

# Metaverse vs. metacurse: The role of governments and public sector use cases

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## Abstract

As an immersive virtual experience, the Metaverse is enabled by multiple technologies and concepts, such as extended reality, blockchain, artificial intelligence, the internet of things, and digital twins, among others. This reflection paper discusses the concept of the Metaverse and the role of the government and the public sector in maximising the potential of conceptual metaverse technology for public service delivery. First, the aim is to reflect on the regulatory role, which must address the existing and emerging issues of the suit of technologies enabling the Metaverse. Second, the role of the public sector and the government as potential users of the Metaverse is addressed. Lastly, various policy and program implications highlight the Metaverse's opportunity for innovation and transformation of public sector decision-making, service production, and delivery while stressing the importance of carefully considering whether Metaverse is the most appropriate technology to address specific public sector needs.

## Keywords

Metaverse, government, public sector, digital government

## 1. Introduction

Metaverse or metacurse that is the question. The Metaverse, a fully immersive virtual experience, has become a buzzword since 2020, with big tech leading the hype. Governments and the public sector are following suit, not least as regulators and potential users of the metaverse concept and suit of technologies. Interest in the Metaverse is rapidly accelerating. Gartner identified it as one of the “top 10 strategic technology trends for 2023” [1]. Meanwhile, an Ipsos-World Economic Forum study [2] found that over half of adults across 29 countries are already familiar with the Metaverse. However, it is not entirely new technology since Neal Stephenson first coined it in his 1992 sci-fi novel “Snow Crash” [3].

As a new term, the definition varies, with experts agreeing that there is no fixed definition for Metaverse yet. As a concept, the Metaverse is still in its infancy and continuously evolving, but one of the most cited definitions refers to it as “*a persistent and immersive simulated world that is experienced in the first person by large groups of simultaneous users who share a strong sense of mutual presence. It can be fully virtual, (or it can be) layers of virtual content overlaid on the real world*” [4].

As a result, the Metaverse is associated with extended reality (XR) technologies like virtual reality (VR), augmented reality (AR), and mixed reality (MR). Several recent studies also mentioned that other core technologies involved in the Metaverse include blockchain, artificial intelligence (AI), Internet of Things (IoT), and digital twins [5] [6]. All heavily rely on core enablers – internet connectivity and data collection, management and exchange.

While several studies have explored the technical aspects behind the Metaverse, there is still an existing gap on how this technology may impact governments and the public sector. Therefore, this reflection paper approaches the discourse through a review of related literature addressing the research question: *what are the roles of the government and the public sector in the adoption/use of the Metaverse technology?* In particular, this paper is divided into two main sections. Section 2 will discuss

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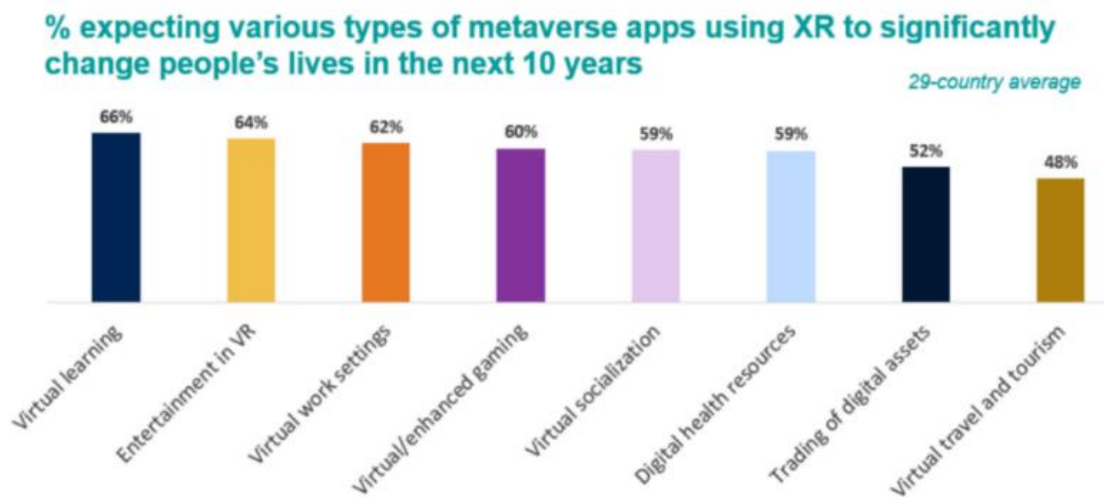
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the role of the government as a regulator of the Metaverse in ensuring the responsible use of the technology across relevant sectors. Meanwhile, section 3 shall delve more closely into the role of the government and the public sector as potential users of the Metaverse. Then, this paper will provide some key points as its conclusion.

## 2. How can government guide the responsible use of the Metaverse

The Metaverse holds a myriad of different promises to a multitude of users and interest groups. When combined effectively, the suit of technologies enabling the Metaverse can provide a valuable experience for the users. Most citizen end-users expect the Metaverse to enhance their experiences with digital services like distance learning, remote work, healthcare, and tourism [2]. These expectations may be met if the Metaverse's features are successfully deployed. Of particular relevance is the realism of being immersed in a virtual environment, the ubiquity or accessibility across gadgets while maintaining a virtual identity, interoperability or seamless information sharing across platforms. The scalability or a network architecture supporting an efficient system is essential, not least with a high volume of active users simultaneously [3].



**Figure 1:** Expected applications of the Metaverse in the next ten years [2]

While the Metaverse holds much potential, past technology hypes and IT failures require governments to proceed with a healthy degree of caution. Like any emerging technology, the Metaverse must be assessed for its suitability as a tool to address business needs, socio-economic challenges, and innovative transformation of public sector decision-making, service production, and delivery. Like other emerging technologies and concepts (e.g. service delivery, smart and sustainable cities and communities, distributed ledger technology or DLT), the Metaverse faces several existing and emerging issues – not least as a sum of the individual technologies the Metaverse relies on. Referring to the “three M’s in the metaverse”, one study stresses the risks of the technology, associated explicitly with Monitoring, Manipulating, and Monetising users [4].

A number of the risks associated with the three M’s can be addressed by uniform standards and protocols in the product and service design of metaverse-affiliated technologies like XR [7]. Therefore, the government’s role is essential in at least two ways: first, the regulation of the Metaverse to minimise and mitigate any potential risks associated with privacy and data protection, and; second, in establishing open and shared standards to facilitate competition among big tech companies and avoid monopoly situations and technology lock-in.

A key concern of the Metaverse is associated with security and users' privacy. Governments may consider facilitating the creation of a metaverse ecosystem and support framework for multistakeholder consultation. Revisiting existing frameworks and policies like the European Union’s (EU) General Data Protection Regulation (GDPR) is essential to address the intricacies of the Metaverse [8]. The EU's ongoing work on digital space regulations, such as the Digital Services Act and the Digital Markets

Act, is highly relevant [9] as Japan's Web 3.0 Policy office, established by the Ministry of Economy, Trade and Industry [10] to address concerns about emerging technologies like the Metaverse.

Building on connectivity, open internet protocol, and interoperability is also important. Without reliable connectivity, the IoT and data exchange will face challenges. Without affordable access, citizens and businesses may be limited or even excluded from the potential of the Metaverse. Government approaches on telecommunication regulations and licensing are vital to ensure digital inclusion and avoid increasing marginalisation of digital and socio-economic divides. Once implemented, technical, semantic, and organisational interoperability standards and the governance of these are equally essential to optimise data management over time.

While Metaverse is supposed to be an extension of actual reality, the applicability of real-life laws in the virtual world must also be further assessed. Governments must support research and consultations when developing policies. Key policy areas include the ownership of metaverse items like virtual lands, intellectual property, financial liabilities, and identity management [11][12]. Like data, the match between physical real-life and virtual assets must be managed within a legal and regulatory framework to protect privacy, confirm ownership, and minimise the risk of fraudulent and criminal activities. In short, the Metaverse will not require a complete reimagination of existing standards or regulations but rather an optimisation to maximise the potential of the technology and the Metaverse while minimising adverse effects.

Although the Metaverse is seen as an immersive virtual reality, its users are still real people and linked to actual organisations that need to be protected with respect to the three M's of the Metaverse. Algorithm bias is an imminent issue in the Metaverse. Research showed that some AR-based potentials filters tend to promote racial biases [13]. Inclusivity is also a critical concern. For instance, initiatives addressing persons with disability's accessibility already exist, yet challenges persist due to the lack of standards or compliance with these [14]. Representation in metaverse avatars is essential for inclusivity, equity, and respect for diversity. Yet, persons with disability continue to face challenges in finding avatars with disabilities or tools like a wheelchair for their virtual selves [15]. Like internet connectivity, immersive technologies like the Metaverse may amplify the existing digital divide, not least as XR devices tend to be relatively more costly than smartphones [16].

In short, the role of governments in guiding the inclusive and equitable digital transformation – including the United Nations Sustainable Development Goals and the upcoming Global Digital Compact - includes Metaverse. For instance, only 34% of the world's population still does not use the internet [17]. McKinsey and Company [18] find that, while more women use the Metaverse and account for more activities (by volume), female leadership in the metaverse economy remains rare. Concerning enabling devices, women are also more vulnerable to cybersickness, as most VR headsets illustrate the gender bias inherent to both traditional tech and the Metaverse at the design stage [19].

Expert opinion on the mental health effects of the Metaverse is divided. For adolescents, it may amplify unhealthy self-image and bullying seen on social media in the last two decades [20]. Others consider the Metaverse useful for therapy sessions for patients with autism spectrum disorder and post-traumatic illnesses [21]. Likewise, a debate over the Metaverse's effects on the environment is ongoing [22]. Concerns revolve around the pollution levels of AI models, which tend to produce large amounts of carbon emissions, resource extraction for continuous gadget upgrades, and subsequent disposal of electronic waste. Others emphasise the potential of the Metaverse in cutting pollution-generating activities like travelling or working in a physical office. While the jury is out with limited analysis on both the positive and adverse environmental effects of the Metaverse, for instance, studies on DLT and cryptocurrency mining do give indications of the scale of the challenge, as do past studies on teleworking and online service delivery and e-Commerce.

While regulations are important, as big tech companies cannot be solely responsible for self-regulating the Metaverse [23], it is also vital to see how governments and the public sector balance this with the potential of this technology for public service delivery.

### **3. How can governments use the Metaverse?**

While the Metaverse is still in its early stages of development, its conceptual and technical elements of it have captured the attention of governments worldwide for a while. Multiple public sector use cases

can be identified. This could be in terms of various classical or core government services, such as applications and transactions, healthcare and assisted living, urban and community planning, or education. For instance, for public service production and delivery, the use of virtual worlds for meetings dates to the early 2000s, while teleworking was seen as early as the mid-1990s but with limited impact assessments [24] [25]. The early virtual world platform Second Life was used during the 2008 speech of US Representative Ed Markey at the United Nations Climate Change Conference in Bali, Indonesia, while he was physically in Washington [26]. Fast forward to the present day, virtual work and meetings are considered the new normal, with Zoom, Google Meet, Microsoft Teams, and the like becoming a norm brought about by the pandemic restrictions [27]. The field of video conferencing is also being disrupted by Metaverse, like the heavily techy interpretation by Meta and Microsoft, and the more approachable versions like Gather Town [28]. Several workplaces have created virtual offices, and events are being held in Gather Town, like the tech startup demo day conducted by the Philippine Department of Trade and Industry [29] and the PhilDev Foundation.

The Metaverse can also disrupt public service delivery by enabling the holistic merger of data and technology for a more user-centric experience, value creation, and increased productivity. For instance, Seoul, South Korea, is the first local government to have devised a comprehensive metaverse master plan called Metaverse Seoul [30]. This project includes the creation of a virtual tourist zone where cultural activities will be held and a virtual version of their city hall where citizens can avail of public services - although an impact assessment of cost-efficiency and productivity is currently outstanding.

The Metaverse can also guide urban planners using AI, XR, and digital twins in simulations[6], such as the case of Gothenburg, Sweden, which tested how new infrastructure may affect wind patterns in the locale [31]. Elements of the Metaverse, such as digital twins and augmented and virtual reality, can be used for urban planning and community consultations and heritage protection. This, in turn, may also form the basis for tourism promotion. It is gaining traction as it is seen as a step towards an immersive virtual service experience and even as a branding exercise by some. In September 2022, Saudi Arabia held a metaverse celebration of their National Day on the popular metaverse platform Decentraland [32]. Barbados is planning to launch the world’s first metaverse embassy using the same platform [33]. However, several governments already experimented with the idea of a virtual world embassy in the early 2000s using Second Life, such as Estonia, Kazakhstan, Maldives, Serbia, and Sweden [26].

The Metaverse also promises to address some of the financial woes in the education sector by making educational resources more affordable. Virtual or augmented simulations may enhance students' learning process without the need to secure costly materials such as cadavers for medical students [34]. Metaverse can also help better understand real-world phenomena through virtual experiential learning, such as disaster risk reduction education [35]. And in the health sector, Metaverse may also help facilitate communication and collaboration using accurate and predictive data [36].

By contrast, the relative cost of accessing the internet and devices to access the Metaverse may, at other educational levels, create a financial barrier to the education of children from low-income households, as seen during the Covid-19 pandemic. It may also increase the isolation of marginalised youth and amplify challenges around mental well-being, socialisation, and even cyberbullying. We have summarised some of the potentials and challenges of the Metaverse for the public sector in Table 1.

**Table 1**

Pros and cons of the Metaverse in select public sector use cases

Use Case	Pros	Cons
<i>Core government services</i>	<ul style="list-style-type: none"> <li>• Increased efficiency, effectiveness, &amp; user-centric services [30]</li> <li>• Holistic merger of information &amp; transactional based services [30]</li> <li>• Builds on existing infrastructure &amp; solutions [5][6]</li> </ul>	<ul style="list-style-type: none"> <li>• Cyber security, privacy &amp; data protection issues may be amplified [8]</li> <li>• Risk of increased digital divide &amp; must be complemented with alternative channels to facilitate universal access [16]</li> </ul>

<i>Health and assisted living</i>	<ul style="list-style-type: none"> <li>Facilitate collaboration &amp; communication using real and predictive data for scenarios &amp; testing for better outcomes [21][36][34]</li> </ul>	<ul style="list-style-type: none"> <li>Virtual does not compensate for physical well-being [20]</li> </ul>
<i>Urban and community planning</i>	<ul style="list-style-type: none"> <li>Builds on existing concepts, tools, &amp; data including IoT, smart &amp; sustainable cities, digital twins, XR [5][6] [31]</li> </ul>	<ul style="list-style-type: none"> <li>Existing learning platforms &amp; XR already do this [5]</li> <li>Smart cities initiatives often not holistic enough in their approach &amp; risk bring this to the Metaverse [6]</li> <li>Potential digital divide amplifying the “chattering classes” or even increase bias [16][13]</li> <li>Cost of platforms, government &amp; stakeholder skills &amp; capacities, viability of IoTs &amp; infrastructure [16]</li> </ul>
<i>Education</i>	<ul style="list-style-type: none"> <li>Immersive setting conducive to experimentation, scenarios, augmenting the real world or images of it [35][36][34]</li> <li>Enhance traditional educational approaches by allowing teachers &amp; students to explore historical sites or carry out risky experiments in a secure setting [35][34]</li> </ul>	<ul style="list-style-type: none"> <li>Existing learning platforms &amp; XR technology already does this [5]</li> <li>Cyber bullying &amp; lack of socialisation continue to be issues [20]</li> <li>Cost of platforms, teacher’s skills &amp; capacities, affordable connectivity even if done from a cache [16]</li> </ul>

#### 4. Conclusion

So, is the Metaverse a positive or a potential curse? The potential and implications of Metaverse might seem overwhelming, but governments and the public sector should be ready to address this technology to maximise its potential. We have in this paper outlined some of the existing and potentially replicable use cases of the Metaverse for public service delivery and their potential pros and cons (see Table 1). As a positive, we confirm that there are viable public sector use cases for the Metaverse. This includes government services (e.g., virtual city hall), urban planning (e.g., digital twin), virtual work including in the public sector back-office and their interactions with citizens (e.g., virtual meetings, virtual offices), tourism (e.g., virtual cultural events, virtual embassies), healthcare and assisted living (e.g., operation simulations, remote consultations, robotics), and education (e.g., virtual teaching aides, cadavers for medical students).

However, caution is still necessary when considering the Metaverse for public service delivery, given the failures and hype of previous emerging technologies. The success and sustainability of the metaverse implementation rely on regulating the Metaverse and its suit of technologies. Regulations must address data privacy, protection, and interoperability issues and set standards and protocols in the design stage to facilitate big tech competition while avoiding any monopoly or lock-in. Ensuring reliable connectivity and affordable access are essential for bridging the digital divide. The applicability of real-world policies in the virtual world and inclusivity are also equally important to be addressed by governments and the public sector to ensure that no one will be left behind in the goal of using the Metaverse for digital transformation.

As of writing, the Metaverse is becoming more controversial. Two recent opinion pieces deem it to be obsolete sooner with the shift of big tech to generative AI [37] [38]. However, there are also experts who argue that the Metaverse is here to stay and that booming technologies like generative AI can also be utilised in the Metaverse [39] [40]. Hence, there is a need to investigate the Metaverse further such as through the existing use cases mentioned earlier and identify entry points for replication and lessons learned. Governments have a key role in ensuring that everyone's metaverse experience creates value, while making technology an ally for sustainable development thus limiting the risk of a "metacurse" [41]. Governments should endeavour to be present where their constituents are or are expected to be [26], and the Metaverse may just be one of those places.

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