The Metaverse and Web 3.0: Revolutionising Consumption and Communication for the Future

Ali B. Mahmoud

ABSTRACT:

The metaverse is a new frontier in consumption. It is a digital place where people can buy and consume anything they want, whenever they want. It is an oasis of freedom and choice, and it has the potential to change the way we live and work. The future of the metaverse is placed where data and technology merge to create an experience that's both unique and engaging. With information overload becoming a weekly reality, it is crucial for businesses to understand how their consumers are engaging with their offerings. This chapter synthesised the current research and practice to answer the following questions: How is the metaverse changing the way we consume and communicate? And how is Web 3.0 empowering and transforming the metaverse? Moreover, what are the threats Web 3.0 is bringing to our privacy on the internet?

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INTRODUCTION

The digital landscape is changing rapidly, with more and more emerging technologies connecting us in ways that were not possible even a few years ago (Keikhosrokiani, 2022). We are on the brink of a revolutionary era in how we use the internet. Web 3.0, also known as the Metaverse, is a new version of the internet powered by blockchain technology and data. Web 3.0 is bringing about a change in how we interact with information online and, more importantly, a dramatic shift in the power dynamics between consumers and companies.

The Metaverse, an online world made up of data and technology, is the latest frontier in this digital revolution. Conceived in the minds of science-fiction novelists (The Economist, 2022), the Metaverse, or virtual worlds, has the potential to revolutionise marketing by providing brands with new ways to engage with consumers and deliver immersive experiences. In the Metaverse or the *new market universe*, as termed by Hollensen et al. (2022), brands can create virtual storefronts and product displays (Darbinyan, 2022), host virtual events and promotions (Chen, 2022), and even create virtual versions of their products for customers to try on or test drive (Lim et al., 2022). Additionally, the Metaverse can allow for more targeted and personalised marketing (Dwivedi et al., 2022), as brands can gather data on consumer behaviour and preferences in virtual environments (Hazan et al., 2022). A 2021 study (Netcore Cloud, 2021) comparing the conversion rates of U.S. e-commerce websites revealed that a greater proportion of sales were completed when the shopping experience was personalised to individual consumers. Though conversion rates increased in a number of e-commerce subsegments, marketplaces demonstrated the largest difference in conversion rates before and after personalisation (see Table 1). Overall, the Metaverse has the potential to create more engaging and interactive brand experiences that can build stronger connections with consumers who can use Web 3.0 to shop, pay bills, communicate with friends and family, and even participate in digital marketing activities. Therefore it is no wonder that the Metaverse is considered to be shaping the real-world ambitions of the leading brands worldwide (The Economist, 2022).

Table 1: Online shopping conversion rate in select verticals before and after offering personalised shopping experience in the United States in 2021

	Pre-personalisation	Post-personalisation
Marketplace	1.2%	1.75%
Brand	1.04%	1.5%
Fashion/Apparel	1.32%	1.78%
Groceries	1.31%	1.79%
Jewelry	1.43%	1.78%
Books	1.22%	1.66%
Cosmetics	1.29%	1.75%

Web 3.0 is the latest iteration of the internet, allowing us to access more and more data and information on the Web. From digital marketing to media and blockchain, the implications of Web 3.0 on the Metaverse are far-reaching. The precursors to the modern Metaverse emerged during the Web 2.0 era, primarily concentrating on the gaming industry (Dwivedi et al., 2022). With the advent of web 3.0 technology, metaverse platforms now provide users with an augmented reality extension of traditional platforms, paving the way for more natural discussions between users (Solakis et al., 2022). The implications of the Metaverse for digital marketing are vast. With the ability to target specific audiences, businesses can now engage consumers with highly relevant content reversing long-held negative attitudes towards digital marketing, especially the one delivered via e-mail (Mahmoud, 2015; Mahmoud et al., 2019). This includes connecting with potential customers through social media, personalising e-mail campaigns, and offering customised product recommendations. Therefore, this chapter delves into the Metaverse's past, present and future, looking at how the Metaverse is changing the way we consume and communicate and what that signifies for the future of communication, highlighting how Web 3.0 is empowering and transforming the Metaverse—it discusses the technologies necessary to power the Metaverse and explores the benefits, challenges, and privacy concerns that come with Web 3.0.
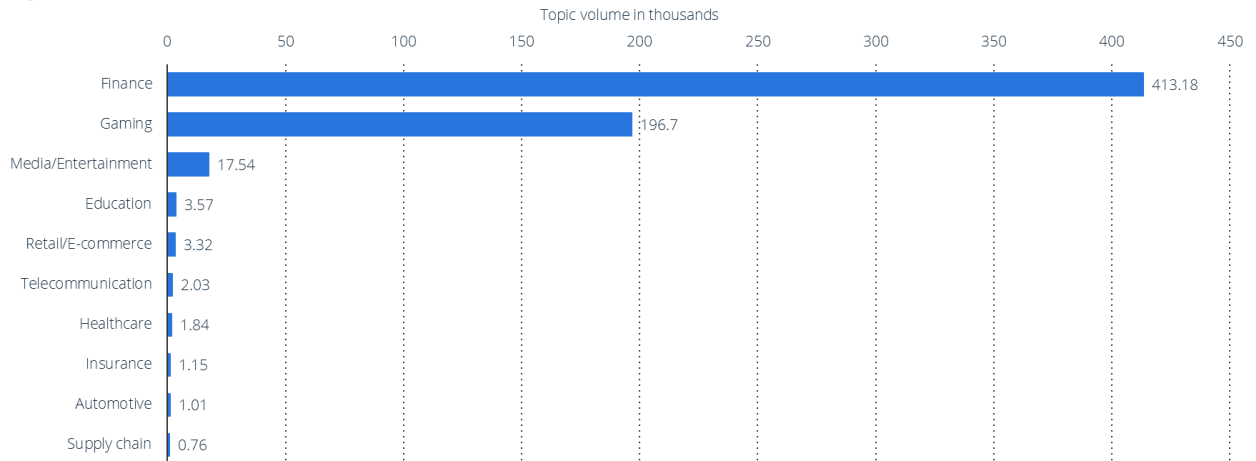
BACKGROUND

Web 3.0 is a concept that refers to the next evolution of the internet, characterised by a shift towards a more decentralised and user-driven web (Choudhary, 2022). Web 3.0, commonly referred to as the Metaverse, is a concept where the entire Web operates as a single, interconnected virtual world (Salar et al., 2023). It refers to an interconnected network that includes the internet, data and technology, information, media, and digital marketing (Kumar, 2021). Theoretically, Web 3.0 could bring together the entire world in a shared online experience.

At the heart of Web 3.0 is the idea of decentralisation. By removing the reliance on a single platform, Web 3.0 encourages a more open, accessible web. For example, blockchain technology is being used to decentralise services and create a more secure environment for data transactions (Yli-Huumo et al., 2016). Additionally, Web 3.0 is set to create a more personalised experience for users (Ferrari, 2016), giving them greater control over who and what they interact with online. Therefore, Web 3.0 refers to the next stage of the World Wide Web, where the internet is more intelligent, decentralised, and user-centric.

Overall, Web 3.0 is working towards creating a more secure, user-centric web experience. Albeit primarily visible in the finance sector (see Figure 1), by decentralising services and creating a more personalised experience, however, Web 3.0 is beginning to revolutionise the way people interact with and consume information online. This could potentially create a new era of digital marketing and media, where consumers have more control over what information and services they can access. Web 3.0 is anticipated to bring several benefits, but legitimate privacy worries about it exist. To that end, this chapter argues that businesses and governments need to take measures to safeguard users' privacy so that we can keep the Metaverse private and safe through ethical data collection and solid policy frameworks.

Figure 1. Top sectors in Web 3.0 panorama in India as of April 2022

Topic volume in thousands

Sector	Value
Finance	413.18
Gaming	196.7
Media/Entertainment	17.54
Education	3.57
Retail/E-commerce	3.32
Telecommunication	2.03
Healthcare	1.84
Insurance	1.15
Automotive	1.01
Supply chain	0.76

Source: (Fleishman-Hillard & Website (eleve.co), 2022)

METHODOLOGY

As a general review (e.g. Mahmoud, 2021; Mohr et al., 2022a), this chapter synthesised and summarised existing research on the Metaverse and Web 3.0 concerning consumption and communication patterns. Therefore, the methodology for conducting this work involved the following steps (Templier & Paré, 2015):

1. The work identified the research objectives that steered the scoping of previous research. It sought to answer the following questions: How is the Metaverse changing the way we consume and communicate? And how is Web 3.0 empowering and transforming the Metaverse? Moreover, what are the threats Web 3.0 is bringing to our privacy on the internet?
2. A comprehensive search of academic databases, journals, and other good sources was conducted to determine relevant research studies, articles, and books. The ultimately deemed-relevant literature was carefully and critically read and analysed to synthesise the information into a coherent narrative.
3. The assistance of three independent expert peers was solicited to guarantee that the source selection method was devoid of bias.
4. This chapter synthesised the fragmented pieces of knowledge that informed the discussions and conclusions presented in this work.

THE METAVERSE

The term "Metaverse" has become increasingly popular in the world of technology and information-related industries. It is a combination of the words "meta", which refers to an abstraction layer, and "universe", which is used to describe a wide variety of virtual worlds. In essence, the Metaverse is a collective virtual shared space created by the convergence of virtually enhanced physical reality, virtual reality, and the internet (Falchuk et al., 2018). The Metaverse is poised to represent a virtual world that is created when the internet, data, and technology are combined. In the Metaverse, people are no longer limited by physical distance or time zones, allowing them to access and consume information and media anytime, anywhere in the world (Armstrong, 2023).

As technology advances and the internet expands, the Metaverse is becoming a reality, becoming an important part of the communications, entertainment, and digital marketing industries (Babu & Mohan, 2022). This new virtual environment promises to provide a space for people to interact and engage in ways not possible in the physical world, creating a new, more immersive experience (Solakis et al., 2022). The Metaverse is quickly becoming an integral part of our digital lives and our access to information and media, with an estimated global market size surging from 47.48 billion U.S. dollars in 2022 to 678.8 billion U.S. dollars in 2030 (Figure 2). As we move into this new era of digital transformation, it is important to consider how consumers may be responding to the Metaverse and what we can expect to see in the near future.

Figure 2: Metaverse market revenue worldwide from 2021 to 2030 (in billion U.S. dollars)
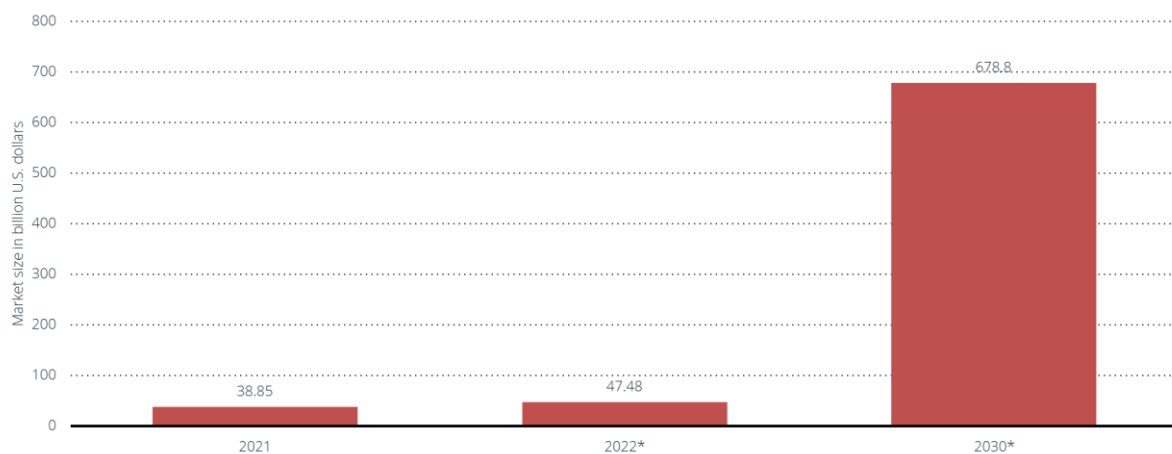

Source: (Grand View Research, 2022)

Consumption in metaversial realms

Consumers are becoming increasingly aware of how the internet, data, and technology are impacting how we shop, communicate, and interact. The Metaverse allows for a wide range of activities, from online social networking to gaming and even virtual shopping. As the Internet of Things (IoT) expands, the Metaverse will become increasingly connected to the internet, allowing for the storage and sharing of data across different platforms and allowing for new technologies to be developed (Gadekallu et al., 2022). This is all made possible by the usage of blockchain technology and its associated data-processing protocols (Jeon et al., 2022).

The Metaverse, empowered by Web 3.0 technologies, is already transforming the way consumers interact with companies, services, and entertainment. For instance, retailers are now able to offer virtual product demonstrations, where customers can try out products before making a purchase (Read, 2022). Customers can also receive virtual consultations with customer service representatives and access real-time product information. The construction of avatars for realistic consultations, tailored care through data interconnection, the use of digital twins, and future clinical uses in teaching, diagnostics, and therapies are all examples of applications of the Metaverse in ophthalmology (Tan et al., 2022). In the entertainment industry, the Metaverse is being used to create immersive gaming experiences, allowing players to interact with each other in virtual environments (Kharjule, 2022). For instance, Decentraland (see Figure 3) is a browser-based three-dimensional world platform. Using the Ethereum blockchain-based MANA cryptocurrency, users can purchase non-fungible tokens (NFTs) representing virtual plots of land on the platform.

Figure 3: Decentraland's marketplace
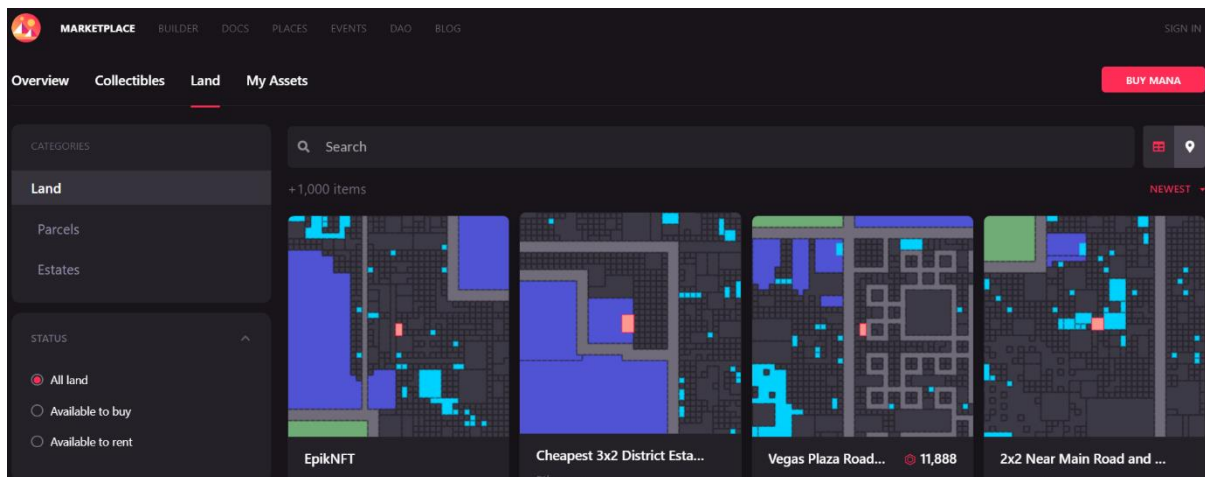
Source: Current study and Decentraland (2023)

The Metaverse is also becoming a popular platform for virtual events, such as concerts, festivals, and conferences, which provide a unique and interactive experience for attendees. Furthermore, consumers can use the Metaverse to network and connect with others, forming communities based on shared interests and experiences.

Figure 4: Metaverse Fashion Week

Source: Current study and Everyrealm (2023)

The Metaverse also provides new opportunities for digital marketing and advertising. Companies will be able to advertise their products and services to a larger audience while also providing valuable information to their customers. This will help increase brand loyalty

and engagement with customers while providing a better overall experience. A survey (Morning Consult, 2022a, 2022b) performed in March 2022 in the United States (Figure 5) revealed that 36 per cent of internet adults were interested in accessing the Metaverse, with 12 per cent indicating they were highly interested. Men were more likely than women to be interested in using the Metaverse, with 7 per cent of women expressing strong interest and 50 per cent expressing no interest. Just over a third of males were not at all interested, while 18 per cent of men were very interested (Morning Consult, 2022a). Furthermore (see Figure 6), in a subsequent question about possessing a digital avatar as a representative in the Metaverse, Baby Boomers were by far the least interested in establishing an avatar to represent them in the Metaverse, while Gen Z and Millennials were the most likely to be interested in doing so (Morning Consult, 2022b). Additionally, a global poll (Dynata, 2022) conducted in February 2022 revealed that Generation Z and Millennials were most interested in metaverse activities. Thirty-seven per cent of Gen Z and 38 per cent of Millennial online users indicated that they were extremely or very interested in attending virtual concerts of their favourite musical artists (Dynata, 2022). Therefore, as Web 3.0 continues to evolve, tech-savvy (or -native) consumers will be better prepared to make informed decisions about their online lives (Mahmoud, Ball, et al., 2021; Mahmoud, Hack-Polay, et al., 2021).

As the Metaverse continues to evolve, its potential for providing new and exciting experiences will be fully realised. As technology continues to develop, the possibilities for the Metaverse will also continue to expand and become more integrated with everyday life. From virtual education to virtual shopping and entertainment, the Metaverse will likely provide unprecedented engagement and convenience to its users (Dwivedi et al., 2022).

Figure 5. March 2022, the percentage of internet users in the United States who are interested in accessing the Metaverse by gender
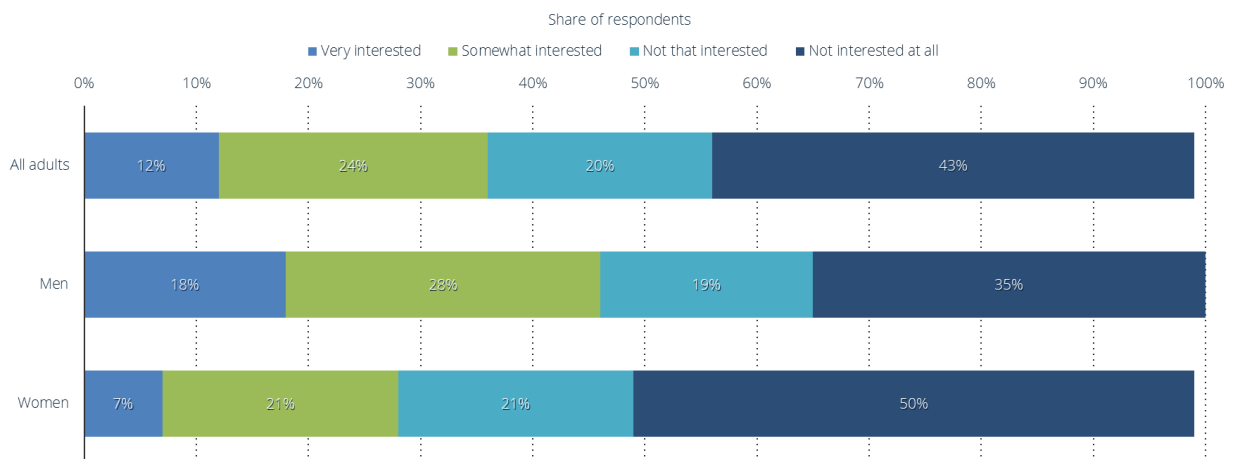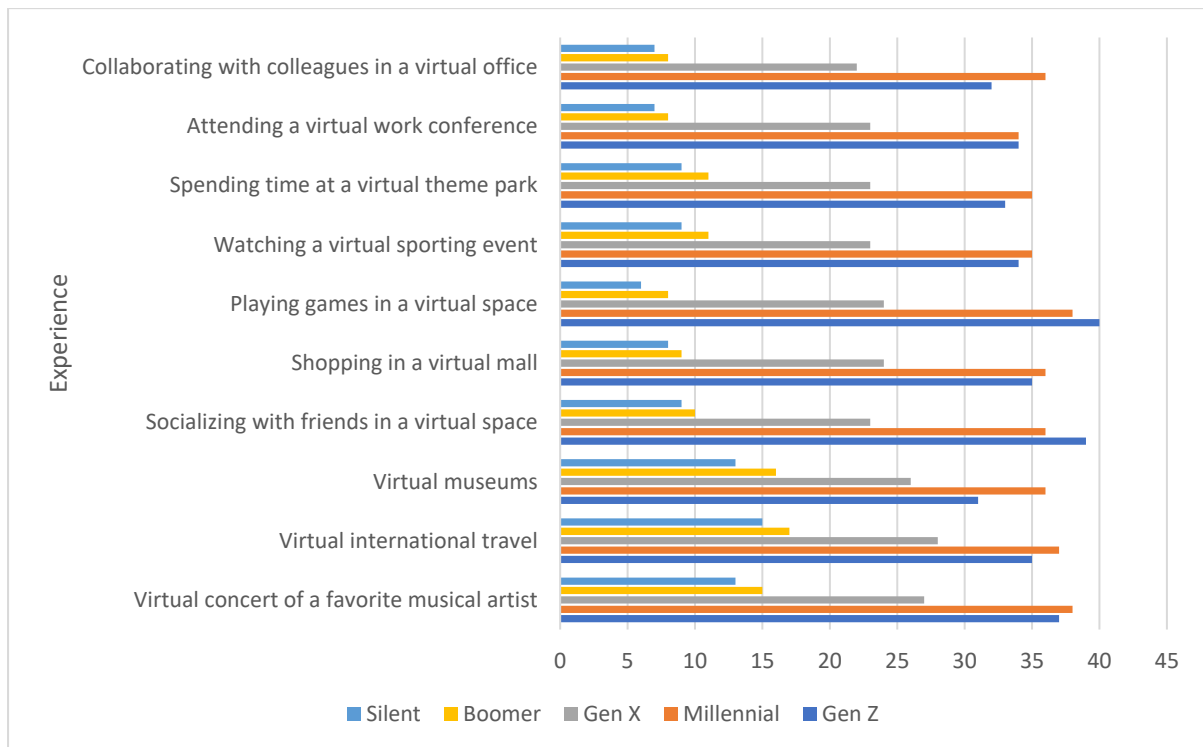

Source: (Morning Consult, 2022a)

Figure 6. March 2022, the percentage of internet users in the United States who are interested in accessing the Metaverse by generation
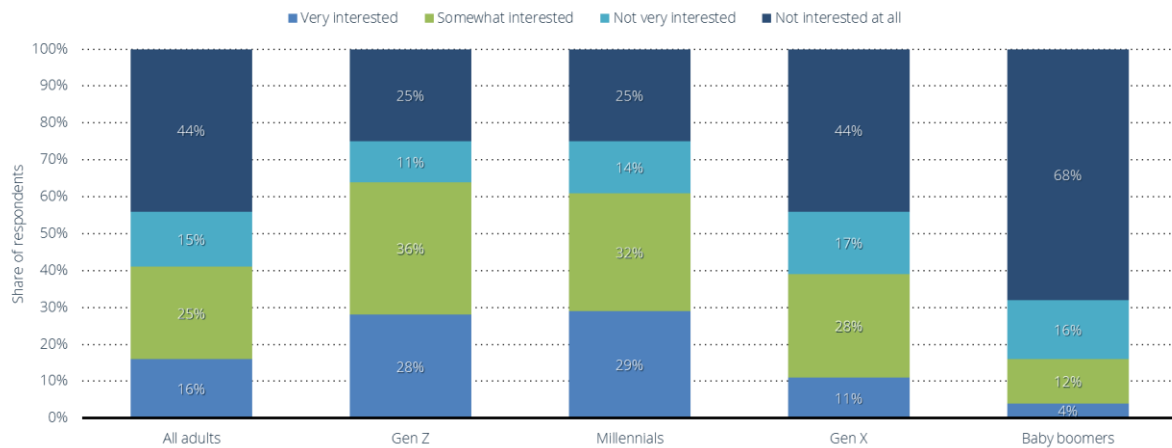
Source: (Morning Consult, 2022b)

Figure 7: Share of adults worldwide who are interested in trying select types of metaverse experiences as of February 2022 by generation

Source: (Dynata, 2022)

WEB 3.0 AND THE METAVERSE

The Metaverse is undergoing rapid transformation due to the introduction of Web 3.0. The availability of data and technology has enabled the creation of new experiences, platforms,

and interactions (Joy et al., 2022) such that the Metaverse is becoming more connected, and internet users' interactions with it are changing. As a result, one of the most noticeable changes is the increased use of digital marketing and blockchain technology. The proliferation of available information has enabled marketers to target customers more precisely while making it easier to have conversations and exchange data in real-time (Haleem et al., 2022).

Additionally, the use of blockchain technology has enabled businesses to securely store information, access data more efficiently, and facilitate transactions between multiple parties (Peres et al., 2022). This is crucial for businesses in a world making its first steps into the fifth industrial revolution or Industry 5.0, which aims to create a smart, interconnected, and sustainable industrial ecosystem with a focus on human-centred values and experiences through the integration of advanced technologies, such as artificial intelligence (AI), the Internet of Things (IoT), and robotics, into various processes and systems, leading to greater efficiency and productivity (Keikhosrokiani & Pourya Asl, 2023).

Furthermore, the Metaverse is becoming more informative, entertaining, and interactive. As information and media become more accessible, the amount of content available to users is more varied and engaging. Announcements and events can be shared more quickly and with greater accuracy. Live streaming has become a growing form of entertainment and communication, allowing users to come together and express their thoughts and ideas more personally (Baía Reis & Ashmore, 2022). As a result, the Metaverse is becoming more personalised to individual users. As users continue to share their personal information, the Metaverse will be able to tailor content and services to the unique needs of each user (Plechatá et al., 2022). Rather than simply being a platform for communication, the Metaverse is set to become a tool for managing personal data and creating an individualised experience (Zallio & Clarkson, 2022). These developments are enabling a new era of decentralised and user-driven virtual experiences—a Web 3.0-enabled Metaverse.

Technologies for Web 3.0

When discussing consumer reactions to Web 3.0, it is important to understand the underlying technology that enables its functioning. Web 3.0 is powered by emerging technologies such as blockchain and smart contracts. These cutting-edge technologies are aimed at providing a secure infrastructure for users to carry out tasks such as making online payments and transferring data. Such technologies and features set to be used to power the Metaverse need to be highly secure, versatile, and user-friendly. As a decentralised web, Web 3.0 requires several key technologies to function (Garfatta et al., 2021; Goel et al., 2022; Lacity et al., 2022; Mahmoud et al., 2020; Murray et al., 2022; Nkosinkulu, 2023). These technologies work together to create a decentralised and secure online environment where users have substantially more control over their data, assets, and identities.

Blockchain

Blockchain is a secure, decentralised ledger that enables the development of decentralised applications and platforms. The decentralised and secure nature of the blockchain can contribute to the transparency, immutability, and security of digital data and transactions (Gad et al., 2022) and create decentralised autonomous organisations (DAOs) and decentralised applications (dApps), which can provide more equitable and transparent method of managing digital assets and services (Santana & Albareda, 2022). For instance, blockchain technology is used by dApps to secure transactions and maintain a tamper-proof

ledger of all activity on the network. Also, decentralised infrastructure makes dApps less vulnerable to downtime, hacking, or censorship. Additionally, many dApps use tokens to incentivise users to contribute to the network, providing a means of distributing rewards and creating value. This resonates with the arguments suggesting that the landscape of marketing communication is adapting, and digital customers are presently more empowered (Mahmoud et al., 2022).

Decentralised storage

Frameworks like InterPlanetary File Systems (IPFS) that enable decentralised data and file storage and retrieval (Muralidharan & Ko, 2019). These solutions eliminate the need for centralised data storage and lower the risk of data breaches and censorship by distributing and storing data through a peer-to-peer network (Garcia-Font, 2020). Decentralised storage options can also lower the price of conventional data storage while enhancing the scalability and dependability of digital data storage (Miyachi & Mackey, 2021). This may offer a more accessible and secure platform for digital data, enabling the creation of fresh and cutting-edge services and applications.

Unassailable internet connection

A secure and reliable internet connection is required to power the Metaverse successfully. The internet connection must be able to handle a large amount of traffic and must be able to support all the applications that will be used in the Metaverse. Additionally, an internet-protocol-based system needs to be in place for data transfer, data storage, and application access.

Decentralised identity

Technologies like decentralised identity systems enable users to securely and decentrally control and manage their personal data and digital identities (Avellaneda et al., 2019). These systems give people more ownership and control over personal data by using decentralised technologies like blockchain to store and manage identity information (Stockburger et al., 2021). Decentralised identity systems can also lessen the chance of fraud and identity theft and increase the speed and convenience of identity verification procedures (Sung & Park, 2021).

Semantic Web

Semantic Web is a web where the data and information are organised in a meaningful and easily accessible way, allowing for more intuitive searches and data analysis (Patel & Jain, 2021). The semantic Web is a vision for the future of the Web, where information is not only accessible to humans but can also be understood and processed by computers. This is achieved by using common standards such as RDF (Resource Description Framework) and OWL (Web Ontology Language) to describe and represent the meaning of data on the Web (Houssein et al., 2022). The Semantic Web is intended to enable intelligent applications to process and integrate information from a variety of sources, provide new and innovative services, and make the Web more accessible and useful. By representing information in a machine-readable format, the Semantic Web aims to create a more connected, intelligent, and open web, where data can be linked and combined to provide a more comprehensive understanding of the world.

Smart contracts

Smart contracts can automate and streamline numerous processes and transactions, such as property transfers, supply chain management, and financial transactions, resulting in a

more efficient, transparent, and secure digital environment, as the functionality of such contracts can enforce agreement terms without needing go-betweens (E. Nwafor, 2021). In addition, smart contracts can reduce the costs associated with conventional agreements and improve contract accuracy and enactment speed (Peters & Panayi, 2016).

Decentralised exchanges

Platforms that facilitate the decentralised exchange of cryptocurrencies and other digital assets without the need for mediators (e.g. 0x Protocol, Kyber Network).

Cryptography

Advanced cryptographic algorithms ensure the security and privacy of data and transactions in a decentralised network. Cryptographic algorithms are mathematical functions that are used to secure and protect data in Web 3.0. These algorithms provide essential security features, such as confidentiality, integrity, and authenticity, for digital transactions and communications (Xu et al., 2022).

AI and Machine Learning

AI and machine learning have the potential to greatly empower Web 3.0 as a decentralised and more intelligent version of the internet. With the use of machine learning algorithms, Web 3.0 can analyse vast amounts of data and make predictions or decisions based on that data. This can result in more personalised and relevant experiences for users, as well as enable new and innovative applications and services. AI can also enhance the security and privacy of the web by detecting and preventing malicious activities. Additionally, machine learning can help to make sense of unstructured data, such as text and images, and transform it into structured information that can be easily analysed and utilised. By combining AI and machine learning with the decentralised architecture of Web 3.0, the internet can become a more intelligent, secure, and empowering place for individuals and organisations alike.

Natural language processing (NLP)

The rising disruptive power of artificial intelligence technology has changed the phase of marketing (Anifa et al., 2022). Methods in artificial intelligence that facilitate the processing and understanding of human language, with applications in the development of intelligent and conversational user interfaces. Some applications of natural language processing in Web 3.0 include (Keikhosrokiani & Pourya Asl, 2023; Mahmoud, 2021; Solakis et al., 2022): a) conversational interfaces and chatbots: NLP can be used to create chatbots and conversational interfaces that understand and respond to users' natural language inputs. As a result, people will smoothly navigate and use digital services and applications, which can enhance their overall experience. NLP can be used to analyse and extract meaningful information from large amounts of text data, such as news articles, reports, and research papers, for the purposes of information retrieval and summarisation. Users may be able to save time and effort due to this. c) Sentiment analysis: Natural language processing can be used to analyse and classify the tone of large amounts of text data, such as social media posts and customer reviews (e.g. Mahmoud, Hack-Polay, et al., 2021). Information about public opinion and responses from customers can be gleaned from this. d) Text generation: Natural language processing can be used to generate new text based on preexisting patterns and associations in a given dataset. Summaries, reports, and other written materials can all benefit from this technique.

Extended Reality (XR)

The term *Extended Reality* (XR) encompasses all *forms of immersive technology, including but not limited to Augmented* Reality (AR), *Virtual Reality* (VR), *Mixed Reality* (MR), and their hybrids. Integrating XR technologies into the web can provide a more immersive and interactive experience for users, enabling them to engage with digital content more intuitively and naturally. Additionally, these technologies can be leveraged to create new and innovative applications and services, such as virtual marketplaces, training simulations, and collaborative workspaces. By incorporating XR into Web 3.0, users can gain access to a wider range of experiences and interact with digital content in a more intuitive and engaging manner. Furthermore, the decentralised architecture of Web 3.0 can provide a more secure and decentralised platform for XR applications, allowing for greater user control and privacy. In this way, XR variants have the potential to greatly enhance the capabilities of Web 3.0 and empower a more immersive and connected digital experience. Ultimately, XR technologies can help bring the Metaverse to life by providing immersive experiences that allow users to feel as if they are truly present in the virtual space. For example, VR headsets can be used to provide a fully immersive experience within the Metaverse, while AR technologies can overlay virtual objects onto the physical world, creating a mixed-reality experience that blends the real and virtual worlds.

*The Internet of Things (IoT)*

The interconnectedness of physical devices, vehicles, buildings, and other objects embedded with electronics, software, sensors, and connectivity which enables them to collect and exchange data. The Internet of Things (IoT) has the potential to greatly enhance and empower Web 3.0, a decentralised and more intelligent version of the internet. IoT involves connecting everyday devices, such as appliances, vehicles, and medical equipment, to the internet, allowing for the exchange of data and remote control. This can result in a more connected and efficient world, where devices can communicate and collaborate with one another to provide new and innovative services. By incorporating IoT into Web 3.0, users can gain access to a more connected and intelligent digital environment, where devices can work together to provide a more seamless and personalised experience. Additionally, the decentralised architecture of Web 3.0 can provide a more secure and decentralised platform for IoT devices, allowing for greater user control and privacy. In this way, IoT has the potential to greatly enhance the capabilities of Web 3.0 and empower a more connected and efficient digital world

DISCUSSION

The Metaverse and Web 3.0 are expected to create significant value in the future digital economy by emphasising decentralisation and the democratisation of data, allowing individuals more control over their data and leading to greater privacy and security regarding online interactions.

We are already starting to see this by introducing decentralised media platforms, such as voice and video streaming protocols like Steemit (see Figure 8). This shift towards a user-centric model is predicted to pave the way for the creation of novel business models like programmable economies and virtual real estate, both of which have the potential to open up fresh revenue channels and expansion possibilities. One example is the improved ease with which content creators can monetise their efforts, thereby realising financial rewards without onerous contractual commitments. Because of this, it is hoped that end users will exercise more discretion over their personal information.

Figure 8: Steemit is a blockchain-based blogging and social media website
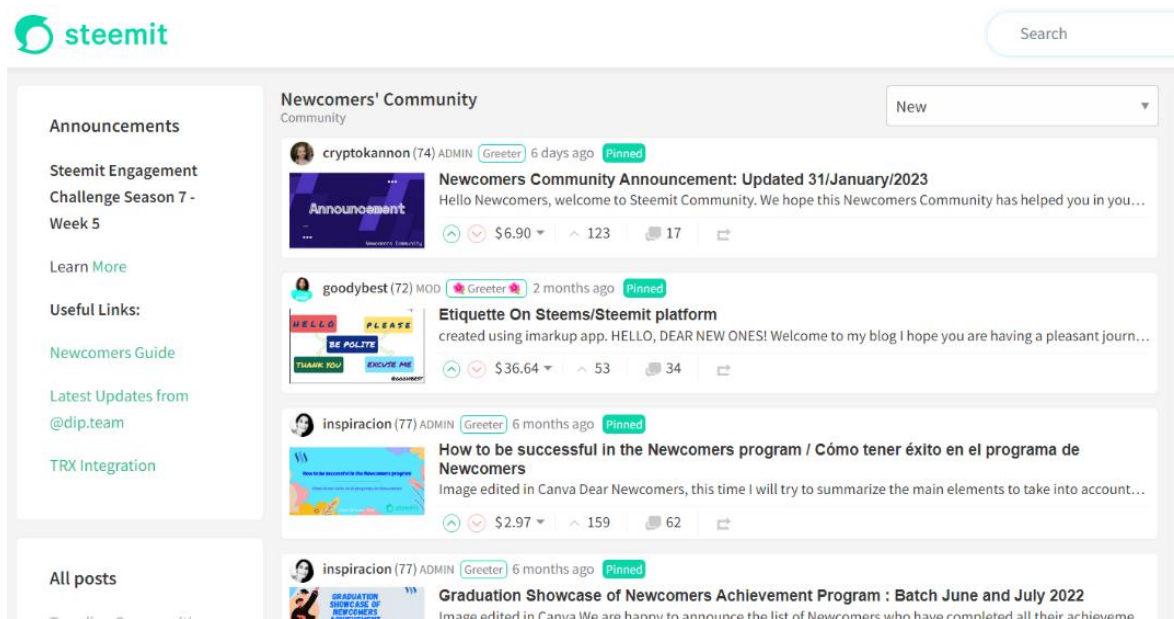
Source: Current study and Steemit (2023)

One key aspect of Web 3.0 and the Metaverse is the use of blockchain technology. Blockchain technology will allow for the creation of transparent and secure decentralised systems less susceptible to intermediaries and single points of failure. This will lead to increased efficiency, lower costs for businesses and consumers and the development of new digital currency and assets. Additionally, blockchain technology will enable the creation of NFT marketplaces, where unique virtual items and purchases can be bought, sold, and traded, creating new forms of value and wealth. Besides, the Metaverse is designed to support smart contracts, allowing users to take advantage of seamless data exchange and automated processes. This will create a much smoother, more intuitive, and more efficient online experience.

In addition to the benefits to businesses, the development of Web 3.0 also offers unexpected advantages to consumers. The ability to purchase products, complete transactions and connect with friends and family has been revolutionised with the introduction of the Metaverse. This can help keep marketing functioning in extreme contexts like warzones or pandemic-hit territories with restricted movement and social isolation imposed (e.g. Ezimmuo & Keikhosrokiani, 2022; Mahmoud, Ball, et al., 2021; Mohr et al., 2022b; Xian et al., 2022). More than 92 per cent of responding businesses in a March 2022 survey of companies from selected countries that had already invested in the Metaverse felt that the global COVID-19 pandemic had spurred the development of metaverse technologies (Sortlist, 2022a). Online transactions are now more secure thanks to the addition of blockchain technology, which is proven to be more effective than traditional networks. Furthermore, many popular platforms, such as Facebook, Instagram and YouTube, are now available to users in a 3D format with enhanced user experience, allowing them to easily interact with their favourite content. For instance, Amazon launched a new service called 'Virtual Try-on' where customers can use AR via their phones to visualise how fashion products would like on the customer from different angles (see Figure 9).

Figure 9: Amazon's Virtual Try-on

Source: Current study and Amazon.com (2023)

Ultimately, a Web 3.0-enabled Metaverse brings new possibilities and value to the digital economy. This can be achieved by enabling new configurations of digital interaction and exchange as well as allowing for the development of decentralised applications, such as peer-to-peer marketplaces and decentralised finance (Minevich, 2022).

Web 3.0—a double-edged sword

Web 3.0, like any new technology, has both potentially positive and negative aspects. Web 3.0 poses new difficulties in addition to promising a number of advantages, including increased security, privacy, and control for users. The following are some of the most important privacy issues that Web 3.0 may introduce (Ellul et al., 2020; Kim, 2021; Lesavre et al., 2019; Li et al., 2021; Rowland et al., 2020; Saqib et al., 2021).

Lack of standardisation and regulation

In societies where individuals mainly consider online communication instead of face-to-face interaction (Ashaye et al., 2023), Web 3.0 is an evolving technology, and there is currently a lack of clear regulatory frameworks for its use. This could create uncertainties for users and businesses and lead to privacy abuses. The decentralised nature of Web 3.0 makes it difficult to standardise and regulate, which could result in security vulnerabilities and a lack of privacy protection. Decentralised systems can be technically complex, making it difficult for regulators to fully understand the technology and its potential impact on society—they may create political challenges, as different countries and regions may have different priorities and regulations regarding privacy, security, and data ownership.

Increased risk of hacking and cyber attacks

Decentralised systems are more vulnerable to hacking and cyber attacks, which could result in data breaches and theft of personal information. In a decentralised system, there is no central authority to monitor and protect against cyber attacks. The lack of central authority makes it easier for hackers to target individual nodes in the network. Decentralised systems are often more complex than central systems, making it challenging to identify and fix security vulnerabilities. Lack of standardisation in decentralised systems could lead to different networks using different security protocols. Therefore, personal data could be vulnerable to hacks, theft, and exposure by malicious actors in a decentralised network. A survey conducted in March 2022 of companies from certain countries that had already invested in the Metaverse found that cyber security was the biggest worry for more than 38% of the businesses that responded (see Figure 10).

Centralised gatekeepers

Even though Web 3.0 is designed to be decentralised, centralised gatekeepers such as blockchain miners or wallet providers could still have control over user data, creating a single point of failure.

Technical complexity

The technology behind Web 3.0 is complex and may be difficult for the average person to understand, which could lead to confusion and mistrust, which can have a significant impact on technology adoption. People who do not fully understand new technology or have concerns about privacy and security may be less likely to adopt it. This can lead to a slower rate of adoption and potentially limit the potential benefits that the technology can bring.

Lack of interoperability

Different Web 3.0 systems may not be compatible with each other, which could limit the growth and adoption of the technology. Therefore, one of the main challenges facing the growth and adoption of Web 3.0 is the lack of interoperability between different systems. Due to the decentralised and open-source nature of Web 3.0, different systems may use different technologies, protocols, and standards, making it difficult for them to communicate and exchange data seamlessly. This can lead to fragmentation in the Web 3.0 ecosystem, making it challenging for users to move their data and assets between different platforms and services. This lack of interoperability can limit the potential benefits of Web 3.0, as it can make it more difficult for users to take advantage of the full range of services and applications available on the decentralised Web. Addressing the interoperability challenge will be critical for the growth and adoption of Web 3.0, as it will enable users to fully realise the potential of the decentralised Web.

Financial privacy

Transactions on a decentralised network can be traced, potentially revealing sensitive financial information. Financial privacy is an important aspect of Web 3.0, as decentralised financial systems offer the potential for greater privacy and security compared to traditional centralised systems. In a decentralised financial system, users can transact directly with each other without the need for intermediaries, reducing the risk of data breaches and the unauthorised use of personal information. Additionally, the use of cryptographic technologies, such as zero-knowledge proofs, can enable users to transact without revealing their identity, providing greater privacy and protection against financial fraud. However, ensuring financial privacy in Web 3.0 also presents its own set of challenges, including the

potential for money laundering and other illegal activities and the difficulty in enforcing financial regulations in a decentralised system. Addressing these challenges will be important for ensuring the responsible use of financial privacy in Web 3.0 and for building trust in decentralised financial systems.

Pseudonymity

While Web 3.0 provides users with more control over their personal data, it may also make it easier for malicious actors to create pseudonyms to engage in illegal activities. Web 3.0 offers the potential for greater pseudonymity compared to the current centralised Web. In a decentralised system, users can create and use digital identities that are not tied to their real-world identity, providing greater privacy and protection against data breaches and other privacy risks. This can help to mitigate concerns about the collection and use of personal data by central authorities and intermediaries and enable users to have greater control over their personal information. However, pseudonymity in Web 3.0 also presents its own set of challenges, including the potential for misuse and abuse and the difficulty in enforcing laws and regulations in a decentralised system. Addressing these challenges will be important for ensuring the responsible use of pseudonymity in Web 3.0 and building trust in the decentralised Web.

Location privacy

Decentralised networks may store metadata that could be used to track a user's location and online activities. This metadata may include information about the time and location of transactions, as well as other data that could be used to build a profile of the user's online behaviour. To address this challenge, it will be important for Web 3.0 systems to implement strong privacy and security measures that protect user data and ensure that users have control over their metadata and can choose what information is shared and with whom. This can help to build trust in decentralised networks and encourage wider adoption of Web 3.0.

Figure 10: Main doubts regarding the metaverse
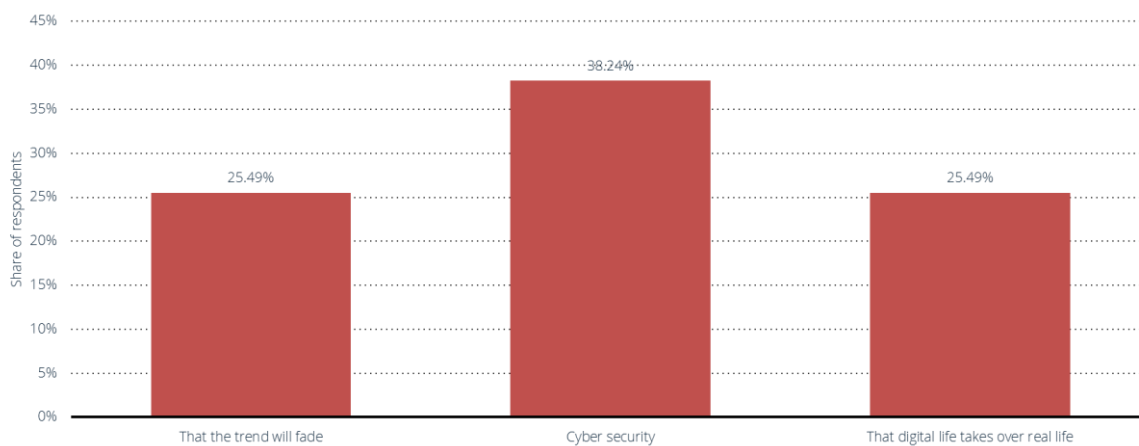
Source: (Sortlist, 2022b)

CONCLUSION

This chapter has examined the potential for Web 3.0 to revolutionise how we interact with and utilise the Metaverse. This chapter has discussed the technical requirements for Web

3.0, as well as the opportunities, challenges, and potential privacy threats associated with this technology, as well as the reactions of consumers. Evidently, the development of Web 3.0 is set to have a significant impact on the Metaverse, bringing with it both opportunities and obstacles.

Web 3.0 will likely become a standard component powering the Metaverse in the coming years. This will give people more and better ways to access and interact with their digital environment. Consumers' reactions to Web 3.0 will improve as they learn more about it and its potential advantages, speeding up its adoption. The Metaverse is anticipated to expand in both accessibility and immersion over the next few years, enabling more significant user interaction and social connection. People can participate in immersive and interactive experiences in the Metaverse, such as video games, concerts, and sporting events. Despite expectations of leading to social patterns where humans are set to live in more and more isolation, the Metaverse can help people connect with others with similar interests and passions through these experiences, which can foster a stronger sense of community and social belonging. The Metaverse can significantly alter future consumer behaviour. People can access and buy goods and services in a virtual environment called the Metaverse without travelling long distances or dealing with traffic. This could make shopping more accessible and convenient because people can look at products and buy them from the comfort of their homes or even from inside a virtual world. The Metaverse is expected to have a bright future ahead of it as technology develops and advances. The Metaverse is also likely to give rise to new forms of commerce and entertainment, potentially creating entirely new industries and markets, meaning that the Metaverse is set to disrupt digital marketing practice. Therefore, businesses wanting to thrive in the inevitable *metaversal era* will need to assess their digital marketing workforce against the potential of Web 3.0 technologies for marketing practice and ensure the human arsenal of digital marketing is competitively equipped with relevant skills, knowledge and attitudes. However, with this increased integration into our lives, there will also be important considerations around privacy and security that must be addressed. Therefore, regulation of the Metaverse and Web 3.0 is necessary to ensure that these technologies are developed and used *responsibly and ethically* and to protect the rights and interests of users and consumers.

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