emerging market, but examples from other markets suggest that it will become increasingly important (e.g., physical art, stamps, etc.).

Finally, the social **networks** that an avatar belongs to can also shape its character. Avatars can be connected to other avatars through social or professional networks, and these connections can influence the avatar's identity and reputation. An avatar that is a member of a prestigious virtual club (e.g., NFT collections such as the Bored Ape Yacht Club¹¹³) or organization may be considered more influential or respected.



The map (and network) of the virtual world of The Sandbox includes major brands and artists such as Warner Brothers, Adidas, Snoop Dogg, Binance, Gucci and Playboy.¹¹¹

Overall, **avatars in the metaverse are characterized by a wide range of factors**, including their appearance and digital fashion, expressions, emotions, behaviors, and networks. Understanding these various aspects can help the creator economy to form and customize avatars that accurately reflect identities and personalities within the virtual world.

Section 9

Conclusion and Outlook

The internet requires an update; and it is being worked on

The internet as we know it today is often criticized for its **lack of value and identity layers**. It can be difficult to assign tangible value to online interactions and information and to **establish a clear and trustworthy identity in the digital realm**. This has led to issues such as the proliferation of fake news and the exploitation of personal data for financial gain.

The emergence and development of Web 3.0, which focuses on the integration of blockchain technology and decentralized systems, has the potential to change this. Web 3.0 offers the opportunity to create interoperable value and identity layers within the internet that are transparent, secure, and controlled by the users themselves. This shift towards **greater user autonomy and control can revolutionize the way we interact and conduct business online**, and these are exciting times to be a part of this transformation.

A person's digital identity has traditionally been defined by their virtual address or domain and the data collected about them and their online behavior, including demographic information and browsing history. However, the emergence of the metaverse and decentralized online spaces powered by blockchain technology, has led to a shift in the understanding of digital identity. **In the future metaverse, users will hopefully have greater control over their personal information** and its disclosure to others, and may even maintain multiple digital identities that correspond to their various real-world identities, such as work and personal personas.

The extent to which data, identity and ownership in the metaverse will really be controlled by the users is a question for the coming years. Whether "the metaverse" will be in the hands of a few corporations or in the hands of a creator economy currently remains open.

It is quite clear that the metaverse offers vast economic opportunities, as evidenced for example by

the Facebook rebranding to Meta. **Established companies have little interest in empowering users** and sacrificing their old but lucrative, centralized and data-driven business models. Instead, they try to migrate their old business models into the metaverse.

The open metaverse should be a team effort and public good

An open, freely accessible metaverse should be the ultimate goal for ensuring **inclusion, interoperability, and user empowerment**. Such a metaverse would allow anyone, regardless of their background or resources, to participate and connect with others in a virtual environment. It would also enable the integration of a wide range of services and applications, ensuring that users have access to a diverse set of tools and resources. By putting the power in the hands of users and fostering a sense of community and collaboration, an open metaverse has the potential to **revolutionize the way we interact and engage with each other online**.

The future development of **the metaverse will face a range of challenges**, including technological limitations, security and privacy concerns, legal and regulatory concerns, ethical, social and cultural questions, and economic considerations. While a centralized entity may be able to address such challenges more efficiently, **a decentralized approach that draws on a range of perspectives and expertise promises superior results**. All things considered, some balance between centralization (e.g. legal certainty) and decentralization (e.g. empowerment) is probably best suited to address the challenges and ensure the best outcome for users.

Collaboration is crucial for collectively building the open metaverse and integrating diverse perspectives, ideas, and resources. In an open metaverse, users from different backgrounds come together to co-create and build the virtual world. This requires a level of collaboration and cooperation, as well as **a willingness to listen to and learn from others**.

The role of avatars in the open metaverse

Avatars play a crucial role in an open metaverse, as they represent the users in the virtual world, allowing them to express their identities, their personalities, and their creativity. **Avatars are the users' face and voice. In an open metaverse, they serve as a bridge between different cultures and communities**, helping to promote understanding and cooperation between different groups of people and fostering a sense of community and connection. The design and development of avatars in an open metaverse must therefore be inclusive and accessible, allowing all users to fully participate in and engage with the virtual world.

As the metaverse continues to evolve, the importance of digital identities is set to grow. In the future, people may rely on their avatars to access a variety of services and experiences, both in the virtual and the physical world. As such, it will be important for individuals to carefully manage and protect their digital identities, to ensure that it accurately reflects who they are and what they stand for.

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About



The **Blockchain Research Lab** promotes independent science and research on blockchain technologies and the publication of the results in the form of scientific papers and contributions to conferences and other media. The BRL is a non-profit organization aiming, on the one hand, to further the general understanding of blockchain technology and, on the other hand, to analyze the resulting challenges and opportunities as well as their socio-economic consequences.

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