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METAVERSE AND ITS GOVERNANCE

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TABLE OF CONTENTS

ABSTRACT 5
EXECUTIVE SUMMARY 6

1. INTRODUCTION 7

1.1 DEFINITION OF METAVERSE 7
1.2 TIPPING POINT 8

2. METAVERSE EVOLUTION AND ITS HISTORY OF GOVERNANCE 10

2.1 HISTORY OF METAVERSE 10
2.2 GOVERNANCE ISSUES 12
2.2.1 SYSTEMS THINKING AND PURPOSEFUL LEADERSHIP 14
2.2.2 A SUSTAINABLE METAVERSE 16
2.2.3 NORMS, SOCIETY, AND GOVERNANCE 17
2.2.4 DISASSOCIATION 18
2.2.5 LEGAL RECOURSE 18
2.2.6 PRIVACY 18
2.2.7 PROTECTIONS FOR YOUNG PEOPLE 19
2.2.8 DIGITAL SKILLS 19

3. RECOMMENDATIONS 20

3.1 CREATE A SYSTEMS PROCESS FOR GOVERNANCE 20
3.2 CASCADE SOCIETAL OR RULE-BASED INTERVENTIONS WITH GOVERNMENTAL LEGISLATIONS 21
3.3 LEGAL RESOURCES 21
3.4 PRIVACY 22

4. CALL FOR ACTION 22

5. CITATIONS 24

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THE IEEE GLOBAL INITIATIVE ON ETHICS OF EXTENDED REALITY (XR) REPORT

METAVERSE AND ITS GOVERNANCE

ABSTRACT

This report results from the work of the IEEE Global Initiative on Ethics of Extended Reality (XR), a multidisciplinary group of industry practitioners, ethicists, academics, researchers, educators, and technology enthusiasts. It focuses on the growing governance gaps between the potential of extended reality (XR), the popularity of the term *metaverse*,[1] and the scale the adoption of metaverse. While the metaverse as a concept is an advanced level of XR, we are not at that stage yet. However, there are valuable lessons from the past that may help direct and manage the present evolution of the metaverse. We hope the recommendations of this report will lead to more discourse between industry, governments, and other key stakeholders about the world they wish to live in or leave as an inheritance.

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[1] The term *metaverse* refers to a term and concept outlined in the novel *Snow Crash* by Neal Stephenson in 1992. It does not refer to the new company name Meta announced by Facebook in 2021.

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EXECUTIVE SUMMARY

The *metaverse*, a form of extended reality (XR), has become a popular term. There is a lack of understanding about its achievable potential, challenges regarding its governance, and the systemic changes required for the idea to become a reality. This report highlights the caution required when embracing the concept of the metaverse as it forms key narratives driving technological design and global policy.

Section 1 introduces the metaverse as a form of XR technology. It identifies three factors that have coalesced to form a tipping point, catapulting the metaverse into popularity.

Section 2 provides a brief historical perspective on the evolution of the metaverse. It highlights some of the historical governance issues that earlier versions faced, and the methods used by the owners of XR platforms to govern communities. This section presents some suggestions for managing the governance of metaverse technologies and communities.

Section 3 outlines some recommendations to better govern the fledgling metaverse. Discussions of governance should start at a global level and then facilitate adoption at the country and institutional level. The importance of having diverse stakeholders involved is key to governance as the metaverse will cut across cultures, technologies, products, and jurisdictions, making it difficult to monitor and align on values.

Section 4 is a call for action. The recommendations here are not exhaustive; rather, they form a foundation for current discussions to ensure safe and accountable platforms are deployed for this generation and future generations as well. The recommendations include: raising greater awareness about what the metaverse is and the requirements for and challenges to its good governance; balancing the needs of all stakeholders based on metaverse's purpose (and profits); creating a responsive framework agile enough to respond to changes in technology; the implications of funding, collecting, and sharing research and data about the metaverse; and *equitably* managing its impact on all sectors across the world and even the planet itself.

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1. INTRODUCTION

The purpose of this report is to highlight the caution required when embracing the concept of the metaverse as it forms key narratives driving technological design and global policy. Part of the identification problem is that the potential of the metaverse is being assessed from a fragmented perspective. Studies are narrow, focusing on single industries (education, health, banking, gaming, entertainment, etc.) and on usage over a limited time period. The metaverse, however, is meant to have constant and seamless integration with existing physical reality. Furthermore, the effects of onboarding huge populations to an extended reality (XR) in short time periods will spill over into areas where we lack the tools to manage such change. This is because 1) precedent is built on prototypes, 2) areas are inconsistent concerning values (e.g., profitability versus entertainment or capital versus public value), and 3) regulators and populations themselves lag in understanding the metaverse's impact.

1.1. DEFINITION OF METAVERSE

The metaverse is a collection of multiple advanced virtual worlds that are interconnected with each other and the physical world through specialized hardware and biological interfaces and software technologies, services, and data. The metaverse is an example of XR, where XR and real worlds form a continuum. The metaverse is an aspirational concept, while XR is a present-day reality. XR currently includes technologies like augmented reality (AR) and virtual reality (VR) that use human data through multiple channels and methodologies. The real world is the physical and "normal" world we experience without technology.

The evolution of the metaverse can be traced back to early internet gaming in the 1960s. Most studies of the metaverse begin with the introduction of virtual communities like *Second Life* and Web 2.0 in the early 2000s. However, in this report, an earlier history is considered as its lessons are still extremely relevant; even though the technologies have changed, people remain fundamentally the same.

For this report, *metaverse* is defined as an open-ended digital reality and culture that connects various virtual worlds by operating at multiple levels: parallel to, overlaid on, or interactive with the physical domain through increasing developments in interface technologies and real-time data sharing. There is tremendous hope in the metaverse as a concept that will change how we collaborate, share information and resources, and create economies [1]. However, the metaverse faces increased complexity as corporate interests clash with the idealistic ethos of the metaverse as a new frontier [2] and with growing government involvement. Through a

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quick review of the history of XR's growth, this report illustrates that we are at a tipping point in governance; it concludes with an outline of an initial set of recommendations.

1.2. TIPPING POINT

A tipping point is a "magic moment when an idea, trend, or social behavior crosses a threshold, tips, and spreads like wildfire" [3]. Aside from the leaps in hardware and software technology and the huge growth in funding—both for research and development (R&D) and from investors—that make the metaverse possible, there are three things fueling its tipping point: connectedness, monetization potential, and ignorance.

1) Connectedness: More than 4.6 billion people can access the virtual worlds of the metaverse via smartphones, laptops, desktops, headsets, or consoles [4]. This networking and collaboration have led to a frenzy of creativity, optimism, and scalability. The onboarding to virtual worlds was accelerated further by the COVID-19 pandemic.

2) Monetization potential: Investment opportunities exist for individuals, corporations, and governments. With rising speculation and increasing confidence, the metaverse market could reach US$600 billion by 2027 [5].

> ***Individuals***: It is estimated that microtransactions fuel 85% of the existing virtual economy for content, digital artifacts, retail transactions, and advertising [6]. Sales of non-fungible tokens, or NFTs, and speculations on virtual real estate are growing. For example, the largest NFT sale to date by CryptoPunks—one of the earliest and largest collections of NFTs—was for approximately US$23 million on February 12, 2022 [7]. Virtual property in the online world Decentraland sold for US$2.4 million in November 2021 [8].
>
> ***Corporations***: In 2019, *Second Life* had its largest user-generated economy of US$567 million [9]. *Fortnite* held a virtual concert with Travis Scott and attracted 12.3 million partygoers [10]! In the first quarter of 2022 alone, several high-value deals were announced. Microsoft Corp. (owner of *Minecraft*) moved to acquire Activision Blizzard, Inc., publisher of *Call of Duty*, for nearly US$69 billion.[2] Sony Group Corp. (which has stakes in Epic Games, Inc., of *Fortnite* fame) announced its bid for Bungie, Inc., creator of *Destiny* and *Halo*, for US$3.6 billion. In March, Netflix, Inc., agreed to purchase mobile game developer Next Games for approximately US$72 million. Although these examples are high-profile and public, many companies are also working behind the scenes to make such XR experiences possible. The possibility of monetizing big data is an added incentive to have captive—or, perhaps, *captivated*—

[2] Although the announcements were made, none of these deals have been completed while the Microsoft deal is being challenged.

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audiences. To gather marketing data and other, more qualitative information, companies have experimented with testing products on *Second Life* before exhibiting them in the real world [11].

Governments: Governments are embracing the metaverse. The city government of Seoul, South Korea, has plans for what is tentatively called *Metaverse Seoul,* and although some tasks will be functional (i.e., festivals, civil complaints), the aim is to be completed by 2026.[3] Barbados plans to open a digital embassy in Decentraland in 2022. Saudi Arabia is planning a virtual version of its NEOM smart-city project.[4] Digital twins have been announced for Mecca (as part of Saudi Arabia's Vision 2030 framework) and for Dubai, United Arab Emirates. Dubai's Ministry of Health also announced a metaverse-based health portal. Significant R&D and investment are being focused directly or indirectly in this area—for example, the Defense Advanced Research Projects Agency (DARPA). The scuttling of the Arm (U.K.) sale to Nvidia Corp. (U.S.) is one example of future antitrust issues [12].

Metaverse economic opportunities will fuel global competitiveness and increase regulatory pressures as countries try to safeguard and extend their domain to XR spaces, leading to unanticipated public-private partnerships that will create new country alliances or lead to the breakdown of others.

3) Ignorance: Awareness among the general population of what the metaverse is and what potential governance challenges it faces is low. However, the rate of adoption and deployment of new technologies is unprecedented. While it took 68 years for 50 million customers to adopt the airplane, Facebook took three years and Pokémon GO only 19 days [13] to attract the same number of customers. In its most nascent form, online gaming has existed since the 1960s, but the World Health Organization (WHO) only classified *gaming disorder* (of digital or video games) as a behavioral addiction in 2019 [14].

How human data is handled, accessed, shared, and sold is also a key critical area of importance for governments to recognize and address. Issues around cybersecurity, centralized or decentralized models of identity for citizens, and XR technologies (e.g., eye-tracking and facial recognition) can have drastic effects on the well-being (both physical and mental) of users of the metaverse [15]. While there is early research into these issues, there is not enough information on their impact.

[3] South Korea's Ministry of Science and ICT set up a *metaverse alliance* to coordinate the effort for a large gaming market that includes companies like Netmarble and Zepeto and the platform ifland.

[4] NEOM is a US$500 billion giga-project, and XVRS is the digital twin of NEOM, which will be accessible for a charge. It will have an end-to-end consent management platform for data privacy called called M3LD. M3LD is a hyperscale data center that will power M3LD.

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2. METAVERSE EVOLUTION AND ITS HISTORY OF GOVERNANCE

Dionisio, Burns, and Gilbert [16] identified five phases of metaverse development based on four essential areas: immersive realism, the ubiquity of access and identity, interoperability, and scalability. This section briefly presents the historical evolution of the metaverse and key experiments with its management, followed by a summary of the challenges of governing the fledgling metaverse.

2.1. METAVERSE HISTORY

Metaverse as a concept was coined in 1992 by the author Neal Stephenson in his science fiction novel *Snow Crash*. He imagines an immersive virtual world where humans live lives outside of physical reality. It was a cult classic in its time, and technology is trying to recreate some of the elements the author outlined during the early internet. In an interview in 2017, Stephenson said of the extended reality technology

> *"The purpose of VR is to take you to a completely made-up place, and the purpose of AR is to change your experience of the place that you're in. That pervades everything in terms of how you think about content, how you tell stories, what it is that you can actually do with these devices." [17]*

The metaverse is rooted in technology whose evolution is due to the growth of online communities that were formed over shared interests like entertainment, fantasy, and social networking (see Figure 1). The evolution was from text-based communities in the 1960s to immersive, cocreated worlds, which often existed as an alternate or parallel reality world. The early communities experimented with multirole-playing games, multiusers, and quests, where texts formed the main basis of communication.

The 1990s were years fueled with optimism with the introduction of Web 1.0. There was a shift from precreated to cocreated worlds. Huge investments were poured into games, buoyed by changes in computing power and technology. As these communities evolved, virtual marketplaces developed and connected to the real world. These connections were through official payment gateways or marketplaces—sanctioned or unsanctioned—with real or virtual currency or tokens.

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